Bridge Course - Day 02

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Activity 1: Everyday Decisions

- Think of three common decisions you make daily.
- Write them in format of If [condition] and Then[action].
- How would a computer represent these decisions using java syntax?

1.1 Algorithm:

1. Start
2. Set skindry = True
3. Set goingout = True
4. Set feeling_stressed = True
5. If skindry is true → Print "Use skin care products"
6. If goingout is true → Print "Use sunscreen and cosmetics"
7. If feeling_stressed is true → Print "Take a short break and relax."
8. End

1.2 Pseudocode:

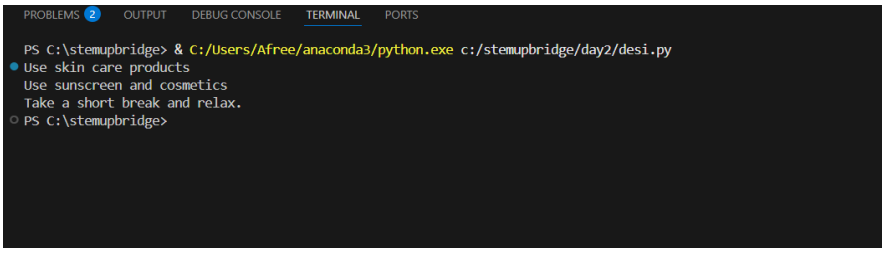
```
STARTSTART
SET skindry = True
SET goingout = True
SET feeling_stressed = True
IF skindry THEN
   DISPLAY "Use skin care products"
IF goingout THEN
   DISPLAY "Use sunscreen and cosmetics"
IF feeling_stressed THEN
   DISPLAY "Take a short break and relax."
END
```

1.3 Code:

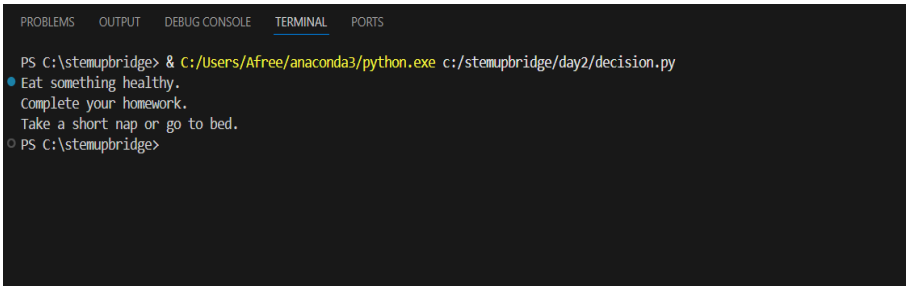
```
skindry = True
goingout = True
feeling_stressed = True
if skindry:
    print("Use skin care products")
if goingout:
    print("Use sunscreen and cosmetics")
if feeling_stressed:
    print("Take a short break and relax.")
```

1.4 Output:

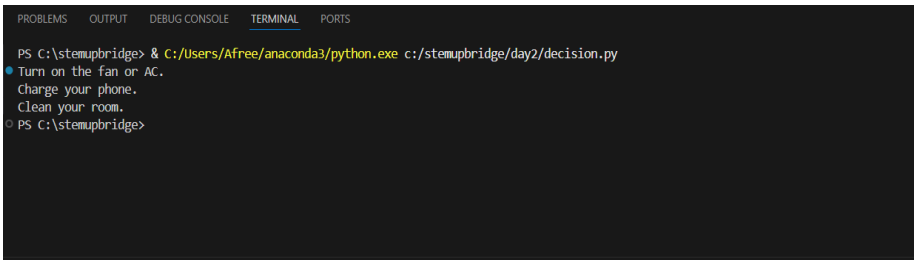
Case 1:



Case 2:



Case 3:



Activity 2: Computer's "Thoughts"

- **Imagine a simple home device**
- **Write two decisions it might need to make in daily use.**
- **Describe the condition and the corresponding action in pseudocode**

2.1 Algorithm:

1. Start
2. Set sunlight = True
3. Set battery_full = False
4. If there is sunlight and battery is not full → Charge the battery
5. If the battery is full → Stop charging
6. If there is no sunlight → Switch to backup power
7. End

2.2 Pseudocode:

```
START
SET sunlight = True
SET battery_full = False
IF sunlight AND battery_full == False THEN
   DISPLAY "Charge the battery using solar power"
IF battery_full == True THEN
   DISPLAY "Stop charging, battery is full"
IF sunlight == False THEN
   DISPLAY "No charging, switch to backup power"
END
```

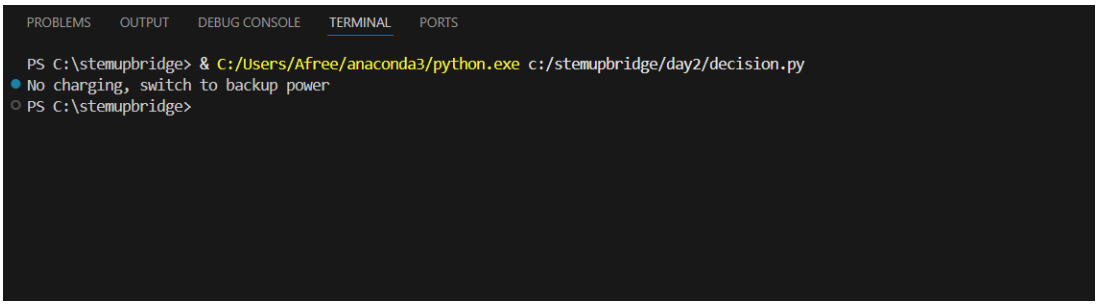
2.3 Code:

```
sunlight = True
battery_full = False

if sunlight and not battery_full:
   print("Charge the battery using solar power")

if battery_full:
   print("Stop charging, battery is full")
```

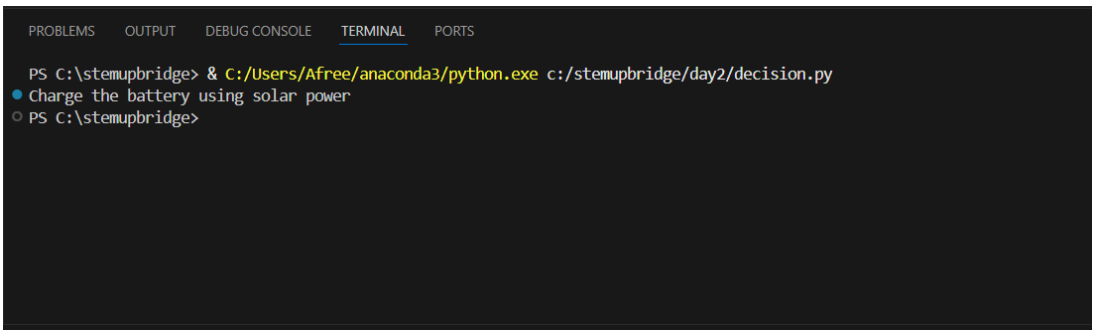
```
if not sunlight:
    print("No charging, switch to backup power")
```

2.4 Output:

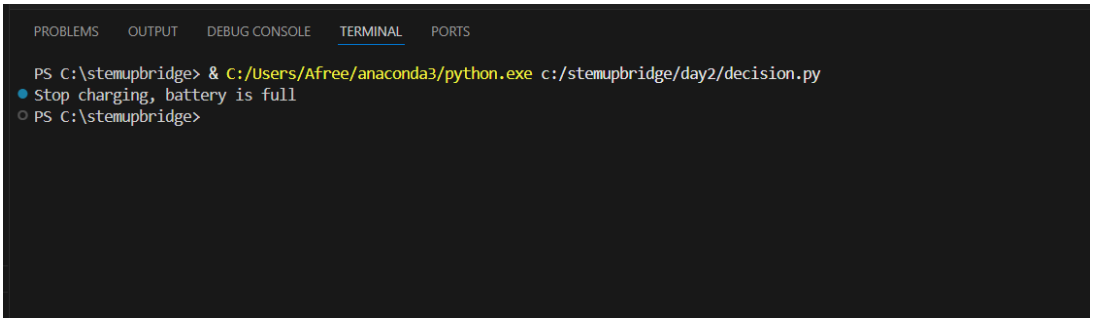
Case 1: If sunlight is False



Case 2:If sunlight is True and battery is not full



Case 3: If sunlight is True and battery is full



Activity 3: Age Checker

1. **Declare an int variable myAge and assign your age to it.**
2. **Write expressions using comparison operators to check if:**
   - **myAge is equal to 25.**
   - **myAge is greater than 18.**
   - **myAge is less than or equal to 65.**
   - **myAge is not equal to 30.**
3. **Print the Boolean result of each expression using System.out.println().**

3.1 Algorithm:

1. Start
2. Declare an integer variable myAge and assign your age
3. Check if myAge is equal to 25
4. Check if myAge is greater than 18
5. Check if myAge is less than or equal to 65
6. Check if myAge is not equal to 30
7. Print the result of each condition
8. End

3.2 Pseudocode:

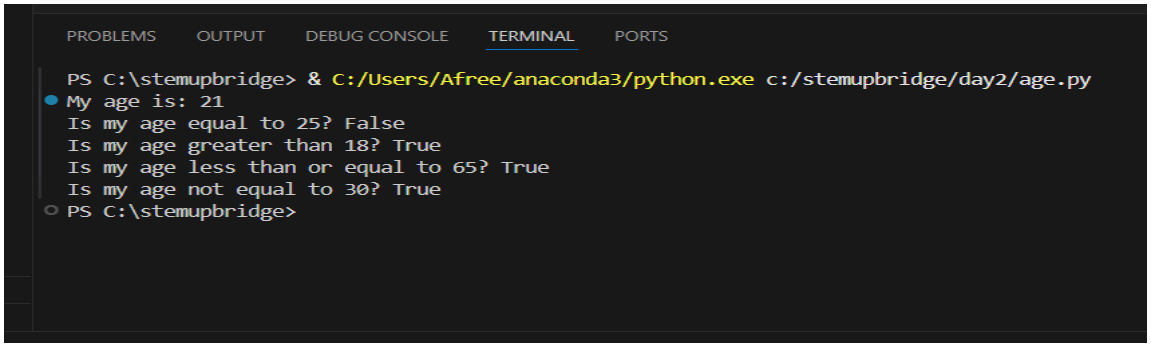
```
START
SET sunlight = True
SET battery_full = False
IF sunlight AND battery_full == False THEN
   DISPLAY "Charge the battery using solar power"
IF battery_full == True THEN
   DISPLAY "Stop charging, battery is full"
IF sunlight == False THEN
   DISPLAY "No charging, switch to backup power"
```

3.3 Code:

```
myAge = 21
if myAge <= 0:
    print("Age cannot be zero or negative. Please enter a valid age.")
else:
    print("My age is:", myAge)
    print("Is my age equal to 25?", myAge == 25)
    print("Is my age greater than 18?", myAge > 18)
    print("Is my age less than or equal to 65?", myAge <= 65)
    print("Is my age not equal to 30?", myAge != 30)
```

3.4 Output:

Case 1: If Age is in Positive number.



Case 2: If Age is in negative number.

Case 3: If Age is in 0.

Activity 4: Login Credentials

1. **Declare two String variables: username = "admin" and password = "password123".**
2. **Declare two more variables: enteredUsername and entered Password, and assign some test values.**
3. **Write a logical expression that returns true only if both username and password match**

4.1 Algorithm:

1. Start
2. Set stored username = "admin"
3. Set stored password = "password123"
4. Set entered username (e.g., "admin")
5. Set entered password (e.g., "password123")
6. Compare both username and password
7. If both match → Login successful
8. Else → Login failed
9. End

4.2 Pseudocode:

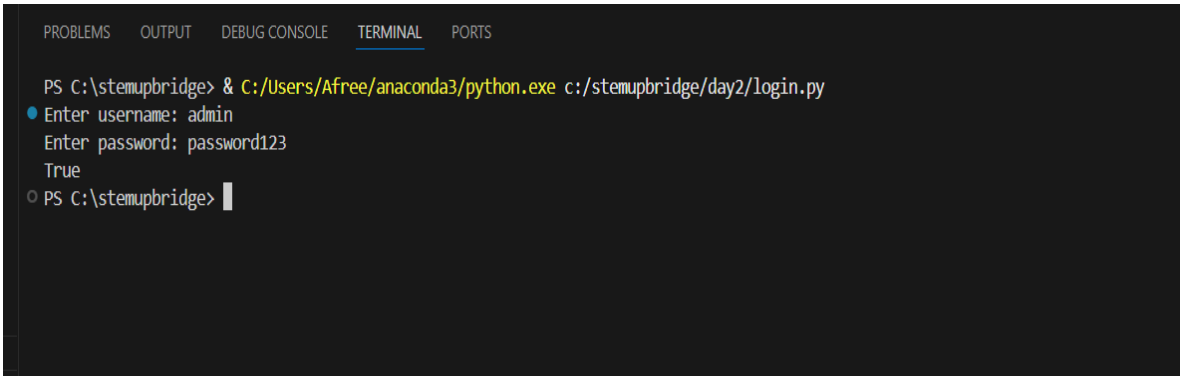
```
START
SET sunlight = True
SET battery_full = False
IF sunlight AND battery_full == False THEN
   DISPLAY "Charge the battery using solar power"
IF battery_full == True THEN
   DISPLAY "Stop charging, battery is full"
IF sunlight == False THEN
   DISPLAY "No charging, switch to backup power"
```

4.3 Code:

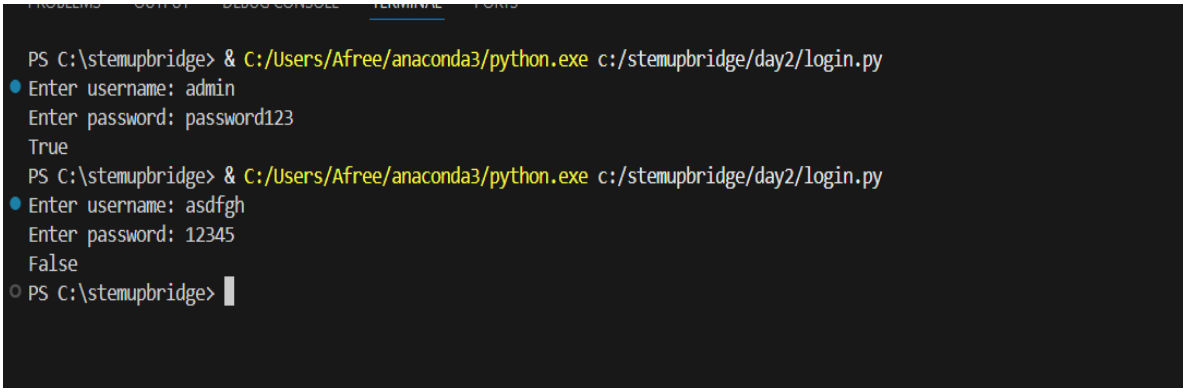
```
username = "admin"
password = "password123"
name= input("Enter username: ")
password= input("Enter password: ")
if name == username and password == password:
    print("True")
else:
    print("False")
```

4.4 Output:

Case 1: Username and password matched.



Case 2: Username and password is not matched.



Activity 5: Number Range

Declare an int variable num and assign it a value.

Check whether num is:

- Greater than 10 AND less than 20.
- Less than 5 OR greater than 100.

Print the results.

5.1 Algorithm:

1. Start
2. Declare and assign an integer variable num
3. Check if num is greater than 10 **and** less than 20
4. Check if num is less than 5 **or** greater than 100
5. Print the result of both conditions
6. End

5.2 Pseudocode:

```
START
SET num = 15
IF num > 10 AND num < 20 THEN
   DISPLAY "Number is between 10 and 20"
IF num < 5 OR num > 100 THEN
   DISPLAY "Number is either less than 5 or greater than 100"
END
```

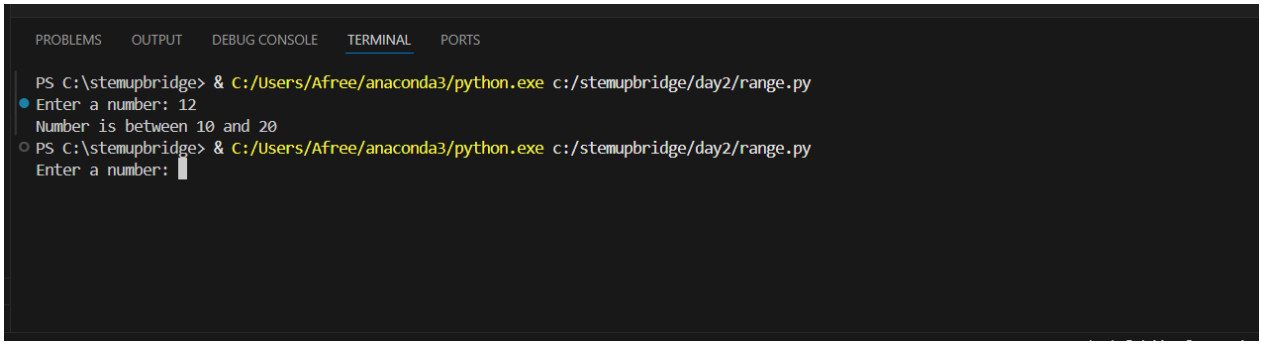
5.3 Code:

```
num = int(input("Enter a number: "))#num=12
if num > 10 and num < 20:
   print("Number is between 10 and 20")
```

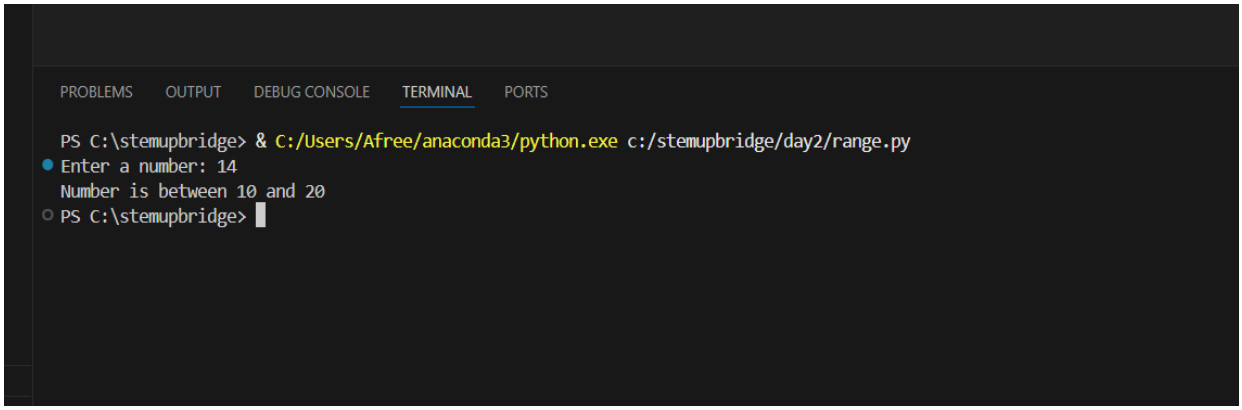
```
if num < 5 or num > 100:
    print("Number is either less than 5 ")
else:
    print("Number is between 5 and 100")
```

5.4 Output:

Case 1: If number given is 12\number in a range



Case 3: If number given 14 in range



Case 3: If number given is 5/out in range

Activity 6: Operator Precedence Challenge

- **Given the expression: 5+3*2>10 &&!(7 == 7)**
- **Break it down step-by-step.**
- **Show the result after each stage of the operation and determine final Boolean value.**

6.1 Algorithm:

1. Start
2. Multiply 3 by 2 → result = 6
3. Add 5 to result → total = 11
4. Compare if 11 > 10 → True
5. Evaluate (7 == 7) → True
6. Apply NOT to result → False
7. Final result = True AND False → False
8. Print result
9. End

6.2 Pseudocode:

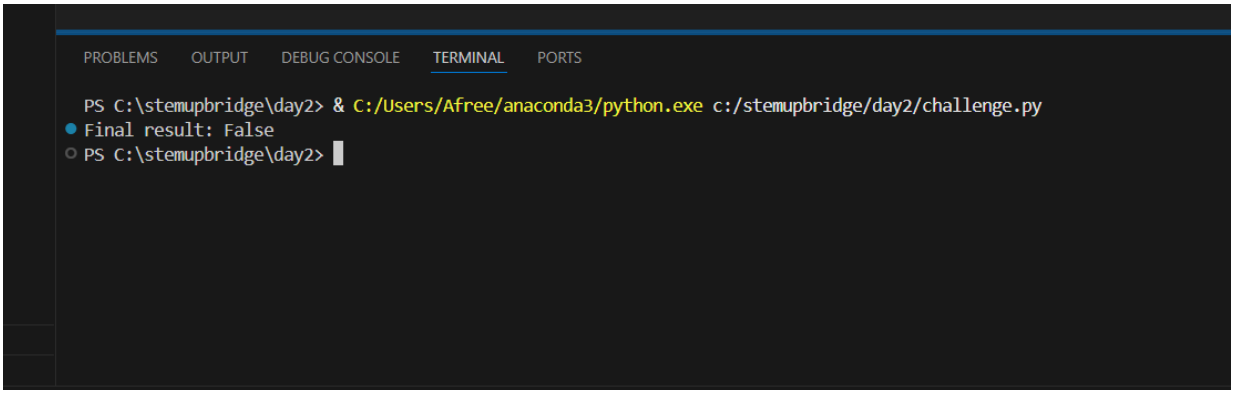
```
START
SET part1 = 5 + (3 * 2)   // part1 = 11
SET condition1 = part1 > 10   // condition1 = True
SET condition2 = (7 == 7)     // condition2 = True
SET not_condition2 = NOT condition2   // False
SET final_result = condition1 AND not_condition2
DISPLAY final_result
END
```

6.3 Code:

```
result = 5 + 3 * 2 > 10 and not (7 == 7)
print("Final result:", result)
```

6.4 Output:

The final result is False



Activity 7 : Positive, Negative, or Zero

- **Get an integer input from the user using Scanner.**
- **Write an if-else if- else structure that:**
  - **Prints "Positive" if the number is greater than 0.**
  - **Prints "Negative" if the number is less than 0.**
  - **Prints "Zero" if the number is exactly 0.**

Algorithm 7.1:

1. Start
2. Prompt the user to enter an integer
3. Read the number
4. If the number is greater than 0 → Print "Positive"
5. Else if the number is less than 0 → Print "Negative"
6. Else → Print "Zero"
7. End

Pseudo code 7.2:

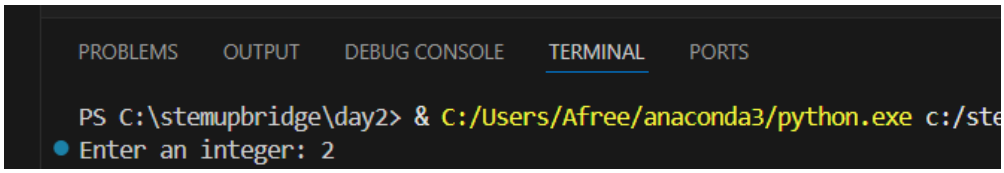
```
START
DISPLAY "Enter a number"
INPUT number
IF number > 0 THEN
   DISPLAY "Positive"
ELSE IF number < 0 THEN
   DISPLAY "Negative"
ELSE
   DISPLAY "Zero"
END IF
END
```

Code 7.3:

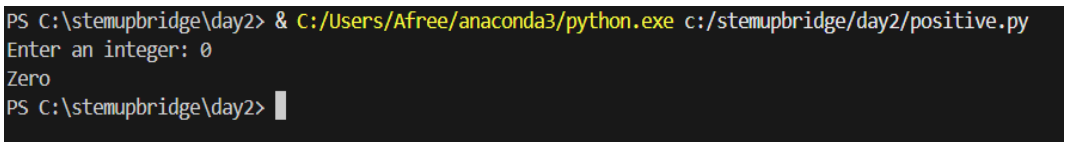
```
num = int(input("Enter an integer: "))
if num > 0:
    print("Positive")
elif num < 0:
    print("Negative")
else:
    print("Zero")
```

Output:

Case 1: when input is positive number



Case 2: when input is zero



Case 3: when input is negative number

Activity 8: Driving Eligibility

Ask the user to input their age.

Use an if-else structure to determine if they are eligible to drive (age >= 18).

Algorithm 8.1

1. Start
2. Prompt the user to enter their age
3. Convert the input to an integer
4. If age is greater than or equal to 18
   Display "You are eligible to drive"
5. Else
   Display "You are not eligible to drive"
6. End

Pseudo code 8.2:

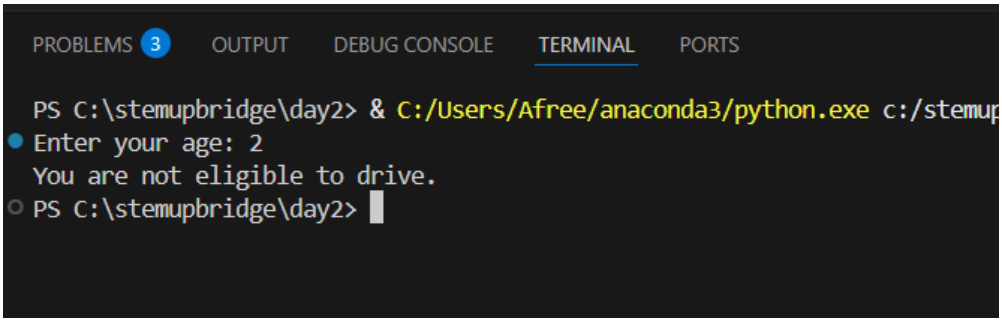
```
START
  DISPLAY "Enter your age: "
  READ age
  IF age >= 18 THEN
    DISPLAY "You are eligible to drive."
  ELSE
    DISPLAY "You are not eligible to drive."
END
```

Code 8.3:

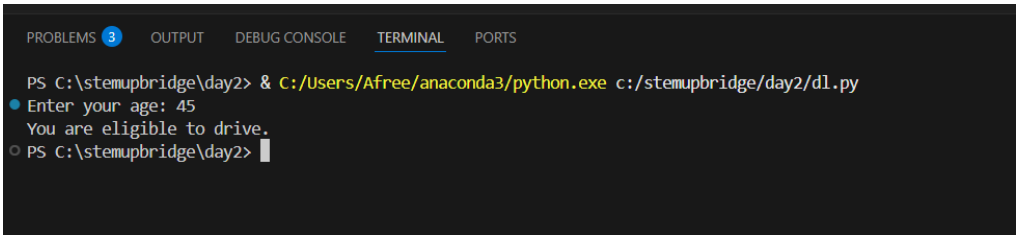
```
age = int(input("Enter your age: "))
if age >= 18:
   print("You are eligible to drive.")
else:
   print("You are not eligible to drive.")
```

Output

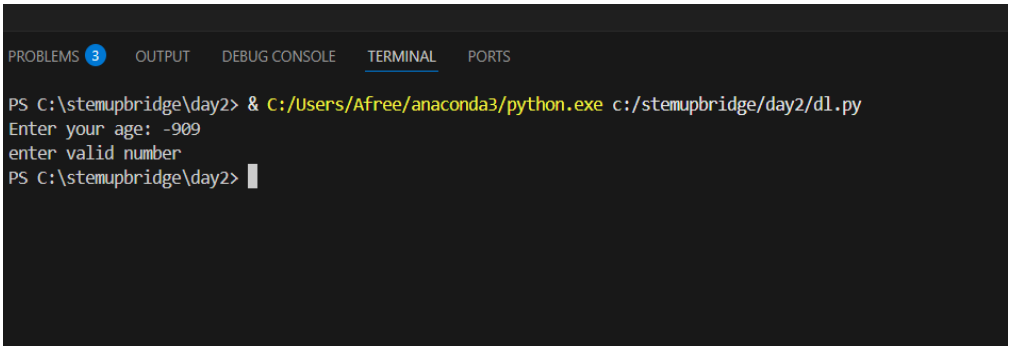
Case 1. If the age of the person is below 18



Case 2. If the age of the person in above 18



Case 3. If the number is invalid



Activity 9 : Simple Calculator

Get two double inputs and an operator (+, - , * ,/) from the user.

Use if-else if-else to perform the operation.

Handle division by zero using an if check.

Algorithm 9.1

1. Start
2. Get first number as a double from user
3. Get second number as a double from user
4. Get operator (+, -, *, /) from user
5. If operator is +, perform addition
6. Else if operator is -, perform subtraction
7. Else if operator is *, perform multiplication
8. Else if operator is /
    a. If second number is not 0, perform division
    b. Else, display error message "Cannot divide by zero"
9. Else, display "Invalid operator"
10. End

Pseudo code 9.2

```
START
  DISPLAY "Enter first number: "
  READ num1
  DISPLAY "Enter second number: "
  READ num2
  DISPLAY "Enter operator (+, -, *, /): "
  READ op
  IF op == "+"
     result = num1 + num2
     DISPLAY result
  ELSE IF op == "-"
     result = num1 - num2
     DISPLAY result
```

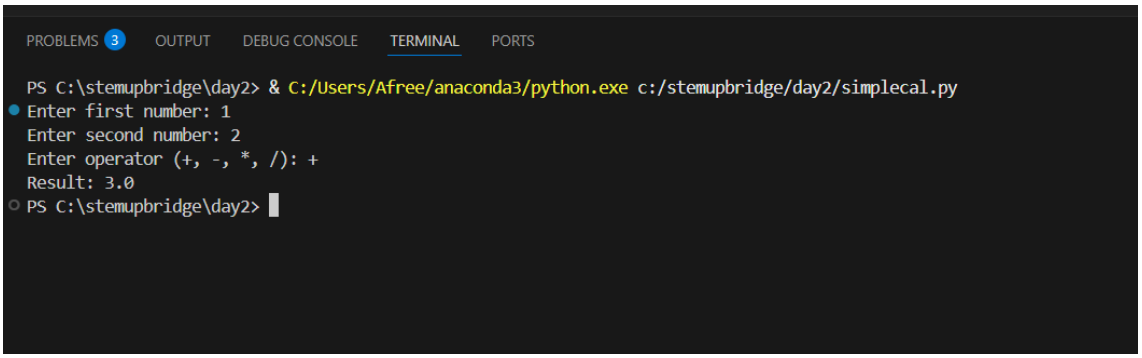
```
    ELSE IF op == "*"
        result = num1 * num2
        DISPLAY result
    ELSE IF op == "/"
        IF num2 != 0
            result = num1 / num2
            DISPLAY result
        ELSE
            DISPLAY "Cannot divide by zero"
    ELSE
        DISPLAY "Invalid operator"
 END
```

Code 9.3:

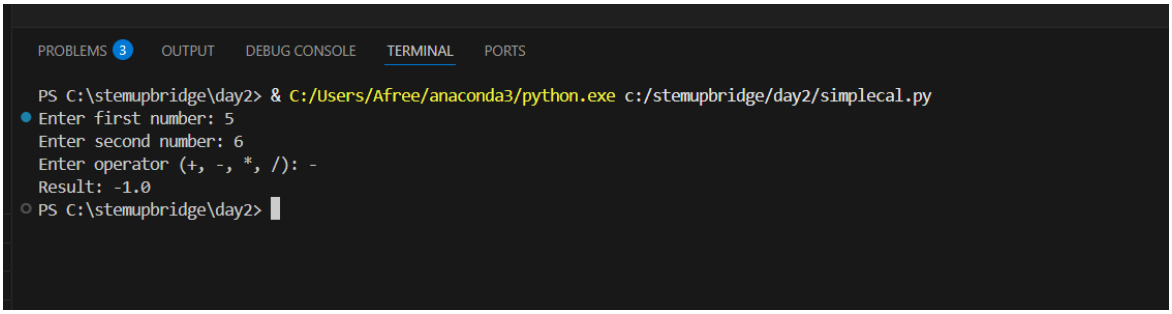
```
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
operator = input("Enter operator (+, -, *, /): ")
if operator == '+':
    print("Result:", num1 + num2)
elif operator == '-':
    print("Result:", num1 - num2)
elif operator == '*':
    print("Result:", num1 * num2)
elif operator == '/':
    if num2 == 0:
        print("Error: Cannot divide by zero.")
    else:
        print("Result:", num1 / num2)
else:
    print("Invalid operator.")
```

Output

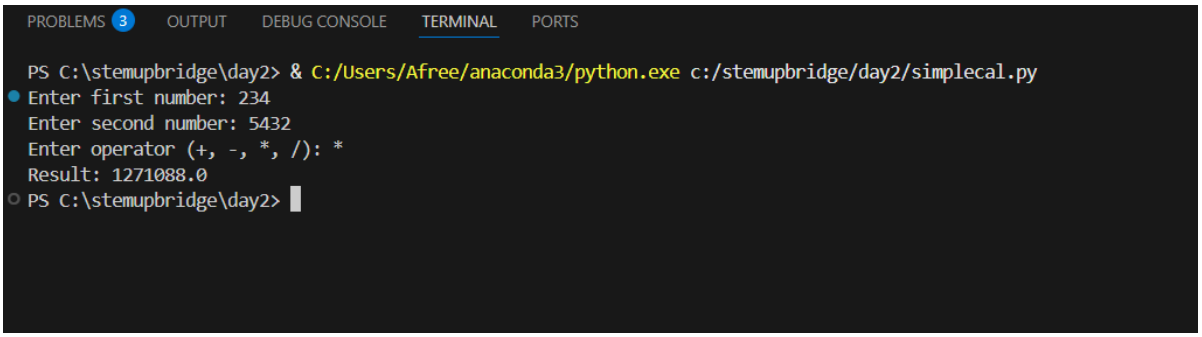
Case 1:Adding the two number



Case 2: Difference of two number



Case 3: Product of two numbers



Activity 10: Movie Ticket Price

1. **Get user age (int) and student status (boolean).**
2. **Use nested if or logical operators to determine:**
   - **If under 5 or over 65: $5**
   - **If 5-18 and student: $8**
   - **Otherwise: $12**

3 Print the result.

Algorithm 10.1:

1. Start
2. Get first number as a double from user
3. Get second number as a double from user
4. Get operator (+, -, *, /) from user
5. If operator is +, perform addition
6. Else if operator is -, perform subtraction
7. Else if operator is *, perform multiplication
8. Else if operator is /
   a. If second number is not 0, perform division
   b. Else, display error message "Cannot divide by zero"
9. Else, display "Invalid operator"
10. End

Pseudocode 10.2:

```
START
  DISPLAY "Enter first number: "
  READ num1
  DISPLAY "Enter second number: "
  READ num2
  DISPLAY "Enter operator (+, -, *, /): "
  READ op
  IF op == "+"
    result = num1 + num2
```

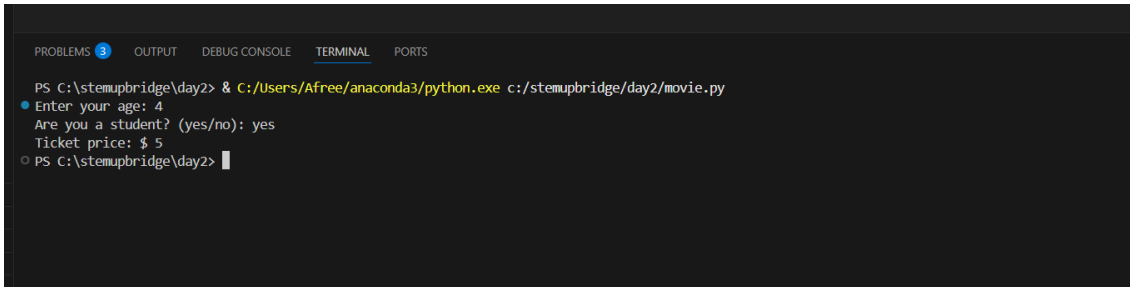
```
        DISPLAY result
    ELSE IF op == "-"
        result = num1 - num2
        DISPLAY result
    ELSE IF op == "*"
        result = num1 * num2
        DISPLAY result
    ELSE IF op == "/"
        IF num2 != 0
            result = num1 / num2
            DISPLAY result
        ELSE
            DISPLAY "Cannot divide by zero"
    ELSE
        DISPLAY "Invalid operator"
END
```

Code 10.3:

```
age = int(input("Enter your age: "))
is_student = input("Are you a student? (yes/no): ").lower() == "yes"
if age < 5 or age > 65:
    price = 5
elif 5 <= age <= 18 and is_student:
    price = 8
else:
    price = 12
print("Ticket price: $", price)
```

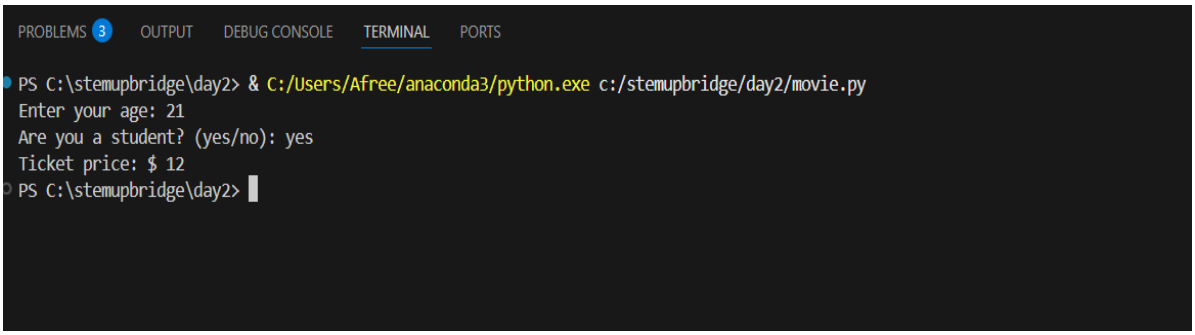
Output 10.3:

Case 1: If it is student.



Case 2: : If it is not student.

Case 3: If it is student.



Activity 11 : Day of the Week

Ask the user to input an integer from 1-7.

Use a switch statement to print the corresponding day.

Include a default case for invalid inputs.

Algorithm 11.1:

1. Start
2. Get first number as a double from user
3. Get second number as a double from user
4. Get operator (+, -, *, /) from user
5. If operator is +, perform addition
6. Else if operator is -, perform subtraction
7. Else if operator is *, perform multiplication
8. Else if operator is /
    a. If second number is not 0, perform division
    b. Else, display error message "Cannot divide by zero"
9. Else, display "Invalid operator"

Pseudocode 11.2:

```
START
  DISPLAY "Enter first number: "
  READ num1
  DISPLAY "Enter second number: "
  READ num2
  DISPLAY "Enter operator (+, -, *, /): "
  READ op
  IF op == "+"
    result = num1 + num2
    DISPLAY result
  ELSE IF op == "-"
    result = num1 - num2
    DISPLAY result
```

```
    ELSE IF op == "*"
        result = num1 * num2
        DISPLAY result
    ELSE IF op == "/"
        IF num2 != 0
            result = num1 / num2
            DISPLAY result
        ELSE
            DISPLAY "Cannot divide by zero"
    ELSE
        DISPLAY "Invalid operator"
END
```

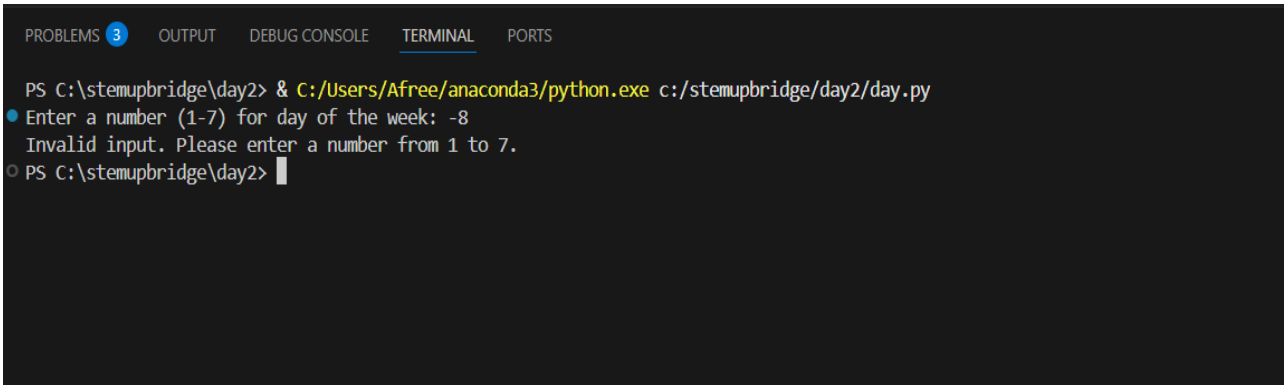
Code 11.3:

```
day = int(input("Enter a number (1-7) for day of the week: "))
match day:
    case 1:
        print("Monday")
    case 2:
        print("Tuesday")
    case 3:
        print("Wednesday")
    case 4:
        print("Thursday")
    case 5:
        print("Friday")
    case 6:
        print("Saturday")
    case 7:
        print("Sunday")
    case _:
        print("Invalid input. Please enter a number from 1 to 7.")
```

Output :

Case 1: Select from 1-7

Case 2: If the number selected other than from 1-7



Case 3: If the number selected other than from 1-7

Activity 12: Simple Menu Selection

Simulate an ATM.

Get user input: 1 = Check Balance, 2 = Withdraw, 3 = Deposit, 4 = Exit.

Use switch to print the action.

Handle invalid input with a default case.

Algorithm 12.1:

1. Start
2. Display the ATM menu:
   1 = Check Balance
   2 = Withdraw
   3 = Deposit
   4 = Exit
3. Get user input (choice)
4. Use a switch/case structure:
   - If choice is 1, display "Checking balance..."
   - If choice is 2, display "Withdrawing money..."
   - If choice is 3, display "Depositing money..."
   - If choice is 4, display "Exiting..."
   - Default: Display "Invalid choice"
5. End

Pseudo code 12.2:

```
START
  DISPLAY "ATM Menu:"
  DISPLAY "1. Check Balance"
  DISPLAY "2. Withdraw"
  DISPLAY "3. Deposit"
  DISPLAY "4. Exit"
  DISPLAY "Enter your choice: "
  READ choice
  SWITCH (choice)
    CASE 1:
      DISPLAY "Checking balance..."
      BREAK
```

```
    CASE 2:
        DISPLAY "Withdrawing money..."
        BREAK
    CASE 3:
        DISPLAY "Depositing money..."
        BREAK
    CASE 4:
        DISPLAY "Exiting..."
        BREAK
    DEFAULT:
        DISPLAY "Invalid choice"
END
```

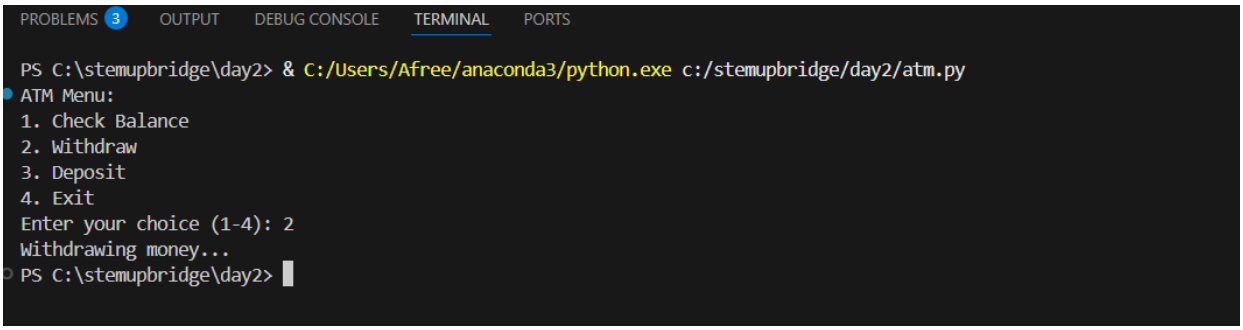
Code 12.3:

```
print("ATM Menu:")
print("1. Check Balance")
print("2. Withdraw")
print("3. Deposit")
print("4. Exit")
choice = int(input("Enter your choice (1-4): "))
match choice:
    case 1:
        print("Checking balance...")
    case 2:
        print("Withdrawing money...")
    case 3:
        print("Depositing money...")
    case 4:
        print("Exiting... Thank you!")
    case _:
        print("Invalid choice. Please select between 1 and 4.")
```

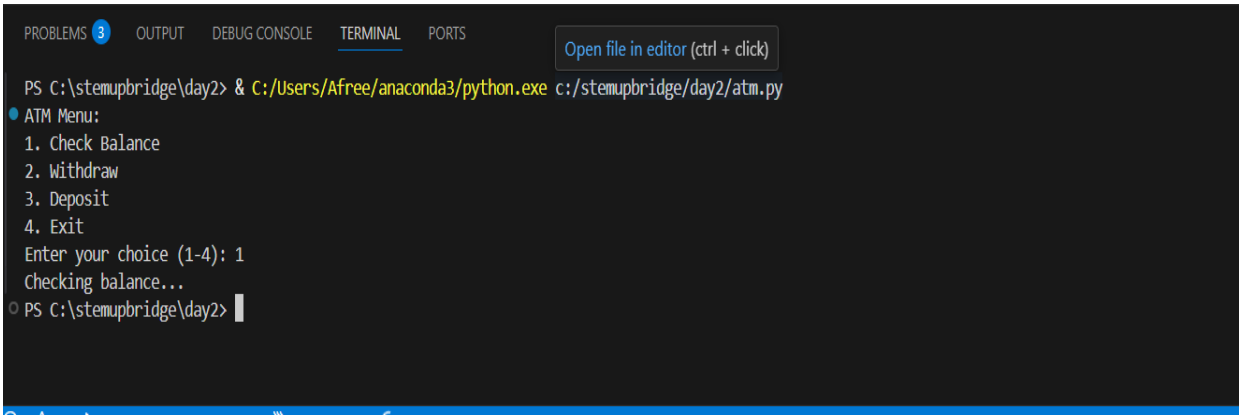
Output:

Case 1:The choice is given 3

Case 2 :The choice is given 2



Case 3 : The choice is given 3



Activity 13: Grade Remarks (Why switch is not ideal)**is not ideal) **

Input score (0-100).

Use if-else if-else to print:

90-100: "Excellent"

80-89: "Very Good"

70-79: "Good"

60-69: "Pass"

Below 60: "Fail"

Explain why switch would not be appropriate here.

Algorithm:

1. Start
2. Ask the user to enter a score (0–100)
3. Convert the input to an integer
4. Use if-else statements to check the range:
   - If 90–100 → print "Excellent"
   - Else if 80–89 → print "Very Good"
   - Else if 70–79 → print "Good"
   - Else if 60–69 → print "Pass"
   - Else → print "Fail"
5. End

Pseudo code:

```
START
  DISPLAY "Enter your score (0–100): "
  READ score

  IF score >= 90 AND score <= 100 THEN
     DISPLAY "Excellent"
  ELSE IF score >= 80 AND score <= 89 THEN
     DISPLAY "Very Good"
```

```
    ELSE IF score >= 70 AND score <= 79 THEN
        DISPLAY "Good"
    ELSE IF score >= 60 AND score <= 69 THEN
        DISPLAY "Pass"
    ELSE
        DISPLAY "Fail"
END
```

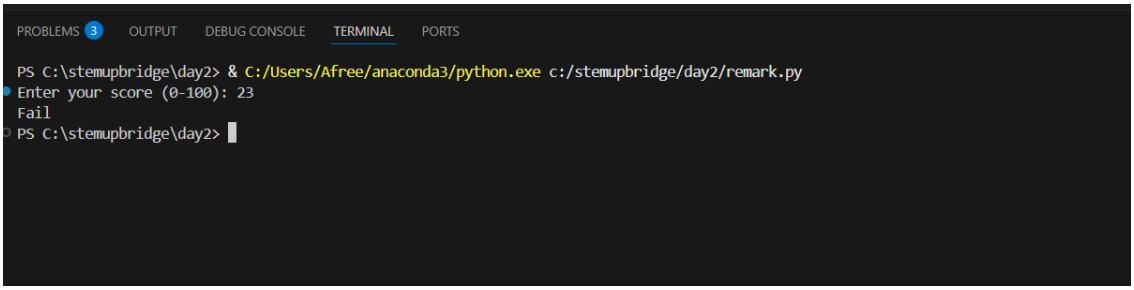
Code 13.3:

```
score = int(input("Enter your score (0-100): "))
if 90 <= score <= 100:
    print("Excellent")
elif 80 <= score <= 89:
    print("Very Good")
elif 70 <= score <= 79:
    print("Good")
elif 60 <= score <= 69:
    print("Pass")
elif 0 <= score < 60:
    print("Fail")
else:
    print("Invalid score. Please enter a number between 0 and 100.")
```

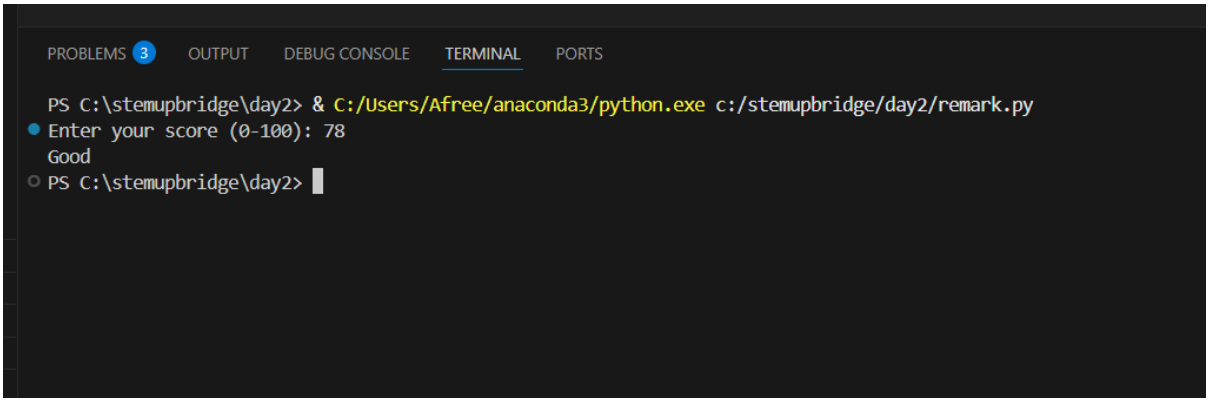
- Switch statements only match specific values, not ranges.
- In this problem, we need to check ranges like 90–100, 80–89.
- To handle such conditions, if-elif-else is the better and more flexible choice.

Output 13.3:

Case 1:



Case 2:



Case 3: