Python Flow Control

Background:
Indentation is a concept in python which replaces the use of curly braces {}, and represents a block of code. After colon(:), it is a necessity to give indentation.
For example:

```
def hello():
   print("Hello world inside ")
print("Hello world outside")
```

In the above example, the indentation causes the first print statement to be a part of the function hello().

Flow Control/ Control Flow/ Control Structure:

Python program control flow is regulated by Conditional statement, Iterative statement (loop), and Transfer statement.

Conditional/Selection Statement:
If some lines of code, on the basis of some condition, executes/ doesn't execute then it is called a conditional statement. It consists of:
Syntax:

if -

```
if (condition): action
```

if..else -

```
if (condition):
        action 1
else:
        action 2
```

if..elif..else -

```
if (condition):
        action 1
elif (condition):
        action 2
elif (condition):
        action 3
.
.
else:
        action n
```

if..elif - if (condition):
action 1
elif (condition):
action 2
.
.

Example 1:

```
name = input("Enter name: ")
if name == 'Shreya':
 print("Hello Shreya!")
print("Hello Guest!")
```

Output:

```
Enter name: Isha
Hello Guest!
```

Example 2:

```
name = input("Enter name: ")
if name == 'Shreya':
 print("Hello Shreya!")
else:
 print("Hello Guest!")
print("How are you doing today?")
```

Output:

```
Enter name: Akshat
Hello Guest!
How are you doing today?
```

Example 3:

```
name = input("Enter name: ")
if name == 'Shreya':
 print("Hello Shreya!")
elif name == 'Isha':
 print("Hello Isha!")
elif name == 'Ishan':
 print("Hello Ishan!")
else:
 print("Hello Guest!")
print("How are you doing today?")
```

Output:

```
Enter name: Akshat
Hello Akshat!
```

```
How are you doing today?
```

Example 4:

```
name = input("Enter name: ")
if name == 'Shreya':
 print("Hello Shreya!")
elif name == 'Isha':
 print("Hello Isha!")
elif name == 'Ishan':
 print("Hello Ishan!")
print("How are you doing today?")
```

Output:

```
Enter name: Ishan
Hello Ishan!
How are you doing today?
```

Example 5:

```
n1= int(input("Enter first number: "))
n2= int(input("Enter second number: "))
n3= int(input("Enter third number: "))
if n1>n2 and n1>n3:
 print(f"{n1} is largest")
elif n2>n3:
 print(f"{n2} is largest")
else:
 print(f"{n3} is largest")
```

Output:

```
Enter first number: 12
Enter second number: 23
Enter third number: 20
23 is largest
```

Example 6:

```
n = int(input('Enter any number: '))
if n==0:
 print("Zero")
elif n==1:
 print("One")
elif n==2:
 print("Two")
elif n==3:
```

```
 print("Three")
elif n==4:
 print("Four")
elif n==5:
 print("Five")
elif n==6:
 print("Six")
elif n==7:
 print("Seven")
elif n==8:
 print("Eight")
elif n==9:
 print("Nine")
else:
 print("This is not the desired number")
```

To make this easier:

```
list=["zero","one","two","three","four","five","six","seven","eight","nine"]
n = int(input("Enter any number: "))
if n<10:
 print(list[n])
else:
 print("This is not the desired number")
```

Output:

```
Enter any number: 6
six
```

Example 7:

```
upto_19=["","one","two","three","four","five","six","seven","eight","ni
ne","ten","eleven","twelve","thirteen","fourteen","fifteen","sixteen","
seventeen","eighteen","nineteen"]
tens_words=["","","twenty","thirty","forty","fifty","sixty","seventy","
eighty","ninety"]
n = int(input("Enter any number 0 to 99: "))
if n==0:
 output= "zero"
elif n<20:
 output= upto_19[n]
elif n<100:
 output = tens_words[n//10] + ' ' +upto_19[n%10]
else:
 print("This is not the desired number")
```

```
print(output)
```

Output:

```
Enter any number 0 to 99: 88
eighty eight
Enter any number 0 to 99: 20
twenty
Enter any number 0 to 99: 59
fifty nine
```

- **switch statement:**

If we select some statement on the basis of some input, we generally use switch statements. To use switch statements, we should have python version 10 or above.

Example:

```
sub = input("Enter your favorite subject in engineering: ")
match sub:
  case 'DSA':
   print("Data Structure and Algorithms")
  case 'DS':
   print("Discrete Structure")
  case 'OOP':
   print("Object Oriented Programming")
  case _:
   print("Uh-oh! You missed exciting subjects.")
```

Output:

```
Enter your favorite subject in engineering: OOP
Object Oriented Programming
```

Assignment:

1. WAP to find the smallest number of given two numbers.

```
n1= int(input("Enter first number: "))
n2= int(input("Enter second number: "))
if n1<n2:
 print(f"{n1} is smallest")
else:
 print(f"{n2} is smallest")
```

Output:

```
Enter first number: 23
Enter second number: 5
5 is smallest
```

2. WAP to find the smallest number of given three numbers.

```
n1= int(input("Enter first number: "))
n2= int(input("Enter second number: "))
n3= int(input("Enter third number: "))
if n1<n2 and n1<n3:
 print(f"{n1} is smallest")
elif n2<n3:
 print(f"{n2} is smallest")
else:
 print(f"{n3} is smallest")
```

Output:

```
Enter first number: 25
Enter second number: 45
Enter third number: 21
21 is smallest
```

3. WAP to find if the given number is even or odd.

```
n=int(input("Enter a number: "))
if n%2==0:
 print(f"{n} is even")
else:
 print(f"{n} is odd")
```

Output:

```
Enter a number: 24
24 is even
```

4. WAP to find the words of any given number up to 1 trillion.

```
upto_19=["","one","two","three","four","five","six","seven","eight","nine
","ten","eleven","twelve","thirteen","fourteen","fifteen","sixteen","seve
nteen","eighteen","nineteen"]
tens_words=
["","","twenty","thirty","forty","fifty","sixty","seventy","eighty","nine
ty"]
remaining_words = ["","thousand","million","billion","trillion"]
n = int(input("Enter any number, 0 to 1 trillion: "))
if n==0:
 output= "zero"
elif n >= 10**12:
    print("This is not the desired number (too large).")
else:
    result = ""
    count = 0
```

```
        while n > 0:
            num = n % 1000

            #converting last 3 digits into words
            if num > 0:
                hundreds = num // 100
                remainder = num % 100
                part = ""

                if hundreds > 0:
                    part = part + upto_19[hundreds] + " hundred"
                    if remainder > 0:
                        part = part + " and "

                if remainder < 20:
                    part = part + upto_19[remainder]
                else:
                    part = part + tens_words[remainder // 10]
                    if remainder % 10 != 0:
                        part = part + " " + upto_19[remainder % 10]

                result = part + " " + remaining_words[count] + " " + result

            n = n // 1000
            count = count + 1

        output = result
    print(output)
```

Output:

```
Enter any number, 0 to 1 trillion: 867543091209
eight hundred and sixty seven billion five hundred and forty three
million ninety one thousand two hundred and nine

Enter any number, 0 to 1 trillion: 32
thirty two

Enter any number, 0 to 1 trillion: 97623
ninety seven thousand six hundred and twenty three

Enter any number, 0 to 1 trillion: 8675430912090
This is not the desired number (too large).
```