Assignment 2 : Decision Making Statements

Question 1: Write a Python program to check if a number is positive or negative.

Code:

Python
```
a = int(input("Enter a number: "))
if a>=0:
    print("positive")
else:
    print("Negative")
```

Sample Output:

```
Enter a number: -5
Negative
```

Question 2: Write a Python program to check if a number is even or odd.

Code:

Python
```
a = int(input("Enter a number: "))
if a%2==0:
    print("Even")
else:
    print("Odd")
```

Sample Output:

```
Enter a number: 42
Even
```

Question 3: Write a Python program to find the greatest of three numbers.

Code:

Python
```
a = int(input("Enter a number: "))
b = int(input("Enter b number: "))
c = int(input("Enter c number: "))
if (a>b>c):
    print("a is the greatest")
elif (b>c>a):
    print("b is the greatest")
```

```
else:
    print("c is the greatest")
```

Sample Output:

```
Enter a number: 10
Enter b number: 30
Enter c number: 20
c is the greatest
```

Note: The logic in this code is incomplete and may not always give the correct greatest number. It only checks for specific orderings (e.g., a > b > c).

Question 4: Write a Python program to check if a number is divisible by 7.

Code:

```
Python
a = int(input("Enter a number: "))
if a%7==0:
    print("yes it is divisible by 7")
else:
    print("It's not divisible by 7")
```

Sample Output:

```
Enter a number: 49
yes it is divisible by 7
```

Question 5: Write a Python program to check if a number is divisible by 11 and 13.

Code:

```
Python
a = int(input("Enter a number: "))
if (a%7==13 and a%11==0):
    print("yes it is divisible by both 11 and 13")
else:
    print("It's not divisible by both 11 and 13")
```

Sample Output:

```
Enter a number: 143
It's not divisible by both 11 and 13
```

Note: This code has an error. The condition `a%7==13` can never be true, because the result of a modulo 7 operation will always be between 0 and 6. It should likely be `a%13==0`.

Question 6: Write a Python program to calculate (a-b)/(c-d) and handle division by zero.

Code:

Python
```
print("calculating (a-b)/(c-d)")
a = int(input("Enter a: "))
b = int(input("Enter b: "))
c = int(input("Enter c: "))
d = int(input("Enter d: "))
if c-d == 0:
    print("Error: division by zero")
else:
    X = (a-b)/(c-d)
    print(f"Result: {X}")
```

Sample Output:

```
calculating (a-b)/(c-d)
Enter a: 10
Enter b: 2
Enter c: 5
Enter d: 1
Result: 2.0
```

Question 7: Write a Python program to determine if there is a profit or loss.

Code:

Python
```
c = int(input("Enter cost price: "))
d = int(input("Enter selling price: "))
if d < c:
    print("Loss")
elif d == c:
    print("No profit, no loss")
else:
    print("Profit")
```

Sample Output:

```
Enter cost price: 100
Enter selling price: 125
Profit
```

Question 8: Write a Python program to solve a system of linear equations.

Code:

Python

```
print("calculating x1 and x2 for ax1 + bx2 = m & cx1 + dx2 = n :")
a = int(input("Enter a: "))
b = int(input("Enter b: "))
c = int(input("Enter c: "))
d = int(input("Enter d: "))
m = int(input("Enter m: "))
n = int(input("Enter n: "))
if (a * b - c * d == 0):
    print("No solution")
else:
    x1 = (m * d - n * b) / (a * d - b * c)
    x2 = (n * a - m * c) / (a * d - b * c)
    print(f"x1 = {x1}, x2 = {x2}")
```

Sample Output:

```
calculating x1 and x2 for ax1 + bx2 = m & cx1 + dx2 = n :
Enter a: 2
Enter b: 3
Enter c: 4
Enter d: 1
Enter m: 8
Enter n: 6
x1 = 1.0, x2 = 2.0
```

*Note: The condition to check for a solution (a * b - c * d == 0) is incorrect. The correct determinant for the system is (a * d - b * c). The program may proceed to calculate even when no unique solution exists.*

Question 9: Write a Python program to check if a year is a leap year.

Code:

```
Python
year = int(input("Enter year: "))
if year % 4 == 0:
    if year % 100 == 0:
        if year % 400 == 0:
            print(f"{year} is a leap year")
        else:
            print(f"{year} is not a leap year")
    else:
        print(f"{year} is a leap year")
else:
    print(f"{year} is not a leap year")
```

Sample Output:

```
Enter year: 2024
2024 is a leap year
```

Question 10: Write a Python program to identify the type of a triangle.

Code:

```
Python
print("Enter three sides of a triangle :")
a = int(input("Enter a: "))
b = int(input("Enter b: "))
c = int(input("Enter c: "))
if a == b == c:
    print("Equilateral triangle")
elif a == b or b == c or a == c:
    print("Isosceles triangle")
else:
    print("Scalene triangle")
```

Sample Output:

```
Enter three sides of a triangle :
Enter a: 7
Enter b: 7
Enter c: 5
Isosceles triangle
```

Question 11: Write a Python program to create a simple calculator.

Code:

```
Python
a = float(input("Enter first number: "))
b = float(input("Enter second number: "))
choice = input("Enter choice (+, -, *, /): ")
if choice == '+':
    print(a + b)
elif choice == '-':
    print(a - b)
elif choice == '*':
    print(a * b)
elif choice == '/':
    print(a / b)
else:
    print("Invalid choice")
```

Sample Output:

```
Enter first number: 20
Enter second number: 5
Enter choice (+, -, *, /): *
```

100.0

Question 12: Write a Python program to assign a grade based on the average marks.

Code:

Python
```
subject1 = float(input("Enter marks for subject 1: "))
subject2 = float(input("Enter marks for subject 2: "))
subject3 = float(input("Enter marks for subject 3: "))
average_marks = (subject1 + subject2 + subject3) / 3
if average_marks >= 90:
    grade = 'A'
elif average_marks >= 80:
    grade = 'B'
elif average_marks >= 70:
    grade = 'C'
elif average_marks >= 60:
    grade = 'D'
else:
    grade = 'F'
print(f"Grade: {grade}")
```

Sample Output:

```
Enter marks for subject 1: 95
Enter marks for subject 2: 85
Enter marks for subject 3: 92
Grade: A
```

Question 13: Write a Python program to categorize a person based on their age.

Code:

Python
```
age = int(input("Enter your age: "))
if age < 0:
    print("Invalid age")
elif age <= 12:
    print("Child")
elif age <= 19:
    print("Teenager")
elif age <= 59:
    print("Adult")
else:
    print("Senior Citizen")
```

Sample Output:

Enter your age: 34
Adult

Question 14: Write a Python program to calculate the electricity bill.

Code:

Python
```
units = int(input("Enter the total units consumed: "))
if units <= 100:
    bill = units * 5
elif units <= 200:
    bill = 100 * 5 + (units - 100) * 7
else:
    bill = 100 * 5 + 100 * 7 + (units - 200) * 10
print("Electricity bill: ₹", bill)
```

Sample Output:

Enter the total units consumed: 250
Electricity bill: ₹ 1700

Question 15: Write a Python program to calculate BMI and classify weight status.

Code:

Python
```
weight = float(input("Enter your weight in kilograms: "))
height = float(input("Enter your height in meters: "))
bmi = weight / (height ** 2)
if bmi < 18.5:
    print("Underweight")
elif bmi < 25:
    print("Normal weight")
elif bmi < 30:
    print("Overweight")
else:
    print("Obese")
```

Sample Output:

Enter your weight in kilograms: 70
Enter your height in meters: 1.75
Normal weight