

Python Programming Language

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Lecture 7: If-elif-else, nested if and Problem Solving

Solving

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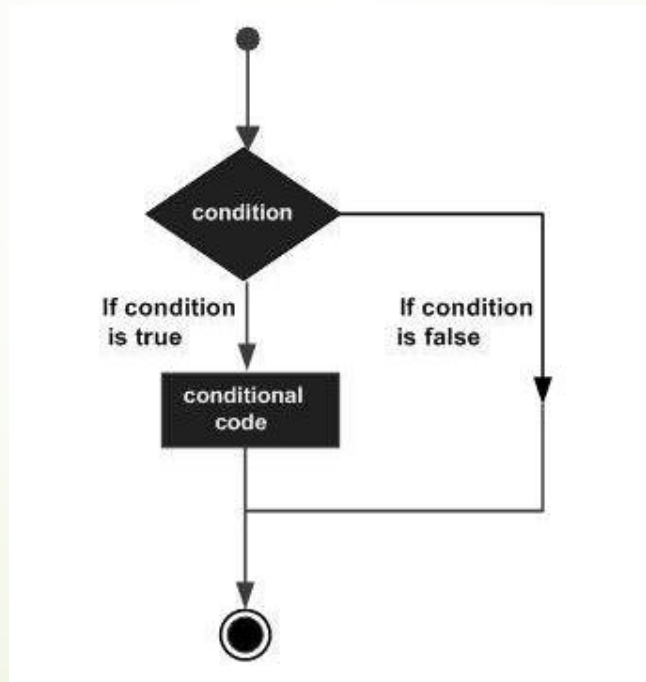
Computer Science and Engineering

Today's Learning Objectives

- Decision Making
- Conditional Statements
- If-Else Constructs
- Practical Exercises

Decision Making

Decision structures evaluate multiple expressions that produce TRUE or FALSE as outcome.



What are Conditional Statements?

- **Definition:** Instructions that only run when a certain condition is true.
- **Importance:** Allows programs to make decisions and execute different code paths.

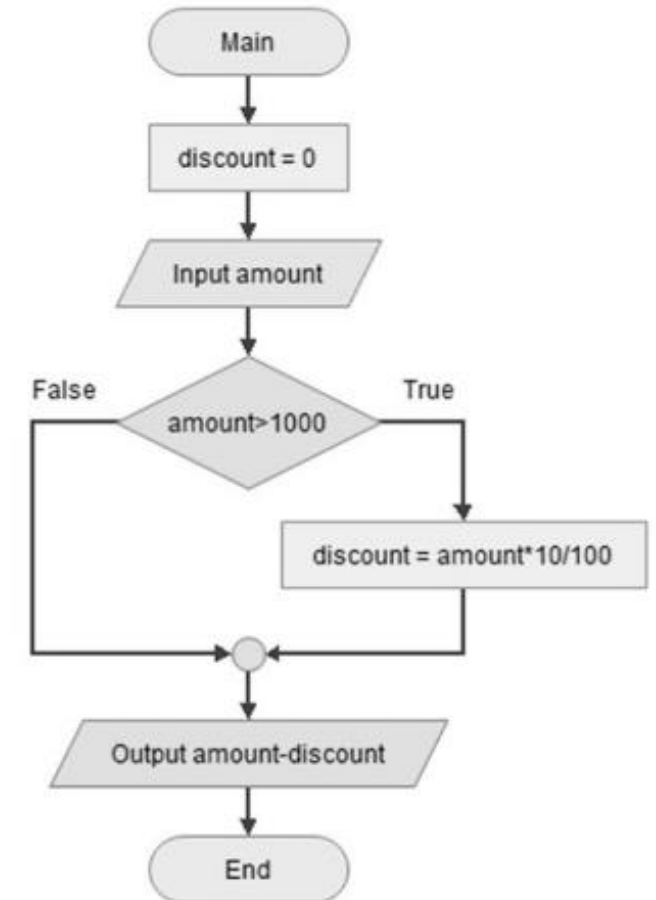
Logical conditions:

- Equals: $a == b$
- Not Equals: $a != b$
- Less than: $a < b$
- Less than or equal to: $a \leq b$
- Greater than: $a > b$
- Greater than or equal to: $a \geq b$

If Statement

- Let us consider an example of a customer entitled to 10% discount if his purchase amount is > 1000 ; if not, then no discount is applicable.

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Simple If Statement

- **Syntax:** if expression:
 statement(s)

if condition:

 # code to execute if the condition is true

Example: Check if a number is positive

```
num = 5
if num > 0:
    print("The number is positive")
```

If-Else Statement

► Syntax:

if condition:

 # code to execute if condition is true

else:

 # code to execute if condition is false

► Example: Check if a number is even or odd.

```
num = 4
```

```
if num % 2 == 0:
```

```
    print("The number is even")
```

```
else:
```

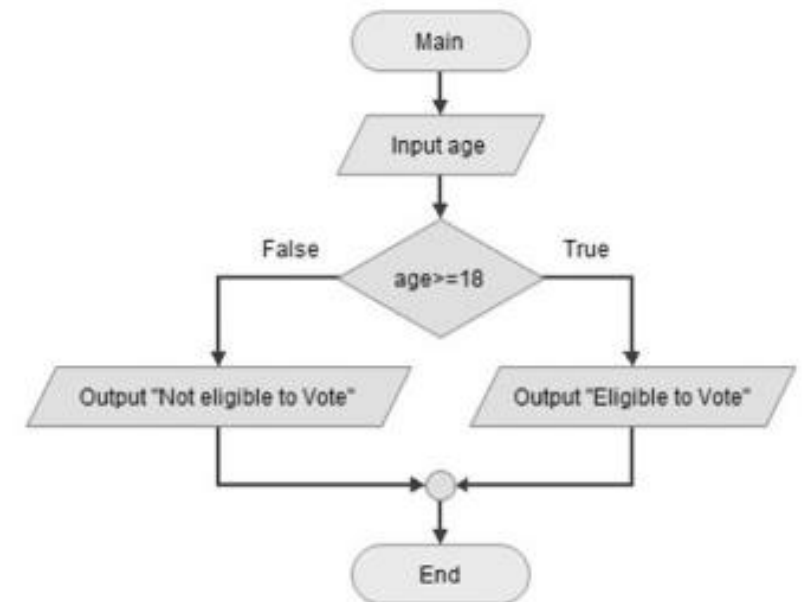
```
    print("The number is odd")
```

If-Else Statement

➤ **Example:** The variable age can take different values. If the expression "age > 18" is true, the message you are eligible to vote is displayed otherwise not eligible message should be displayed.

➤ **Code:**

```
age=25
print ("age: ", age)
if age >=18:
    print ("eligible to vote")
else:
    print ("not eligible to vote")
```



If-Elif-Else Statement

➤ Syntax:

```
if condition1:  
    # code to execute if condition1 is true  
elif condition2:  
    # code to execute if condition2 is true  
else:  
    # code to execute if both conditions are false
```

➤ Example: Determine the grade based on marks.

```
marks = 85  
if marks >= 90:  
    print("Grade: A")  
elif marks >= 80:  
    print("Grade: B")  
else:  
    print("Grade: C")
```

Short Hand If ... Else

➤ Example:

a = 2

b = 330

print("A") if a > b else print("B")

Nested If Statements

- **Definition:** An if statement inside another if statement.
- **Example:** Check if a number is positive and even.

```
num = 6
if num > 0:
    if num % 2 == 0:
        print("The number is positive and even")
    else:
        print("The number is positive but odd")
else:
    print("The number is not positive")
```

Using Boolean Operators

- **Boolean operators:** and, or, not
- **Example:** Check if a number is positive and less than 10.

```
num = 7
```

```
if num > 0 and num < 10:
```

```
    print("The number is positive and less than 10")
```

If-Else with Strings

➤ **Example:** Check if a string is empty.

```
my_string = ""  
if my_string == "":  
    print("The string is empty")  
else:  
    print("The string is not empty")
```

If-Else with Lists

- Example: Check if a list contains an item.

```
my_list = [1, 2, 3, 4, 5]
```

```
if 3 in my_list:
```

```
    print("3 is in the list")
```

```
else:
```

```
    print("3 is not in the list")
```

Practical Example 1

- Check if a user is old enough to vote.

```
age = 18
```

```
if age >= 18:
```

```
    print("You are old enough to vote")
```

```
else:
```

```
    print("You are not old enough to vote")
```

Practical Example 2

- Determine if the temperature is hot, cold, or just right.

```
temperature = 25
if temperature > 30:
    print("It's hot")
elif temperature < 15:
    print("It's cold")
else:
    print("The temperature is just right")
```


Common Mistakes

- Forgetting the colon: after the condition.
- Incorrect indentation.
- Using = instead of == for comparison.

Debugging Tips

- Use print statements to check variable values.
- Carefully read error messages.
- Test each condition separately.

Practical Exercise 3

- Title: Guessing Game
- Write a program that asks the user to guess a number.

```
secret_number = 7
guess = int(input("Guess the number: "))
if guess == secret_number:
    print("You guessed it!")
else:
    print("Try again!").
```

Practical Exercise 4

- Title: Password Check
- Write a program that checks if a password is correct.

```
password = "python123"  
user_input = input("Enter the password: ")  
if user_input == password:  
    print("Access granted")  
else:  
    print("Access denied")
```

Practical Exercise 5

- Title: Leap Year
- Write a program that checks if a password is correct.

```
Year = int(input("Enter the number: "))  
if((Year % 400 == 0) or (Year % 100 != 0) and (Year % 4 == 0)):  
    print("Given Year is a leap Year");  
else:  
    print ("Given Year is not a leap Year")
```

Recap

- Conditional Statements
- If-Else Constructs
- Elif and Nested If Statements
- Practical Examples

Any Question?

References

- <https://www.w3schools.com/python/>
- <https://www.tutorialspoint.com/python/>

EXAM-1

Problem 1

non_start

Given 2 strings, return their concatenation, except omit the first char of each. The strings will be at least length 1.

`non_start('Hello', 'There') → 'ellohere'`

`non_start('java', 'code') → 'avaode'`

`non_start('shotl', 'java') → 'hotlava'`

Problem 2

sum_double

Given two int values, return their sum. Unless the two values are the same, then return double their sum.

sum_double(1, 2) → 3

sum_double(3, 2) → 5

sum_double(2, 2) → 8

"

Problem 3

make_tags

The web is built with HTML strings like "<i>Yay</i>" which draws Yay as italic text. In this example, the "i" tag makes <i> and </i> which surround the word "Yay". Given tag and word strings, create the HTML string with tags around the word, e.g. "<i>Yay</i>".

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`make_tags('i', 'Yay') → '<i>Yay</i>'`

`make_tags('i', 'Hello') → '<i>Hello</i>'`

`make_tags('cite', 'Yay') → '<cite>Yay</cite>'`