PROGRAMMING PYTHON

Lecture # 3 - Conditions

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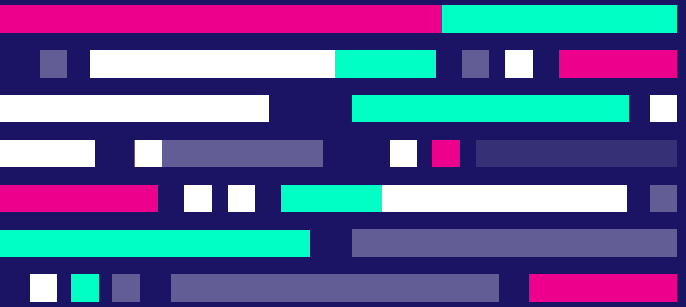

Conditions

- Python can check all the logical and mathematical conditions for example
  - If something equals something
  - If something is greater than or less than something
  - If something is empty if something is not empty
  - If something is true or false
  - If something matches a criteria etc.
- There are three main types of statements in python to check conditions
  - **If statement**
  - **If else statement**
  - **If - elif statement**

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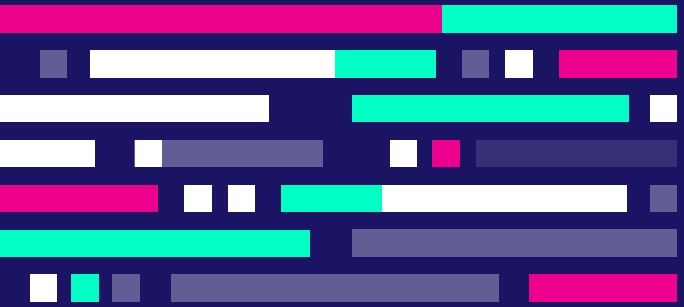

If Statement

- If statement generally checks if some conditions is true. It has this syntax
  - If Conditional_Check_Is_true:

    Perform some action
  - Example
    - If a > b:

      print("A is greater")
  - You can see it will only work if the condition satisfies, there is nothing for if the condition is not satisfied.
  - Also note the indentation (empty spaces before print function). Indentation is very important in Python.
  - Its like a block of code that runs under something.

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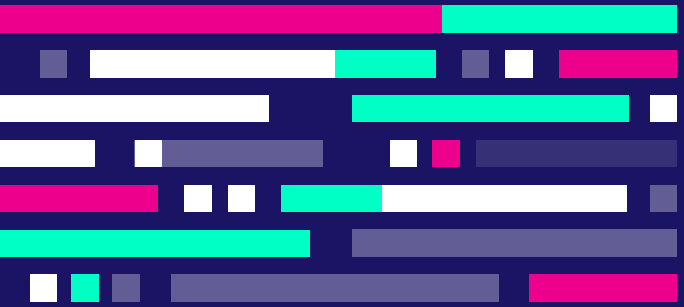

If-Else Statement

- If - else is used when we also want to mention what the program should do when a condition is not true.
  - In if, we are only interested in the true condition.
  - In if-else, we also tell what to do if the condition does not meet.
  - Example: Suppose if score of a batsman is zero its called a duck otherwise it is not a duck. So how can we right this in python?

    ```
    If score == 0:
        print("It's a Duck")
    Else:
        print("Not a Duck")
    ```

  - Please note again, indentation is extremely important

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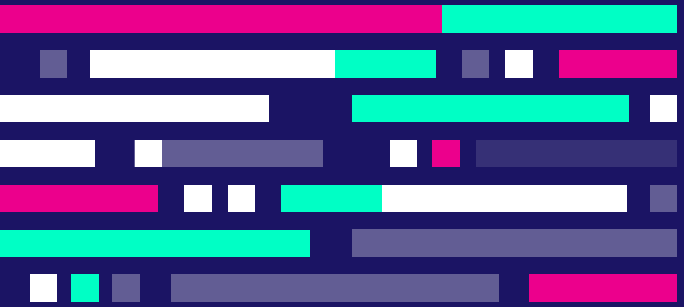

Elif Statement

- Elif if basically a short form of Else -if
- It's the Python's way of saying "if the previous conditions were not true, then try this condition".
- For example
  - ```
    If traffic_light == "green":
      print("Go go go")
    Elif traffic_light == "yellow":
      print("Get ready")
    Else:
      print("Wait, red is dangerous!")
    ```
- We can also use multiple Elif statements.
- Lets do some practice!
- Consider a marks sheet system and write a code to satisfy these conditions
    ```

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Elif Statement

- Consider a marks sheet system and write a code to satisfy these conditions
- Input marks in a variable called marks.
- The program should display grade and remarks in the end.
- Check if the marks are greater than or equal to 90
  - The grade will be “A+”
- If marks are greater than or greater than or equal to 80 and less than 90
  - The grade will be “A”
- If marks are greater than or greater than or equal to 70 and less than 80
  - The grade will be “B”
- If marks are greater than or greater than or equal to 60 and less than 70
  - The grade will be “C”
- If marks are greater than or greater than or equal to 50 and less than 60
  - The grade will be “D”
- If marks are greater than or greater than or equal to 40 and less than 50
  - The grade will be “E”
- If marks are less than 40, then student Fails. Grade is “F”

- **HINT: This is how you check for a range of values in Python**
  - `if 90 <= marks <= 100:`

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Solution

```
# Marksheet system
marks = 75  # Change this value to test different marks

if 90 <= marks <= 100:
    grade = "A+"
    remarks = "Excellent"
elif 80 <= marks < 90:
    grade = "A"
    remarks = "Very Good"
elif 70 <= marks < 80:
    grade = "B"
    remarks = "Good"
elif 60 <= marks < 70:
    grade = "C"
    remarks = "Satisfactory"
elif 50 <= marks < 60:
    grade = "D"
    remarks = "Needs Improvement"
else:
    grade = "F"
    remarks = "Fail"

print("Your grade is ", grade, " and your performance is ", remarks)
```

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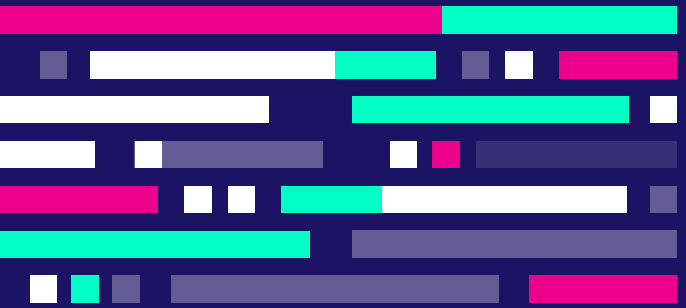

Logical Conditions

- You can also combine conditional statements with logical operators like AND, OR and NOT
- For example
  - Consider this login system
  - ```
    If user == "Wasiq" and pass == "abc123":
        print("Login Success")
    Else:
        print("Login Fail")
    ```
  - Consider this example:
  - ```
    If issue == "headache" or issue == "migraine"
       print("Do rest")
    ```
  - Consider another example:
  - ```
    If not country == "Pakistan":
       print("Foreigner")
    ```
    ```

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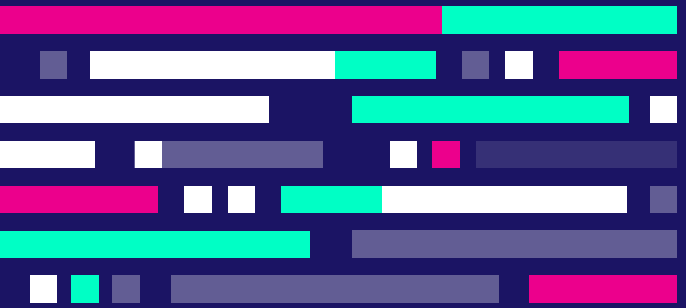
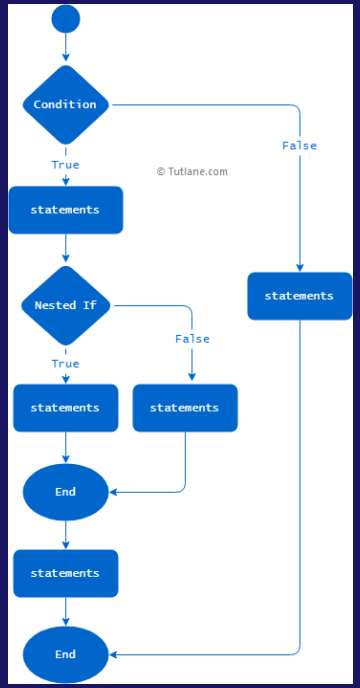


Nested conditions

- Nested ifs(or multiple Ifs or Ifs within Ifs) are used when we have to check another condition if a certain condition is true.
- Suppose if a team is Asian then check its uniform
  - If its green its Pakistan
  - If its blue its India
  - Else it can be any team
- Else it can be any team. Here is the code:

```
team_is_asian = True
uniform_color = "green"
if team_is_asian:
    if uniform_color == "green":
        country = "Pakistan"
    elif uniform_color == "blue":
        country = "India"
    else: country = "Unknown Asian Country"
else: country = "Non-Asian Country"
```

ANOTHER TEST



Write a program to display the greatest among three numbers using nested if statement.

SOLUTION

```
a = 40
b = 80
c = 70

if(a>b):
    if(a>c):
    print("a is greater")

if(b>a):
    if(b>c):
    print("b is greatest")

if(c>a):
    if(c>b):
    print("c is greatest")

# output
# b is greatest
```

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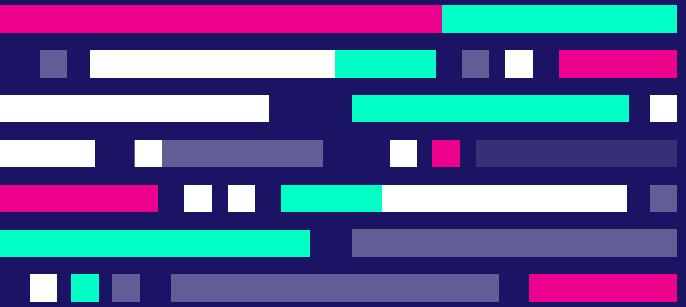


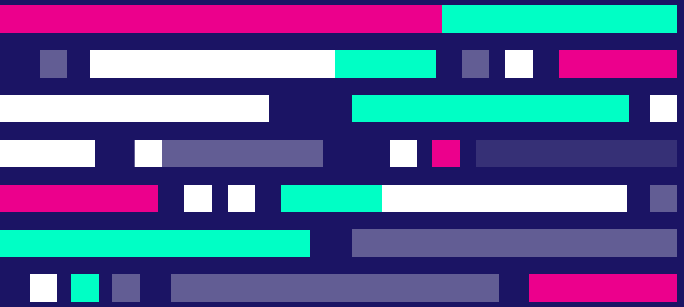
Some Shortcuts

- If a>b: print("A is greater than B")
- print("Male") if gender=="M" else print("Female")
  - Above example is called Ternary Operation in Python.

Or may be something like this:

- print("Male") if gender=="M" else print("Female") if gender=="F" else print("Alien")

- All of the above techniques are called short-hand techniques. They minimize the code and save space.
- For Booleans it is even easier to check a condition
  - If person_is_married:
    print("Bro you are gone!")
    Else:
    print("Bro you lucky!")
- In the above example, we didn't even check the condition to be true, python itself did it.



Some References

- https://pythonlobby.com/if-statement-in-python-programming/
- https://www.w3schools.com/python/python_conditions.asp

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… and some assignments!

1. Write a program which takes a number in input and returns if the number is Even or Odd
2. Make a python program which takes three inputs.
    1. Store two numbers as a and b
    2. Store operation as “+”, “-” , “*”, “/” in variable called choice
    3. First it checks that the user has entered only the allowed operation
        1. If yes proceed to calculation
        2. Else Returns a message showing this operation is now allowed
    4. Based on user’s input, it either returns sum, or subtraction or multiplication or division of the numbers.
    5. Use Nested Ifs to do this task.
3. Make a login system which takes two inputs, as name and password. It should check if the name is “student” and password is “123456” then its display a success message, if only name is student and password is wrong it should display the message that “password is wrong” or if password is correct but name is wrong it should display that “name is wrong”. If both are wrong, then it should display “False credentials.”
4. Solve exercises 6,8,9,10,11 on Auditorium!
5. Try Assignment 12 on Auditorium (without solution, otherwise we will do it)