Chapter 11: Python

Assignment Solutions

Multiple-Choice Questions (MCQs)

1. Which of the following statements is correct about assigning values to a variable?

a. x=2 b. 2=x
c. x-->2 d. x>2

Ans. a

2. Which of the following is true about naming a variable?

a. The variable name can only be started from either an underscore or a letter
b. You cannot use keywords while declaring a variable.
c. The variable names are case-sensitive in Python
d. All of these

Ans. d

3. Which of the following is an example of float data type?

a. -55 b. 58
c. 62.0 d. 1L

Ans. c

4. In how many ways, can you define strings in Python?

a. By using double quotes
b. By using single quotes
c. By using triple double quotes
d. All of these

Ans. d

5. Which of the following symbols represents floor division?

a. ** b. //
c. /* d. #

Ans. b

Very Short Answer Questions

6. Who developed Python?

Ans. Python was developed by a Dutch programmer Guido Van Rossum.

7. Name the two languages whose features are present in Python.

Ans. The two languages whose features are present in Python are C and java.

8. Define open source programming language.

Ans. An open source programming language is a language which can be freely downloaded from the Internet.

9. What is byte code?

Ans. A byte code is a fixed set of instruction whose execution remains the same in every type of operating system or hardware.

10. Define object in Python.

Ans. An object can be defined as an entity that has physical existence in the real world.

Short Answer Questions

11. What are comments? Why are they useful?

Ans. A comment is useful to describe the elements of a program. Comments are not executed in the final result. Hence, it is not compulsory to write comments. However, comments improve the understanding of a program.

12. Write a short note on JIT compiler.

Ans. The compiler which converts the byte code into machine code with greater speed than the interpreter is known as just-in-time (JIT) compiler. This compiler has improved the execution of a Python program and thus improves the performance.

13. What is the difference between interactive and script mode of executing Python programs?

Ans. **Interactive mode:** The interactive mode in Python, also called Python IDLE, is mainly used for executing a single line of statements and viewing the results. IDLE stands for Integrated Development and Learning Environment.

Script mode: The script mode is preferred or used for writing and determining the output of multi-line programs. In the script mode, we type the program in the text editor and then save it with the extension .py, such as first.py. The contents in the text editor file are commonly called script.

14. Why are variables used in Python? Explain with a suitable example.

Ans. A variable is used for storing some value or data. In other words, variables are reserved memory locations that can store values. A variable is allocated memory on the basis of the type of value that you want to store in the variable.

For example, you can allocate value to a variable by using the following line of code:

X = 2

15. Discuss binary operators with a suitable example.

Ans. The arithmetic operators that operate on two operands are called binary operators. Suppose you write x - y, the operator '-' is acting on two operands 'x' and 'y'.

Long Answer Questions

16. Explain the following features of Python:

a. Database connectivity
b. Scalable
c. High-level programming language
d. Embeddable
e. Platform independent

Ans.

a. **Database connectivity:** A database can be regarded as a software application that allows you to store and manipulate data. Python allows you to make connections with different types of database programs, such as Oracle, Sybase or MySql to perform different types of operations in the database, such as inserting, deleting or updating the stored data.

b. **Scalable:** Programs developed in Python are scalable in nature, which means they can be executed or moved on to other operating systems or hardware. A scalable program can be run successfully in the new environment and performs its functionality in the same manner. The programs developed in Python are highly scalable as they can be executed on a new platform and are capable of using the features of the new platform effectively for their performance.

c. **High-level programming language:** Python is regarded as a high-level programming language as English words are used while creating programs in it like any other high-level programming language, such as COBOL, PHP or Java.

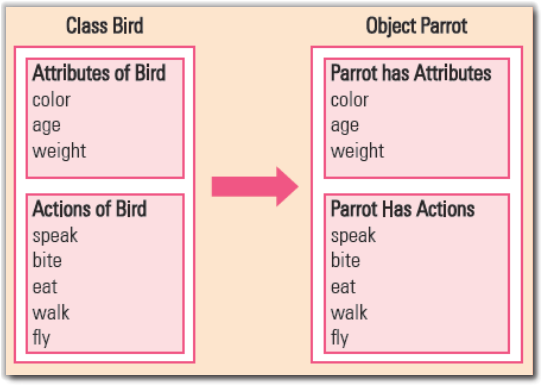
d. **Embeddable:** Python can easily be integrated with other high-level languages, such as C++, COM, CORBA, Java, etc.

e. **Platform independent:** Whenever a Python program is compiled in Python compiler, a byte code is generated. The byte code instructions can be executed on any computer system with the help of Python Virtual Machine (PVM). The interpreter present inside the PVM converts the byte code instructions into machine code which can be easily understood by the processor and run the machine code to obtain results.

17. Discuss the relationship between classes and objects in Python.

Ans. An object can be defined as an entity that has a physical existence in the real world. Consider an example of a parrot. It can either exist physically inside one's home or outside it. An object exhibits certain behavior which is represented by its attributes and actions. For example, a parrot has attributes, like color, age, weight, etc. These attributes are represented by variables in a programming language. The parrot can perform different actions, such as speak, bite, eat, walk, fly, etc. These actions of an object are represented by methods (or functions) in a programming language. Therefore, an object comprises of variables and methods.

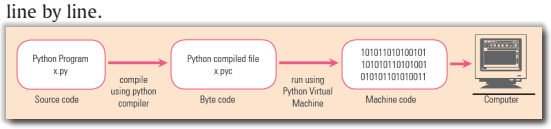
On the other hand, unlike objects, a class does not have any physical existence. A class can be defined as an abstract idea which can specify the common behavior of several objects of the class. For example, bird is a class. When we talk about a parrot, we imagine a bird with a head, beak, wings, tail, etc. This imaginary picture in your mind is called a class. Now, consider a parrot with all the attributes that we have in our mind along with its physical existence and, hence, the parrot becomes the object of the bird class.



A Class and its object

18. Explain the role of PVM in the execution of Python program.

Ans. A computer can only execute binary code instructions comprising 0s and 1s. The binary code is also known as machine code as it is understandable to the machine (i.e., computer). Therefore, it becomes necessary that byte code should get converted into machine code so that a machine can understand and execute the code. For this conversion, Python Virtual Machine (PVM) is required. PVM uses an interpreter which can understand the byte code and translates into machine code. The computer processor further executes these machine code instructions and displays the results. An interpreter converts the source code of the program line by line.



Steps of the execution of a Python program

19. How is memory managed in Python? Explain.

Ans. In Python, everything is considered as an object and for every object, memory needs to be allocated. The job of memory allocation needed for objects is done by the memory manager present inside the PVM. The memory area allocated to objects is known as heap. It is allocated at runtime or dynamically. The size of the heap memory relies on the RAM of a computer and can be increased or decreased depending upon the requirement of the Python program. The memory allocation for any Python program is done by the operating system installed on the computer. On top of the operating system, a raw memory allocator ensures whether enough memory is available to store objects. Above raw memory allocator, there are several object-specific allocators that are available on the heap to implement different kinds of memory management policies depending upon the kind of objects. For example, there are different ways of storing integers and strings in memory. Such storage issues of different types of objects are handled by object-specific memory allocators.

20. Enlist the rules that need to be kept in mind while declaring variables in a Python program.

Ans. There are some rules or conventions that need to be kept in mind while creating a variable name in Python program:

a. The variable name can only be started from either an

underscore or a letter. The remaining name of the variable can include letters, numbers and underscores. For example, _emp_id, empid, or empid1.

b. You cannot use keywords while declaring a variable as these are reserved words in Python. The keywords are those words whose functionalities are already defined in Python. For example, Print is a keyword in Python; therefore, it cannot be used as a variable.

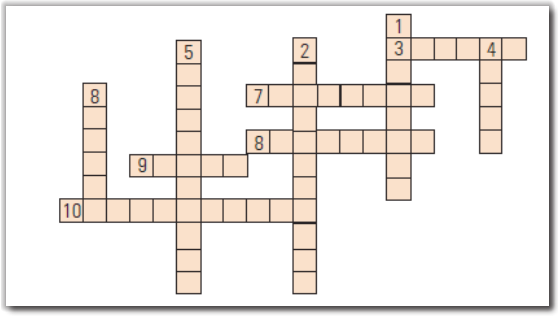
c. The variable names are case-sensitive in Python, which means the same variable written in different casing of letters is treated as different. For example, EMPID, Empid and empID are three different variables.

d. You should avoid using the uppercase letters 'I' and 'O' for naming variables as they resemble like 1 and 0.

e. You must declare descriptive names for the variables as it enhances its readability of the Python program. For example, total_marks is the name of a variable that references total marks of a student. If we declare the name of variable as x instead of total_marks, then you will not be able to know what does the number referenced by x signify.

Application-Oriented Questions

1. Enter the words in the boxes by using the clues provided:



Across

3 An entity that has a physical existence in the real world.

7 It describes the type of value a variable can contain.

8 It is known as a reserved memory location.

9 It is a text editor used for writing Python script in Linux.

10 A mode in python to execute a single line of code.

Down

1 It compiles the program in one go.

2 It compiles the program line by line.

4 It has no physical existence.

5 It is a feature of Python due to which it can integrate with other high-level languages.

6 It a programming language that has features of both C++ and Java.

Ans.

1. Compiler
2. Interpreter
3. Object
4. Class
5. Embeddable
6. Python
7. Datatype
8. Variable
9. gedit
10. Interactive

2. The following sentences are mismatched. All you have to do is to match them correctly:

a.	Python was	1.	making connections with different types of database programs.
b.	Python is	2.	comprises variables and methods.
c.	Python allows	3.	is only a picture having some attributes and actions at an abstract level.
d.	An object	4.	is useful to describe the elements of a program.
e.	A class	5.	regarded as a high-level programming language.
f.	A comment	6.	developed by a Dutch programmer Guido Van Rossum in the year 1991.

Ans.

a	6
b	5
c	1
d	2
e	3
f	4