110005 : PROGRAMMINGAND PROBLEM SOLVING
(2019 Pattern)
Apr-2019 (Sem 2) In Sem Examination Question paper Solution

Q1)a) what is a problem?Explainsixproblemsolvingsteps. **[4]**

Ans:

A problem is a state of difficulty that need to be resolved, when a problem exist then means there is some uncertainty in the solution. While solving the problem there is a desire to attain some specific goal.

The Six Steps

1. Define the Problem or identify the problem
2. Determine/understand the Root Cause(s) of the Problem
3. Identify the Alternative Solutions
4. Select the best way to Solution
5. List the instruction using the selected Solution
6. Evaluate the Outcome

b) ListdowntypesofoperatorsinPython.Explainrelationaloperators.**[5]**

Ans:

Python language supports the following types of operators.

1. Arithmetic Operators
2. Comparison (Relational) Operators
3. Assignment Operators
4. Logical Operators
5. Bitwise Operators
6. Membership Operators
7. Identity Operators

Relational operators are used for comparing the values. It either returns True or False according to the condition. These operators are also known as Comparison Operators.

Operator	Description	Syntax
>	Greater than: True if the left operand is greater than the right	x > y
<	Less than: True if the left operand is less than the right	x < y
==	Equal to: True if both operands are equal	x == y
!=	Not equal to – True if operands are not equal	x != y
>=	Greater than or equal to: True if left operand is greater than or equal to the right	x >= y
<=	Less than or equal to: True if left operand is less than or equal to the right	x <= y

c) Explainflow-chartandalgorithmwithexample. **[6]**

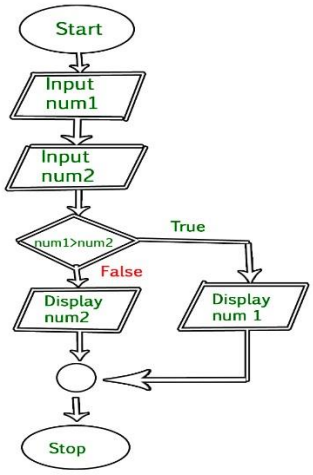
Ans:

Flowchart is a graphical representation of an algorithm. Programmers often use it as a program-planning tool to solve a problem. It makes use of symbols which are connected among them to indicate the flow of information and processing.

The process of drawing a flowchart for an algorithm is known as “flowcharting”.

Example:

A flowchart to input two numbers from user and display the larger of two numbers



OR

Q2)a) Explainfollowingtermswithsuitableexamples. **[4]**

i) Comment

Ans:

Comments are lines that exist in computer programs that are ignored by compilers and interpreters. Using comments in programs can make code more readable for humans, as it provides some information or explanation about what each part of a program is doing.Because comments do not execute, when you run a program you will not see any indication of the comment there. Comments are in the source code for humans to read, not for computers to execute.

Comments in Python begin with a hash mark (#) and whitespace character and continue to the end of the line.

Syntax:

```
# This is a comment
```

Example:

```
# Print "Hello, World!" to console
print("Hello, World!")
```

ii) ReserveWords

Ans:

Reserved words (also called keywords) are defined with predefined meaning and syntax in the language. These keywords have to be used to develop programming instructions. Reserved words can't be used as identifiers for other programming elements like name of variable, function etc.

Python 3 has 33 keywords while Python 2 has 30. The print has been removed from Python 2 as keyword and included as built-in function.

b) Write a program to swaptwonumbers. **[5]**

Ans:

```
num1 =input('Enter First Number: ')
num2 =input('Enter Second Number: ')

print("Value of num1 before swapping: ", num1)
print("Value of num2 before swapping: ", num2)

# swapping two numbers using temporary variable
temp= num1
num1 = num2
```

```
num2 = temp

print("Value of num1 after swapping: ", num1)
print("Value of num2 after swapping: ", num2)
```

c) ExplainanysixfeaturesofPythonprogramming. **[6]**

Ans:

1. Easy to code:Python is a high-level programming language. Python is very easy to learn the language as compared to other languages like C, C#, Javascript, Java, etc. It is very easy to code in python language and anybody can learn python basics in a few hours or days. It is also a developer-friendly language.

2. Free and Open Source:Python language is freely available at the official website and you can download it from the given download link below click on the Download Python keyword.

3. Object-Oriented Language:One of the key features of python is Object-Oriented programming. Python supports object-oriented language and concepts of classes, objects encapsulation, etc.

4. GUI Programming Support:Graphical User interfaces can be made using a module such as PyQt5, PyQt4, wxPython, or Tk in python..

5. High-Level Language:Python is a high-level language. When we write programs in python, we do not need to remember the system architecture, nor do we need to manage the memory.

6. Extensible feature:Python is a Extensible language. We can write us some Python code into C or C++ language and also we can compile that code in C/C++ language.

Q3)a) Describethefollowingtermswithexamples(anytwo): **[4]**

i) Break

Ans:

The break statement in Python terminates the current loop and resumes execution at the next statement, just like the traditional break found in C.

The most common use for break is when some external condition is triggered requiring a hasty exit from a loop. The break statement can be used in both while and for loops.

Example:

```
for letter in 'Python':     # First Example
if letter == 'h':
break
print 'Current Letter :', letter
```

ii) Continue

Ans:

The continue statement in Python returns the control to the beginning of the while loop. The continue statement rejects all the remaining statements in the current iteration of the loop and moves the control back to the top of the loop.The continue statement can be used in both while and for loops.

Example:

```
var = 10                    # Second Example
whilevar> 0:
var = var -1
ifvar == 5:
```

```
continue
print 'Current variable value :', var
print "Good bye!"
```

iii) Pass

Ans:

The pass statement in Python is used when a statement is required syntactically but you do not want any command or code to execute. The pass statement is a *null* operation; nothing happens when it executes.

Example:

```
for letter in 'Python':
if letter == 'h':
pass
print 'This is pass block'
print 'Current Letter :', letter

print "Good bye!"
```

iv) Range

Ans:

The built-in function range() is the right function to iterate over a sequence of numbers. It generates an iterator of arithmetic progressions.range function used with for statement in Python has the ability to iterate over the items of any sequence, such as a list or a string.

Exmaple:

```
forvar in list(range(5)):
print (var)
```

b) Writeaprogramtotestwhetheranumberenteredbytheuserispositive, negativeorzero. **[5]**

Ans :

```
n = float(input("Input a number: "))
if n >= 0:
if n == 0:
print("It is Zero!")
else:
print("Number is Positive number.")
else:
print("Number is Negative number.")
```

c) Explainfollowingselection/decisionmakingstatementsinPython **[6]**

i) ifstatement

Ans:

The if statement contains a logical expression using which data is compared and a decision is made based on the result of the comparison.If the boolean expression evaluates to TRUE, then the block of statement(s) inside the if statement is executed. If boolean expression evaluates to FALSE, then the first set of code after the end of the if statement(s) is executed.

Syntax:

```
if expression:
statement(s)
```

Example :

```
var1 =100
if var1:
print"1 - Got a true expression value"
print var1
```

ii) if. ...elsestatement

Ans:

An else statement can be combined with an if statement. An else statement contains the block of code that executes if the conditional expression in the if statement resolves to 0 or a FALSE value.

Syntax:

```
if expression:
statement(s)
else:
statement(s)
```

Example:

```
var1 = 100
if var1:
print "1 - Got a true expression value"
print var1
else:
print "1 - Got a false expression value"
print var1
```

iii) if..elif..elsestatement

Ans:

The elif statement allows you to check multiple expressions for TRUE and execute a block of code as soon as one of the conditions evaluates to TRUE.

Syntax:

```
if expression1:
statement(s)
elif expression2:
statement(s)
else:
statement(s)
```

Example:

```
var = 100
ifvar == 200:
print "1 - Got a true expression value"
printvar
elifvar == 150:
print "2 - Got a true expression value"
printvar
else:
print "3 - Got a false expression value"
printvar

print "Good bye!"
```

OR

Q4)a) Explainforloopwithflowchart. **[4]**

Ans:

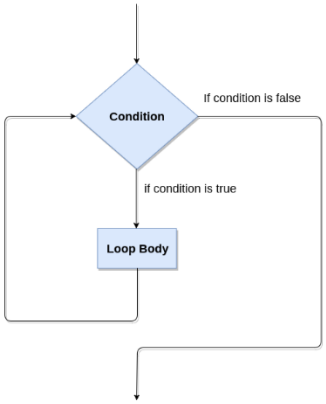
A loop statement allows us to execute a statement or group of statements multiple times.Python programming language provides following types of loops to handle looping requirements.

Type of loops are following

1. while loop:Repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body.A while loop statement in Python

programming language repeatedly executes a target statement as long as a given condition is true.

Flowchart:



Syntax:

```
while expression:
statement(s)
```

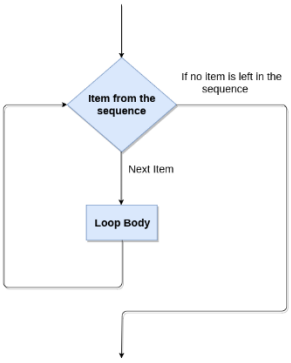
Example:

```
count=0
while(count <9):
print'The count is:', count
count= count +1

print"Good bye!"
```

2. for loop: Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.

   Flowchart:



Syntax:

```
foriterating_var in sequence:
statements(s)
```

Example:

```
for letter in'Python':# First Example
print'Current Letter :', letter

fruits=['banana','apple','mango']
for fruit infruits:# Second Example
print'Current fruit :', fruit

print"Good bye!"
```

b) What is a list?Explain anyt here operations of list. **[5]**

Ans:

The list is a most versatile datatype available in Python which can be written as a list of comma-separated values (items) between square brackets.

Operation in List

1. cmp() Operation:

Python list method cmp() compares elements of two lists.If elements are of the same type, perform the compare and return the result. If elements are different types, check to see if they are numbers

Syntax:

```
cmp(list1, list2)
```

Example:

```
list1, list2 =[123,'xyz'],[456,'abc']
printcmp(list1, list2)
printcmp(list2, list1)
list3 = list2 +[786];
printcmp(list2, list3)
```

2. len() Operation:

Python list method len() returns the number of elements in the list.

Syntax:

```
len(list)
```

Example:

```
list1, list2 = [123, 'xyz', 'zara'], [456, 'abc']
print "First list length : ", len(list1)
print "Second list length : ", len(list2)
```

3. max() Operation:

Python list method max returns the elements from the list with maximum value.

Syntax:

```
max(list)
```

Example:

```
list1, list2 = [123, 'xyz', 'zara', 'abc'], [456, 700, 200]
print "Max value element : ", max(list1)
print "Max value element : ", max(list2)
```

c) Write a program to generate a Fibonacci series of'n'numbers. **[6]**

Ans:

```
#Python program to generate Fibonacci series until 'n' value
num = int(input("Enter the value of 'n': "))
n1, n2 = 0, 1
print("Fibonacci Series:", n1, n2, end=" ")
for i in range(2, num):
    n3 = n1 + n2
    n1 = n2
    n2 = n3
    print(n3, end=" ")

print()
```