COMPRO1 Reviewer #2: Programming Problems
Coverage: functions, if-else conditional control structure

The programming problems given below are based on real-life scenarios but have been simplified to suit the need of our course. After solving the exercises CORRECTLY, you should have gained experience and a good understanding of the following:

- ***How to analyze the problem (identify input, output, computations/formulas)***
- ***How to formulate an algorithm***
- ***How to specify correct conditional expressions***
- ***How to use if-else statement***
- ***How to write functions***
- ***How to write a syntactically and semantically correct C program.***

Note: Please emai [redacted] ***for corrections.***
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IMPORTANT: To properly develop your programming skilss, make sure that you faithfully follow the program development steps.

Step 1. Analyze (read/understand) the problem. Identify the input, computations/formula involved and output. Identify the data types of your input and output variables.

Step 2. Formulate the algorithm (use English or flowchart for this).

Step 3. Code/encode the corresponding C program. Fix the syntax errors.

Step 4. Run/test/debug your program.

Problem 1. You were hired by the "City Hall of Kulafu" as a programmer. Your task is to write a program that will determine whether two individuals can be married legally or not. The criteria for legality are as follows:

- both should be at least 18 years old
- the individuals should not have the same gender (same gender marriage is not legal in Kulafu)
- the individuals should not have a married status

Write a program that will accept via keyboard the information regarding the age, gender and marital status of the two individuals. The following numeric coding system should be used. For gender: 0 represents Male and 1 represents Female. For marital status: 0 represents Single and 1 represents Married. The output should either be "LEGAL" if all the criteria above were met, otherwise the output should be "NOT LEGAL". HINT: You will need six variables to store the values of age, gender and status. ANOTHER HINT: You will need to use relational and logical operators!

Problem 2. You were hired as a programmer by the "DiKoMakita Computer Vision Research Institute". You were required to write a program that will be able to classify fruits based on their (1) shape, (2) color and (3) texture. The following are basic assumptions:

- shape can assume any of the two values, namely: 0 to represent a round shape, 1 to represent an oblong shape
- color can assume any of the four values, namely: 0 to represent a green color, 1 to represent a yellow color , 2 to represent a red color and 3 to represent an orange color
- texture can assume any of the two values, namely: 0 to represent smooth texture and 1 to represent a rough texture

The program should be able to determine the following fruits with the following characteristics:

apple: round shape, red color, smooth texture
banana: oblong shape, yellow color or green color, smooth texture
orange: round shape, orange color, smooth texture
jackfruit: oblong shape, green color, rough texture

Write a program that will accept values for the shape, color and texture. Thereafter, based on these values, the program should output the name of the fruit that was recognized. If the input characteristics do not match any of the fruits above, the program should output "Unknown fruit!".

Problem 3. "Gatas ng Kalabaw", a dairy product company, hired you as a programmer. Currently, the company sells pasteurized milk and ice cream. For the meantime, pasteurized milk are packaged in a bottle; each bottle costs 15.25 pesos. Ice cream comes in half-gallon size only which is prized at 100.00 pesos. To attract more customers, the company gives a five percent discount (on milk purchase only) to customers who buy at least 10 bottles of milk. Also, customers who buy at least 3 cans of ice cream are given seven percent discount on their ice-cream purchase (discount not applicable to milk purchases). Your program should ask the customer the following information: the number of bottles of milk and the number of ice-cream cans to purchase. Input zero if you will not purchase the product being offered. The output should be: total cost of milk purchase, total cost of ice cream purchase, and combined total of these items.

Your program should produce/follow the sample program interactions shown below:

Example #1:

```
How many bottles of milk will you purchase? 0
How many cans of half-gallon ice cream will you purchase? 4
Total cost of milk purchase: 0.00 pesos
Total cost of ice cream purchase: 372.00 pesos
Total cost : 372.00 pesos
```

Example #2:

```
How many bottles of milk will you purchase? 20
How many cans of half-gallon ice cream will you purchase? 2
Total cost of milk purchase:  289.75 pesos
Total cost of ice cream purchase: 200.00 pesos
Total cost : 489.75 pesos
```

Problem Number 4. "Toot-toot E-Train", a private train company, hired you as a programmer. Your job is to write a program for an automated train fare computation. The program accepts two inputs, namely: (i) a train station number indicating where the passenger will board the train, (ii) a second train station number indicating where the passenger will get off from the train. Train stations are numbered consecutively from 1 to 100.

The train fare is computed based on the number of stations that the passenger will pass through. Included in the counting are the stations where he/she boarded and the station where he/she got off. For example, if the passenger boarded at station 8 and got off at station 11, then the passenger passed through station numbers 8, 9, 10 and 11 – a total of 4 stations. Another example; if the passenger boarded at station 51 and got off at station 85, then the passengers passed through a total of 35 stations.

A fixed fare of 30.00 Pesos should be paid by the passenger for the first 20 stations. An additional 1.25 Pesos is charged for every additional station. The program should output the (i) the count or number of stations passed through by the passenger and (ii) the train fare. An example program interaction is shown below.

Example #1:

```
Input station number where you will board: 8
Input station number where you will get off: 11
Number of stations that you will pass through is 4.
Please pay a train fare of 30.00 pesos.
```

Example #2:

```
Input station number where you will board: 51
Input station number where you will get off: 85
Number of stations that you will pass through is 35.
Please pay a train fare of 38.75 pesos.
```

Problem 5. "RoostTan's Department Store" hired you as a programmer. Your job is to write a program that they will use to compute the price to be paid by a customer for a certain product. A product may sometimes have a discount, for example a 5% or 10 % discount. Thus, a product with an original price of 1,000 pesos and a discount of 10% will have a discounted price of 900 pesos. Moreover, customers who have a "Preferred Customer" status are given an additional 1% discount on the original price. For example, if a product's original price is 1,000 pesos, a "Preferred Customer" customer will get a discount of 10 pesos (1% of 1,000).

The program should accept the following inputs: (1) original price, (2) discount and (3) customer status. The customer status information is entered as a number coded as either a zero or one. A zero value means that the customer does not have a "Preferred Customer" status (yet), while a value of 1 means that the customer is a "Preferred Customer". The output of the program is the price to be paid by the customer. Examples of expected program runs/interactions are shown below.

Example #1:

```
Input original price: 1000.00
Input discount (in percentage):  0
Input customer status (0: for usual, 1: for preferred): 0
Customer should pay: 1000.00 pesos.
```

Example #2:

```
Input original price: 1500.00
Input discount (in percentage):  7.5
Input customer status (0: for usual, 1: for preferred): 0
Customer should pay: 1387.50 pesos.
```

Example #3:

```
Input original price: 1000.00
Input discount (in percentage):  0
Input customer status (0: for usual, 1: for preferred): 1
Customer should pay: 990.00 pesos.
```

Example #4:

```
Input original price: 1000.00
Input discount (in percentage):  10
Input customer status (0: for usual, 1: for preferred): 1
Customer should pay: 890.00 pesos.
```

Problem 6. You were hired as a programmer by "Nagsusumikap Kahit Mahirap Company". Your task is to write a program that will compute the new monthly salary of its employees. The new salary will be increased by a certain percentage depending on the number of years a particular employee worked for the company. The number of year and the corresponding percentage salary increase is shown in the following table:

Number of Years	**Percentage Salary Increase**
Less than 5 years	4 percent
5 years or more, but less than 10 years	9 percent
10 years or more, but less than 15 years	15 percent
15 years or more	20 percent

For example, assume that an employee has been working for the company for 8 years, and that his/her current monthly salary is 35000. Based on the table above, the corresponding percentage salary increase is 9 percent. The new monthly salary of the said employee will therefore be computed as:

```
New salary =  35000 + 9 percent of 35000
           =  35000 + 3150
           =  38150
```

Thus, the new salary for the employee is 38150.

Write a program that will ask the user to input the following information:

a. Current monthly salary (floating point value)
b. Number of years in the company (integer value)

The program should then determine the percentage salary increase corresponding to the numbers. Thereafter, the program should compute and output the new salary. Several examples of expected program interactions are shown below.

Example #1:

```
Input current monthly salary: 10000.00
Input number of years in the company:  3
The corresponding percentage salary increase is 4 percent.
The new salary is 10400.00.
```

Example #2:

```
Input current monthly salary: 35000.00
Input number of years in the company:  8
The corresponding percentage salary increase is 9 percent.
The new salary is 38150.00.
```

Example #3:

```
Input current monthly salary: 45000.00
Input number of years in the company:  10
The corresponding percentage salary increase is 15 percent.
The new salary is 51750.00.
```

Problem 7. You've been hired as a programmer by SFT (Send Fail Telecoms) – a mobile telecommunications company. You job is to write a program that will compute the text messaging charge. The text messaging charge is computed based on the subscriber's plan and the number of text messages. There are three types of plans. The first plan is called "Plan 1" which allows free text messaging of up to 100 messages. Beyond that, each message is charged 1.00 pesos. The next plan is called "Plan 2" which allows free text messaging of up to 300 messages. Beyond that, each message is charged 0.75 pesos. The last plan is called "Plan 3" which allows free text messaging of up to 500 messages. Beyond that, each message is charged 0.50 peso. Your program should input the plan number as 1, 2, or 3 (representing the plan number) and the number of text messages. The plan number and the number of text messages are both integers. The output should be the charge incurred which is a single precision floating point value.

Problem 8. You were hired as a programmer by the "National Post Office of Kulafu". Your task is to write a program that will compute the charge to be imposed on a package to be sent within the country. The charge is determined by two factors, namely: (i) the transportation mode and (ii) the weight of the package. There are two types of transportation modes, namely: (i) by sea and (ii) by air. If the package is to be sent by sea, the charge is computed as 1000 Kulafines for the first 500 grams (Note: Kulafines is the denomation in the United Islands of Kulafu). If the package is more than 500 grams, an additional charge of 1.25 Kulafines for every gram in excess of the first 500 grams is imposed. On the other hand, if the package is to be sent by air, the charge is computed as 5000 Kulafines for the first 500 grams. If the package is more than 500 grams, an additional charge of 7.5 Kulafines for every gram in excess of the first 500 grams is imposed.

Write a program that will input the values of the transportation mode and the weight of the package. Assume that an integer value of `0` for transportation mode represents sea transport, while a value of `1` represents air transport. Assume also that the weight is always given as a whole number (i.e., there is no fractional part). Thereafter, the program should compute and output the charge to be imposed on the package.

**** END OF EXERCISE SET ****