IT Department

Selection Statements (if-elif-else)

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Programming I (IT 117)

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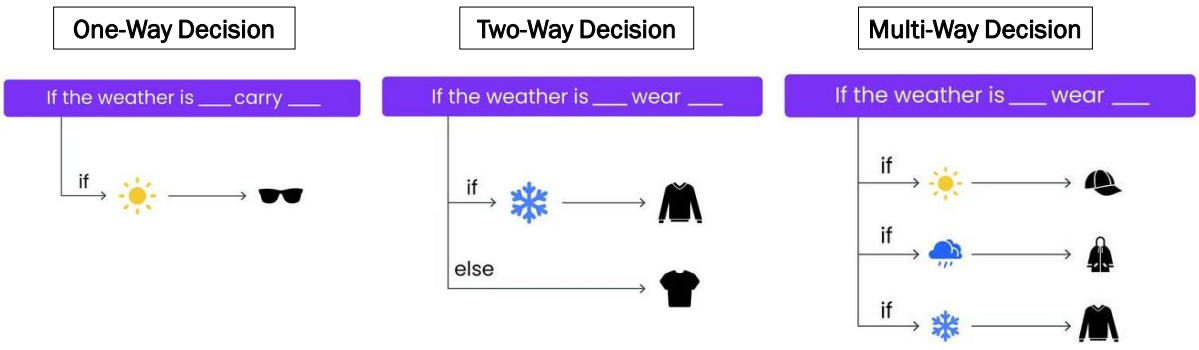
Outline

- **One-way** and **Two-way** Decisions
- **Multi-way** Decisions
- **if-elif-else** Statement in Python

One-Way, Two-Way, Multi-Way Decision



SELECTION Statements

- **SELECTION** statements in Python:
  - **IF** Statement
    - **if** → One-way decision
    - **if-else** → Two-way decisions
    - **if-elif-…-else** → Multi-way decisions
- **Switch** control structure is another way to implement a selection process in programming languages. Python unlike other programming languages doesn't have a built-in **SWITCH** control structure, but user-defined structures can implement it.

if-elif-else Statement

- **if...else** statement is used when there is a two-way decision.
- If we must choose between more than two selections, we use the **if...elif...else** statement.
- The **elif** keyword is used to check more conditions after the **if** condition or between the **if** and **else** conditions.

```
if    (condition1) :
          execute statements1
elif  (condition2) :
          execute statements2
else :
          execute statements3
```

elif (condition2) is evaluated only if the previous condition(s) are False.

Multi-Way Decisions

- Suppose you need to make a four-way decision. You can use **Nested If**s or **elif** conditions. A code using **elif** is more readable.

Using Nested if

```
if  (condition1) :
        statements1
else :
        if  (condition2) :
                statements2
        else :
                if  (condition3) :
                        statements3
                else :
                        statements4
```

Using elif

```
if    (condition1) :
          statements1
elif  (condition2) :
          statements2
elif  (condition3) :
          statements3
else :
          statements4
```

if-elif-else Statement (Example)

Suppose you want to compare two numbers to see whether the first number is less than, greater than or equal to the second number.

```
x = 10
y = 20

if (x < y):
    print (x,"is less than",y)
elif (x > y):
    print (x,"is greater than",y)
else:
    print (x,"and",y,"are equal.")
```

- The first condition **(x < y)** is evaluated to **True**, so the program outputs 10 is less than 20.
- The **elif** and **else** clauses are skipped and not executed.

if-elif-else Statement (Example)

Suppose you want to compare two numbers to see whether the first number is less than, greater than or equal to the second number.

```
x = 40
y = 20

if (x < y):
    print (x,"is less than",y)
elif (x > y):
    print (x,"is greater than",y)
else:
    print (x,"and",y,"are equal.")
```

- The first condition **(x < y)** is evaluated to **False**, so the control of the program goes to the second condition in **elif (x > y)**, which is evaluated to **True,** so the program outputs 40 is greater than 20.
- The **else** clause is skipped and not executed.

if-elif-else Statement (Example)

Suppose you want to compare two numbers to see whether the first number is less than, greater than or equal to the second number.

```
x = 20
y = 20

if (x < y):
    print (x,"is less than",y)
elif (x > y):
    print (x,"is greater than",y)
else:
    print (x,"is equal to",y)
```

- The first condition **(x < y)** is evaluated to **False**, so the control of the program goes to the second condition in **elif (x > y)**, which is also evaluated to **False.** So the the **else** clause is executed and the program outputs 20 is equal to 20.

if-elif-else Statement (Example)

◦ Use **IF** statement to check whether an entered number by user is **positive**, **negative**, or **zero**.

```
x = int(input("Enter a number: "))

if (x > 0):
    print (x,"is positive.")
elif (x < 0):
    print (x,"is negative.")
else:
    print (x,"is zero.")
```

if-elif-else

- You can have as many **elif** clauses as you need.

```
if      (condition1) :
            execute statements
elif    (condition2) :
            execute statements
elif    (condition3) :
            execute statements
...

else :
            execute statements
```

if-elif-else Statement

- Is it possible to have **if** and **elif** clauses without **else** clause? Yes. The **else** clause in the **if** statement is optional.

```
if      (condition1) :
            execute statements
elif    (condition2) :
            execute statements
elif    (condition3) :
            execute statements
```

if-elif-else Statement (Example)

- A program to check the **temperature** and decide on the **weather**.

```
temperature = 40

if (temperature < 0):
    status = "freezing"
elif (temperature < 10):
    status = "cold"
elif (temperature < 20):
    status = "mild"
elif (temperature < 30):
    status = "warm"
else:
    status = "hot"

print ("Today's weather is", status)
```

Output

Today's weather is hot

What are the outputs of these two codes?

```
temperature = 45

if (temperature > 40):
    print("Weather is hot.")

if (temperature > 20):
    print("Weather is mild.")

if (temperature > 0):
    print("Weather is cold.")
```

Output

Weather is hot.
Weather is mild.
Weather is cold.

```
temperature = 45

if (temperature > 40):
    print("Weather is hot.")

elif (temperature > 20):
    print("Weather is mild.")

elif (temperature > 0):
    print("Weather is cold.")
```

Output

Weather is hot.

IF-ELSE Statement

```
mark = int(input('Enter your mark in Programming 1: '))

if (mark >= 80) :
    print("Well Done!")
else:
    print("Practice More!")
```

Output if the user enters 60 as their mark

Practice More!

Let's Try it More!

```
mark = int(input('Enter your mark in Programming 1: '))

if (mark >= 80) :
    print("Well Done!")
else:
    print("Practice More!")
```

Output if the user enters 60 as their mark

Practice More!

Let's Try it More!

Change the code below in a way that:

- If student's **mark** $\geq$ **80** , program prints **"Well Done!"**
- If student's **mark is between 70 and 80** , program prints **"Good! But you need more practice!"**
- If student's **mark is between 50 and 70**, the program prints **"Study harder!"**
- If student's **mark** $<$ **50** , program prints **"Failed!"**

```
mark = int(input('Enter your mark in Programming 1: '))

if (mark >= 80) :
    print("Well Done!")
else:
    print("Practice More!")
```

Answer (First Way for Writing Conditions)

```
mark = int(input("Enter your mark in Programming 1: "))

if (mark >= 80):
    print ("Well Done!")
elif (mark >= 70):
    print ("Good! But you need more practice!")
elif (mark >= 50):
    print ("Study harder!")
else:
    print ("Failed!")
```

Answer (Second Way for Writing Conditions)

```
mark = int(input("Enter your mark in Programming 1: "))

if (80 <= mark <= 100):
    print ("Well Done!")
elif (70 <= mark < 80):
    print ("Good! But you need more practice!")
elif (50 <= mark < 70):
    print ("Study harder!")
else:
    print ("Failed!")
```

Let's Try it More!

Ask the user to enter a **country name**, and outputs the **capital city**.

Country	Capital
Netherlands	Amsterdam
France	Paris
UK	London
Germany	Berlin