Programming Fundamentals

Tutorial 2 & 3

Note: You are not allowed to copy-paste code snippets. You need to have a basic understanding of following concepts at the end of the Tutorial

- Use Python built-in functions – print(), type()
- Type conversions – int(), float(), str()
- Keyboard inputs – input()
- Translate Pseudocode into Python programs
- Understand Flow Charts
- Use of If-else
- Use If-elif-else
- Usage of conditional expressions
- Boolean operators: and, or

1. Use Pycharm integrated development environment (IDE) to write and run the following programs. If it is not installed, you can use Python IDLE.
2. See the difference between the following print statements.

```
value=100
#print - version 1
print('value is ’)
print(value)

#print - version 2
print('value is ’, value)

#print - version 3 - To suppress printing of a new line, use end=' '
print('value is ', end=' ')
print(value)
```

3. How to print the following strings using escape characters
   “I’m a student ……”
   “This is a “great” website”
   “\n is the character to enter a new line”

"This is a 'great' website"
"test\test2\answers.txt"
'\ is called a Backslash'

4. Ann likes to jog in the morning. As she jogs, she counts the number of strides she makes during the first and the last minutes of her jogging. Anne then averages those two and calls this the number of strides she makes in a minute. Design an flowchart that accepts those averages and the total time she spent jogging (in hours and minutes) and then outputs the distance Ann jogged in miles. Assume that Ann's stride to be 2.5 feet.
Hint: 1 mile has 5280 feet.

5. Write a program to fulfill the following test cases

Input	**Expected Result**
1	positive
2	positive
-1	negative
-2	negative

6. Write a program that checks whether a number is even or odd and then displays the appropriate message. (Hint – use the % operator).

7. Test the following program

```
if mark < 0 or mark > 100:
   print('Invalid mark')
elif mark >= 70:
   print('Exceptional result!')
elif mark >= 40:
   print('Satisfactory result!')
else:
   print('You have failed.')
```

a) Trace which condition was executed for the following inputs
    a. -1, 50, 71,39,120
    b. What if all the elif conditions are converted in to if conditions. What changes can happen during the execution?

8. A school has following rules for grading system:
    a. Below 25 – F
    b. 25 to 45 – E
    c. 4 to 50 – D
    d. 50 to 60 – C
    e. 60 to 80 – B
    f. f.Above 80 – A

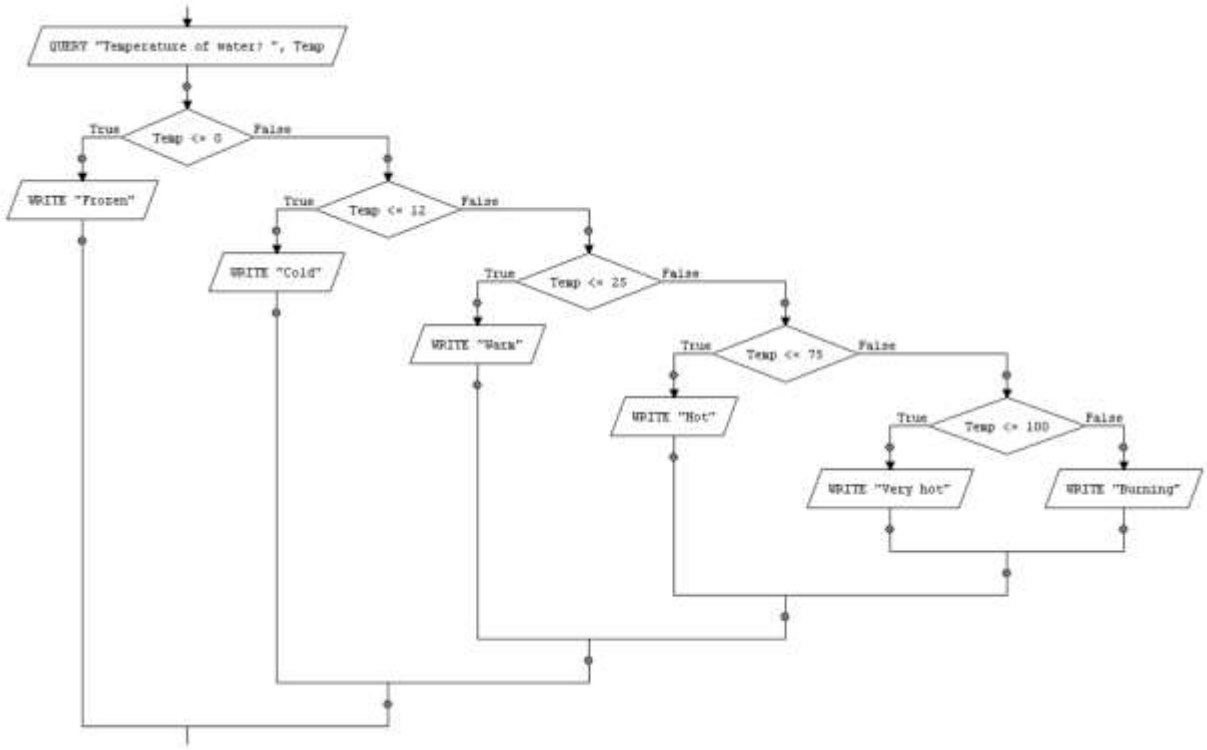
    Ask the user to enter marks and print the corresponding grade.

9. Create a simple calculator program in Python.
    a. User needs to enter an integer or a float value 1
    b. Next, User can select the operator: +,-,*,/
    c. Finally, user enter integer or float value 2
    d. The program calculates and displays the answer

Value 1	Operator	Value 2	Expected output
5	+	10	15
7	*	2	14
5	/	0	Invalid
12.5	-	1.25	11

10. Take input of the age of 3 people by the user and determine the oldest and youngest among them.

11. Understand the following flowchart and write the python code
    a. Test the program with valid and invalid input combinations



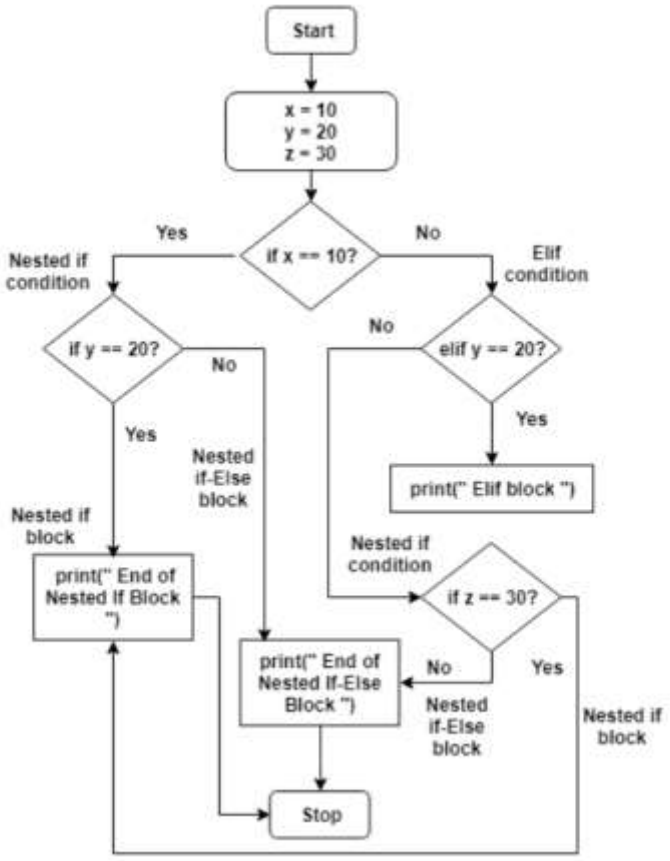
12. Run the following program and examine the Boolean conditions

```
a=100
b=105

if a>50 and a<200:
   print("both conditions are true")
#This will not execute
if a==50 and b==105:
   print("first condition false, second true")
#This will not execute
if a>=100 and b<100:
   print("first condition true, second false")
#This will not execute
if a!=100 and b==100:
   print("both false")

if a>=100 or b<200:
   print("both conditions are true")
if a==100 or b==100:
   print("first condition true, second false")
```

```
if a<1000 or b<200:
   print("first condition false, second true")
if a<1000 or b<1000:
   print("both conditions are false")


if(not(a==50 and b==105)):
   print("Evaluate opposite boolean value")
```

a. Change a and b values and examine the output again

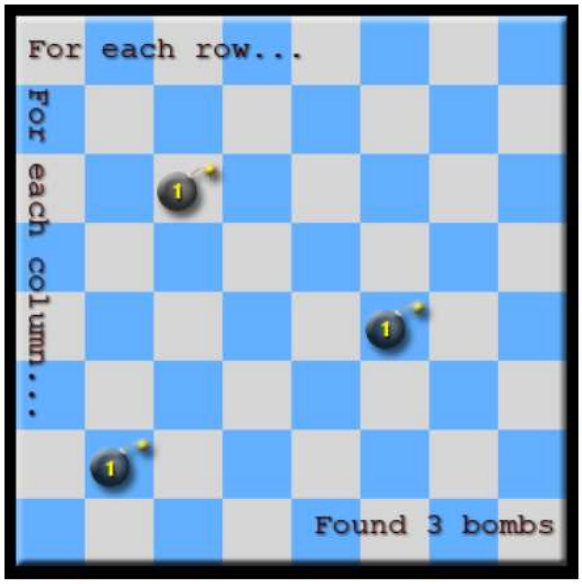
13. Understand the flow of the program and write the python code snippet
Note: It is important that you understand complicated, nested IF- ELSE scenarios.



Challenge Question

14. Write the pseudo codes for the following scenarios

Pretend we have a square game board with one or more bombs hidden among the squares. We want to scan the game board and print the number of hidden bombs.



String reverse - Design an algorithm that reverses a string and print it