**DAY 1**

**SECTION 1 (Data)**

**1.**  **Problem Statement** : Write a program that takes your name and age as input and print a greeting like : “Hello John,you are 20 years old.”

**Pseudo code** **:**

Start

Read name and age\_input

If age\_input is a number and age ≥ 0

convert and display greeting

Else if age < 0

display "age cannot be negative"

Else

display "invalid input"

End

**Algorithm: steps**

1. Start
2. Read name and age input as strings
3. If age contains only digits:

* Convert to integer
* If age ≥ 0, display greeting
* Else, display "Age cannot be negative"

1. Else, display "Invalid input"
2. End

**Code** :

A= input("Enter your name: ")

B\_input = input("Enter your age: ")

if age\_input.isdigit():

age = int(age\_input)

if age >= 0:

print(f"Hello {name}, you are {age} years old.")

else:

print("Age cannot be negative.")

else:

print("Invalid input. Please enter a valid positive number for age.")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation**

* The program asks the user to enter their name and age (both as strings).
* It checks if the age contains only digits using isdigit().
* If valid, it converts the age to an integer.
* If the age is non-negative, it prints a greeting.
* If the age is negative or invalid, it shows an appropriate error message.

**2.**  **Problem Statement :** Take two numbers as input (strings), convert them to integers, and print their sum, difference, and product.

**Pseudo code** **:**

Start

Read num1 and num2 as strings

Convert both to integers

Calculate sum, difference, and product

Display the results

End

**Algorithm: steps**

1. Start
2. Input first number as num1 (string)
3. Input second number as num2 (string)
4. Convert num1 and num2 to integers
5. Calculate sum, difference, and product
6. Display the results
7. End

**Code** :

num1 = input("Enter the first number: ")

num2 = input("Enter the second number: ")

int\_num1 = int(num1)

int\_num2 = int(num2)

sum\_result = int\_num1 + int\_num2

diff\_result = int\_num1 - int\_num2

prod\_result = int\_num1 \* int\_num2

print("Sum:", sum\_result)

print("Difference:", diff\_result)

print("Product:", prod\_result)

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation**

* The program asks the user to enter two numbers as input (stored as strings).
* It converts both inputs from strings to integers using int().
* It calculates the sum, difference, and product of the two numbers.
* The results are stored in separate variables: sum\_result, diff\_result, and prod\_result.
* Finally, it prints the sum, difference, and product to the screen.

**3.**  **Problem Statement :** Identify the data type of the following inputs in your language of choice: "123", 123, 123.45, True, "Hello".

**Pseudo code** **:**

Start

Set a = "123"

Set b = 123

Set c = 123.45

Set d = true

Set e = "hello"

Display type of a

Display type of b

Display type of c

Display type of d

Display type of e

End

**Algorithm: steps**

1. Start
2. Assign "123" to variable a
3. Assign 123 to variable b
4. Assign 123.45 to variable c
5. Assign True to variable d
6. Assign "Hello" to variable e
7. Display the type of each variable using the type() function
8. End

**Code** :

a = "123"

b = 123

c = 123.45

d = True

e = "Hello"

print("Value:", a, "Type:", type(a))

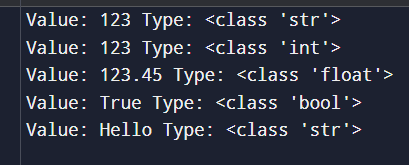
print("Value:", b, "Type:", type(b))

print("Value:", c, "Type:", type(c))

print("Value:", d, "Type:", type(d))

print("Value:", e, "Type:", type(e))

**Output:**

****

**Observation:**

* "123" and "Hello" are **strings** (str) because they are in quotes.
* 123 is an **integer** (int) as it’s a whole number.
* 123.45 is a **float** (float) because it has a decimal point.
* True is a **boolean** (bool) representing a true/false value.

**SECTION 2 (Variables)**

**1.** **Problem Statement :** Write a program that converts Celsius to Fahrenheit using a variable

and formula F=(C\*9/5)+32

**Pseudo code** **:**

Start

Read temperature in celsius → c

Compute fahrenheit → f = (c \* 9 / 5) + 32

Display f

End

**Algorithm: steps**

Start

Input temperature in Celsius (C)

Calculate Fahrenheit: F = (C × 9 / 5) + 32

Display Fahrenheit value

End

**Code** :

celsius = float(input("Enter temperature in Celsius: "))

fahrenheit = (celsius \* 9/5) + 32

print("Temperature in Fahrenheit:", fahrenheit)

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program correctly converts Celsius to Fahrenheit using the formula.
* Input is taken from the user, converted to float for accuracy.
* The result is displayed in Fahrenheit.
* It demonstrates use of variables, arithmetic operations, and user interaction.

**2. Problem Statement :** Create a basic calculator that performs +, -, \*, and/ between two user provided numbers.

**Pseudo code** **:**

Start

Read num1

Read num2

Display operation choices (+, -, \*, /)

Read operation

If operation is "+"

result = num1 + num2

Else if operation is "-"

result = num1 - num2

Else if operation is "\*"

result = num1 \* num2

Else if operation is "/"

if num2 ≠ 0

result = num1 / num2

else

display "cannot divide by zero"

Else

display "invalid operation"

Display result (if valid)

End

**Algorithm: steps**

1. Start
2. Input first number (num1)
3. Input second number (num2)
4. Display available operations: +, -, \*, /
5. Input the chosen operation
6. If operation is +, compute sum
7. If operation is -, compute difference
8. If operation is \*, compute product
9. If operation is /

* If num2 ≠ 0, compute division
* Else, show error message

1. If operation is invalid, show error message
2. Display result
3. End

**Code** :

num1 = float(input("Enter first number: "))

num2 = float(input("Enter second number: "))

print("Choose an operation: +, -, \*, /")

operation = input("Enter the operation: ")

if operation == "+":

result = num1 + num2

print("Result:", result)

elif operation == "-":

result = num1 - num2

print("Result:", result)

elif operation == "\*":

result = num1 \* num2

print("Result:", result)

elif operation == "/":

if num2 != 0:

result = num1 / num2

print("Result:", result)

else:

print("Error: Cannot divide by zero.")

else:

print("Invalid operation.")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program correctly performs basic arithmetic operations (+, -, \*, /) on two user inputs.
* It handles division by zero and invalid operations gracefully.
* It demonstrates use of conditional statements, user input, and arithmetic logic.

**SECTION 3 (Flow Control)**

**1.** **Problem Statement :** Accept a number from the user and print whether it is even or odd using if-else.

**Pseudo code** **:**

Start

Input number

If number mod 2 equals 0

Print "Even number"

Else

Print "Odd number"

End

**Algorithm: steps**

1. Start
2. Input a number from the user and store it in a variable (e.g., num)
3. Check if num % 2 == 0

* If true, print "Even number"
* Else, print "Odd number"

1. End

**Code** :

num = int(input("Enter a number: "))

if num % 2 == 0:

print("The number is even.")

else:

print("The number is odd.")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program takes an integer input from the user.
* It uses the modulus operator % to determine if the number is divisible by 2.
* If the remainder is 0, the number is even; otherwise, it's odd.
* This logic works for both positive and negative integers.
* The program is simple and demonstrates basic use of conditional statements (if-else).

**2.** **Problem Statement :** Based on marks (0-100), print grade using:

A: 90+

B: 80-89

C: 70-79

D: 60-69

F: <60

**Pseudo code** **:**

Start

Input marks

If marks < 0 or marks > 100

Print "Invalid input"

Else if marks >= 90

Print "Grade: A"

Else if marks >= 80

Print "Grade: B"

Else if marks >= 70

Print "Grade: C"

Else if marks >= 60

Print "Grade: D"

Else

Print "Grade: F"

End

**Algorithm: steps**

1. Start
2. Input marks from the user
3. Check if marks are less than 0 or greater than 100

* If yes, print "Invalid input"

1. Else, check the range of marks:

* If marks ≥ 90 Print "Grade: A"
* Else if marks ≥ 80 Print "Grade: B"
* Else if marks ≥ 70 Print "Grade: C"
* Else if marks ≥ 60 Print "Grade: D"
* Else Print "Grade: F"

End

**Code** :

marks = int(input("Enter your marks (0-100): "))

if marks < 0 or marks > 100:

print("Invalid input! Marks should be between 0 and 100.")

else:

if marks >= 90:

print("Grade: A")

elif marks >= 80:

print("Grade: B")

elif marks >= 70:

print("Grade: C")

elif marks >= 60:

print("Grade: D")

else:

print("Grade: F")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program accepts marks as input and checks if they fall within the valid range (0–100).
* It uses a sequence of if-elif-else conditions to determine the correct grade.
* Input validation prevents incorrect data from being processed.
* The grading is accurate and follows the specified scale:
* A: 90+, B: 80–89, C: 70–79, D: 60–69, F: <60
* The logic is simple and effective for evaluating academic performance.

**3.** **Problem Statement :** Accept two numbers and print which is greater, or if they are equal.

**Pseudo code :**

Start

Input num1

Input num2

If num1 > num2

Print "First number is greater"

Else if num2 > num1

Print "Second number is greater"

Else

Print "Both numbers are equal"

End

**Algorithm: steps**

1. Start
2. Input two numbers: num1, num2
3. Compare num1 and num2:
   * If num1 > num2, print "First number is greater"
   * Else if num2 > num1, print "Second number is greater"
   * Else, print "Both numbers are equal"
4. End

**Code** :

num1 = float(input("Enter the first number: "))

num2 = float(input("Enter the second number: "))

if num1 > num2:

print("The first number is greater.")

elif num2 > num1:

print("The second number is greater.")

else:

print("Both numbers are equal.")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program takes two numbers as input from the user.
* It compares the numbers using conditional (if-elif-else) statements.
* It correctly identifies whether the first number is greater, the second is greater, or both are equal.
* The logic is simple and demonstrates basic number comparison effectively.

**4.** **Problem Statement :** Using a while loop, print numbers from 10 down to 1.

**Pseudo code :**

Start

Set num = 10

While num >= 1

Print num

Decrease num by 1

End

**Algorithm: steps**

1. Start

2. Initialize num to 10

3. While num is greater than or equal to 1, do:

* Print num
* Decrease num by 1

4. End

**Code** :

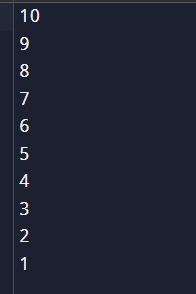
count =10

while count >= 1:

print(count)

count -= 1

**Output:**



**Observation:**

* The program uses a while loop to print numbers in reverse from 10 to 1.
* It initializes a counter and decreases it in each iteration.
* The loop stops when the number becomes less than 1.
* It demonstrates the use of decrementing control in a loop structure effectively.

**5.** **Problem Statement :** Accept a number from the user and print its multiplication table up to 10 using a for loop.

**Pseudo code :**

Start

Input num

For i from 1 to 10

Print num × i = result

End

**Algorithm: steps**

1. Start

2. Accept a number and store it in num

3. Loop i from 1 to 10

* Calculate num × i
* Print the result in the format "num x i = result"

4. End

**Code** :

num = int(input("Enter a number: "))

print(f"\nMultiplication Table for {num}:\n")

for i in range(1, 10):

print(f"{num} x {i} = {num \* i}")

| Test cases | Input | Expected Output |
| --- | --- | --- |
| TC1 |  |  |
| TC2 |  |  |
| TC3 |  |  |

**Observation:**

* The program generates a multiplication table for a given number using a for loop.
* It iterates from 1 to 10 and multiplies the input number by the loop counter.
* The output is displayed in a clear "num x i = result" format.
* It effectively demonstrates the use of loops and basic arithmetic operations.