GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

UNIT-III

CONTROL FLOW, FUNCTIONS

PART-A

1. Define Boolean data type?

The Boolean data type is either True or False. In python, Boolean variables are defined by the True and False keywords.

>>>a=True
>>>type(a)
<class'bool'>
>>>b=False
>>>type(b)
<class'bool'>

The output<bool'bool'> indicates the variable is a Boolean data type. True and False must have an Upper Case first letter. Using a lowercase true returns an error.

2. What are the conditional statements used in python?

Conditional statement in python performs different computations or actions depending on whether a specific Boolean constraint evaluates to true or false. The conditional statements are

-if
-if else
-elif
-nested if

3. Define if…else statements in python.

If statement is used for decision making. It will run the body of code only when IF statement is true. When you want to justify one condition while the other condition is not true. Then you use "if statement"

Syntax:

-if expression:
    Statement
Else:
    Statement

4. Write the syntax for ternary operator in python?

Ternary operator is also known as conditional expression or operator that evaluate something based on a condition being true or false it simply allows to test a condition in a single line replacing the multiline if-else making the code compact.

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Syntax: [on_true]if[expression]else[on_false]

Eg: a if (a<b)else b

#program to demonstrate conditional operator

a, b = 10,20

#copy value of a in min if a<b else copy b

Min=a if a<b else b

Print(min)

5. **Define chained conditionals.**

Sometimes there are more than two possibilities and we need more than two branches. One way to express a computation: like that is a chained conditional:

Ifx<y:

Prin t('x is less than y')

Elif x>y:

Print ('x is greater than y')

Else:

Print('x and y are equal')

Elif is an abbreviation of "else if". Again, exactly one branch will be executed.

6. **Define iteration.**

Repeated execution of a set of statements is called iteration. In python 2 iterations are there

While loop:

The statements inside the while loop is executed only if the condition is evaluated to true.

Syntax:

While(condition)

statements

For loop:

The general form of a for statement is

Syntax:

For variable in sequence:

Code block

7. **Define range ( ) function and its syntax.**

The range ( ) function generated the integer numbers between the given start integer to the stop integer, which is generally used to iterate over with for loop. The range ( ) function returns a sequence of numbers, starting from 0 by default and increments by 1 (by default), and end at a specified number.

Syntax:

Range(start,stop,step)

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eg: for in range(1,10,2):

print(i)

output: 1,3,5,7,9

Parameters:

Start: element from which sequence constructed has to start(default)

Stop: element number at which numbers in sequence have to end (exclusive)

Step: can be +ve or -ve number, denoting the elements need to be skipped during filling of list(default1)

8. **Define while loop.**

In python, while loop is used to execute a block of statements repeatedly until a given condition is satisfied. And when the condition becomes false, the line immediately after the loop in program is executed.
Syntax:

While(expression):
Statement(S)

9. **Write the syntax for nested for loops and nested while loop statements:**

If one looping statement is present inside another looping statement then it is called as nester loops.

Syntax for nested for loops:

For iterating var in sequence:

For iterating var in sequence:

Statements(S)

Syntax for nested while loop

While expression:

While expression:

Statement(S)

Statement(S)

10. **What is python break statement?**

When a break statement is encountered inside a loop the loop is immediately terminated and the program control resumes at the next statement following the loop.
Example:

For letter in 'python':
If (letter =='h'):
Continue
Print('current letter:'letter)

Output: python

11. What is python continue statement?

The continue statement works somewhat like a break statement. Instead of facing termination, it forces the next iteration of the loop to take place, skipping any code in between.

Example:

For letter in 'python':

If(letter=='h'):

Continue

Print('current letter:'letter)   output: python

12. Write the scope of the variable.

The scope of a variable refers to the places that we can see or access a variable. If we define a variable on the top of the script or module, the variable is called global variable. The variables that are defined inside a class or function is called local variable.

Example:

Def my_local( ):

a = 10

print("this is local variable",a)

output: This is a local variable 10

Example:

a = 10

Def my_global( ):

print("this is global variable",a)

output: This is a global variable 10

13. What is recursive function and its limitations?

The process in which a function calls itself directly or indirectly is called recursion and the corresponding function is called as recursive function.

Example:

Def function(n);

If n==;

Return 1

Else

14. What is conditional execution?

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The ability to check the condition and change the behaviour of the program accordingly is called conditional execution.

Example:

If statement:

The simplest form of if statement is

Syntax:

    If(test_expression);

       Statement

Example: x=4

    If(x>0);

    Print("x is positive")   output: x is positive

The Boolean expression after if is called the condition. If it is true, then the indented statement gets executed. If not, nothing happens.

15. What is alternative execution?

A second forth of if statement is alternative execution, that is, if ….else, where there are two possibilities and the condition determines which one to execute.
Syntax:
    If(Test_expression);
       Statement
    Else
       Statement
Example x=4
    If(x%2==0);
       Print("x is even")
    Else
       Print("x is odd")   output:x is even

16. Explain while loop with example.

The statement inside the while loop is executed only if the condition is evaluated to true.
Syntax:
    While(condition);
       Statements
Example:
    #program to add natural numbers upto sum = 1+2+3+….+10
    n=10
    sum=0 #initialize sum and counter
    i=1
    while(i<=n);

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```
sum=sum+i
i=i+1 #update counter
print ("the sum is", sun)
```

17. Explain "for loop" with example

The general form of a for statement is

Syntax:

For variable in sequence

Block

Example:

X=4

For I in range(0,x)

Print( )   output:0,1,2,3

18. Explain function composition.

Function composition is called as nested function if one function call is present inside other function, we say it is function composition.

Example:

```
Def power(b,p);
        Y=b*p;
        Return y
Def square(x);
        a=power(x,2)
        return a
n=int(input("enter the value"))
result=square(n)
print(result)
```

19. Compare string and string slices.

A string is a sequence of character.

Example:

String Slices:

A segment of a string is called string slice. Selecting a slice is similar to selecting a character.

Example:

```
>>>s="Monty Python"
>>>print(s(0:5))
Monty
>>>print(s[6:12])
Python
```

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20. Mention a few string methods.
- S.captilize( ) – capitalizes first character of string
- S.count(sub) – count number of occurance of sub in string
- S.lower( ) – converts a string to lower case
- S.split( ) – returns a list of words in string

21. What are string methods?

A method is similar to a function – it takes arguments and returns a value – but the syntax is different. For example: the method upper takes a string and returns a new string with all uppercase letters.

Instead of the function syntax upper(word), it uses the method syntax word.upper( )

>>>word – "banana"
>>>new_word=word.upper( )
>>>print(new_word)
    BANANA

22. Define string immutability.

Python strings are immutable 'a' is not a string. It is a variable with string value. We can't mutate the string but can change what value of the variable to a new string.

Program	Output
a="foo"	#foofoo
b=a	#foo
a=a+a	It is observed that 'b' hasn't changed even though 'a' has changed.
# a point to the new string "foofoo", but b points to the same old "foo".	
Print(a)	
Print(b)	

23. Write a python program to accept two numbers and find the largest among them.

Num1 = float(input("enter first number:"))
Num2 = float(input("enter second number:"))
If(num1==num2);
        Print("the numbersare equal")
Elif(num1>num2);
        Print("num1 is greater")
Else
        Print("num2 is greater")

24. Write the merits of using functions in a program.

The advantages of using functions are:
- Reducing duplicate of code
- Decomposing complex problems into simpler pieces
- Improving clarity of the code
- Reduce of code

- Information hiding

25. Define fruitful functions in python.

In python function which returning some values means we say it is fruitful functions.

26. What are the types of functions arguments?

- Required Arguments
- Default arguments
- Keyword arguments
- Variable-length Arguments

27. What are the various parameter passing techniques?

- Pass by value
- Pass by reference

28. List some of the methods to list?

Python list methods

- Append( ) – Add an element to the end of the list
- Extend( ) – Add all elements of a list to the another list
- Insert( ) – insert an item at the defined index
- Remove( ) – removes an item from the list
- Pop( ) – removes and returns an element at the given index
- Clear( ) – removes all items from the list
- Index( ) – returns the index of the first matched item
- Count( ) – returns the count of number of items passed as an argument
- Sort( ) – sort items in a list in ascending order
- Reverse( ) – reverse the order of items in the list
- Copy( ) – returns a shallow copy of the list

29. State the difference between linear search and binary search.

Linear search is used for finding a target value within a list. It's also called sequential search that because it sequentially checks each element of the list for the target value until a match is found or until all the elements have been searched. Linear search also runs in at worst linear time and makes 0(n) comparisons.

Binary Search is also called half-interval search or binary chop. It's a search algorithm that find the position of a target value by repeatedly dividing the search interval in half. And the whole array begins with an interval covering. It compares the target value to the middle element of the array. If they are an unequal half array to be searched then it is eliminated and the search continues on the remaining half until it is successful. It runs in at worst algorithm time, making 0(log n) comparisons.

30. What will be the output of print str[2:5] if str='hello world'?

o/p: [ ]0

31. Where does indexing starts in python?

In python the indexing starts with 0 index.

32. Define array with an example.

An array is a special variable, which can hold more than one value of same type at a time. We need to import array module to create arrays. For example:

Import array

a=array.array('d',[1.1,3.5,4.5])

print(a)   o/p: array('d',[1.1,3.5,4.5])

33. Difference between Arguments and parameters in python?

Arguments	Parameters
Arguments are the value passed for these parameters while calling a function.	Parameters are the variables that are defined or used inside parentheses while defining a function.
Arguments are the values thar are passed to the function at run-time so that the function can do the designated task using these values.	

34. Write the rules to define a function?

Function blocks begin with the keyword def followed by the function name and parentheses.