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Revision Notes

Mind Maps

- Stand Alone MCQs
- Assertion & Reason based MCQs
- Case based MCQs

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SYLLABUS COVERED

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❑❑

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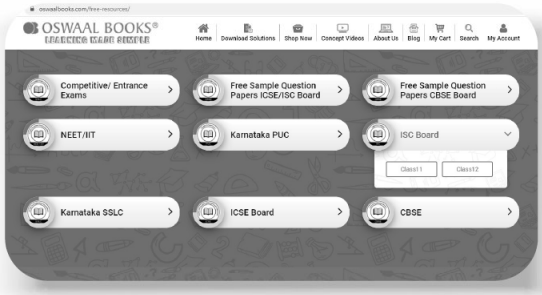

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TWIST IN THE TEST

The Special Assessment Scheme

CBSE's Special Assessment Scheme has radically transformed the evaluation landscape.

This novel decision has unequivocally changed the perception of board examinations in India. This change has made our examination systems compatible with semester-based systems followed in higher education institutions in the country and across the globe.

As per the Special Assessment Scheme, the Academic Session 2021-22 will be divided into two terms with approximately 50% syllabus in each term, thereby helping the students in achieving the learning objectives over a more structured and progressively flexible curriculum.

How will this special scheme benefit the students?

2020 was a year that has fundamentally changed the world as we knew it. Every sector underwent a transformation, none more so than education. Students and teachers alike adapted to online learning, examinations and new teaching learning methodologies.

This announcement, right at the start of the new academic year, gives teachers and students ample time to prepare and plan for the year. This timely announcement will enable students to have a clear understanding of what they need to study for their Terms – I & II for their board examinations.

How to prepare for Term – I board?

There is a lot of focus on MCQs in the assessment policy as they are a robust assessment technique for evaluating learning outcomes.

MCQs are an excellent way to test conceptual understanding. They offer the advantages of versatility (can be used to assess application & problem solving), and are a much more reliable test of understanding.

The Term – I examination will be of 90 minutes' duration and the question paper will have Multiple Choice Questions (MCQs) including case-based MCQs and MCQs on assertion-reason type. This focus on MCQs will make students mentally more ready for facing competitive examinations in the future.

Oswaal CBSE Chapter-wise Question Banks for Term – I are strictly based on the new term-wise syllabus for Board examinations to be held in the Academic Session 2021-22.

For extensive practice of MCQs based questions and for deep understanding of core-concepts.

These Question Banks include:

1. Multiple Choice Questions based on latest typologies introduced by the board like:
   a. Stand-alone MCQs
   b. MCQs based on Assertion-Reason
   c. Case-based MCQs
2. Revision Notes, Mnemonics, Mind Maps, Answers with Explanations & Concept videos, all of which enhance learning experiences and improve learning outcomes.
3. Questions from CBSE official Question Bank (released in April 2021) for exam-oriented preparation.

Our Heartfelt Gratitude

Finally, we would like to thank our authors, editors, and reviewers. We promise to always strive towards **'Making Learning Simple'** for all of you.

Wish you all Happy Learning!

Wish you all Happy Learning and a Successful 2021-22!!

केन्द्रीय माध्यमिक शिक्षा बोर्ड
CENTRAL BOARD OF SECONDARY EDUCATION

150 YEARS OF CELEBRATING THE MAHATMA

NO.: F.1001/CBSE-Acad/Curriculum/2021 **Date: July 22, 2021**

Circular No: Acad- 53/2021

All the Heads of Schools affiliated to CBSE

Subject: Term wise syllabus for Board Examinations to be held in the academic session 2021-22 for Secondary and Senior Secondary classes and guidelines for the conduct of the Internal Assessment/Practicum/Project.

This is in continuation to Board's circular number Acad 51/2021 dated July 05, 2021 regarding Special Scheme of Assessment for Board Examination for Classes X and XII for the Session 2021- 22. The syllabus for the two terms mentioned in the scheme in all subjects for classes IX to XII are hereby notified vides this circular. In addition to syllabus for term end board examinations, guidelines for the conduct of Internal Assessment/Practicum/Project are also enclosed.

Schools are requested to share the term wise syllabus and guidelines for the conduct of board examinations and Internal Assessment / Practicum / Project available on CBSE Academic Website **http://www.cbseacademic.nic.in** at the link **http://cbseacademic.nic.in/Term-wise-curriculum_2022.html** with all their teachers and students.

(Dr. Joseph Emmanuel)
Director (Academics)

SYLLABUS

Latest Syllabus issued by CBSE for Academic Year 2021-22

COMPUTER SCIENCE

Class - XII (Code No. 083)

1. **Prerequisites**

   Computer Science- Class XI

2. **Learning Outcomes**

   Student should be able to

   (a) apply the concept of function.

   (b) explain and use the concept of file handling.

   (c) use basic data structure: Stacks.

   (d) explain basics of computer networks.

   (e) use Database concepts, SQL along with connectivity between Python and SQL.

3. **Distribution of Marks:**

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
I	Computational Thinking and Programming - 2	40	50	25
II	Computer Networks	10	10	----
III	Database Management	20	20	15
	Total	70	80	40

Unit No.	Unit Name	Term-1	Term-2
I	Computational Thinking and Programming - 2	35	5
II	Computer Networks	----	10
III	Database Management	----	20
	Total	35	35

4. **Unit wise Syllabus**

TERM-I

Unit I: Computational Thinking and Programming – 2

- Revision of Python topics covered in Class XI.
- Functions: types of function (built-in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)

- Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths
- Text file: opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file
- Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump() and load() method, read, write/create, search, append and update operations in a binary file
- CSV file: import csv module, open / close csv file, write into a csv file using csv.writerow() and read from a csv file using csv.reader( )

TERM-II

Unit I: Computational Thinking and Programming – 2

- Data Structure: Stack, operations on stack (push & pop), implementation of stack using list.

Unit II: Computer Networks

- Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
- Data communication terminologies: concept of communication, components of data communication (sender, receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
- Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves
- Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
- Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
- Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP
- Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML), domain names, URL, website, web browser, web servers, web hosting

Unit III: Database Management

- Database concepts: introduction to database concepts and its need
- Relational data model: relation, attribute, tuple, domain, degree, cardinality, keys (candidate key, primary key, alternate key, foreign key)
- Structured Query Language: introduction, Data Definition Language and Data Manipulation Language, data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command
- Aggregate functions (max, min, avg, sum, count), group by, having clause, joins : Cartesian product on two tables, equi-join and natural join
- Interface of python with an SQL database: connecting SQL with Python, performing insert, update, delete queries using cursor, display data by using fetchone(), fetchall(), rowcount, creating database connectivity applications

SYLLABUS

5. Practical

S.No.		Marks (Total 30)	Term-I (15 Marks)	Term-II (15 Marks)
1.	**Lab Test:** 1. Python program	8	6	2
	2. 3 SQL Queries based on one/two table(s), 2 output questions based on SQL queries	4	----	4
2.	**Report file:** Term – I : Minimum 15 Python programs based on Term-I Syllabus Term – II : ● Minimum 3 Python programs based on Term-II Syllabus ● SQL Queries – Minimum 5 sets using one table / two tables. ● Minimum 2 programs based on Python - SQL connectivity.	7	4	3
3.	Project (using concepts learnt in Classes 11 and 12) Term – I : Synopsis of the project to be submitted by the students (documentation only, may not submit the code during Term - I) Term - II : Final coding + Viva voce (Student will be allowed to modify their Term I document and submit the final executable code.)	8	3	5
4.	Viva voce	3	2	1

6. Suggested Practical List:

TERM-I

Python Programming

- Read a text file line by line and display each word separated by a #.
- Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.
- Remove all the lines that contain the character 'a' in a file and write it to another file.
- Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- Create a binary file with roll number, name and marks. Input a roll number and update the marks.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).
- Create a CSV file by entering user-id and password, read and search the password for given userid.

SYLLABUS

TERM-II

Python Programming

- Write a Python program to implement a stack using list.

Database Management

- Create a student table and insert data. Implement the following SQL commands on the student table:
  - ALTER table to add new attributes / modify data type / drop attribute
  - UPDATE table to modify data
  - ORDER By to display data in ascending / descending order
  - DELETE to remove tuple(s)
  - GROUP BY and find the min, max, sum, count and average
  - Joining of two tables.
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing suitable module.

Database Management

- Create a student table and insert data. Implement the following SQL commands on the student table:
  - ALTER table to add new attributes / modify data type / drop attribute
  - UPDATE table to modify data
  - ORDER By to display data in ascending / descending order
  - DELETE to remove tuple(s)
  - GROUP BY and find the min, max, sum, count and average
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing suitable module.

7. Suggested Reading Material

- NCERT Textbook for COMPUTER SCIENCE (Class XII)
- Support Materials on the CBSE website.

8. Project

The aim of the class project is to create something that is tangible and useful using Python file handling/ Python-SQL connectivity. This should be done in groups of two to three students and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve.

Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative

here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications, of course to do some of these projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

The students should be sensitised to avoid plagiarism and violations of copyright issues while working on projects. Teachers should take necessary measures for this.

❑❑

30 DAYS OF ONLY GRATITUDE!

Take it as a challenge; practice gratitude every day.

When you'll look around yourself, you'll find umpteen number of things to be grateful for. Practicing gratitude everyday will only multiply those things in your life & will ignite positive emotions in you. Here are a few things you could be grateful for. So, get started today!

#1 About your body.	#2 What you find beautiful.	#3 A song you love.	#4 An accomplish-ment of yours.	#5 A friend.
#6 A Smell you love.	#7 Something that makes you smile.	#8 A happy memory.	#9 Something you like about where you live.	#10 A person in your family.
#11 A food you love.	#12 An ability of yours.	#13 A person.	#14 You're looking forward to.	#15 A life lesson.
#16 A person you look up to.	#17 A personality trait of yours.	#18 An item you use every day.	#19 A freedom you are grateful for.	#20 A holiday you love.
#21 A technology.	#22 Something made you laugh.	#23 Something nice.	#24 A book magazine or podcast.	#25 Another person.
#26 Something in nature.	#27 A gift you received.	#28 Something that brings hope.	#29 A compliment you have received.	#30 Something you are passionate about.

HEAR IT FROM OUR HAPPY READERS!

Good sample paper for preparation after revision. Once I finished my syllabus for boards, I used sample papers for practicing and found it really good and beneficial.

Daksh Gaba
Teacher

If you are confident after solving 5 solved sample papers you can practice the 5 self-assessment papers which have QR code so you can see answers and they are kind to provide hints and I think this worked for me. Excellent preparation tool for my Boards!!

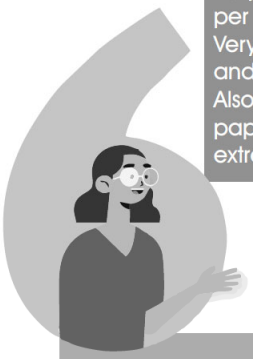
Ansh
Teacher

Very good test papers as per new CBSE pattern. Very good mind maps and chapter wise notes. Also, toppers answer papers for reference are extremely helpful.

Rajni
Student

Rohan Mehra
Teacher

This is the best book of sample papers for 10th. Best material for the board preparation. Highly Recommended!!



Oswaal Sample Question Papers are great for practice because it contains a variety of questions synchronised with the latest syllabus. Kudos to the Oswaal Editorial Team!

Shalini Mehta
Student

This is the best till date, I completed all the sample papers and got a good practice of writing in examination, just go for it. Surely, it will help you a lot.

Prem
Student

Awesome book for preparations in board exam. 65-70% questions cracked in the board exam 2020 from this book.

Abhay Kumar
Student

I recommend Oswaal Sample Question Papers to all the students studying in the 10th grade. This book is awesome and very helpful.

Soham Roshan
Student

Awesome book! Class 10th students must buy it as soon as possible! Very helpful!

Neel
Student

POSITIVE AFFIRMATIONS

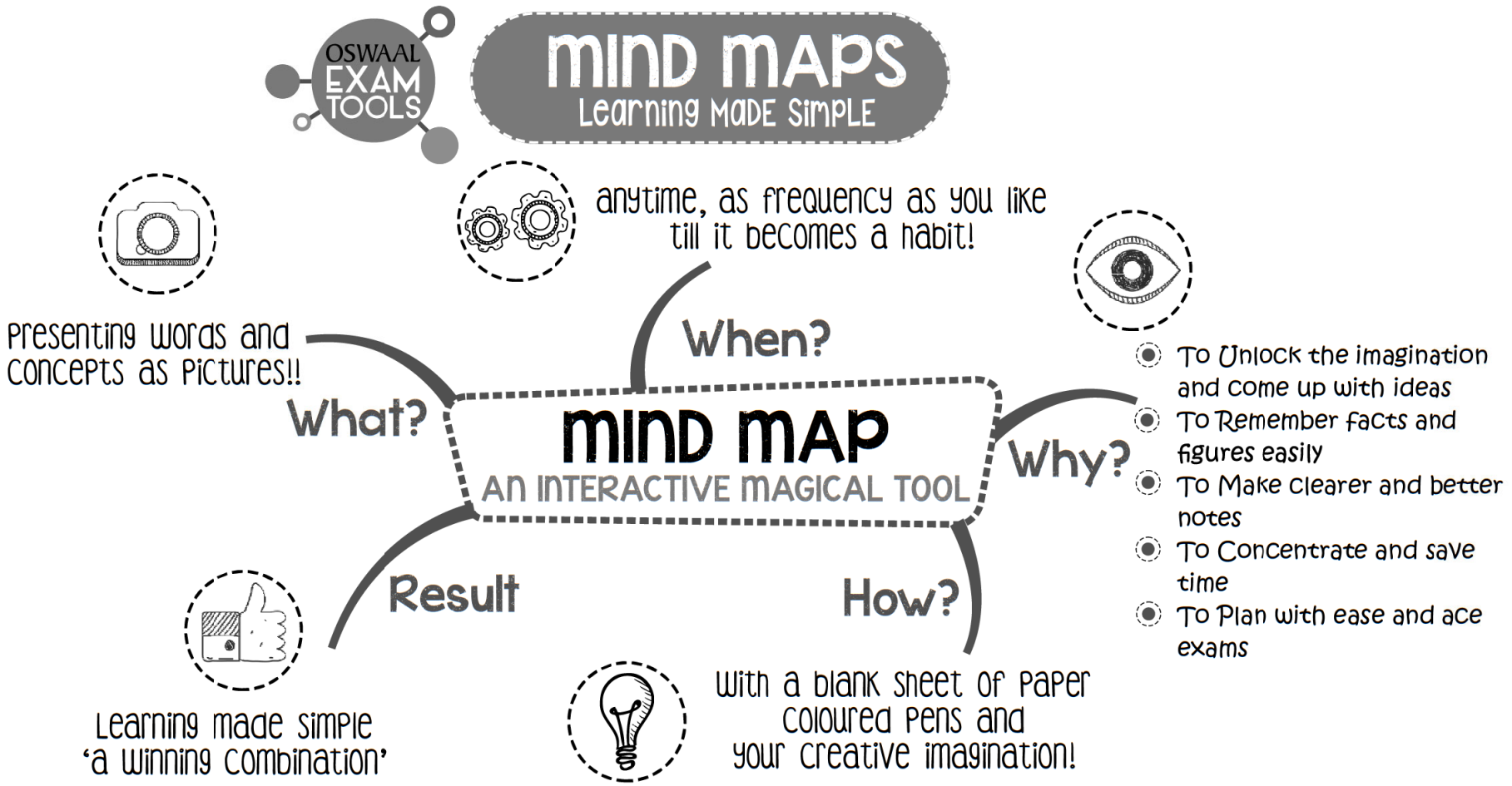
"Affirmations are like a seed planted in soil. Poor soil, poor growth. Rich soil, abundant growth. The more you choose to think thoughts that make you feel good, the quicker the affirmations work."

- Louise Hay

- I am confident.
- I love who I am.
- I am compassionate.
- I am responsible.
- I am a leader.
- I believe in my dreams.
- I am brave.
- I choose a positive attitude.
- I am enough.
- I am great just the way I am.
- I work hard.
- I radiate joy and love.
- I am honest.
- I ampatient.
- I help my family.
- I am strong.
- I can achieve my goals.
- I make good decisions.
- I am diligent.
- I am thoughtful.
- I am talented.
- I am loved.
- I am generous.
- I accept and love myself.
- I am unique.
- I am wonderfully made.
- I am creative.
- Good things happen to me.
- I am loving.
- I am kind.
- I am joyful.
- I care about others.
- I am important.
- I like myself.
- It's going to be a great day.
- I learn from my mistakes.
- I make friends easily.
- I am worthy.
- I am open to new experiences.
- I am beautiful.
- I am deserving of good things.
- I am grateful.
- I believe in me.
- I respect myself and I respect others.

Our mind starts believing what we repeatedly think or say. We, at Oswaal Books, resonate with this belief. So, we want all our readers to create their own positive affirmations! A positive affirmation is something spoken aloud that you want to believe or want to be true. Repeating positive affirmations daily can help shift your internal dialogue from negative to positive.

So let's get started!



What are Associations?

It's a technique connecting the core concept at the Centre to related concepts or ideas. Associations spreading out straight from the core concept are the First Level of Association. Then we have a Second Level of Association emitting from the first level and the chronology continues. The thickest line is the First Level of Association and the lines keep getting thinner as we move to the subsequent levels of association. This is exactly how the brain functions, therefore these Mind Maps. Associations are one powerful memory aid connecting seemingly unrelated concepts, hence strengthening memory.

WRITING NOTES

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UNIT I: COMPUTER SYSTEMS AND ORGANISATION

CHAPTER 1

REVISION OF THE BASICS OF PYTHON

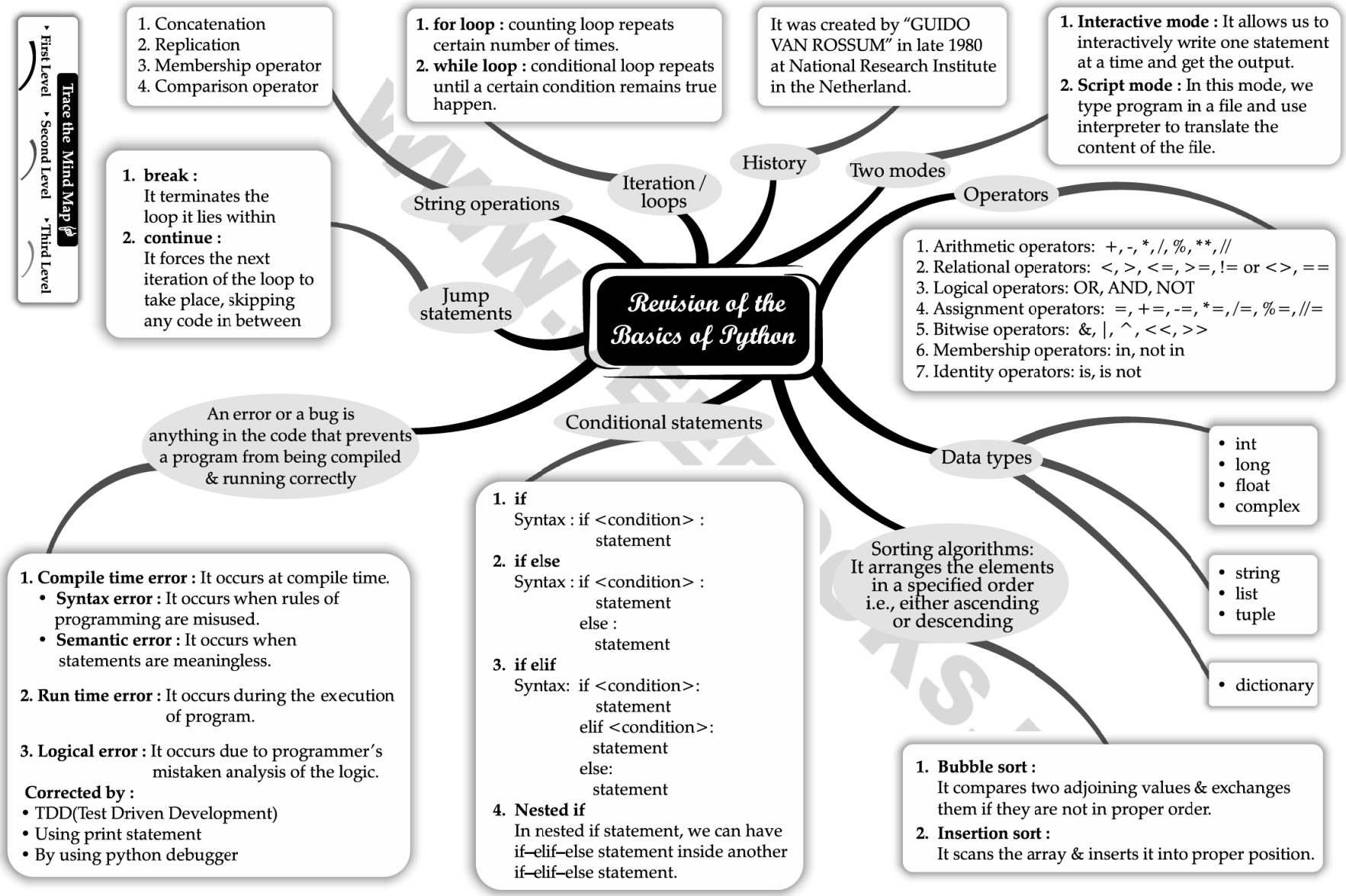
Syllabus

- *Review :*
  Python covered in Class XI

Revision Notes

Python Basics

- **Python was created by Guido Van Rossum in late '1980s' (Released in 1991) at National Research Institute in the Netherland. Python got its name from a BBC comedy series – "Monty Python's Flying Circus". Python is based on two programming languages:**
  (i) ABC language
  (ii) Modula 3
  Some qualities of Python based on the programming fundamentals are given below:
- **Interactive Mode:** Interactive mode, as the name suggests, allows us to work interactively. It executes the code by typing one command at a time in Python shell.
- **Script Mode:** In script mode, we type Python program in a file and then execute the content of the file.
- **Indentation:** Blocks of code are denoted by line indentation, which is rigidly enforced.
- **Comments:** A hash sign (#) that is not inside a string literal begins a single line comment. We can use triple quoted string for giving multiple-line comments.
- **Variables:** A variable in Python is defined through assignment. There is no concept of declaring a variable outside of that assignment. Value of variable can be manipulated during program run.
- **Dynamic Typing:** In Python, while the value that a variable points to has a type, the variable itself has no strict type in its definition.
- **Static Typing :** In static typing, a data type is attached with a variable when it is defined first and it is fixed.
- **Multiple Assignment:** Python allows you to assign a single value to several variables and multiple values to multiple variables simultaneously.
  For example: a = b = c = 1
  a, b, c = 1, 2, "john"
- **Token :** The smallest individual unit in a program is known as a Token or a lexical unit.
- **Identifiers : An identifier is a name used to identify a variable, function, class, module, or other object. An identifier starts with a letter A to Z or a to z or an underscore (_) followed by zero or more letters, underscores, and digits (0 to 9).**



Python does not allow punctuation characters such as @, $, and % within identifiers. Python is a case sensitive programming language. Thus, Value and value are two different identifiers in Python.

Here are identifiers naming convention for Python:

- Class names start with an uppercase letter and all other identifiers with a lowercase letter.
- Starting an identifier with a single leading underscore indicates by convention that the identifier is meant to be private.
- Starting an identifier with two leading underscores indicates a strongly private identifier.
- If the identifier also ends with two trailing underscores, the identifier is a language-defined special name.
- **Reserved Words(Keywords) :** The following list shows the reserved words in Python v3.0 or later

Python Keyword List

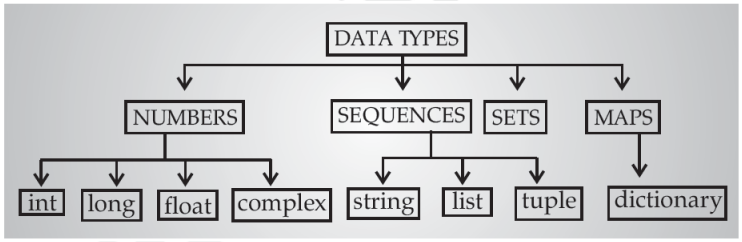
False	None	True	and	as	assert	async (v3.5 or later)
await (v3.5 or later)	break	class	continue	def	del	elif
else	except	finally	for	from	global	if
import	in	is	lambda	nonlocal	not	or
pass	raise	return	try	while	with	yield

These reserved words should not be used as constant or variable or any other identifier names. All the Python keywords contain lowercase letters only except False, None and True which have first letter capital.

Scan to know more about this topic

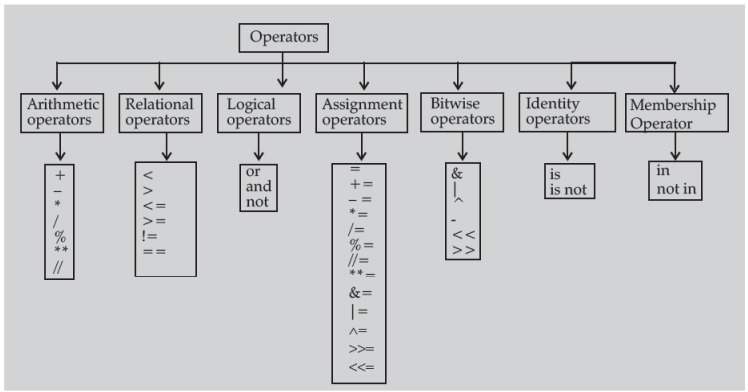
Getting Started with Python

- **Literal/Constant :** Literals (Often referred to as constant value) are data items that have a fixed value. Python allows several kind of literals as String literals, Numeric literals, Boolean literals, special literal None and literal Collections
- **Data Types :** Data type is a set of values and the allowable operations on those values. Python has a great set of useful data types. Python's data types are built in the core of the language. They are easy to use and straight forward.



- **Numbers** can be either integer or floating point numbers.
- A **sequence** is an ordered collection of items, indexed by integers starting from 0. Sequences can be grouped into strings, tuples and lists.
  - **Strings** are lines of text that can contain any character. They can be declared with double quotes.
  - **Lists** are used to group other data. They are similar to arrays.
  - A **tuple** consists of a number of values separated by commas.
- A **set** is an unordered collection with no **duplicate** items.
- A **dictionary** is an unordered set of key value pairs where the keys are unique.
- **Operator :** Operators are special symbols which perform some computation. Operators and operands form an expression. Python operators can be classified as given below :

Python Operators

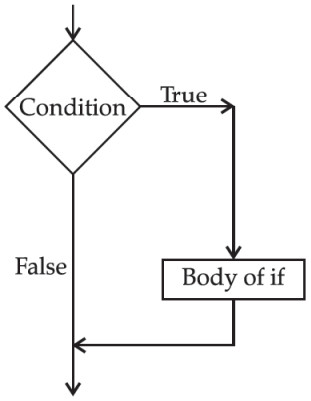


➢ **Expressions :** An expression in Python is any valid combination of operators, literals and variables.

Conditional Statements

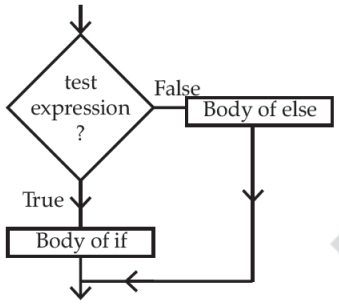
➢ **A conditional is a statement which is executed, on the basis of result of a condition.**
- **if conditionals in Python have the following forms.**

(A) Simple if



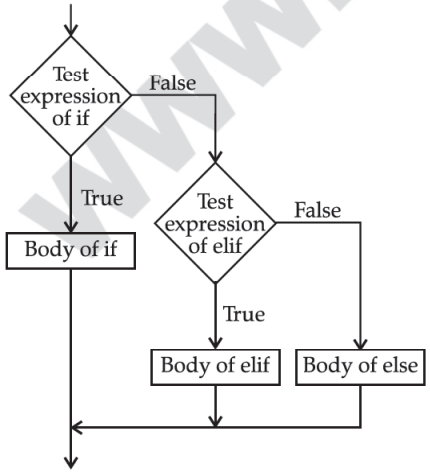
Syntax:
if < conditional expression>:
[statements]

(B) The if-else conditional



Syntax:
if <conditional expression>:
[statements]
else:
[statements]

(C) The if-elif conditional statement



Syntax:
if <conditional expression>:
Statement
[statements]
elif <conditional expression>:
statement
[statements]
else:
statement
[statements]

Scan to know more about this topic

Conditional Statements in Python

(D) Nested if
- A nested if is an if which is inside another if's body or elif's body or else's body.
- Storing conditions – Complex and repetitive conditions can be named and then used in if statements.

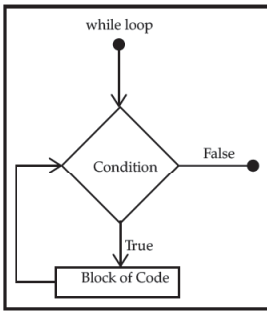
Iteration Constructs

➢ The iteration statements or repetition statements allow a set of instructions to be performed repeatedly.
➢ Python provides three types of loops

(A) Counting loops repeat a certain number of times e.g. for
(B) Conditional loops repeat until a certain condition is true e.g. while.
(C) Nested loops**.**

1. Python While Loop

A while loop in Python iterates till its condition becomes False. In other words, it executes the block of statements until the condition it takes is true.



Syntax

while <logical Expression>:

loop body

When the program control reaches the while loop, the condition is checked. If the condition is true, the block of code under it is executed. After that, the condition is checked again. This continues until the condition becomes false. Then the first statement, if any after the loop is executed. Remember to indent all statements under the loop equally.

e.g.

```
>>> a=3
>>> while(a>0):
        print(a)
        a-=1
```

Output

3
2
1

(a) **An Infinite Loop**

Be careful while using a while loop. Because if you forget to increment or decrement the counter variable in Python, or write flawed logic, the condition may never become false. In such a case, the loop will run infinitely, and the conditions after the loop will starve. To stop execution, press Ctrl+C. However, an infinite loop may actually be useful.

(b) **The else statement for while loop**

A while loop may have an else statement after it. When the condition becomes false, the block under the else statement is executed. However, it doesn't execute if you break out of the loop or if an exception is raised.

e.g.

```
>>> a=3
>>> while(a>0):
        print(a)
        a-=1
    else:
        print("Reached 0")
```

Output

3
2
1
Reached 0

In the following code, we put a break statement in the body of the while loop for a==1. So, when that happens, the statement in the else block is not executed.

e.g.

```
>>> a=3
>>> while(a>0):
        print(a)
```

```
a-=1
if(a==1):
   break
else:
   print("Reached 0")
```

Output

3

2

c. Single Statement while

Like an if statement, if we have only one statement in while loop's body, we can write it all in one line.

e.g.

```
>>> a=3
>>> while a>0: print(a); a-=1;
```

Output

3

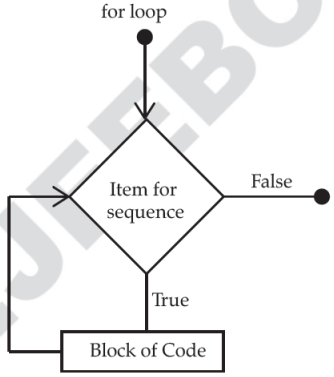
2

1

You can see that there were two statements in while loop's body, but we used semicolons to separate them. Without the second statement, it would form an infinite loop.

2. **Python FOR Loop**

Python for loop can iterate over a sequence of items. The structure of a for loop in Python is different than that in C++ or Java. That is, for(int i=0;i<n;i++) won't work here. In Python, we use the 'in' keyword.




```
>>> for a in range(3):
        print(a)
```

Output

0

1

2

If we wanted to print 1 to 3, we could write the following code.

```
>>> for a in range(3):
        print(a+1)
```

Output

1

2

3

a. **The range() function**

This function yields a sequence of numbers. When called with one argument, say n, it creates a sequence of numbers from 0 to n-1.

```
>>> list(range(10))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

We use the list function to convert the range object into a list object. Calling it with two arguments creates a sequence of numbers from first to second.

```
>>> list(range(2,7))
[2, 3, 4, 5, 6]
```

You can also pass three arguments. The third argument is the interval.

```
>>> list(range(2,12,2))
    [2, 4, 6, 8, 10]
```

Remember, the interval can also be negative.

```
>>> list(range(12,2,-2))
    [12, 10, 8, 6, 4]
```

3. **Nested Loops**

A loop may contain another loop in its body, this inner loop is called nested loop. But in a nested loop, the inner loop must terminate before the outer loop.

e.g.

```
for i in range(1,6):
    for j in range (1,i):
        print("*", end=" ")
    print()
```

- **Jump Statements** Python offers two jump statements-break and continue to be used within loops to jump out of loop iterations.
  - **break statement** It terminates the loop it lies within. It skips the rest of the loop and jumps over to the statement following the loop.
  - **continue statement** Unlike break statement, the continue statement forces the next iteration of the loop to take place, skipping any code in between.

Idea of Debugging

- An error or a bug is anything in the code that prevents a program from compiling and running correctly.
- There are three types of errors

Compile Time errors occur at compile time.

These are of two types :

(i) Syntax errors occur when rules of programming language are misused.

(ii) Semantics errors occur when statements are not meaningful.

Run Time errors occur during the execution of a program.

Logical Errors occur due to programmer's mistaken analysis of the error.

To remove logical errors is called debugging.

List, Tuples and Dictionary

- **List**

Scan to know more about this topic

List in Python

- A list is a standard data type of Python that can store a sequence of values belonging to any type.
- The lists are depicted through square brackets.
- These are mutable (i.e. modifiable), you can change elements of a list in place.
- Lists store a reference at each index.
- We can index, slice and access individual list elements.
- len (L) returns the number of items in the list L.Membership operators in and not in can be used with list.
- To join two lists, use `+' (concatenation) operator.
- L [start: stop] creates a list slice with starting index as start till stop as stopping index but excluding stop.
- List manipulation functions are

  append(), insert(), extend(),sort(), remove(), reverse() and pop().

- **Tuples**
  - Tuples are immutable Python sequences, *i.e.* you cannot change elements of a tuple in place.
  - Tuples' items are indexed.
  - Tuples store a reference at each index.
  - Tuples can be indexed sliced and its individual items can be indexed.
  - len (T) returns count of tuple elements.
  - Tuple manipulation functions are: len(), max(), min(), and tuple().
- **Dictionaries**
  - Dictionaries in Python are a collection of some key-value pairs.
  - These are mutable and unordered collection with elements in the form of a key : value pairs that associate keys to values.
  - The keys of dictionaries are immutable type and unique.
  - To manipulate dictionaries functions are : len(), clear(), has_key(),items(), keys(), values(), update().
  - The membership operators in and not in work with dictionary keys only.
- Sorting means arranging the elements in a specified order i.e. either ascending or descending order.
- Two sorting techniques are
  - **(i)** **Bubble Sort** – It compares two adjoining values and exchanges them if they are not in proper order.
  - **(ii)** **Insertion Sort** – Suppose a list A with n elements A[1], A[2],…..A[n] is in memory. The insertion sort algorithm scans A from A[1] to A[N] inserting each element A[x] into its proper position in the previously sorted sub list A[1], A[2]…….A[x-1]

Strings in Python

Scan to know more about this topic

Python Strings

- Strings in Python are stored as individual character in contiguous location, with two way index for each location.
- Strings are immutable and hence item assignment is not supported.
- Following operations can be used on strings.
  - (1) Concatenation `+'
  - (2) Replication `*'
  - (3) Membership Operators as in and not in
  - (4) Comparison Operators as ==, ! =, <, >, < =, > =
- **Built in functions**

  ord() – returns ASCII value of passed character.

  chr() – returns character corresponding to passed ASCII code
- String slice refers to a part of the string, where strings are sliced using a range of indices

  Syntax : string [n:m].

Python modules

- A Python module can contain objects like docstrings, variables constants, classes, objects, statements, functions.
- Modules are accessed by using the import statement. A module is loaded only once, regardless the number of times it is imported.

  Syntax **(i)** import module_name **(ii)** from <module> import <object>

  Mathematical functions
- Mathematical operations can be performed by importing the math module. Different types of mathematical functions:
  - **(i)** sqrt() : find the square root of a specified expression
  - **(ii)** pow() : compute the power of a number
  - **(iii)** fabs() : Returns the absolute value of x.
  - **(iv)** ceil(x) : returns smallest integer value greater than or equal to x.
  - **(v)** floor(x) : returns the largest integer value less than or equal to x.

Random Functions

- Python offers random module that can generate random numbers. Different random functions are as follows
  - **(i)** random() : Used to generate a float random number less than 1 and greater than or equal to 0.
  - **(ii)** choice() : Used to generate 1 random number from a container.

Statistics Module

- To access Python's statistics functions, we need to import the functions from the statistics module.

Some statistics functions are as follows:

- **(i)** mean() : Returns the simple arithmetic mean of data which can be a sequence or an iterator.
- **(ii)** median() : Calculates middle value of the arithmetic data in iterative order.
- **(iii)** mode() : Returns the number with maximum number of occurrences.

Know the Terms

- **Slicing:** In Python it is a feature that enables accessing parts of sequences like strings, tuples and lists.
- Debugging is the process of detecting and removing of existing and potential errors in a software code that can cause it to behave unexpectedly or crash.
- Debugger is a computer program used by programmers to test and debug a target program.
- Control Structure is a programming language construct which affects the flow of the execution of program.
- **Packing:** In Python, tuples are collections of elements which are separated by commas. It packs elements or value together so, this is called packing.

STAND ALONE MCQs (1 Mark each)

Q. 1. Which of the following is valid arithmetic operator in Python?

(A) // **(B)** ?

(C) < **(D)** and

[CBSE SQP-2020]

Ans. Option (A) is correct.

Explanation: Arithmetic operators are used to do arithmetic operations. // is an arithmetic operator.
While < is relational operator and is logical operator? is punctuator.

Q. 2. What will be output of this expression:

'p' + 'q'

(A) pq **(B)** rs

(C) pqrs **(D)** pq12

Ans. Option (A) is correct.

Explanation: Concateration operator (+) is used to merge or join two string.

Q. 3. Find the invalid identifier from the following

(A) MyName **(B)** True

(C) 2ndName **(D)** My_Name

[CBSE SQP 2020]

Ans. Options (B) and (C) both are correct.

Explanation: Identifiers are the fundamental building blocks of a program which are used to give the name to data items items included by the programmer. True, 2nd Name are invalid identifiers because keywords cannot be used and name cannot be start with a digit.

Q. 4. Which of the following is invalid?

(A) _a = 1 **(B)** __a = 1

(C) __str__ = 1 **(D)** none of the mentioned

Ans. Option (D) is correct.

Explanation: In given options, all are valid variable names, Variable is a container object stores a meaning ful value that can be used throughout the program.

Q. 5. Which of the following is an invalid variable?

(A) my_string_1 **(B)** 1st_string

(C) foo **(D)** _

Ans. Option (B) is correct.

Explanation: Variable is an identifier that is used to represent specific data item. The data item may be a whole number, a fractional number, a sequence of character, a single character etc.
1st_string is invalid because variable's name cannot be start with a digit.

Q. 6. All keywords in Python are in _____ except three ketwords.
(A) lower case **(B)** UPPER CASE
(C) Capitalized **(D)** None of the mentioned

Ans. Option (A) is correct.

Explanation: Keyboards are predefined reserved words by the programming language that have same special or predefined meaning. These are reserved for special purpose and must not be used as identifier names. All keyboard in Python are in lower case except True, False, None.

Q. 7. Which of the following is true for variable names in Python?
(A) unlimited length
(B) all private members must have leading and trailing underscores
(C) underscore and ampersand are the only two special characters allowed
(D) none of the mentioned

Ans. Option (A) is correct.

Explanation: Variable is a container object that stores a meaningful value that can be used throughout the progam. Each variable has a specific type, which determines the size and layout of the variable memory, and the set of operations that can be applied do the variable.

Q. 8. Which of the following is an invalid statement?
(A) abc = 1,000,000
(B) a b c = 1000 2000 3000
(C) a,b,c = 1000, 2000, 3000
(D) a_b_c = 1,000,000

Ans. Option (B) is correct.

Explanation: You can assign multiple values to multiple variables in a single statement.
Valid

$abc = 1{,}00{,}000$
$a, b, c = 1000, 2000, 3000$
$a, b, c = 1{,}00{,}000$

Q. 9. What is the output of 0.1 + 0.2 == 0.3?
(A) True
(B) False
(C) Machine dependent
(D) Error

Ans. Option (B) is correct.

Explanation: == is relational. These operators. These operators compare two operands to one another.
0.1 + 0.2 = = 0.3 is invalid or false

Q. 10. Which of the following is not a complex number?
(A) k = 2 + 3j
(B) k = complex(2, 3)
(C) k = 2 + 3l
(D) k = 2 + 3J

Ans. Option (C) is correct.

Explanation: Complex number is a number expressed in the form $a + bi$, where a (real part) and *bi is the imaginary part.*

Q. 11. In python ~x=-(x+1) then, what does ~~~~~5 evaluate to?
(A) -6
(B) -11
(C) +11
(D) -5

Ans. Option (A) is correct.

Explanation:
Here is $\sim x = -(x + 1)$
if $x = 5$
then $\sim 5 = -(5 + 1)$
$\sim 5 = -6$
$\sim \sim 5 = -(-6) = 6$
that means even number of ~ operator give positive output and odd number of ~ operator give negative output.
Here is used 5 operators (~) which will give – 6 as output.

Q. 12. Which of these in not a core data type?
(A) Lists
(B) Dictionary
(C) Tuples
(D) Class

Ans. Option (D) is correct.

Explanation: Para type is a term that is used to shows the kind of data values or the type of data that is expected to be handed. Lists, dictionary, and tuples are data type.

Q. 13. In a Python program, a control structure:
(A) Defines program-specific data structures
(B) Directs the order of execution of the statements in the program
(C) Dictates what happens before the program starts and after it terminates
(D) None of the above

Ans. Option (B) is correct.

Explanation: In a Python python program, a structure directs the order of execution of the statements in the program. Various types of control structure are sequence (simple program), selection (if, if-else, if-elif-else) and iteration (for, while).

Q. 14. What keyword would you use to add an alternative condition to an if statement?
(A) else if
(B) elseif
(C) elif
(D) None of these

Ans. Option (C) is correct.

Explanation: elif keywords is used to add an alternative condition to an if statement.

Syntax If (Condition 1):
Statement 1
elif (condition 2) :
Statement 2
else :
Statement 3

Q. 15. Which statement will check if a is equal to b?

(A) if a = b:
(B) if a == b:
(C) if a === c:
(D) if a == b

Ans. Option (B) is correct.

Explanation: If *a==b:* will check if a is equal to b. If statement allows branch depending upon the value or state of variables. If the condition evaluates true, an action is followed otherwise, the action is ignored.

Q. 16. Which of the following is a valid for loop in Python?

(A) for(i=0; i<n; i++)
(B) for i in range(0,5):
(C) for i in range(0,5)
(D) for i in range(5)

Ans. Option (B) is correct.

Explanation: For statement encloses one or more statements that form the body of the loop, the statements in the loop are repeated continuously a certain number of times. This loop is also an entry control loop, as condition is checked before entering into the scope of the loop.

Syntax
For <variable> in <sequence> :
Or Statements
For <Variable> in range ([Start], [Stop], [Step]) :
Statement

Q. 17. Which of the following sequences would be generated in the given line of code?

range (5, 0, -2)

(A) 5 4 3 2 1 0 -1
(B) 5 4 3 2 1 0
(C) 5 3 1
(D) None of the above

Ans. Option (C) is correct.

Explanation: The correct output is 5 3 1 because iteration will be start 5 with – 2 step end and before 0.

Q. 18. What will be the output of the following code?

```
x = "abcdef"
i = "i"
while i in x:
  print(i, end=" ")
```

(A) a b c d e f
(B) abcdef
(C) i i i i i ...
(D) No output

Ans. Option (D) is correct.

Explanation: There is no output because variable *i* is equal to string value which cannot be used in iteration.

Q. 19. What will be the output of the following code?

```
x = 12
for i in x:
  print(i)
```

(A) 12
(B) 1 2
(C) Error
(D) None of the above

Ans. Option (C) is correct.

Explanation: It gives Type Error means '*int*' object is not iterable.

Q. 20. Which type of error occurs when rules of programming language are misused?

(A) Syntax error **(B)** Semantic error
(C) Run time error **(D)** Logical error

Ans. Option (A) is correct.

Explanation: When a formal set of rules defined for writing a program in a particular language is not followed then error raised is known as syntax error. Syntax errors occur when syntax rules of any programming language are violated.

Q. 21. Which of the following is/are compile time errors?

(A) Syntax error **(B)** Semantic error
(C) a and b both **(D)** None of these

Ans. Option (C) is correct.

Explanation: All the errors that detected and displayed by the compiler or interpreter are known as compile time errors, when ever the compiler displays an error, it will not be able to run.
There are two categories of compile time errors as
• Syntax • Semantic error

Q. 22. How many types of error are there in Python?

(A) One **(B)** Two
(C) Three **(D)** Four

Ans. Option (C) is correct.

Explanation: An error is flow, fault or failure in a computer program that causes it to produce an incorrect or unexpected result or to behave in unintended ways.

Q. 23. Identify the valid data type of L:

L = [1, 23, 'hi', 6]

(A) list (B) dictionary
(C) array (D) tuple **[CBSE SQP, 2020]**

Ans. Option (A) is correct.

Explanation: List is a type of container which is used to store multiple data at the same time. It can store integer, string as well as object in a single list. Lists can be created to put the elements in square brackets [].

Q. 24. Which is the correct form of declaration of dictionary?

(A) Day={1:'monday',2:'tuesday',3:'wednesday'}
(B) Day=(1;'monday',2;'tuesday',3;'wednesday')
(C) Day=[1:'monday',2:'tuesday',3:'wednesday']
(D) Day={1'monday',2'tuesday',3'wednesday']

[CBSE SQP 2020]

Ans. Option (A) is correct.

Explanation: In Python, dictionary is an unordered collection of data values that stored the key: value pair instead of single value as an element. Keys of a dictionary must be unique and of immutable data types such as strings, type etc.
Syntax
dictionary name = {key 1 : value 1, key 2 : value 2, ...}

Q. 25. Suppose a tuple T is declared as
T = (10, 12, 43, 39), which of the following is incorrect?

(A) print(T[1])
(B) T[2] = -29
(C) print(max(T))
(D) print(len(T)) **[CBSE SQP 2020]**

Ans. Option (B) is correct.

Explanation: A tuple is a collection of Python objects separated by comma (,). Tuples are immutable by design which means they cannot be changed after creation. Tuple holds a sequence of heterogenous elements.

Q. 26. Sorting means arranging the elements in

(A) ascending order **(B)** descending order
(C) Either a or b **(D)** None of these

Ans. Option (C) is correct.

Explanation: Sorting is the process of arranging the elements in ascending or descending order. Sorting is the opeation performed to arrange the records of a tube or list in some order all ordring to some specific ordering criteria.

Q. 27. Which of the following is/are sorting technique?

(A) Bubble sort **(B)** Insertion sort
(C) Both a and b **(D)** None of these

Ans. Option (C) is correct.

Explanation: Bubble sort in the technique in which consecutive elements are compared and if not in order it exchange them upto end of the list.
Insertion sort method is generally used for small set of data. Under this method, initial the first element is picked up in the unsorted part and is then appropriately inserted in the sorted part, this process will repeat till the final list is ordered accordingly.

Q. 28. Which sorting technique compares two adjoining values and exchanges them?

(A) Bubble sort
(B) Insertion sort
(C) Both a and b
(D) None of these

Ans. Option (A) is correct.

Explanation: Bubble sort type of sorting is based on exchange sort technique, as it is related to exchange mechanism. In this technique, consecutive elements are compared and if not in order it exchanges them upto end of the list.

Q. 29. What is the output when the following code is executed ?
print(r"\nhello")
(A) a new line and hello
(B) \nhello
(C) the letter r and then hello
(D) Error

Ans. Option (B) is correct.

Explanation: Give code will give output
\nhello
because \nhellow is in double quotes which consider as string.

Q. 30. What is the output of "hello"+1+2+3 ?

(A) hello123
(B) hello
(C) Error
(D) hello6

Ans. Option (C) is correct.

Explanation: It will give Type Error because string and integer objects cannot be concentrate.

Q. 31. Which function helps us to randomize the items of a list?

(A) shuffle() **(B)** mean()
(C) choice() **(D)** max()

Ans. Option (A) is correct.

Explanation: Shuffle () method randomly reorder the elements in a list. It can stuffle only list elements.
Syntax random shuffle (list)

Q. 32. Which type of elements are accepted by random. shuffle()?

(A) tuples **(B)** dictionaries
(C) lists **(D)** strings

Ans. Option (C) is correct.

> *Explanation:* random shuffle () method randomly recorder the elements in a list It can shuffle only list elements.

Q. 33. Which function calculates middle value of the arithmetic data in iterative order?

(A) median() **(B)** mode()
(C) mean() **(D)** None of these

Ans. Option (A) is correct.

> *Explanation:* Median function calculate middle value of the arithmetic data in iterative order. If these are an odd number of values, median () returns the middle value. If these are an even number of values it returns an average of two middle values.

ASSERTION AND REASON BASED MCQs (1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

(A) Both A and R are true and R is the correct explanation for A.
(B) Both A and R are true and R is not correct explanation for A.
(C) A is true but R is false.
(D) A is false but R is true.

Q. 1. Assertion (A): Lists can be change after creation.
Reason (R): Lists are mutable.

Ans. Option (A) is correct.

> *Explanation:* List is a type of container in data structure, which is used to store multiple data at the same time. It contains a sequence of heterogenous elements which makes it powerful tool in Python. Lists are mutable which means they can be changed after creation.

Q. 2. Assertion (A): Dictinnery is an unordered collection of data values that stored the key : value pair.
Reason (R): Immutable means they cannot be changed after creation.

Ans. Option (B) is correct.

> *Explanation:* In Python, dictionary is an unordered collection of data that stored key : value pair instead of single value as an element. Dictionary is mutable while keys of a dictionary must be unique and of immutable data tpes such as strings, tuples etc.

Q. 3. Assertion (A): Data types are used to identify the type of data.
Reason (R): Data types are two types as numbers and strings.

Ans. Option (C) is correct.

> *Explanation:* Data types are used to identify the type of data and associated operations to handle it. Python has five standard data types as number, strings, lists, Tuples and Dictionary.

CASE-BASED MCQs

Attempt any four sub parts from each question. Each sub part carries 1 mark.

I. List

A list is a standard data type of Python that can store a sequence of values belonging to any type. The lists are depicted through square brackets. These are mutable, you can change elements of a list in place.

Lists store a reference at each index. We can index, slice and access individual list elements.

L [start: stop] creates a list slice with starting index as start till stop as stopping index but excluding stop.

Q. 1. When one or more elements of a list is another list, it is called

(A) nested list **(B)** super list
(C) hit list **(D)** sub list

Ans. Option (A) is correct.

> *Explanation:* Nested list are list objects where the elements in the lists can be lists themselves.

Q. 2. In Python, list is of what type?

(A) Mutable **(B)** Immutable
(C) either (A) or (B) **(D)** None of these

Ans. Option (A) is correct.

> *Explanation:* Lists are mutable which means they can be changed after creation. Each elements of a list is assigned a number its position or index.

Q. 3. Which method is used to delete a given element from the list?

(A) rem ( ) **(B)** remove ( )
(C) del ( ) **(D)** delete ( )

Ans. Option (B) is correct.

Explanation: remove( ) method searches for the given element in the list and removes it from the list.

Q. 4. Which type of bracket is used to define a list?
(A) [ ] **(B)** ( )
(C) { } **(D)** < >

Ans. Option (A) is correct.

Explanation: List is a type of container in data structure, which is used to store multiple data at the same time. Lists can be created to put the elements in square brackets []. The elements in the list are separated by the comma (,).

Q. 5. How to create a list slice?
(A) List_name [start]
(B) List_name [stop]
(C) List_name [start_stop]
(D) List_name [start: stop]

Ans. Option (D) is correct.

Explanation: In Python list, there are multiple ways to print the whole list with all the elements, but to print a specific range of elements from the list, we use slice operation. Since operation is performed on lists with the use of colon (:).
Syntax s = list name [start : End]

II. Tuples

Tuples are immutable python sequences, i.e. you cannot change elements of a tuple in place.
Tuples' items are indexed.
Tuples store a reference at each index. Tuples can be indexed sliced and its individual items can be indexed. len (T) returns count of tuple elements.
Tuple manipulations functions are: len ( ), max ( ), min ( ) and tuple ( ).

Q. 1. In Python, tuple is what type?
(A) Mutable **(B)** Immutable
(C) Either (A) or (B) **(D)** None of these

Ans. Option (B) is correct.

Explanation: Tuples are immutable by design which means they cannot be charged after creation. Tuple holds a sequence of heterogenous elements. Tuples store a fixed set of elements and do not allow changes.

Q. 2. Which method is used to return count of tuple elements?
(A) len (T) **(B)** Count (T)
(C) Total (T) **(D)** Sum (T)

Ans. Option (A) is correct.

Explanation: len () is the built in function in tuple. It is used to count the number of elements that present in the tuple.

Q. 3. The name of tuple's method (s).
(A) max ( ) **(B)** min ( )
(C) len ( ) **(D)** All of these

Ans. Option (D) is correct.

Explanation: max (), min (), len () are all tuple's methods. max () is used to return the element with maximum value out of the elements in tuple
min () is used to return with maximum value of out of elements in tuple.
len () is to count the number of elemens that present in the tuple.

Q. 4. Which type of brackets is used to define the tuple?
(A) [ ] **(B)** ( )
(C) { } **(D)** < >

Ans. Option (B) is correct.

Explanation: A tuple is a collection of python objects separated by commas (,) Tuples are decleared in parentheses (). They hold a sequence of heterogenous elements.

Q. 5. The immutable Python sequence is
(A) List **(B)** tuple
(C) string **(D)** dictionary

Ans. Option (B) is correct.

Explanation: The immutable Python sequence is Tuple which cannot be changed creation.

III. Dictionary

A dictionary in Python is the unordered and changeable collection of data values that holds key value pairs. Each key value pair in the dictionary maps the key to its associated value making it more optimized.
A dictionary in Python is declared by enclosing a comma separated list of key value pairs using curly braces ({}). Python dictionary is classified into two elements: keys values.
Keys will be a single element.
Values can be a list or list within a list, numbers etc.

Q. 1. In Python, dictionary is what type?
(A) Mutable **(B)** Immutable
(C) Either (A) or (B) **(D)** None of these

Ans. Option (A) is correct.

Explanation: Dictionary is mutable means they can be changed after creation. But key of dictionary are immutable type.

Q. 2. The unordered and changeable collection of data values that holds key value pairs is
(A) List **(B)** Tuple
(C) Dictionary **(D)** String

Ans. Option (C) is correct.

Explanation: In Python dictionary is an unordered collection of data value that stored the key: value pair instead of single value as an element. Dictionary is used to map or associate things you want to store the keys you need to tag them.

Q. 3. Which type of bracket is used to define dictionary?
(A) ( ) **(B)** [ ]
(C) { } **(D)** < >

Ans. Option (C) is correct.

> ***Explanation:*** To define dictionary { } brackets is used. Each key value pair in a dictionary is separated by a colon (:) whereas each key is separated by a comma (,).

Q. 4. What are keys in dictionary?
(A) double elements **(B)** triple elements
(C) single element **(D)** None of these

Ans. Option (C) is correct.

> ***Explanation:*** In dictionary, key will be a single element and values can be a list within a list numbers etc.

Q. 5. The elements that are classified by Python dictionary.
(A) Keys **(B)** Values
(C) Both (A) and (B) **(D)** None of these

Ans. Option (C) is correct.

> ***Explanation:*** The elements that classified by Python dictionary are keys values. Each key value in a dictionary is separated by a colon (:) where as each key is separated by a comma (,)

IV. Module

A Python module can be defined as a python program file which contains a python code including python functions, classes, or variables. In other words, we can say that our python code file saved with extension (.py) is treated as the module. We may have a runnable code inside the python module.

Modules in Python provide us the flexibility to organize the code in a logical way. To use the functionality of one module into another, we must have to import the specific module.

The import statement is used to import all the functionality of one module into another. Here, we must notice that we can use the functionality of any python source file by importing that file as the module into another python source file. We can import multiple modules with a single import statement, but a module is loaded once regardless of the number of times, it has been imported into our file.

Q. 1. Which extension is used to save the Python file?
(A) .py **(B)** .pyth
(C) .thon **(D)** .python

Ans. Option (A) is correct.

> ***Explanation:*** Python files are stored with py extension. Any Python file can be refended as a module.

Q. 2. What is the use of import statement?
(A) to import all functionality of one module
(B) to import all functionality of one module into another
(C) to import all functionality
(D) None of these.

Ans. Option (B) is correct.

> ***Explanation:*** import statement is used to import all functionality of one module into another when interpreter encounters an import statement, it imports the module if the module is present in the search path.

Q. 3. _____ is a file containing Python definitions and statements.
(A) Module **(B)** List
(C) Tuple **(D)** Dictionary

Ans. Option (A) is correct.

> ***Explanation:*** Module is a file containing python definitions and statements. Modules can define functions, classes and variables that you can reference in other Python .py files via the python command line interpreter.

Q. 4. How many kinds of module are there in Python?
(A) Built in **(B)** User defined
(C) Both (A) and (B) **(D)** None of these

Ans. Option (C) is correct.

> ***Explanation:*** A Python module can contain objects like docstrings, variables constants, classes, objects, statements, functions.
>
> There are two types of modules in Python as Built in and user defined.

Q. 5. Which keyword is used to import the module _____ ?
(A) import Module **(B)** Module
(C) import **(D)** None of these

Ans. Option (C) is correct.

> ***Explanation:*** Import keybord is used to import module. You can use any python source file as a module by executing an import statement in some other Python source files. A module is loaded only once, regardless the number of time is imported

V. Krrishnav is looking for his dream job but has some restrictions. He loves Delhi and would take a job there if he is paid over Rs.40,000 a month. He hates Chennai and demands at least Rs. 1,00,000 to work there. In any another location he is willing to work for Rs. 60,000 a month. The following code shows his basic strategy for evaluating a job offer.

[Board QB 2021]

Code:

```
Pay= _____
location= _____
if location == "Mumbai":
```

```
        print ("I will take it!") # Statement 1
    elif location == "Chennai":
        if pay < 100000:
            print ("No way") # Statement 2
        else:
            print ("I am willing!") # Statement 3
    elif location == "Delhi" and pay > 40000:
            print ("I am happy to join") #Statement 4
    elif pay > 60000:
            print ("I accept the offer") #Statement 5
    else:
            print ("No thanks, I can find something
            better") #Statement 6
```

On the basis of the above code, choose the right statement which will be executed when different inputs for pay and location are given.

Q. 1. Input: location = "Chennai", pay = 50000
(A) Statement 1 **(B)** Statement 2
(C) Statement 3 **(D)** Statement 4

Ans. Option (B) is correct.

Explanation: Statement 2 i.e. print ('No way') will be executed becaue condition loction == Chennai is True and then if pay < 100000 is also true by give inputs.

Q. 2. Input: location = "Surat", pay = 50000
(A) Statement 2 **(B)** Statement 4
(C) Statement 5 **(D)** Statement 6

Ans. Option (D) is correct.

Explanation: Statement 6 i.e. print ("No thanks, I can find something better") will be executed because there is no condition which fulfil the input location = "Surat". So else part will be execute

Q. 3. Input- location = "Any Other City", pay = 10000
(A) Statement 1 **(B)** Statement 2
(C) Statement 4 **(D)** Statement 6

Ans. Option (D) is correct.

Explanation: Statement 6 *i.e.* print (" No thanks, I can find something better") will be executed because there is no condition which fulfill the input location = "Any Other City". So, else will be execute.

Q. 4. Input location = "Delhi", pay = 500000
(A) Statement 6 **(B)** Statement 5
(C) Statement 4 **(D)** Statement 3

Ans. Option (C) is correct.

Explanation: statement 5 *i.e.* print (" I am hapy to join") will be executed because condition location = "Delhi" is True by given input.

Q. 5. Input- location = "Lucknow", pay = 65000
(A) Statement 2 **(B)** Statement 3
(C) Statement 4 **(D)** Statement 5

Ans. Option (D) is correct.

Explanation: Statement 5 *i.e.* print ("I accept the offer") will be executed because given input pay = 65000 fulfill the condition as pay > 60000.

VI. Consider the following code and answer the questions that follow: [Board QB 2021]

Book = { 1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children Stories')
Library = { '5' : 'Madras Diaries', '6' : 'Malgudi Days'}

Q. 1. Ramesh needs to change the title in the dictionary book from 'Crime' to 'Crime Thriller'. He has written the following command:
Book['Crime']='Crime Thriller'
But he is not getting the answer . Help him choose the correct command:
(A) Book[2]='Crime Thriller'
(B) Book[3]='Crime Thriller'
(C) Book[2]=('Crime Thriller')
(D) Book[3]=('Crime Thriller')

Ans. Option (B) is correct.

Explanation: To change the value of specified key, key is used with dictionary's name
Syntax dictionary-name [key] = value

Q. 2. The command to merge the dictionary Book with Library the command would be:
(A) d=Book+Library
(B) print(Book+Library)
(C) Book.uodate(Library)
(D) Library.update(Book)

Ans. Option (D) is correct.

Explanation: To merge two dictionries, update () method is used.
Syntax dictionary. update (dictionary 2)

Q. 3. What will be the output of the following code:
print(list(Library))
(A) ['5','Madras diaries','6','Malgudi Days']
(B) ['5','Madras diaries','6','Malgudi Days']
(C) ['Madras diaries','Malgudi Days']
(D) ['5','6']

Ans. Option (D) is correct.

Explanation: list (dictionary-name will give the keys as list's elements.

Q. 4. In order to check whether the key 2 is present in the dictionary Book, Ramesh uses the following command:
2 in Book
He gets the answer 'True'. Now to check whether the name 'Madras Diaries' exists in the dictionary Library, he uses the following command: 'Madras Diaries' in Library But he gets the answer as 'False'. Select the correct reason for this:
(A) We cannot use the in operator with values. It can be used with keys only.

(B) We must use the function Library, values() along with the in operator

(C) We can use the Library.items() function instead of the in operator

(D) Both b and c above are correct.

Ans. Option (A) is correct.

> ***Explanation:*** To check the presence of particular key in dictionary we must use the function library, values () along with the an operator.

Q. 5. With reference to the above declared dictionaries, predict the output of the following code fragments

Code 1	Code 2
Library=Book	Library=Book. copy()
Library. pop (2)	Library. pop (2)
print(Library)	print(Library)
print (Book)	print (Book)

(A)

Code 1	Code 2
(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')
(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')

(B)

Code 1	Code 2
(2 : 'Mystery')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')
(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')

(C)

Code 1	Code 2
(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')
(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')

(D)

Code 1	Code 2
(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')
(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')

Ans. Option (C) is correct.

> ***Explanation:*** In code 1, key with 2 has been deleted from the dictionary library.
>
> In code 2, dictionary Book is copy into dictionary Library and then key with 2 has been deleted from dictionary library.

Code 1	Code 2
(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')
(1 : 'Thriller', 3 : 'Crime', 4 : 'Children stories')	(1 : 'Thriller', 2 : 'Mystery', 3 : 'Crime', 4 : 'Children stories')

VII. Priyank is a software developer with a reputed firm. He has been given the task to computerize the operations for which he is developing a form which will accept customer data as follows:

The Data to be entered **[Board QB 2021]**

(i) Name

(ii) Age

(iii) Items bought (all the items that the customer bought)

(iv) Bill amount

Q. 1. Choose the most appropriate data type to store the above information in the given sequence.

(A) string, tuple, float, integer

(B) string, integer, dictionary, float

(C) string, integer, integer, float

(D) string, integer, list, float

Ans. Option (D) is correct.

> ***Explanation:*** Data type for give information as:
> Name - string
> Age - integer
> Items bought - list
> Bill amount - float

Q. 2. Now the data of each customer needs to be organized such that the customer can be identified by name followed by the age, item list and bill amount. Choose the appropriate data type that will help Priyank accomplish this task.

(A) List

(B) Dictionary

(C) Nested Dictionary

(D) Tuple

Ans. Option (B) is correct.

> ***Explanation:*** Dictionary is used to represent the organised data. Dictionary is an unordered collection of data values that stored the key : value pair instead of single value as an element.

Q. 3. Which of the following is the correct way of storing information of customers named 'Paritosh' and 'Bhavesh' with respect to the option chosen above?

(A) customers = {'Paritosh':24,['Printed paper', 'Pen stand'], 3409, 'Bhavesh': 45, ['A4 Rim','Printer Cartridge', ' Pen Carton', ' gift Wrap'], 8099.99}

(B) customers={'Paritosh':[24,[Printed Paper', 'Pen stand'], 3409],'Bhavesh': [45,['A4 Rim','Printer Cartridge', ' Pen Carton', ' gift Wrap'], 8099.99]}

(C) customers=['Paritosh':24, Printed Paper', 'Penstand', 3409, 'Bhavesh': 45, 'A4 Rim','Printer Cartridge', ' Pen Carton', ' gift Wrap', 8099.99]

(D) customers=('Paritosh':24,[Printed Paper', 'Penstand'], 3409, 'Bhavesh': 45,['A4 Rim','Printer Cartridge', ' Pen Carton', ' gift Wrap'], 8099.99)

Ans. Option (A) is correct.

Explanation: option (A) is correct way of strong information of customer with respect to the option chosen.

Q. 4. In order to calculate the total bill amount for 15 customers, Priyank Statement 1. must use a variable of the type float to store the sum. Statement 2. may use a loop to iterate over the values

(A) Both statements are correct.

(B) Statement 1 is correct, but statement 2 is not.

(C) **Both statements are incorrect.**

(D) Statement 1 is incorrect but statement 2 is correct.

Ans. Option (A) is correct.

Explanation: Given both statements are correct.

❐❐

CHAPTER

2

FUNCTIONS

Syllabus

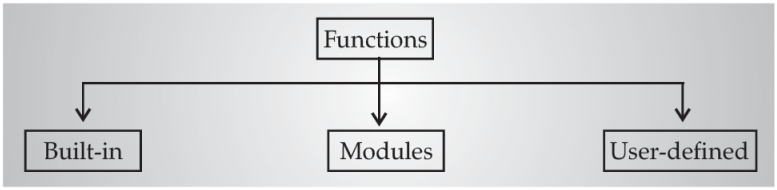
- ***Functions: Types of function (built-in functions, functions defined in module, user defined functions), Creating user defined function, arguments and parameters, default parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)***

Revision Notes

- A function is a named block of statements that can be invoked by its name. A function is organized and reusable code that is used to perform a single, given action. Functions provide better modularity for your application and a high degree of code reusability.
- The math module of Python provides mathematical functionality. Function blocks begin with the keyword def followed by the function name and parentheses e.g def sum( ): Any input parameters or arguments should be placed within these parentheses. You can also define parameters inside these parentheses. The first statement of a function can be an optional statement - the documentation string of the function or docstring, The code block within every function starts with a colon (:) and is indented. The statement return [expression] exit a function, optionally passing back an expression to the caller. A return statement with no arguments is the same as return None. Defining a function only gives a name, specifies the parameters that are to be included in the function, a structure the blocks of code.

Scan to know more about this topic

Functions



- **Examples of Some Built-in Functions**
  (i) print() : It prints objects to the text stream file.
  (ii) input() : It reads the input, converts it to a string and returns that.
  (iii) sorted() : Returns a new sorted list from the items in iterable.
  (iv) bool() : Returns a boolean value i.e., True or False.

Scan to know more about this topic

In-Built Functions

Functions

String functions

capitalize() : converts the first character to uppercase
casefold() : converts string into lower case
count() : returns the number of times a specified value occurs.
find() : searches the string for a specified value.
isalnum() : returns true if all characters in string are alphanumeric
isalpha() : returns true if all characters are alphabets.
isdigit() : returns true if all characters are digits.
islower() : returns true if all characters are in lowercase.
isupper() : returns true if all characters are in uppercase.

Import statement

- import<module name>
- from<module> import<object>

Define

- A function is an organized and reusable code that is used for some single, given action.
- It begins by writing the keyword def. followed by the function name and parenthesis eg. def add ():

Types

1. **Built in functions :** These functions are built into Python library and can be accessed by programmer
2. **Functions in module :** It is a separately saved unit whose functionality can be reused by importing the corresponding module.
3. **User defined function :** They are declared with a keyword def. followed by the function name.

Scope of variables

1. **Local variable :** They are defined and declared inside a function.
2. **Global variable :** They are defined and declared outside a function.

Math function

ceil(x) : returns the smallest integer greater or equal to x.
copysign(x,y) : returns x with sign of y.
fabs(x) : returns the absolute value of x.
factorial (x) : returns the factorial of x
floor (x) : returns the largest integer less than or equal to x.
pow (x,y) : returns x raised to the power y.
sqrt(x,y) : returns the square root of x.
fmod (x) : returns the remainder when x is divided by y.
exp(x) : returns e** x.

Function argument

1. **Required argument :** Are the arguments passed to a function in correct position and order.
2. **Keyword argument :** It is a function call where the caller function identifies the argument by the parameter name.
3. **Default argument :** It is an argument that assumes a default value, if a value is not provided in a function call for that argument.
4. **Variable length argument :** An "*" is placed before the variable name that holds the value of all non – keyword variable arguments.

Trace the Mind Map

First Level Second Level Third Level

(v) min() : Returns the smallest of two or more arguments.

(vi) any() : Returns True if any element of the iterable is True.

- The built-in functions of Python are always available, one needs not import any module for them. The math module of Python provides mathematical functionality.
  - exp(x): Return e**x
  - log(x,(base)): With one argument, returns the natural logarithm of x (to base e).
  - With two arguments, returns logarithm of x to the given base calculate as log(x)/ log(base)
  - log10(x): Returns logarithm of x at base 10. This is usually more accurate than log(x,10).
  - pow(x, y): Returns x raised to the power y. In particular, pow(l.0, x) and pow(x, 0.0) always return 1.0, even when x is a zero or a NaN. If both x and y are finite, x is negative, and y is not an integer then pow(x, y) is undefined, and raises ValueError.
  - sqrt(x): Returns the square root of x.
  - cos(x): Returns the cosine of x radians.
  - sin(x): Returns the sine of x radians.
  - tan(x): Returns the tangent of x radians.
  - degrees(x): Converts angle x from radians to degrees.
  - radians(x): Converts angle x from degrees to radians.
  - String Functions
    (i) partition(): It splits the string at the first occurrence of the given argument and returns a tuple containing three parts.
    (ii) join(): It takes a list of string and joins them as a regular string.
    (iii) split(): It splits the whole string into the items with separator as a delimeter.
  - User-Defined Functions: User defined functions are those that we define ourselves in our program and then call them wherever we need.
- sys.stdin is the most widely used method to read input from the command line or terminal. The command line sys. argv argument is another way that we can grab input, and environment variables can also be used from within our programs.
- The scope of a variable determines the portion of the program where you can access a particular identifier. There are two basic scopes of variables in Python :
  1. Global variables
  2. Local variables

  Variables that are defined inside a function body have a local scope, and those defined outside have a global scope. All variables in a program may not be accessible at all locations in that program. This depends on where you have declared a variable or the scope of variable
- **Passing different objects as arguments**

  You can send any data types of argument to a function as string, number, list, dictionary etc., and it will be treated as the same data type inside a function.

  e.g. List as an argument

```
def fun(Fruit):
    for i in Fruit:
        print(i)
Food = ["Mango", "Cherry", "Grapes", "Banana"]
fun(Food)
```

  Output

```
Mango
Cherry
Grapes
Banana
```

Scan to know more about this topic

Default parameters and Multiple Arguments in Python

- In Python, a number of mathematical operations can be performed with ease by importing a module named "math" which defines various functions which makes our task easier.
  - ceil(x): Returns the ceiling of x as a float, the smallest integer value greater than or equal to x.

- floor(x) : Returns floor of x as a float, the largest integer value less than or equal to x.
- fabs(x): Returns the floating point absolute value of x.

➢ **Flow of Execution:** Flow of execution can be defined as the order in which the statements in a program are executed. The Python interpreter starts executing the instructions in a program from the first statement. The statements are executed one by one, in the order of appearance from top to bottom.

➢ If a def statement is encountered all the statements of the function are skipped but the function head is interpreted to check if it is valid.

➢ If a function call is encountered the statements in the called function are executed from top to bottom.

Know the Terms

➢ **Global Variables** are the one that are defined and declared outside a function and we need to use them inside a function.

➢ **Local Variables:** A variable declared inside the function's body and in the local scope is known as a local variable.

➢ **Doc Strings** are triple quoted string in Python module program which are displayed as document when help command is used.

➢ **Modularity:** The act of partitioning a program into individual components (modules) is called modularity.

➢ **Parameters** are variables listed within parentheses of a function header.

STAND ALONE MCQs (1 Mark each)

Q. 1. What will be the output of the following code?
print (type(type(int)))
(A) type 'int' **(B)** <class 'type'>
(C) Error **(D)** <class 'int'>

Ans. Option (B) is correct.

Explanation: type () method returns class type of the argument (object) passed as parameter. This function is mostly used for debugging purpose.

Q. 2. What will be the output of the following code?
L = ['a','b','c','d'] print (" ".join(L))
(A) Error **(B)** a b c d
(C) ['a','b','c','d'] **(D)** None

Ans. Option (B) is correct.

Explanation: Join () method string method and returns a string in which the elements of sequence have been joined by str separator.
Syntax string-name-join (iterable).

Q. 3. What is called when a function is defined inside a class?
(A) Module **(B)** Class
(C) Another function **(D)** Method

Ans. Option (D) is correct.

Explanation: Method is called when a function is defined inside a class. A function is a named block of statements that can be invoked by its name

Q. 4. **Which of the following is the use of id() function in python?**
(A) id() returns the identity of the object
(B) Every object doesn't have a unique ID
(C) All of the mentioned
(D) None of the mentioned

Ans. Option (A) is correct.

Explanation: Batch object in Pythan has a unique id. The id () function returns the objects id.

Q. 5. Suppose list1 is [3, 4, 5, 20, 5, 25, 1, 3], what is list1 after list1.pop(1)?
(A) [3, 4, 5, 20, 5, 25, 1, 3]
(B) [1, 3, 3, 4, 5, 5, 20, 25]
(C) [3, 5, 20, 5, 25, 1, 3]
(D) [1, 3, 4, 5, 20, 5, 25]

Ans. Option (C) is correct.

Explanation: pop () method is used to remove the element from the list whose index is given. Here index 1 is given as argument in pop () so 4 has deleted from list.

Q. 6. What will be the output of the following python code?

```
def cube (x):
        return x * x * x
x = cube (2)
print (x)
```

(A) 2 **(B)** 4
(C) 8 **(D)** 20

Ans. Option (C) is correct.

Explanation: A function is created to do a specific task. Often there is a result from such a task. The return keyword is used to return values from a function. A function may or may not return a value. If a function does not have a return keyword, it will send none value.

Q. 7. What are the two main types of functions?
(i) Custom function
(ii) Built in function
(iii) User define function
(iv) System function
(A) (i) and (ii) **(B)** (ii) and (iii)
(C) (iii) and (iv) **(D)** (i) and (iv)

Ans. Option (ii) is correct.

> *Explanation:* Built in functions and user defined functions are the two main types of functions. The Built in functions are part of the pythan language that are per defined e.g. dir (),len (), abs () etc.
>
> The user defined functions are functions created with the def keyword.

Q. 8. Which of the following refers to mathematical function?
(A) sqrt **(B)** Rhombus
(C) add **(D)** Rqrt Add

Ans. Option (A) is correct.

> *Explanation:* Functions that are always available for usage, functions that are contained within external modules, which must be imported and functions defined by a programmer with the def keyword.
>
> e.g. from math import sqrt
>
> A sqrt () function is imported from the math module.

ASSERTION AND REASON BASED MCQs (1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

(A) Both A and R are true and R is the correct explanation for A.
(B) Both A and R are true and R is not correct explanation for A.
(C) A is true but R is false.
(D) A is false but R is true.

Q. 1. Assertion (A): Built in function are predefined in the language that are used directly.
Reason (R): print () and input () are built in functions

Ans. Option (B) is correct.

> *Explanation:* The Python built in function are defined as the functions whose functionality is pre-defined. The Python interpreter has several functions that are always present for use.
>
> e.g. print (), input (), sorted (), main() etc.

Q. 2. Assertion (A): Key word arguments are related to the function calls.
Reason (R): When you use keyword arguments in a function call, the caller identifies the arguments by the parameter name.

Ans. Option (A) is correct.

> *Explanation:* Keyword argument is the type of function argument are related to the function calls. When we use keyword arguments in a function call, the caller identifies the argument by the parameter name.

Q. 3. Assertion (A): A function is a block of organized are reusable code that is used to perform a single, related action.
Reason (R): Function provide better modular by for your application and a high degree of code reusability.

Ans. Option (A) is correct.

> *Explanation:* A function is a block of organised and reusable code that is used to perform a single, related action, function provide better modularity for your application and a high degree of code reusability. Function begin with the keyword def followed by function name and parenthesis ().

CASE-BASED MCQs

Attempt any four sub parts from each question. Each sub part carries 1 mark.

I. Function Arguments
These are the values provided in function call/ invoke statement. Required arguments are the arguments passed to a function in correct positional order. Keyword arguments are related to the function calls. When you use keyword arguments in a function call, the caller identifies the arguments by the parameter name. A default argument is an argument that assumes a default value, if a value is not provided in the function call for that argument.

Q. 1. How many types of arguments are there in functions?
(A) 2 **(B)** 3
(C) 4 **(D)** 5

Ans. Option (C) is correct.

> *Explanation:* There are four arguments in functions as:
>
> • Required arguments/Positional arguments.

- Keyword arguments
- Default arguments
- Variable length arguments

Q. 2. Which argument is an argument that assumes a default value?
(A) Default argument
(B) Positional argument
(C) Keyword argument
(D) None of these
Ans. Option (A) is correct.

Explanation: A default arguments is an arguments that assumes a default value, if a value is not provided in the function call for that argument.

Q. 3. Which arguments are also known as positional arguments?
(A) Keyword argument
(B) Default argument
(C) Required argument
(D) Variable length argument
Ans. Option (C) is correct.

Explanation: Required arguments are also known positional argument. These arguments are the arguments passed to a function in correct positional order.

Q. 4. Which of these is/are formal argument (s)?
(A) Required argument
(B) Keyword argument
(C) Default argument
(D) All of these
Ans. Option (D) is correct.

Explanation: Formal arguments arc the values provided in function call/invoke statement. You can call a function by using the following types of formal arguments as
- Required arguments
- Key word arguments
- Default arguments
- Variable length arguments

Q. 5. _____ are the values provided in function call/invoke statement.
(A) Functions **(B)** Arguments
(C) Preprocessor **(D)** Models
Ans. Option (B) is correct.

Explanation: Argument are the values provided in function call/invoke statement. A function is a block of organised and reusable code that is used to perform a single, related action.

II. Functions
A function is a block of organised and reusable code that is used to perform a single, related action. Functions provide better modularity for your application and a high degree of code reusability. The function blocks begin with the keyword def followed by the function name and parentheses (). Any input parameters or argumeters should be placed within these parentheses. You can also define parameters inside these parentheses.

Q. 1. Which keyword is used to define function?
(A) def **(B)** fun
(C) definition **(D)** function
Ans. Option (A) is correct.

Explanation: A function is a block of organised and reusable code that is used to perform a single, related action. The function locks with the keyword def followed by the function name.

Q. 2. Which type of bracket is placed after name of function?
(A) [ ] **(B)** { }
(C) ( ) **(D)** < >
Ans. Option (C) is correct.

Explanation: The function blocks begin with the keyword def followed by the function name and parentheses (). Any input parameters or arguments should be placed within these parentheses.

Q. 3. A/An _____ is a block of organised and reusable code.
(A) Function **(B)** argument
(C) parameter **(D)** Definition
Ans. Option (A) is correct.

Explanation: A function is a block of organised and reusable code that is used to perform a single, related action. Functions provide better modularity for your application and a high degree of code reusability.

Q. 4. Parameters are defined inside
(A) angular brackets **(B)** square brackets
(C) Mid brackets **(D)** Parentheses
Ans. Option (D) is correct.

Explanation: Parameters are defined inside parentheses to function are references to object, which are passed value. When you pass a variable to a function, Python passes the reference to the object to which the variable refers.

Q. 5. Function is used to perform _____ related action.
(A) double **(B)** multiple
(C) single **(D)** All of these
Ans. Option (C) is correct.

Explanation: Function is used to perform related action. A function is a block by code which only runs when it is called. You can pass data, known as parameters into a function.

III. Here is the function to find the sum of arguments

```
total = _____      # Line 1
def sum (arg1, arg2) __ # Line 2
   total = arg1 + _____ # Line 3
   print (total)
   return _____    # Line 5
total = sum (10, 20)
print ( _____ )    # Line 7
```

Q. 1. Which value or constant will be equal to variable total in line 1?

(A) 1 **(B)** 0
(C) 2 **(D)** None

Ans. Option (B) is correct.

> ***Explanation:*** Here total is the variable whose value is fixed during the execution of the program

Q. 2. Which symbol is used to terminate the function def in line 2?

(A) ; **(B)** .
(C) : **(D)** ,

Ans. Option (C) is correct.

> ***Explanation:*** Python provides the def keyword to define the function the function def in line 2 is terminated with symbol :

Q. 3. Fill the blank in line 3

(A) sum **(B)** 1
(C) arg2 **(D)** 0

Ans. Option (C) is correct.

> ***Explanation:*** Total is defined the sum of arg 1 and arg 2.

Q. 4. Which value will be return in line 5?

(A) sum **(B)** total
(C) True **(D)** False

Ans. Option (B) is correct.

> ***Explanation:*** This is function will return the value of variable total.

Q. 5. Fill the blank in line 7.

(A) sum **(B)** True
(C) False **(D)** total

Ans. Option (D) is correct.

> ***Explanation:*** Line 7 will print the value of total which is the sum of arg 1 and arg 2.

❑❑

CHAPTER

3

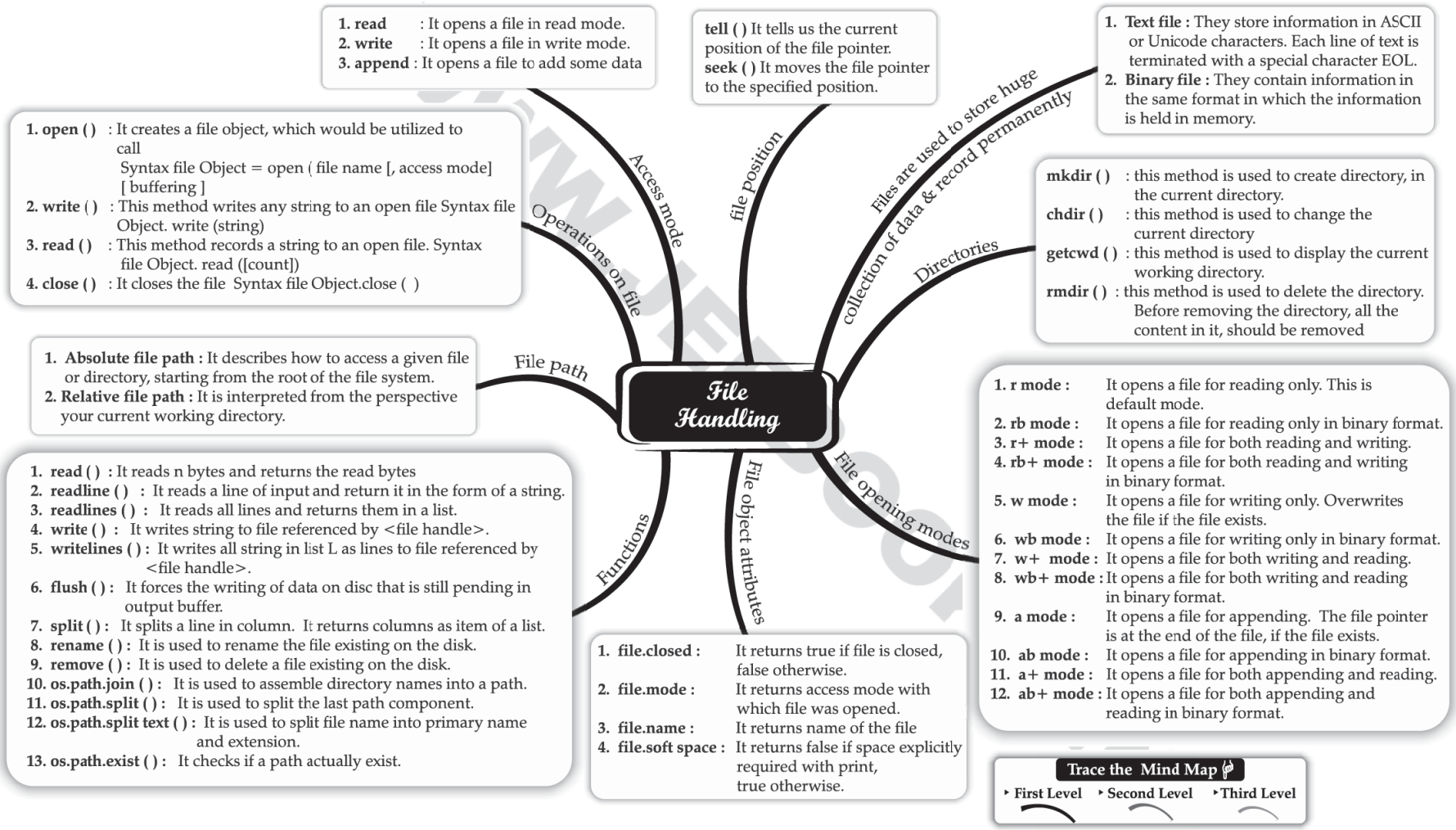
FILE HANDLING

Syllabus

- ***Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute path***
- ***Text file : opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write( ) and writelines( ), reading from a text file using read( ), readline( ), and readlines( ), seek and tell methods, manipulation of data in a text file***
- ***Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump( ) and load( ) method, read, write/create, search, append and update operations in a binary file***
- ***CSV file: import csv module, open/ close csv file, write into a csv file using csv.writerow( ) and read from a csv file using csv.reader( )***

Revision Notes

- Files are used to store huge collection of data and records permanently.
- Many applications require large amount of data. In such situation, we need to use some devices such as hard disk, compact disc etc, to store the data.
- **Need for a Data File**
  - It is a convenient way to deal with large quantities of data.
  - To avoid input of data multiple times during program execution.
  - To share data between various programs.
- **Types of files**
  - **Text files** store information in ASCII or Unicode characters. In text file, each line of text is terminated, (delimited) with a special character known as EOL (End of Line) character.
  - **Binary files** are just files that contain information in the same format in which the information is held in memory, i.e., In binary file, there is no delimiter for a line.
  - **CSV (Comma Separated Value) files** are a common file format for transferring and storing data.
- Access modes specify the type of operations to be performed on the opened file.



- **read**(), **readline**() and **readlines**() methods are available for reading data from the file.
- **write**() and **writelines**() are used for writing data in the file.
- **pickle** module is used in serialization of data. This allows us to store data in binary form in the file.
- **dump** and **load** functions are used to write and read data from file.
- The **open()** function creates a file object which would be utilized to call other methods associated with it.

  Syntax :

  file_object=open(filename[access_mode],[buffering])

  Here is the parameter details:

  - **filename:** The file name argument is a string value that contains the name of the file that you want to access.
  - **access_mode:** The access_mode determines the mode in which the file has to be opened i.e., read, write, append, etc. A complete list of possible values is given below in the table. This is optional parameter and the default file access mode is read (r).

Scan to know more about this topic

File Handling

File Opening Modes

MODES	DESCRIPTION
r	Opens a file for reading only in text format. The file pointer is placed at the beginning of the file. This is the default mode.
rb	Opens a file for reading only in binary format. The file pointer is placed at the beginning of the file. This is the default mode.
r+	Opens a file for both reading and writing. The file pointer will be at the beginning of the file.
rb+	Opens a file for both reading and writing in binary format. The file pointer will be at the beginning of the file.
w	Opens a file for writing only. Overwrites the file if the file exists. If the file does not exist, creates a new file for writing.
wb	Opens a file for writing only in binary format. Overwrites the file if the file exists. If the file does not exist, creates a new file for writing.
w+	Opens a file for both writing and reading. Overwrites the file if the file exists. If the file does not exist, creates a new file for reading and writing.
wb+	Opens a file for both writing and reading in binary format. Overwrites the file if the file exists. If the file does not exist, creates a new file for reading and writing.
a	Opens a file for appending. The file pointer is at the end of the file if the file exists. That is, the file is in the append mode. If the file does not exist, it creates a new file for writing.
ab	Opens a file for appending in binary format. The file pointer is at the end of the file if the file exists. That is, the file is in the append mode. If the file does not exist, it creates a new file for writing.
a+	Opens a file for both appending and reading. The file pointer is at the end of the file if the file exists. The file opens in the append mode. If the file does not exist, it creates a new file for reading and writing.
ab+	Opens a file for both appending and reading in binary format. The file pointer is at the end of the file if the file exists. The file opens in the append mode. If the file does not exist, it creates a new file for reading and writing.

- **Buffering:** If the buffering value is set to 0, no buffering will take place. If the buffering value is 1, line buffering will be performed while accessing a file. If you specify the buffering value as an integer greater than 1, then buffering action will be performed with the indicated buffer size. If negative, the buffer size is the system default (default behaviour).
- **The file object attributes:** Once a file is opened and you have one file object, you can get various information related to that file. Here is a list of all attributes related to the file object:

ATTRIBUTES	DESCRIPTION

file.closed	Returns True if file is closed, False otherwise.
file.mode	Returns access mode with which file was opened.
file.name	Returns name of the file.
file.softspace	Returns False if space explicitly required with print, True otherwise.

- **file () :** This is same as open ().
- **Random Access :** There are two functions that allow us to access a file in a non-sequential or random mode.
  - **tell() :** It tells us the position of the file pointer.
  - **seek() :** It moves the file pointer to the position specified.
- **Functions**

  (a) read () : syntax: <file handle>.read([n])

  It reads at most n bytes and returns the read bytes as string. If `n' is not specified it reads the entire file.

  (b) readline () : syntax: <file handle>.readline ([n])

  It reads a line of input, and returns it in the form of a string.

  (c) readlines () : syntax: <file handle>.readlines ()

  It reads all lines and returns them in a list.

  (d) write () : syntax: <filehandle>.write (str1)

  It writes string str1 to file referenced by <file handle>

  (e) writelines () : syntax: <file handle>.writelines (L).

  It writes all strings in list L as lines to file referenced by <file handle>

  (f) flush () : syntax: <file object>.flush()

  It forces the writing of data on disc that is still pending in output buffer.

  (g) Importing sys module lets you read/write from the standard input/output device using sys.stdin.read () and sys. stdout.write().

  (h) split () function splits a line in columns. It returns columns as items of a list.

  (i) rename () function is used to rename a file existing on the disk.

  syntax: os.remane(<current_file_name>,<new_file_name>)

  (j) remove () function is used to delete a file existing on the disk.

  syntax: os.remove(<file_name>)

  (k) os.path.join () is used to assemble directory names into a path.

  (l) os.path.split () is used to split off the last path component.

  (m)os.path.splittext() is used to split file name into primary name and extension.

  (n) os.path.exists () function checks if a path actually exists.
- **Absolute File Path :** It describes how to access a given file or directory starting from the root of the file system.
- **Relative File Path :** It is interpreted from the perspective of your current working directory.

Reading CSV files with CSV

Reading from a CSV file is done using the reader object. The CSV file is opened as a text file with Python's built in open() function, which returns a file object.

e.g.

```
import CSV
with open("Employee.txt") as CSV_file:
    CSV_reader = CSV.reader (CSV_file, delimiter = ',')
    line _count = 0
    for row in CSV_reader:
```

Scan to know more about this topic

File Objects- Reading and Writing to Files

```
if line_count = = 0:
    print (f' column names are {",".join(row}')
    line_count + = 1
else :
    print (f '\t{row [0]} works in the {row[1]}
    department, and was born in {row[2]}.')
    line_count + = 1
print (f'Processed {line_count} lines.')
```

Optional Python CSV reader Parameters

The reader object can handle different styles of CSV files by specifying additional parameters, some of which are shown below:

Scan to know more about this topic

Python CSV Module

- Delimiter specifies the character used to separate each field. The default is the comma (',').
- quotechar specifies the character used to surround fields that contain the delimiter character. The default is a double quote (' " ').
- escapechar specifies the character used to escape the delimiter character, in case quotes are not used. The default is no escape character.

Writing CSV Files with CSV

You can also write to a CSV file using a writer object and the write_row() methods:

e.g.

```
import CSV
    with open ('Employee_file.CSV', mode = 'w') as Employee_file:
    Employee_writer = CSV.writer (Employee_file, delimiter
    = ',' quotechar = ' " ' quoting = CSV. Quote_Minimal)
    Employee_writer.writerow(['Rahul' , Manager' , 'April'])
    Employee_writer.writerow(['Neha' , 'IT' , 'June'])
```

Know the Terms

- CSV stands for Comma Separated Values.
- Pickle module can be used to store any kind of object in file as it allows us to store Python objects with their structure.
- File Handle serve as a link to a file residing on the computer.
- File Mode governs the type of operations possible in the operand file. The default mode is read ('r')
- flush () function forces the writing of data on disc still pending in output buffers.
- seek () method can be used to position the file object at particular place in the file.
- tell () method returns an integer giving the current position of file pointer in the file.

STAND ALONE MCQs (1 Mark each)

Q. 1. To open a file c:\scores.txt for reading, we use _____

(A) infile = open("c:\scores.txt", "r")
(B) infile = open("c:\\scores.txt", "r")
(C) infile = open(file = "c:\scores.txt", "r")
(D) infile = open(file = "c:\\scores.txt", "r")

Ans. Option (B) is correct.

Explanation: Open () function creates a file object which would be utilised to call other methods associated with it.
file object = open [file name (acess_mode]), (buffering)] open (file name, [acess_mode] , [buffering])

Q. 2. Which of the following statements are true?
(A) When you open a file for reading, if the file does not exist, an error occurs
(B) When you open a file for writing, if the file does not exist, a new file is created
(C) When you open a file for writing, if the file exists, the existing file is overwritten with the new file
(D) All of the mentioned

Ans. Option (D) is correct.

Explanation: Given all options are true, when we open a file for recording, if the file does not exist, an error occurs. When we open a file for writing, if the file does not exist, a new file is created.
When we open a file for writing, if the file exists, the existing file is overwritten with the new file.

Q. 3. To read two bytes from a file object infile, we use _____
(A) infile.read(2)
(B) infile.read()
(C) infile.readline()
(D) infile.readlines()

Ans. Option (A) is correct.

Explanation: read () function reads at most *n* bytes and returns the read bytes as string.
Syntax <file-handle>.read [[*n*]] read ([*n*])
to read two character, so *n* = 2 and file name infile
infile.read (2)

Q. 4. To read the entire remaining contents of the file as a string from a file object infile, we use _____
(A) infile.read(2)
(B) infile.read()
(C) infile.readline()
(D) infile.readlines()

Ans. Option (B) is correct.

Explanation: In read () function, if n is not specified then it reads entire file.

Q. 5. What will be the output of the following Python code?

```
f = None
for i in range (5):
  with open("data.txt", "w") as f:
   if i > 2:
        break
   print(f.closed)
```

(A) True **(B)** False
(C) None **(D)** Error

Ans. Option (A) is correct.

Explanation: It will give output as true.

Q. 6. Which function is used to split a line in columns?
(A) split() **(B)** spt()
(C) split_line() **(D)** All of these

Ans. Option (A) is correct.

Explanation: split () function splits a line in columns. It returns columns as item of a list.

Q. 7. It determines the mode in which the file has to be opened.
(A) file name **(B)** access_mode
(C) dump **(D)** pickle

Ans. Option (B) is correct.

Explanation: The access_mode determine the mode in which the file has to be opened i.e., read, write, append, etc.

Q. 8. Text files store information in _____ characters.
(A) ASCII **(B)** Unicode
(C) (A) and (B) **(D)** None of these

Ans. Option (C) is correct.

Explanation: Text files store information in ASCII or unicode characters. In text file, each line of text is terminated, with a special character known as EOL (End of line) character.

ASSERTION AND REASON BASED MCQs (1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

(A) Both A and R are true and R is the correct explanation for A.
(B) Both A and R are true and R is not correct explanation for A.
(C) A is true but R is false.
(D) A is false but R is true.

Q. 1. Assertion (A): CSV stands for comma separated value.
Reason (R): CSV files are a common file format for transferring and storing data.

Ans. Option (B) is correct.

Explanation: CSV stands for comma separated value. These files are common file format for transferring and storing data. The ability to read, manipulate and write data to and from CSV files using Python is a key skill to master for any data scientist or business analysis.

Q. 2. **Assertion (A):** Access mode 'a' opens a file for appending.
Reason (R): The file pointer is at the end of the file if the file exists

Ans. Option (A) is correct.

Explanation: Acess mode 'a' opens a file for appending. The file pointer is at the end of the file if the file exists. That is, the file is in the append mode. If the file does not exist, it creates a new file for writing.

Q. 3. **Assertion (A):** Text file stores information in ASCII or unicode characters.
Reason (R): In text file, thee is no delimiter for a line.

Ans. Option (C) is correct.

Explanation: Text file store information in ASCII or unicode character. IN text file, each line of text is terminated (determined with a special character known as EOL (end of line) character.

CASE-BASED MCQs

Attempt any four sub parts from each question. Each sub part carries 1 mark.

I. Text File

A text file can be understood as a sequence of characters consisting of alphabets, numbers and other special symbols. When we open a text file using a text editor (e.g., Notepad), we see several lines of text. However, the file contents are not stored in such a way internally. Rather, they are stored in sequence of bytes consisting of 0s and 1s. In ASCII, UNICODE or any other encoding scheme, the value of each ASCII value and shows us the equivalent character that is readable by the human being. For example, the ASCII value 65 (binary equivalent 1000001) will be displayed by a text editor as the letter 'A' since the number 65 in ASCII character set represents 'A'. Each line of a text files is terminated by a special character as EOL. However, other characters can be used to indicate EOL. When a text editor or a program interpreter encounters the ASCII equivalent of the EOL character, it displays the remaining file contents starting from a new line. Contents in a text file are usually separated by whitespace, but comma (,) and tab (\t) are also commonly used to separate values in a text file.

Q. 1. The file extension (s) used for text files is/are
(A) .txt **(B)** .py
(C) .csv **(D)** All of these

Ans. Option (D) is correct.

Explanation: Text file store information is ASCII or unicode characters. In text file, each line of text is terminated with a special character known as EOL character. The file extension used for text file is .txt.

Q. 2. What is the default EOL character in Python?
(A) \n **(B)** \t
(C) \e **(D)** \l

Ans. Option (A) is correct.

Explanation: EOL (End of line) character in Python represents by \ *n*

Q. 3. Each line of a text file is terminated by a special character called
(A) DNS **(B)** IP
(C) CSV **(D)** EOL

Ans. Option (D) is correct.

Explanation: Each line of a text file is terminated a special character called EOL (End of line) when a text editor or a program interpreter encounters the ASCII equivalent of the EOL character

Q. 4. How can you separate the content in a text file?
(A) whitespace **(B)** tab
(C) comma **(D)** All of these

Ans. Option (D) is correct.

Explanation: A text file can be sequence of characters consisting of alphabets, number and other special symbols. The content of text file can be separate by white space, tab and comma.

Q. 5. The number 65 in ASCII character set represents
(A) D **(B)** A
(C) C **(D)** B

Ans. Option (B) is correct.

Explanation: The ASCII value 65 (binary equivalent 1000001) will be displayed by a text editor as the letter A.

II. Binary Files

Binary files are also stored in terms of bytes (0s and 1s), but unlike text files, these bytes do not represent the ASCII values of characters. Rather, they represent the actual content such as image, audio, video, compressed versions of other files, executable files, etc. These files are not human readable.

Thus, trying to open a binary file using a text editor will show some garbage values.

We need specific software to read or write the contents of a binary file. Binary files are stored in a computer in a sequence of bytes. Even a single bit change can corrupt the file and make it unreadable to the supporting application. Also, it is difficult to remove any error which may occur in the binary file as the stored contents are not human readable. We can read and write both text and binary files through Python programs.

Q. 1. What is the extension of binary files?

(A) .dat **(B)** .bin
(C) .txt **(D)** .file

Ans. Option (A) is correct.

> ***Explanation:*** Binary files are also stored in terms of bytes, but unlike text file, these bytes do not represent the ASCII values of characters. The extension of binary files, is .dat.

Q. 2. What value will be shown if you try to open a binary file using a text?

(A) Default value **(B)** Advance value
(C) Garbage value **(D)** Parameter value

Ans. Option (C) is correct.

> ***Explanation:*** Binary files represents the actual content such as image, audio, video, compressed versions of other files executable files etc. These files are not human readable. Thus, trying to open a binary file using a text editor will show some garbage values.

Q. 3. In computer, binary files are stored in terms of

(A) bit **(B)** bytes
(C) nibble **(D)** mnemonics

Ans. Option (B) is correct.

> ***Explanation:*** Binary files are also stored in terms of bytes. Byte is measurement of memory unit.

Q. 4. Binary files are human readable or not?

(A) Yes **(B)** No
(C) Depend on data **(D)** Sometimes

Ans. Option (B) is correct.

> ***Explanation:*** No, binary files are not human readable. So, if you try to open a binary file using text editor, it will show garbage values.

Q. 5. Binary files represent the actual content

(A) image **(B)** audio
(C) video **(D)** All of these

Ans. Option (D) is correct.

> ***Explanation:*** Binary files represent the actual content such as image, audio, video, compressed versions of other files, executable file etc.

III. The Pickle Module

To save any object structure along with data, Python provides a module called Pickle. The module pickle is used for serializing and de-serializing and Python object structure. Pickling is a method of preserving food items by placing them in some solution, which increases the shelf life. In other words, it is a method to store food items for later consumption. Serialization is the process of transforming data or an object in memory (RAM) to stream of bytes called byte streams. These bytes streams in a binary file can then be stored in a disk or in a database or sent through a network. Serialization process is also called pickling. De-serialization or unpickling is the inverse of pickling process where a byte stream is converted back to python object. The pickle module deals with binary files. Here, data are not written but dumped and similarly, data are not read but loaded. The pickle Module must be imported to load and dump data. The pickle module provides two methods – dump( ) and load( ) to work with binary files for pickling and unpickling, respectively.

Q. 1. _____ implements binary protocols for serializing and de-serializing a Python object structure.

(A) pickle module **(B)** unpickle module
(C) math module **(D)** random module

Ans. Option (A) is correct.

> ***Explanation:*** The pickle module is used for implementing binary protocols for serializing and de-serializing a Python object structure. The pickle module deals with binary files.

Q. 2. Which method is used to convert (pickling) python object for writing data in a binary file?

(A) load( ) **(B)** dump( )
(C) seek( ) **(D)** tell( )

Ans. Option (B) is correct.

> ***Explanation:*** dump () method is used to convert Python object for writing data in a binary file. The dump (c) needs the json file name in which the output has to be stored as an argument.

Q. 3. This method is used to load (unpickling) data from a binary file.

(A) load( ) **(B)** dump( )
(C) seek( ) **(D)** tell( )

Ans. Option (A) is correct.

Explanation: load () method is used to load (unpickling) data from a binary file. It takes a file object and returns the json object.

Q. 4. It is the process by which a python object is converted to a byte stream.

(A) Unpickling **(B)** loading
(C) pickling **(D)** Dumping

Ans. Option (C) is correct.

Explanation: Pickling is a process where a Python object hierarchy is converted into a byte steam. Serialization process is also called pickling.

Q. 5. The syntax of dump( ) method

(A) dump (data_object, file_object)
(B) dump [data_object, file_object]
(C) dump [data_object]
(D) dump [file_object]

Ans. Option (A) is correct.

Explanation: dump () method is used to convert Python object for writing data in a binary file. The syntax of dump () is dump (data_object, file_object).

IV. Rohit, a student of class 12th, is learning CSV file Module in Python. During examination, he has been assigned an incomplete python code (shown below) to create a CSV File 'Student.csv' (content shown below). Help him in completing the code which creates the desired CSV File.

CSV File

(A) AKSHAY.XII,A
(B) ABHISHEK.XII,A
(C) ARVIND.XII,A
(D) RAVI.XII,A
(E) ASHISH.XII,A

Incomplete Code

```
import ____ # Statement -1
fh = open ( ___, ____, newline='')# Statement -2
stuwriter – csv. _____ # Statement -3
data = [ ]
header = ['Roll_No', 'NAME', 'CLASS', 'SECTION']
data. Append (header)
for i in range (5) :
roll_no = int (input("Enter Roll Number : "))
name = input ("Enter Name : ")
Class = input ("Enter Class : ")
Section = input ("Enter Section : ")
rec = [ _____ ] # Statement -4
data.append(rec)
stuwriter. _____ (data) # Statement -5
fh.close ( )
```

Q. 1. Identify the suitable code for blank space in line marked as Statement-1.

(A) csv file **(B)** CSV
(C) csv **(D)** Csv

Ans. Option (C) is correct.

Explanation: csv (comma separated values) file is importing in statement 1.

Q. 2. Identify the missing code for blank space in line marked as statement-2?

(A) "School.csv", "w" **(B)** "Student.csv", "w"
(C) "Student.csv", "r" **(D)** "School.csv", "r"

Ans. Option (B) is correct.

Explanation: In statement, we need to open a file naming student CSV for writing.
So, we will we "Student.csv", "w" in blank space.

Q. 3. Choose the function name (with argument) that should be used in the blank space of line marked as Statement-3

(A) reader(fh) **(B)** reader(MyFile)
(C) writer(fh) **(D)** writer(MyFile)

Ans. Option (C) is correct.

Explanation: In statement 3, writer (ch) should be used. CSV, writer class to insert data to the CSV file. This class returns a writer object which is responsible for converting the user's data into a delimited string.

Q. 4. Identify the suitable code for blank space in marked as statement-4.

(A) 'ROLL_NO', 'NAME', 'CLASS', 'SECTION'
(B) ROLL_NO, NAME, CLASS, SECTION
(C) 'roll_no', 'name', 'class', 'section'
(D) roll_no,name,Class, Section

Ans. Option (D) is correct.

Explanation: In statement 4, variable rec stores all other variables as roll-no, name class, section in list form.

Q. 5. Choose the function name that should be used in the blank space of line marked as Statement-5 to create the desired CSV File?

(A) dump( ) **(B)** load( )
(C) writerows( ) **(D)** writerow( )

Ans. Option (C) is correct.

Explanation: In statement 5, its create a desired CSV file writerows( ) is used.
This function writes each sequence in a list as a comma separated line of items in the file.
This separated line of items in the file.

V. Amritya Seth is a programmer, who has recently been given a task to write a python code to perform the following binary file operations with the help of two user defined functions/modules:

[CBSE Board QB 2021]

(a) AddStudents() to create a binary file called STUDENT.DAT containing student information-roll number, name and marks (out of 100) of each student.

(b) GetStudents() to display the name and percentage of those students who have a percentage greater than 75. In case there is no student having percentage > 75 the function displays an appropriate message. The function should also display the average percent.

He has succeeded in writing partial code and has missed out certain statements, so he has left certain queries in comment lines. You as an expert of python have to provide the missing statements and other related queries based on the following code of Amritya.

Answer any four questions (out of five) from the below mentioned questions.

```
import pickle
def AddStudents ( ) :
    _____ #1 statement to open the binary file
to write data
    while True:
    Rno = int (input("Rno :"))
    Name = input ("Name : ")
    Percent = float (input ("Percent : "))
    L = [Rno, Name, Percent]
    _____ #2 statement to write the list L into
the file
    Choice = input ("enter more (y/n) : ")
        if Choice in "nN":
                    break
    F.close( )
def GetStudents ( ) :
    Total = 0
    Count rec = 0
    Count above 75 = 0
    with open ("STUDENT.DAT", "rb") as F :
while True:
                    try :
                                _____ #3 statement
to read from the file
                                    Count rec+=1
                                    Total+=R [2]
                                    if R [2] > 75 :


print (R [1], "has percent = ", R [2])
                                Count above 75+=1
    except:
    break
if Count above 75==0:
                                print ("There is no
student who has percentage more than 75")
    average=Total/Count rec
                                print ("average percent
of class = ", average)
AddStudents ( )
GetStudents ( )
```

Q. 1. Which of the following commands is used to open the file "STUDENT.DAT" for writing only in binary format? (marked as # 1 in the Python code)

(A) F= open("STUDENT.DAT",'wb')
(B) F= open("STUDENT.DAT",'w')
(C) F= open("STUDENT.DAT",'wb+')
(D) F= open("STUDENT.DAT",'w+')

Ans. Option (A) is correct.

> ***Explanation:*** To open the file named "STUDENT .DAT" for writing only in binary format, we should used open () function and '*wb*' acess mode.
> F = open ("student.dat", '*wb*')

Q. 2. Which of the following commands is used to write the list L into the binary file, STUDENT.DAT? (marked as #2 in the Python code)

(A) pickle.write(L,f)
(B) pickle.write(f, L)
(C) pickle.dump(L,F)
(D) f=pickle.dump(L)

Ans. Option (C) is correct.

> ***Explanation:*** dump () method is used to convert Python object for writing data in a binary file.
> dump (data-object, file object)
> In given question, data-object is L and file-object is F, so pickle. instead of, dump (L, F)

Q. 3. Which of the following commands is used to read each record from the binary file STUDENT.DAT? (marked as #3 in the Python code)

(A) R = pickle.load(F)
(B) pickle.read(r,f)
(C) r=pickle.read(f)
(D) pickle.load(r,f)

Ans. Option (A) is correct.

> ***Explanation:*** load () method is used to load data from a binary file. To read each record from the binary file with file object F, use
> R = pickle. pickle.load(F)

Q. 4. Which of the following statement(s) are correct regarding the file access modes?

(A) 'r+' opens a file for both reading and writing. File object points to its beginning.
(B) 'w+' opens a file for both writing and reading. Adds at the end of the existing file if it exists and creates a new one if it does not exist.
(C) 'wb' opens a file for reading and writing in binary format. Overwrites the file if it exists and creates a new one if it does not exist.

(D) 'a' opens a file for appending. The file pointer is at the start of the file if the file exists.

Ans. Option (A) is correct.

> *Explanation:* 'It' opens a file for both reading and writing. The file pointer will be at the beginning of the file.
> ' *wb*' opens a file for both writing and reading. Overwrites the file if the file exists.
> ' *a*' opens a file for appending. The file pointer is at the end of the file if the file exists.

Q. 5. Which of the following statements correctly explain the function of seek() method?

(A) tells the current position within the file.

(B) determines if you can move the file position or not.

(C) indicates that the next read or write occurs from that position in a file.

(D) moves the current file position to a given specified position

Ans. Option (D) is correct.

> *Explanation:* seek () us a built in function used for file handling. It moves the file pointer to the specified position.

VI. Arun, during Practical Examination of Computer Science, has been assigned an incomplete search ( ) function to search in a pickled file student.dat. The File student.dat is created by his Teacher and the following information is known about the file.

[CBSE QB 2021]

- File contains details of students in [roll_no,name,marks] format.
- File contains details of 10 students (i.e. from roll_no 1 to 10) and separate list of each student is written in the binary file using dump( ).

Arun has been assigned the task to complete the code and print details of roll number 1.

```
def search ( ):
f = open ("student.dat", _____ )        # Statement-1
_____ :                                 # Statement-2
    while True:
        rec = pickle. _____             # Statement-3
            if ( _____ ) :  # Statement-4
                            Print (rec)
except : pass
                _____                   # Statement-5
```

Q. 1. In which mode Arun should open the file in Statement-1?

(A) r **(B)** r+

(C) rb **(D)** wb

Ans. Option (C) is correct.

> *Explanation:* In statement 1, ' *rb*' made should be used to open the file *rb* opens a file for reading only in binary format. The file pointer is placed at the beginning of the file. This is default mode.

Q. 2. Identify the suitable code to be used at blank space in line marked as Statement-2

(A) if(rec[0]==1) **(B)** for i in range(10)

(C) try **(D)** pass

Ans. Option (C) is correct.

> *Explanation:* In statement 2, try will be used in blank as any error or exception occur.

Q. 3. Identify the function (with argument), to be used at blank space in line marked as Statement-3.

(A) load( ) **(B)** load(student.dat)

(C) load(f) **(D)** load(fin)

Ans. Option (C) is correct.

> *Explanation:* In statement 3, load (*f*) will be used where load (file-object) is used to load data from a binary file.

Q. 4. What will be the suitable code for blank space in line marked as Statement-4.

(A) rec[0]==2 **(B)** rec[1]==2

(C) rec[2]==2 **(D)** rec[0]==1

Ans. Option (D) is correct.

> *Explanation:* The statement 4, there are condition rec [0]== 1 used if statement. If this condition becomes true then print (rec) will be execute.

Q. 5. Which statement Arun should use at blank space in line marked as Statement- 5 to close the file.

(A) file.close( ) **(B)** close(file)

(C) f.close( ) **(D)** close( )

Ans. Option (C) is correct.

> *Explanation:* The statement 5, to close the file with file object *f*, f.close () is used where close () method is used to close the opened file.

VII. Radha Shah is a programmer, who has recently been given a task to write a python code to perform the following CSV file operations with the help of two user defined functions/modules:

[CBSE QB 2021]

(a) CSVOpen( ) : to create a CSV file called BOOKS. CSV in append mode containing information of books – Title, Author and Price.

(b) CSVRead( ) : to display the records from the CSV file called BOOKS.CSV where the field title starts with 'R' .

She has succeeded in writing partial code and has missed out certain statements, so she has left certain queries in comment lines.

```
import csv
def CSVOpen( ) :
```

```
    with open ('books.csv',' _____ ', newline=' ')
    as csvf :                              #Statement-1
    cw= _____                              #Statement-2
    _____                          #Statement-3
    Cw.writerow (['Rapunzel', 'Jack', 300])
    Cw.writerow (['Barbie', 'Doll', 900])
    Cw.writerow (['Johnny', 'Jane', 280])
def CSVRead ( ) :
    try :
    with open ('books.csv', 'r') as csvf :
            cr= _____
                                           #Statement-4
            for r in cr :
             if _____ :  #Statement-5
                         print (r)
                except :
    print ('File Not Found')
CSVOpen ( )
CSVRead ( )
```

You as an expert of Python have to provide the missing statements and other related queries based on the following code of Radha.

Answer any four questions (out of five) from the below mentioned questions.

Q. 1. Choose the appropriate mode in which the file is to be opened in append mode (Statement 1)

(A) w+ **(B)** ab
(C) r+ **(D)** a

Ans. Option (D) is correct.

> ***Explanation:*** ' *a*' access made opens a file for appending. The file painter is at the end of the file if the file exists. That is, the file is in the append mode. If the file does not exist, it ceates a new file for writing.

Q. 2. Which statement will be used to create a csv writer object in Statement 2.

(A) csv.writer(csvf) **(B)** csv.writer(csvf)
(C) csvf.writer( ) **(D)** cs.writer(csvf)

Ans. Option (B) is correct.

> ***Explanation:*** In statement 2, CSV, writer (CSVf) is used. CSV. writer class is used to insert data to the CSV file. This class returns a writer object which is responsible for converting the user's into a delimited string.

Q. 3. Choose the correct option for Statement 3 to write the names of the column headings in the CSV file, BOOKS.CSV.

(A) cw.writerow('Title', 'Author', 'Price')
(B) cw.writerow(['Title', 'Author', 'Price'])
(C) cw.writerows('Title', 'Author', 'Price')
(D) cw.writerows(['Title', 'Author', 'Price'])

Ans. Option (B) is correct.

> ***Explanation:*** In statement 3, to write the names of column heading or one row into a file, use writerow () method writes a single row at a time. Field row can be written using this method.

Q. 4. Which statement will be used to read a csv file in Statement 4.

(A) cs.read(csvf) **(B)** csv.reader(csvf)
(C) csvf.read( ) **(D)** csvf.reader(cs)

Ans. Option (B) is correct.

> ***Explanation:*** In statement 4, reader (CSVf) will be used to read a CSV file.
> reader () used to read the file which returns an iterable reader object.

Q. 5. Fill in the appropriate statement to check the field Title starting with 'R' for Statement 5 in the above program.

(A) r[0][0]=='R' **(B)** r[1][0]=='R'
(C) r[0][1]=='R' **(D)** r[1][1]=='R'

Ans. Option (A) is correct.

> ***Explanation:*** In statement 5, there is condition *r*[0] [0] == 'R' used to check the field. If this condition is true, print (*r*) statement will be executed.

VIII. Your teacher has given you a method/function FilterWords( ) in python which read lines from a text file NewsLetter.TXT, and display those words, which are less than 4 characters. Your teacher intentionally kept few blanks in between the code and asked you to fill the blanks so that code will run to find desired result. Do the needful with the following python code. **[CBSE QB 2021]**

```
def FilterWords ( ) :
    c=0
    file=open ('NewsLetter.TXT ', ' _____ ' )
                                           #Statement-1
    line = file. _____                     #Statement-2
    word = _____                           #Statement-3
    for c in word :
if _____ :                                 #Statement-4
        Print (c)_____                     #Statement-5
FilterWords ( )
```

Q. 1. Write mode of opening the file in statement-1?

(A) a **(B)** ab
(C) w **(D)** r

Ans. Option (D) is correct.

> ***Explanation:*** *r* mode opens a file for reding only in text format. The file painter is placed at the beginning of the file.

Q. 2. Fill in the blank in statement-2 to read the data from the file.

(A) File.Read( ) **(B)** file.read( )
(C) read.lines( ) **(D)** readlines( )

Ans. Option (B) is correct.

> *Explanation:* In statement 2, file read () is used. read () reads atmost *n* bytes and returns the read bytes as string. If '*n*' is not specified, it reads the entire file.

Q. 3. Fill in the blank in statement-3 to read data word by word.

(A) Line.Split() **(B)** Line.split()
(C) line.split() **(D)** split.word()

Ans. Option (C) is correct.

> *Explanation:* split () function is used to split a line in columns. It return columns as items of a list.

Q. 4. Fill in the blank in Statement-4, which display the word having lesser than 4 characters.

(A) len(c)==4 **(B)** len(c)<4
(C) len ( )==3 **(D)** len ( )==3

Ans. Option (B) is correct.

> *Explanation:* len () function is used to count the characters in a word.

Q. 5. Fill in the blank in Statement-5 to close the file.

(A) file.close( ) **(B)** File.Close( )
(C) Close( ) **(D)** end( )

Ans. Option (A) is correct.

> *Explanation:* to close the file.close() is used.

❑❑

WRITING NOTES

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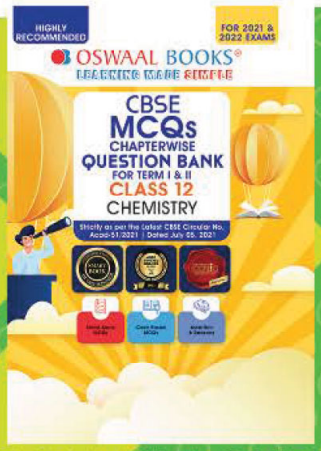

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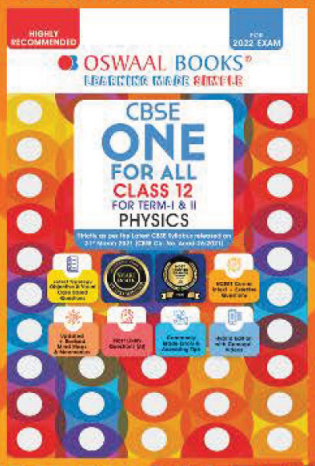

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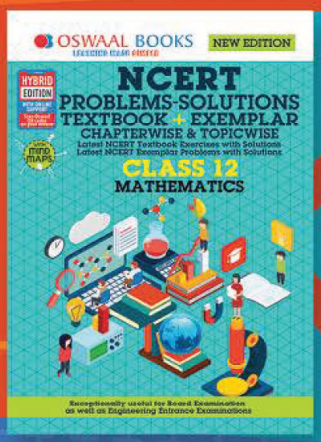

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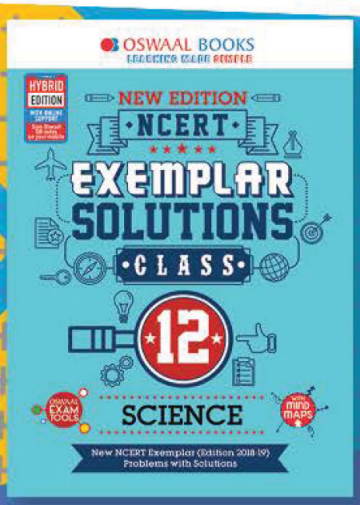

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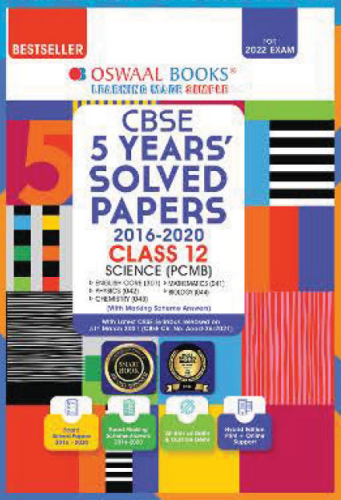

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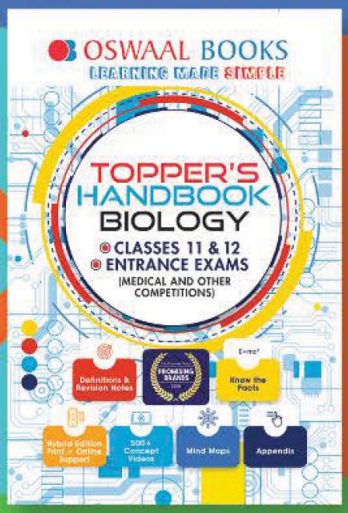

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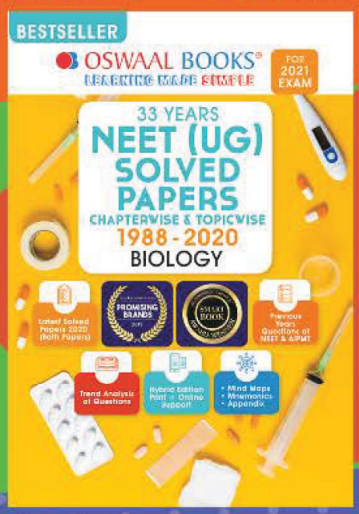

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