Structured Programming

CIS 122 & 122 L

Conditional Practice Problems

Problem 1: Simple calculator

Think about a simple calculator. You need to take two number as user input and then provide various options to the user like sum, subtract, multiply, divide. Now let user chose what to do. Based on the user's choice do the calculation and display result.

Example:

```
Please insert the first number:     110

        Please insert the second number: 11

        What do you want to do with the inputted numbers?

            1. Calculate the summation
            2. Calculate the subtraction
            3. Calculate the multiplication
            4. Calculate the division

            Enter your choice: 2

            The summation of 110 and 11 is  = 121
```

Problem 2:

Write down C codes for following cases:

2.1 Take an integer variable named currentNumber. If integer variable currentNumber is odd, change its value so that it is now 3 times currentNumber plus 1, otherwise change its value so that it is now half of currentNumber (rounded down when currentNumber is odd).

2.2 Assign a value to double variable cost depending on the value of integer variable distance as follows:

Distance	Cost
0 through 100	5.00
More than 100 but not more than 500	8.00
More than 500 but less than 1,000	10.00
1,000 or more	12.00

Problem 3: Gregorian Leap year

In the Gregorian calendar, a normal year consists of 365 days. Because the actual length of a sidereal year (the time required for the Earth to revolve once about the Sun) is actually 365.2425 days, a "leap year" of 366 days is used once every four years to eliminate the error caused by three normal (but short) years. Any year that is evenly divisible by 4 is a leap year: for example, 1988, 1992, and 1996 are leap years.

However, there is still a small error that must be accounted for. To eliminate this error, the Gregorian calendar stipulates that a year that is evenly divisible by 100 (for example, 1900) is a leap year only if it is also evenly divisible by 400.

For this reason, the following years are not leap years:

1700, 1800, 1900, 2100, 2200, 2300, 2500, 2600

This is because they are evenly divisible by 100 but not by 400.

The following years are leap years: 1600, 2000, 2400

This is because they are evenly divisible by both 100 and 400.

Now, consider the above scenario write down necessary c codes to make a leap year calculator.

Problem 4: BMI

BMI is calculated the same way for both adults and children. The calculation is based on the following formulas:

Measurement Units	Formula and Calculation
Kilograms and meters (or centimeters)	Formula: weight (kg) / [height (m)]^2 With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters. Example: Weight = 68 kg, Height = 165 cm (1.65 m) Calculation: 68 ÷ (1.65)^2 = 24.98
Pounds and inches	Formula: weight (lb) / [height (in)]^2 x 703 Calculate BMI by dividing weight in pounds (lbs) by height in inches (in) squared and multiplying by a conversion factor of 703. Example: Weight = 150 lbs, Height = 5′5″ (65″) Calculation: [150 ÷ (65)^2] x 703 = 24.96

BMI Inter Predation in Adults:

For adults 18 years old and older, BMI is interpreted using standard weight status categories. These categories are the same for men and women of all body types and ages.

The standard weight status categories associated with BMI ranges for adults are shown in the following table-

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal or Healthy Weight
25.0 – 29.9	Overweight
30.0 and Above	Obese

For example, here are the weight ranges, the corresponding BMI ranges, and the weight status categories for a person who is 5′ 9″

Height	Weight Range	BMI	Weight Status
5′ 9″	124 lbs or less	Below 18.5	Underweight
	125 lbs to 168 lbs	18.5 to 24.9	Normal or Healthy Weight
	169 lbs to 202 lbs	25.0 to 29.9	Overweight
	203 lbs or more	30 or higher	Obese

Let's say you take input 70 cm height and 70 kg weight now you need to calculate BMI and then need to decide BMI Weight Status.

Now write necessary codes for implementing an BMI Calculator in C.

Instructions:

- Make a word or pdf document and named it with your DIU student id
- Take screenshot of the C program code and output for each task.
- Attach the screenshots to your document and submit