Python Programming

UNIT-2
Conditional Statements

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Overview of this Lecture

- Decision Making Statements
  - If-statements
  - If-else statements
  - Nested if statements
  - Multi-way if-elif-else
  - Conditional Expression

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Control Statements

- Decision making
  - Decision making is required when we want to execute a code only if a certain condition is satisfied.
  - if
  - if else
  - if elif else
- Looping
  - executes a statement or group of statements repeatedly
  - while
  - for

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Conditional Statements

- Python Interpreter executes the statements line by line i.e the control flow of the program is sequential.
- Control flow refers to the order in which the program statements are executed.
- Conditional statements in programming languages decides the direction of flow of program execution.
- It is also known as decision-making statements.
- We use these statements to execute a block of code when the given condition is true or false.

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if - statement

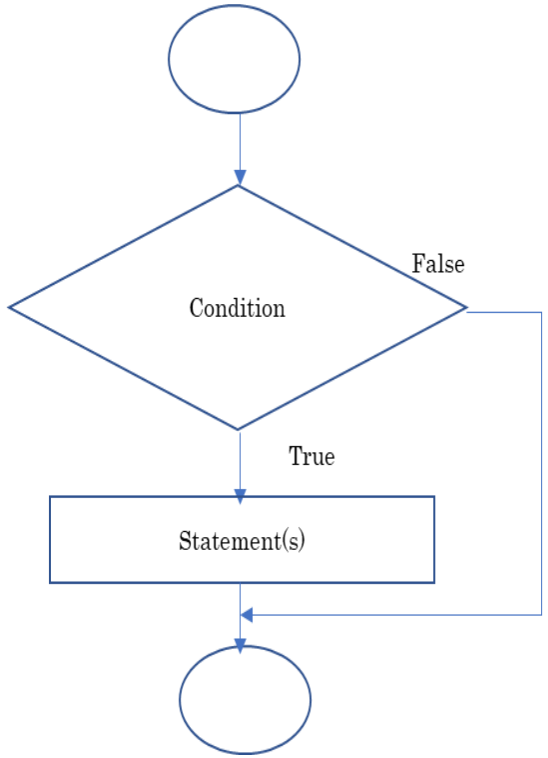
- The “if” statement is the basic decision making statement in any programming languages.
- It executes a block of code if the condition is true
- Python interprets non-zero values as True. None and 0 are interpreted as False.

Syntax

```
if condition:
    statement(s)
```

Example

```
if age>18:
    print(“You are eligible to cast vote”)
```



- “if” is a keyword to begin “if” statement.
- The condition is a Boolean expression which determines whether the body of “if” block is to be executed or not.
- The condition yields Boolean value as a result on upon evaluation i.e True or False.
- A colon (:) should always be followed by the condition.
- The block may contain one or more statements. These statement(s) must be indented using the same number of spaces to avoid indentation errors.

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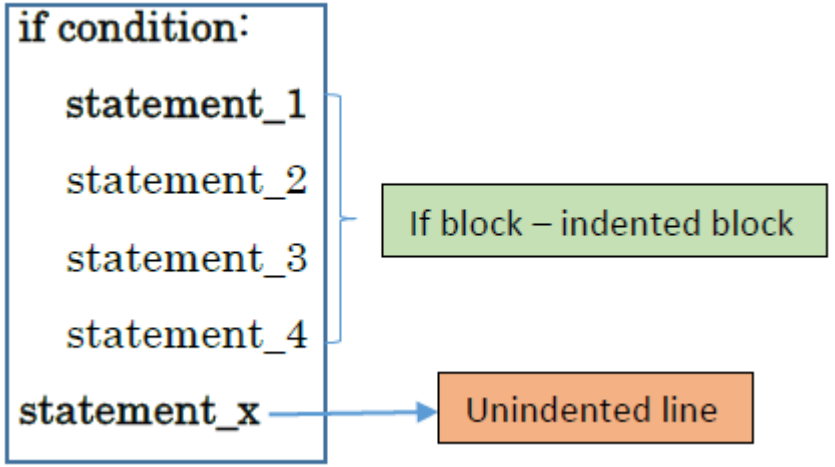
Why indentation?

Most of the programming languages like C, C++, Java use braces { } to define a block of code.



- Python uses indentation to define a block.
- A block of code starts at indentation and ends when the first unindented line is reached.
- The amount of indentation is up to you, but it must be consistent throughout that block.
- Generally one tab space or four whitespaces are used for indentation.
- Indentation in Python gives good aesthetic look and enables better understanding.
- Incorrect indentation will result into IndentationError.

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Example - 1
Write a program to display the result of the student based on the mark scored. (Pass mark-minimum 50%)

Algorithm:

1. Start
2. Read “mark” as input
3. Check if mark is greater than 50.

If mark >50 is True, then display “You have passed”

5. Stop

Program

```
#To display the result of a student
mark=int(input("Enter the mark:  ")) # Read student's mark
if mark>=50:      # check whether the given mark is pass or not
    print("You have Passed!!!") # display the result
```

Output:

```
Enter the mark: 90
You have Passed!!!
```

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Example-2

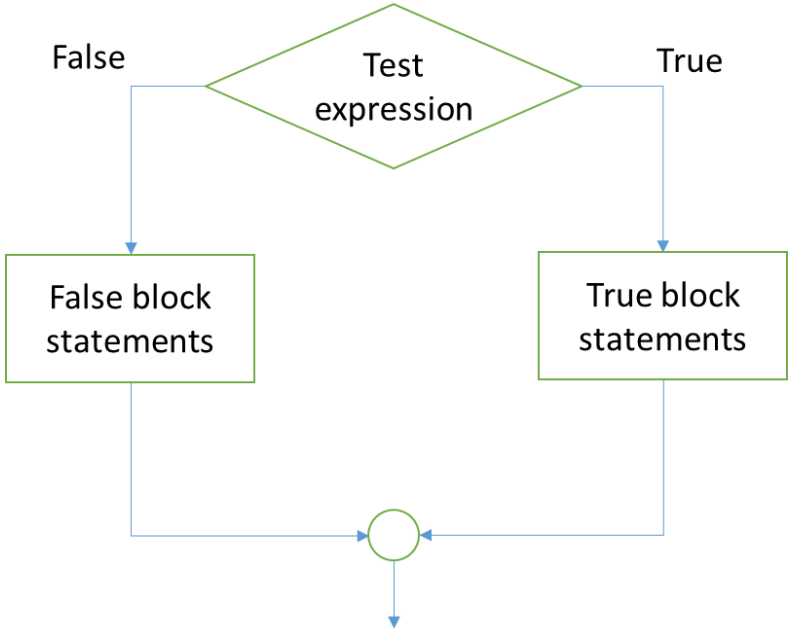
```
#Program to check whether two numbers are equal
a = int(input('Enter number 1'))
b = int(input('Enter number 2'))
if(a==b):
    print('both are equal')
```

Output:

Enter number 1 50
Enter number 2 50
both are equal

If-else statements

- The “if-else” statement is an extension of “if” statement with else section.
- If the condition is true, then block of code will be executed.
- If the condition is false, then another block of code will be executed.



Syntax

```
if condition:
    Body of if
else:
    Body of else
```

Example

```
if age>18:
    print(“You are eligible to cast vote”)
else:
    print(“You are not eligible to cast vote”)
```

Example 1:

Write a program to display the result of the student based on the mark scored.
(Pass mark-minimum 50%)

```
#To display result of a student
mark=int(input("Enter the mark:  ")) # Read student's mark
if mark>=50:    # check whether the given mark is greater than or equal to 50
    print("You have Passed!!!") # display the result
else:
    print("You have Failed!!!") # display the result
```

Output:

Output1:

Enter the mark: 80

You have Passed!!!

Output2:

Enter the mark: 30

You have Failed!!!

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Example – 2

```
#Program to check whether two numbers are equal or not
a = int(input('Enter number 1'))
b = int(input('Enter number 2'))
if(a==b):
    print('both are equal')
else:
    print('both are not equal')
```

Output:

```
Enter number 1 50
Enter number 2 100
both are not equal
```

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if-elif-else statements

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- In if-else statement, only one condition is evaluated and decision is taken based on that condition.
- If we want to check multiple condition then we have to write multiple if-else statements.
- It is also called as multi-way statements or if-elif ladder statements.

- Syntax

```
if condition_1:
    statement(s)_1
elif condition_2:
    statement(s)_2
elif condition_3:
    statement(s)_3
.....
elif condition_n:
    statement(s)_n
else:
    statement(s)_f
```

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Example

Write program to find the person's Body Mass Index(BMI) and prints the corresponding message as shown below. Read the person's name, height (in inches) and weight (in pounds) as input from the user.

BMI = (weight /height^2)*703

BMI	Weight status
< 18.5	Underweight
Between 18.5 and 25	Normal
> 25	Overweight

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Program

```
#BMI Calculation
name=input("Enter your Name: ")
height=eval(input("Enter your height in inches: "))
weight=eval(input("Enter your weight in pounds: "))
bmi = round((weight/height**2 *703),2)            # BMI calculation
if bmi < 18.5:         #underweight condition
   print("Hello", name, "\nYour BMI is", bmi, "\nThis is considered as Underweight")
elif bmi < 25:          # Normal weight condition
   print("Hello", name, "\nYour BMI is", bmi,"\nThis is considered as Normal weight")
else:                        #overweight condition
   print("Hello", name, "\nYour BMI is", bmi,"\nThis is considered as Overweight")
```

Output:

```
Enter your Name: Prince
Enter your height in inches: 60
Enter your weight in pounds: 150
Hello Prince
Your BMI is 29.29
This is considered as Overweight
```

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Activity

- A retail store management wants to provide 2% discount for all bill amounts above Rs.500 and for all other bill amount, a discount of 1%.Write a python program to implement the same
- A retail store management now wants to provide discount based on following scenario. Write a python code to implement the same

Bill Amount	Discount %
>=1000	5
>=500 and <1000	2
>0 and <500	1

Nested if statements

- When body of “if” statement contains another “if” statement then it is called as nested if statements.
- There may be a situation when you want to check for another condition after a condition resolves to True or False.
- In such a situation, you can use the nested if construct.
- Any number of these statements can be nested inside one another.
- Remember, Indentation is the only way to figure out the level of nesting

Syntax

```
if condition_1:
    statement(s)_1T
    if condition_2:
        statement(s)_2T
    else:
        statement(s)_2F
else:
    statement(s)_1F
```

Example

Write a program to find the greatest among three numbers.

```
#To find the greatest of 3 numbers
n1=int(input("Enter the first number: "))
n2=int(input("Enter the second number: "))
n3=int(input("Enter the third number: "))
if n1>n2:
    if n1>n3:
        print(n1," is the greatest number")
    else:
        print(n3," is the greatest number")
else:
    if n2>n3:
        print(n2, " is the greatest number")
    else:
        print(n3," is the greatest number")
```

Nested if-else inside if block

Nested if-else inside else block

Output:

Enter the first number: 15

Enter the second number: 50

Enter the third number: 35

50 is the greatest number

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Conditional Expressions

Syntax:

$expression_1$ if condition else $expression_2$

$expression_1$ is the conditional expression to be evaluated if the condition is true

$expression_2$ is the conditional expression to be evaluated if the condition is false

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Example program – conditional expression

```
>>> age=15
>>> print("kid" if age<18 else "adult")
kid
```

```
>>> age=17
>>> print('kid' if age < 13 else 'teenager' if age < 20 else 'adult')
teenager
```

```
>>> age=22
>>> print('kid' if age < 13 else 'teenager' if age < 20 else 'adult')
adult
```

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Summary

- Conditional statements are used to decide the flow of execution of a program.
- Condition is a Boolean expression
- Boolean expression yields True or False values upon execution.
- Python supports various decision making statements such as if,if-else,if-elif-else.
- Python supports nested if-else operation
- Python uses indentation to define a block of code.

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Tips

Blue light is basically the rays that are emitted by the digital screen, which may cause severe health problems. Flux software for PCs, Twilight app for Smartphones can act as blue light filters.

Microcosm
The Co-existing Architecture

Kumaraguru Eco Campus

Annually, the **4200 trees** inside the Kumaraguru Campus, on an average, releases **10,92,000 pounds** of oxygen inhaled by **42,000 humans**.

Wellness 360

Find ways to structure and optimize your time for when and where you learn best and keep your **learning on track**

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