Unit:2 ; Class:4

Conditional Statements

Introduction to Conditionals

- Conditionals allow programs to make decisions.
- A conditional evaluates a condition and executes a block of code based on the result (True or False).
- Keywords used: `if`, `elif`, `else`.

Practice Problems:

1. Define what a conditional is in Python and its purpose.

The if Statement

- Executes a block of code if the condition is `True`.

Syntax:

```
if condition:
    # Code to execute
```

Example Code:

```
x = 10
if x > 5:
    print("x is greater than 5")
```

Class Work:

1. Write a program to check if a number is positive.
2. Modify the above program to also check if the number is zero.

Multiple if Statements

- Each `if` condition is checked independently.
- All conditions that are `True` will execute their respective code blocks.

Syntax:

```
if condition1:
    # Code for condition1
if condition2:
    # Code for condition2
```

```
x = 10
y = 20
if x > 5:
    print("x is greater than 5")
if y > 15:
    print("y is greater than 15")
```

Class Work: Write a program to check if a number is both greater than 10 and even.

The if-else Statement

- Provides an alternative block of code if the condition is `False`.

Syntax:

```
if condition:
    # Code if condition is True
else:
    # Code if condition is False
```

```python
x = 3
if x > 5:
    print("x is greater than 5")
else:
    print("x is less than or equal to 5")
```

Class Work: Write a program to check if a person is eligible to vote (age >= 18).

The if-elif-else Statement

- Allows checking multiple conditions.
- Executes the first block of code where the condition is `True`.

Syntax:

```
if condition1:
    # Code for condition1
elif condition2:
    # Code for condition2
else:
    # Code if all conditions are False
```

```
x = 15
if x < 10:
    print("x is less than 10")
elif x < 20:
    print("x is between 10 and 20")
else:
    print("x is 20 or more")
```

Class Work: Write a program to find the largest of three numbers using conditionals.

Multiple elif Statements

- Used when more than one condition needs to be checked in sequence.
- Only the first `True` condition's block of code will execute.

Syntax:

```
if condition1:
    # Code for condition1
elif condition2:
    # Code for condition2
elif condition3:
    # Code for condition3
else:
    # Code if all conditions are False
```

```
x = 25
if x < 10:
    print("x is less than 10")
elif x < 20:
    print("x is between 10 and 20")
elif x < 30:
    print("x is between 20 and 30")
else:
    print("x is 30 or more")
```

Class Work: Write a program to assign a grade based on marks using multiple `elif` statements.

Nested Conditionals

- Conditionals inside other conditionals.
- Useful for complex decision-making.

```
x = 10
y = 5
if x > 5:
    if y < 10:
        print("x is greater than 5 and y is less than 10")
```

Class Work: Write a program to check if a number is even or odd and also if it is divisible by 5.

Solution:

```
# Write a program to check if a number is even or odd and also if it is divisible by 5.

# Input: Number from user
number = 25#int(input("Enter a number: "))

# Check if the number is even or odd
if number % 2 == 0: # even
    print(f"{number} is an even number.")
    # Nested condition to check if the number is divisible by 5
    if number % 5 == 0:
        print(f"{number} is also divisible by 5.")
    else:
        print(f"{number} is not divisible by 5.")
else: # odd
    print(f"{number} is an odd number.")
    # Nested condition to check if the number is divisible by 5
    if number % 5 == 0:
        print(f"{number} is divisible by 5.")
    else:
        print(f"{number} is not divisible by 5.")
```

Practice Time

1. Make a Simple Calculator.
2. Write a Python program to check if a number is positive, negative, or zero.
3. Create a program that checks if a person is eligible to vote (age >= 18).
4. Write a program to find the largest of three numbers using conditionals.

Solution of Calculator

```
num_1 = int(input("Enter the first number: "))
num_2 = int(input("Enter the second number: "))
operation = input("Enter the operation (+, -, *, /): ")

if operation == "+":
    result = num_1 + num_2
elif operation == "-":
    result = num_1 - num_2
elif operation == "*":
    result = num_1 * num_2
else:
    result = num_1 / num_2

print(f"The result of {num_1} {operation} {num_2} is: {result}")
```

Assignment: Conditionals

1. Write a Python program to classify a given number as small (< 10), medium (10-100), or large (> 100).
2. Create a program that asks the user for their marks and prints the grade (A, B, C, D, F) based on the following rules:
    - A: Marks >= 90
    - B: Marks 80-89
    - C: Marks 70-79
    - D: Marks 60-69
    - F: Marks < 60
3. Write a program to calculate the electricity bill:
    - First 100 units: $0.5/unit
    - Next 100 units: $0.75/unit
    - Above 200 units: $1/unit

Summary of Class 4

- Learned about conditional statements: `if`, `if-else`, `if-elif-else`.
- Explored nested conditionals.
- Practiced real-world examples.

Thank You