Python Programming Language

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Conditions

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2- IF Statement

3- IF and ELSE Statements

4- IF, ELIF and ELSE Statements

5- Nested IF Statements

6- Single Statement Suites

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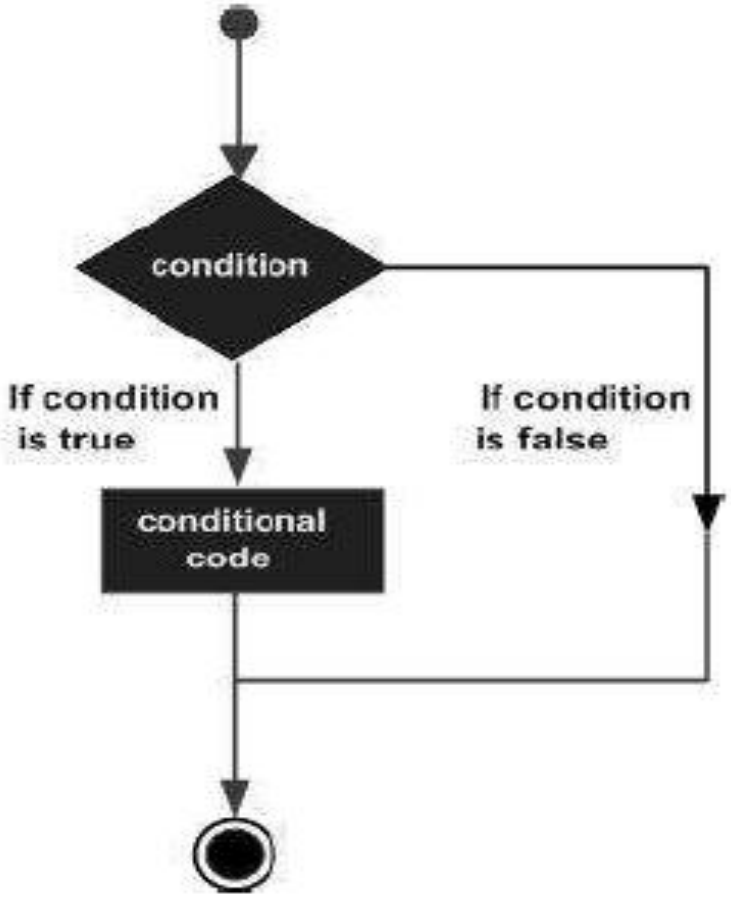
Decision Making Definition

- Decision-making is the anticipation of conditions occurring during the execution of a program and specified actions taken according to the conditions.
- Decision making structure evaluate multiple expressions, which produce TRUE or FALSE as the outcome. You need to determine which action to take and which statement to execute if the outcome is TRUE or FALSE otherwise.
- The general form of a typical decision making structure found in most of the programming language.



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Decision Making Definition

- Python programming language assume any non-zero and non-null values as TRUE, and any zero or null values as FALSE values.
- Python programming language provides the following types of decision making statement

Statement	Description
if statements	An if statement consists of a Boolean expression followed by one or more statements.
if...else statements	An if statement can be followed by an optional else statement, which executes when the boolean expression is FALSE.
nested if statements	You can use one if or else if statement inside another if or else if statement(s).

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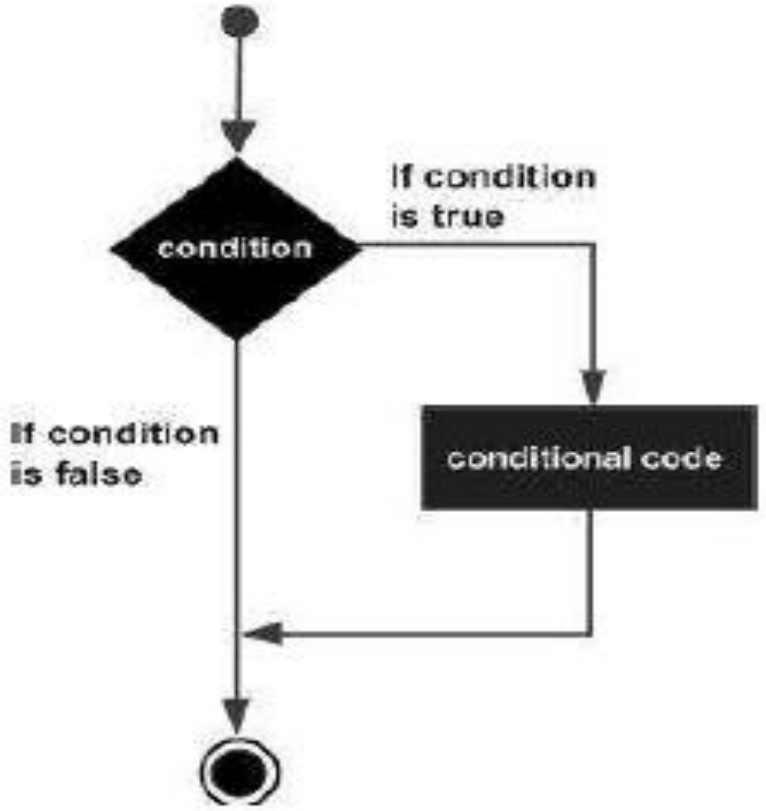
IF Statement

- The IF statement is similar to that of other language. The if statement contains a logical expression using which the data is compared and a decision is made based on the result of the comparison.
- In Python, the body of the if statement is indicated by the indentation. Body starts with an indentation and the first un-indented line marks the end.

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



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IF Statement


```
x = 100
if (x):
    print('1- Got a true expression value')
    print(x)

y = 0
if (y):
    print('2- Got a true expression value')
    print(y)

print('finish')
```

```
1- Got a true expression value
100
finish
```

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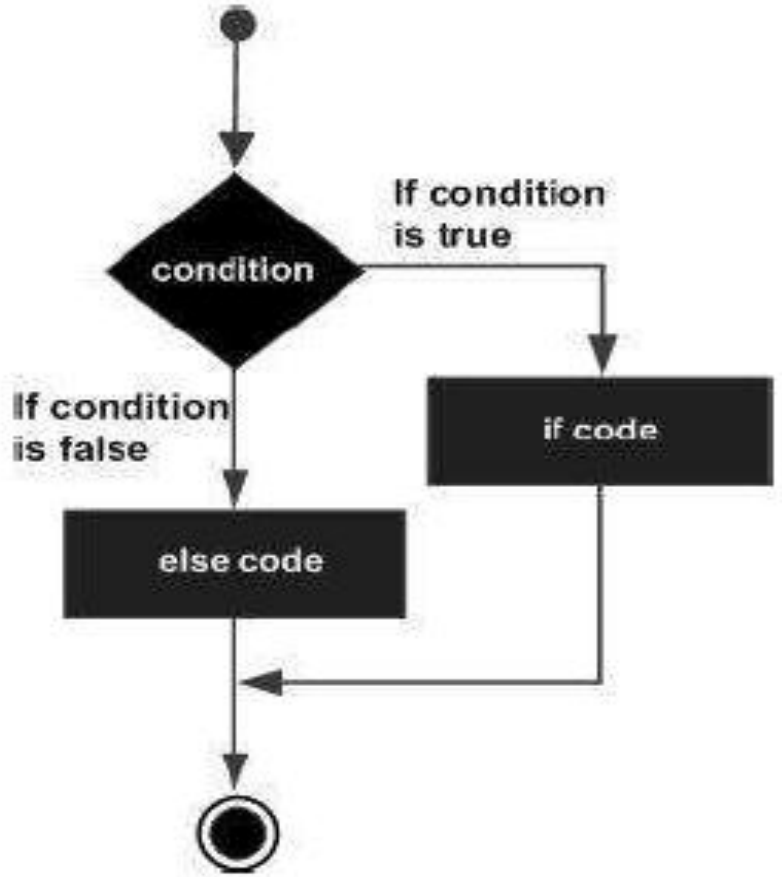
IF and ELSE Statements

- An else statement can be combined with an if statement. An else statement contains a blocks of code that executes if the conditional expression in the if statement resolve to 0 or a FALSE value.
- The else statement is an optional statement and there could be at the most only one else statement following if.

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



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IF and ELSE Statements


```
amount = int( input('Enter amount : ') )
if (amount < 1000):
    discount = amount * 0.05
    print('Discount is : ',discount)
else :
    discount = amount * 0.1
    print('Discount is : ',discount)

print('Net payable is : ', amount - discount)
```

```
Enter amount :  2000
Discount is :  200.0
Net payable is :  1800.0
```

```
Enter amount :  500
Discount is :  25.0
Net payable is :  475.0
```

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IF, ELIF and ELSE Statements

- The elif is short for else if. It allows us to check for multiple expressions.
- If the condition for if is False, it checks the condition of the next elif block and so on.
- If all the conditions are False, body of else is executed.
- Only one block among the several if...elif...else blocks is executed according to the condition.
- The if block can have only one else block. But it can have multiple elif blocks.

```
if expression1:
    statement(s)
elif expression2:
    statement(s)
elif expression3:
    statement(s)
else:
    statement(s)
```

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IF, ELIF and ELSE Statements


```
num = int( input() )

if num%2 == 0 and num%3 == 0:
    print('number is divisible by 2 and 3')
elif num%2 == 0 :
    print('number is divisible by 2 but not divisible by 3')
elif num%3 == 0 :
    print('number is divisible by 3 but not divisible by 2')
else :
    print('number is not divisible by 2 and not divisible by 3')
```

```
 6
number is divisible by 2 and 3
 8
number is divisible by 2 but not divisible by 3
 9
number is divisible by 3 but not divisible by 2
 11
number is not divisible by 2 and not divisible by 3
```

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Problem 1
Students Category

- Take as an input name and x which represent his/her grade and determine which category this grade belong to.
  - Greater than or equal 85 is Excellent
  - Greater than or equal 75 is very good
  - Greater than or equal 65 is good
  - Greater than or equal 50 is pass
  - Less than 50 is fail
- Test Cases:

```
 ali
 66
ali your grade at category good
```

```
 amr
 77
amr your grade at category Very good
```

```
 ahmed
 55
ahmed your grade at category pass
```

```
 mohamed
 88
mohamed your grade at category Excellent
```

```
 ali
 44
ali your grade at category fail
```

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Problem 1 Solution
Students Category


```
name = str(input())
grade = int(input())

if(grade >= 85):
    print(name, 'your grade at category Excellent')
elif(grade >= 75):
    print(name, 'your grade at category Very good')
elif(grade >= 65):
    print(name, 'your grade at category good')
elif(grade >= 50):
    print(name, 'your grade at category pass')
else :
    print(name, 'your grade at category fail')
```

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Nested IF Statements

- There may be a situation when you want to check for another condition after a condition resolve to true. In such a situation, you can use the nested if construct.
- In a nested if construct, you can have an if ... elif ... else construct inside another if ... elif ... else construct.
- We can have a if...elif...else statement inside another if...elif...else statement. This is called nesting in computer programming.
- Any number of these statements can be nested inside one another. Indentation is the only way to figure out the level of nesting. This can get confusing, so must be avoided if we can.

```
if expression1:
   statement(s)
   if expression2:
      statement(s)
   elif expression3:
      statement(s)
   else
      statement(s)
elif expression4:
   statement(s)
else:
   statement(s)
```

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Nested IF Statements


```
num = int( input() )

if num%2 == 0 :
    if num%3 == 0 :
        print('number is divisible by 2 and 3')
    else :
        print('number is divisible by 2 but not divisible by 3')
else :
    if num%3 == 0 :
        print('number is divisible by 3 but not divisible by 2')
    else :
        print('number is not divisible by 2 and not divisible by 3')
```

```
 6
number is divisible by 2 and 3
 8
number is divisible by 2 but not divisible by 3
 9
number is divisible by 3 but not divisible by 2
 11
number is not divisible by 2 and not divisible by 3
```

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Problem 2
Students Sub-Category

- Take as an input name and x which represent his/her grade and determine which category this grade belong to and his/her subcategory.
  - Greater than or equal 85 is Excellent
    A+ from 90, A from 85
  - Greater than or equal 75 is very good
    B+ from 80, B from 75
  - Greater than or equal 65 is good
    C+ from 70, C from 65
  - Greater than or equal 50 is pass
    D+ from 60, D from 50
  - Less than 50 is fail => F
- Test Cases:

```
 amr
 77
amr your grade at category Very good B
 ahmed
 62
ahmed your grade at category pass D+
 ali
 88
ali your grade at category Excellent A
 mohamed
 72
mohamed your grade at category good C+
 amr
 82
amr your grade at category Very good B+
 ahmed
 55
ahmed your grade at category pass D
 ali
 92
ali your grade at category Excellent A+
 mohamed
 66
mohamed your grade at category good C
 amr
 44
amr your grade at category fail  F
```

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Problem 2 Solution
Students Sub-Category


```
name = str(input())
grade = int(input())

if(grade >= 85):
    if(grade >= 90): print(name, 'your grade at category Excellent A+')
    else : print(name, 'your grade at category Excellent A')
elif(grade >= 75):
    if(grade >= 80): print(name, 'your grade at category Very good B+')
    else : print(name, 'your grade at category Very good B')
elif(grade >= 65):
    if(grade >= 70): print(name, 'your grade at category good C+')
    else : print(name, 'your grade at category good C')
elif(grade >= 50):
    if(grade >= 60): print(name, 'your grade at category pass D+')
    else : print(name, 'your grade at category pass D')
else :
    print(name, 'your grade at category fail  F')
```

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Single Statement Suites

- You can write complete if statement as an expression in single line like that.

```
x = 6
print('x equal 7') if (x == 7) else print('x not equal 7')

x = 8
print('x equal 7') if (x == 7) else print('x equal 8') if (x == 8) else print('x not equal 7')
```

```
x not equal 7
x equal 8
```

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Problem 3
Weight Category

- Take as an input name and x which represent his/her weight and determine this weight high or low or normal
- When weight greater than 100 this mean high and when weight less than or equal 50 this mean low else of that mean normal
- Test Cases:

```
 mohamed
 70
mohamed your weight is normal
```

```
 ali
 50
ali your weight is low
```

```
 amr
 100
amr your weight is normal
```

```
 ahmed
 110
ahmed your weight is high
```

```
 kareem
 40
kareem your weight is low
```

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Problem 3 Solution
Weight Category


```
name = str(input())
weight = int(input())

if(weight > 100) :
    print(name,"your weight is high")
elif(weight <= 50) :
    print(name,"your weight is low")
else :
    print(name,"your weight is normal")
```

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Problem 3 Solution
Weight Category


```
name = str(input())
weight = int(input())

if(weight > 100) : print(name,"your weight is high")
elif(weight <= 50) : print(name,"your weight is low")
else : print(name,"your weight is normal")
```

```
name = str(input())
weight = int(input())

print( name + " your weight is high" if(weight > 100) else
       name + " your weight is low"  if(weight <= 50) else
       name + " your weight is normal" )
```

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- ☑ 2- IF Statement
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- ☑ 4- IF, ELIF and ELSE Statements
- ☑ 5- Nested IF Statements
- ☑ 6- Single Statement Suites

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Practice

Questions ?

References

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