

PROGRAMMING WITH PYTHON
(MCAP 1102)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) What is the logical expression for the following:
A is greater than B but A is less than C
(a) $A > B < C$ (b) $A > B \ \&\& \ A < C$
(c) $A > B \ \text{and} \ A < C$ (d) Both (b) and (c)
- (ii) Select the correct example of complex constant in Python:
(a) $3 + 2j$ (b) $-100j$ (c) $5j$ (d) All of the above are correct
- (iii) The input () returns the value as type.
(a) integer (b) string (c) floating point (d) none of these
- (iv) Which of the following statement is not True?
(a) If the condition of the while loop is initially false, the body is not executed even once.
(b) for statement iterates over a range of values or a sequence
(c) The statements within the body of for loop are executed till the range of values is exhausted.
(d) The statements within the body of a while are executed over and over until the condition of the while is true.
- (v) Which statement is used for the condition a loop is to be repeated 30 times?
(a) for i in range (0, 30) : (b) for i in range (0, 29, +1):
(c) for i in range (1, 30, 1): (d) for i in range (1,31,0);
- (vi) Which of the following is not a keyword in Python language?
(a) val (b) raise (c) try (d)with
- (vii) Which of the following declarations is incorrect?
(a) $_x = 2$ (b) $_x = 3$ (c) $_xyz_ = 5$ (d) None of these

- (c) Suppose function F1() calls function F2() within a program in Python. Does the order of the function definitions make any difference? Justify with an example. [(CO5) (Analyze/IOCQ)]

6 + 2 + 4 = 12

- 5 (a) Write a program to take number of rows to be printed as input and display the following output. If number of rows to be printed is 5 then the output will be

```
* *
** **
*****
** **
* *
```

[(CO1) (Apply/IOCQ)]

- (b) Consider the following recursive function. Assume that both n and k is positive.

```
S( n, k){
    if (k > n) return 0;
    if ( (k == 1) || (k == n) ) return 1;
    return S(n-1,k-1) + k * S(n-1,k);
}
```

What value will be returned by S (5, 3)? Show step by step execution of the function. [(CO2) (Analyze/IOCQ)]

- (c) With a suitable example show how a function in Python can return multiple values. [(CO1) (Remember/LOCQ)]

6 + 4 + 2 = 12

Group - D

6. (a) How to use the `__init__()` method to assign values to data attributes in Python?

[(CO3) (Remember/LOCQ)]

- (b) Explain the Run-time Polymorphism in python with example.

[(CO3) (Understand/LOCQ)]

- (c) Create a class called Time that has separate data member for hours, minutes and seconds. Define member functions to perform the following tasks:

to display the time in the format hh: mm: ss.

to add times passed as arguments.

to check which among two times passed as arguments is greater. Write a program to test the class and its functions. Use constructor to initialize the instance variables of the class Time. [(CO3) (Create/HOCQ)]

3 + 3 + 6 = 12

7. (a) How is aggregation different from association? Elucidate with proper example(s). [(CO3) (Understand/LOCQ)]

- (b) Consider an example of book shop which sells books & video tapes. It's modelled by Book & Tape classes. These two classes are inherited from the abstract class called Media. The Media class has common data members such as title & publication. The Book class has data member for storing a no. of pages in a book & Tape class has the playing time in a tape. Each class will have method such as

read () & show (). Write a program that models this class hierarchy & processes objects using reference to base class only. [(C02, C03) (Create/HOCQ)]

5 + 7 = 12

Group - E

8. (a) Write a program in Python to copy the contents of one file to another file? [(C04) (Apply/IOCQ)]
- (b) What is an array and how is it different from a list? What is the name of the built-in array class in NumPy? [(C02) (Remember/LOCQ)]
- (c) Explain the use of the following methods: (i) seek() (ii) dump(). [(C04) (Understand/LOCQ)]
- 6 + 2 + 4 = 12
9. (a) Create the following NumPy arrays:
- A 1-D array called zeros having 10 elements and all the elements are set to zero.
 - A 2-D array called ones having 2 rows and 5 columns and all the elements are set to 1 and dtype as int.
 - A 2-D array called myarray2 using arange() having 3 rows and 5 columns with start value = 4, step size 4 and dtype as float. [(C02) (Apply/IOCQ)]
- (b) Why is it advised to close a file after we are done with the read and write operations? What will happen if we do not close it? Will some error message be flashed? [(C04) (Analyse/IOCQ)]
- (c) Create a Histogram using matplotlib to design the minimum and maximum temperature of your city for a month. [(C05, C06) (Create/HOCQ)]
- 6 + 3 + 3 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	20%	62%	18%

Course Outcome (CO):

After the completion of the course students will be able to

1. Translate fundamental programming concepts such as loops, conditionals, etc into Python code.
2. Demonstrate the use of built-in data structures and functions.
3. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
4. Identify the commonly used operations involving file systems and regular expressions.
5. Implement solutions to real world problems using standard program constructs.
6. Apply python library to solve mathematical and computational problems.

MCA/1ST SEM/MCAP 1102/2021

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question;
HOCQ: Higher Order Cognitive Question

Department & Section	Submission Link
MCA	https://classroom.google.com/c/NDQ5NTk0ODM1Njg4/a/NDU4ODUxNjEwOTE1/details