Revision and Level Test
Procedural Programming (Programming Technique I, SCSJ1013)

Instructions

This exercise is meant for assessing your level of programming skill in terms procedural programming, i.e., what you learnt from the previous course (SCSJ1013).

Answer the questions below by writing the code on computers. You may use any programming environment, for example Dev C++, MS VS Code, etc.

Submit your programs online to elearning. Only the source codes are required for the submission, i.e., program1.cpp, program2.cpp, etc.

Program 1: Simple calculator

Write a program that performs basic arithmetic operations for additions (+), subtractions (-), multiplications (*) and divisions (/).

An example run of the expected program. Note that the bold text indicates user inputs:

```
Enter arithmetic operation => 5 / 2

Result = 2.5
```

Program 2: Find the largest number

Write a function named **largest** to determine the largest value of four numbers. Write a program to find the largest value of four numbers entered by the user.

Expected run and output.

```
Enter four numbers => 10 4 99 15

The largest value is 99
```

Program 3: Find the sum of a list of numbers

Write a program to calculate the sum of numbers from a starting number, *m* to an ending number, *n*. The values of *m* and *n* are specified by the user. There are two situations, i.e., $m \geq n$ or $m \leq n$. Your program must be able to handle both situations.

Expected run and output.

Run 1
```
Enter the starting number, m => 1
Enter the ending number, n => 3

The sum is 6
```

Run 2
```
Enter the starting number, m => 4
Enter the ending number, n => 1

The sum is 10
```

Program 4: Date conversion 1

Write a program which firstly ask the user to enter his or her date of birth in the format of **dd mm yy** (e.g., 12 9 18) and then convert the date to the format of **Mmm dd, yyyy** (e.g., Sep 12, 2018)

Expected run and output.

```
Enter your DOB (dd mm yy)  => 12 9 18

Your Date of Birth is Sep 12, 2018
```

Program 5: Date conversion 2

Write a program which firstly ask the user to enter his or her date of birth in the format of **Mmm dd yyyy** (e.g., Sep 12 2018) and then convert the date to the format of **dd-mm-yyyy** (e.g., 12 9 18)

Expected run and output.

```
Enter your DOB (Mmm dd yyyy)  => Sep 12 2018

Your Date of Birth is 12-9-2018
```

Program 6: Find the covariance of two lists of numbers

Covariance is among statistical measures to describe relatedness between two lists of values. It is expressed by the following equation:

$$covar = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)\left(y_i - \bar{y}\right)}{n}$$

where x and y are the lists of numbers. Thus, x_i is an element (a number) from the list at indexed i, $\bar{x}$ and $\bar{y}$ are the average of each list, respectively, and n the size of each list.

Write a program to calculate the covariance value of two arrays of numbers read from input files. Write a function named `readArrayFromFile` to read a list of numbers from an input file. Your are also provided with some samples of input files, **list1.txt**, **list2.txt**, and **list3.txt,** to test your program.

Expected run and output:

Run 1
```
Enter file #1   => list1.txt
Enter file #2   => list2.txt

Covariance = -90.96
```

Run 2
```
Enter file #1   => list2.txt
Enter file #2   => list3.txt

Covariance = -155.32
```

Run 3
```
Enter file #1   => list3.txt
Enter file #2   => list1.txt

Covariance = 376.12
```