# Programming Exercises

1. **Problem (15 p):**

    a. Write a program that reads a person's course grade as a real number and display the corresponding letter grade.

    The program should check whether the input is a valid number greater than 0 and less than or equal to 100, and if not – display an error message.

    If the input is correct, the letter grade is calculated accordingly to the following scale:

        i. 0 <= grade < 60 – **F**, 60 <= grade < 70 – **D**, 70 <= grade < 80 – **C**, 80 <= grade < 90 – **B**, 90 <= grade – **A**

2. **Problem (5 p):**

    A leap year is one that is divisible by 4 but not by 100, or if it is divisible by 400.

    a. Write a program to read a year from the user, e.g. **2018**, and check and display whether it is leap or not.

3. **Problem (7 p):**

    a. Suppose you shop rice in two different packages. Write a program to compare the costs, given each package's weight and price.

    b. Example input and output:

> ***Enter weight and price for package 1:*** *50 24.59*
> ***Enter weight and price for package 2:*** *25 11.99*
> ***Package 1 has a better price.***

4. **Problem (10 p):**

    a. The formula for converting C to F temperature is: $T_{(°F)} = T_{(°C)} \times 1.8 + 32$

    b. Write a program to convert and print a table of Celsius temperatures and their corresponding Fahrenheit values.

    c. Celsius values should range from 20 to 60 and be in 5-degree intervals – i.e. show lines with C degrees: 20, 25, … up to 60.

5. **Problem (15 p):**

    The factorial of a non-negative integer n, denoted by **n!**, is the product of all positive integers less than or equal to n.

    For example: *5! = 5 x 4 x 3 x 2 x 1 = 120*

    a. Write a program to ask the user for a positive number and output its factorial.

6. **Problem (20 p):**

   A prime number is one that is greater than two and is evenly divisible (with no remainder) only to 1 and itself.

   Examples of prime numbers are: 3, 5, 7, 11, 13, etc.

   a. Write a program to ask the user for a positive number and output if it is prime or not.

      NOTE: If an invalid (non-positive) number is input, the program should show an error and ask the user for input again.

7. **Problem (8 p):**

   a. Write a method with the following header to display the largest of three numbers:

```
public static void displayLargestNumber(double num1, double num2, double num3)
```

   b. Write a program to test the above method.

8. **Problem (10 p):**

   a. Write a method with the following header to display an integer in reverse order:

```
public static void reverse (int number)
```

   b. Write a program to test the above method.

9. **Problem (15 p):**

   a. Write a class that contains the following two methods, which are used for converting temperatures between C and F:

```
public static double CtoF(double celsius)
public static double FtoC(double fahrenheit)
```

      NOTE: You can use the following formulas:

```
F = (9.0 / 5) * C + 32
C = (5.0 / 9) * (F – 32)
```

   b. Add a main method to test the above methods.

10. **Problem (10):**

   a. Write a method to calculate and return the sum of all numbers in each inclusive range, which are divisible by 3 (no remainder):

```
public static int sum(int start, int end)
```

**Total:** ____ **/ 115 points**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| / 15 | / 5 | / 7 | / 10 | / 15 | / 20 | / 8 | / 10 | / 15 | / 10 |