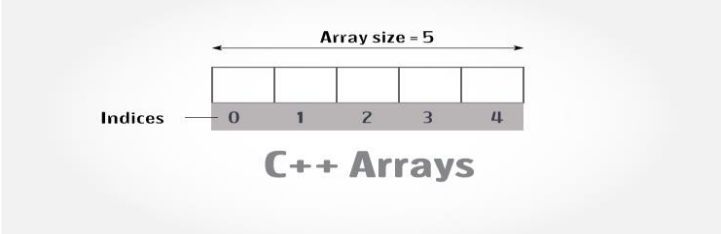
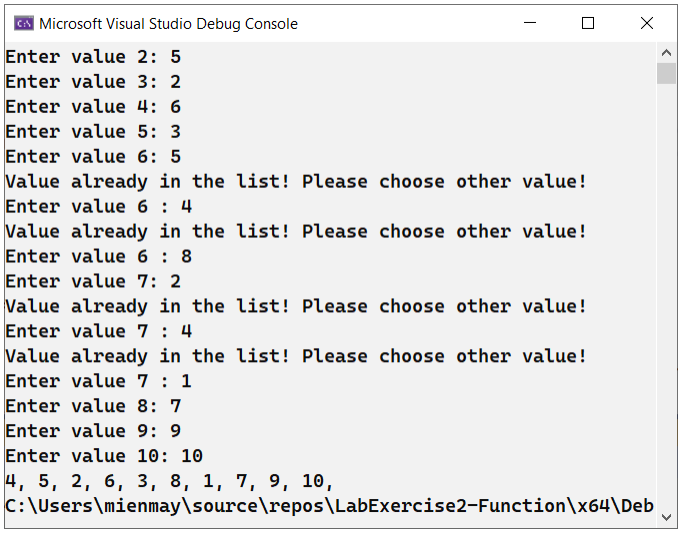
Lab 3: Arrays

Part A: Learn how to create and use Arrays in C++



1. Using an array, read in 10 numbers. As each number is read, print it only if it is not a duplicate of a number already read.

   Output sample:



   [Estimate Finish Time: 30 minutes]

2. Modify the program in Question 1 so that it can search a value from the array. Calculate the time execution for each of the search algorithms.

   a) By using linear search algorithm
   b) By using binary search algorithm

   [Estimate Finish Time: 45 minutes]

3. Write a program that can sort the array values. Calculate the time execution for each of the sort algorithms.

   ```
   int billy [] = {4, 2, 1, 3, 5}.
   ```

   a) By using bubble sort algorithm
   b) By using insertion sort algorithm

   [Estimate Finish Time: 45 minutes]

Part B: Practice Yourself with More Questions.

Submit your answer (*in doc / pdf*) to Moodle before _____. Your answer should include your code and your program screenshot.

1. Write a program that determines 5 student's grades. The program will read three types of scores (quiz, mid-term, and final scores) and determine the grade based on the following rules. You should use the 2D Arrays to store the students' records and you should display them as below table. Finally determine who is the highest scoring student and who is the lowest scoring student, and total students able to score for grade A or grade B result from the 2D arrays.

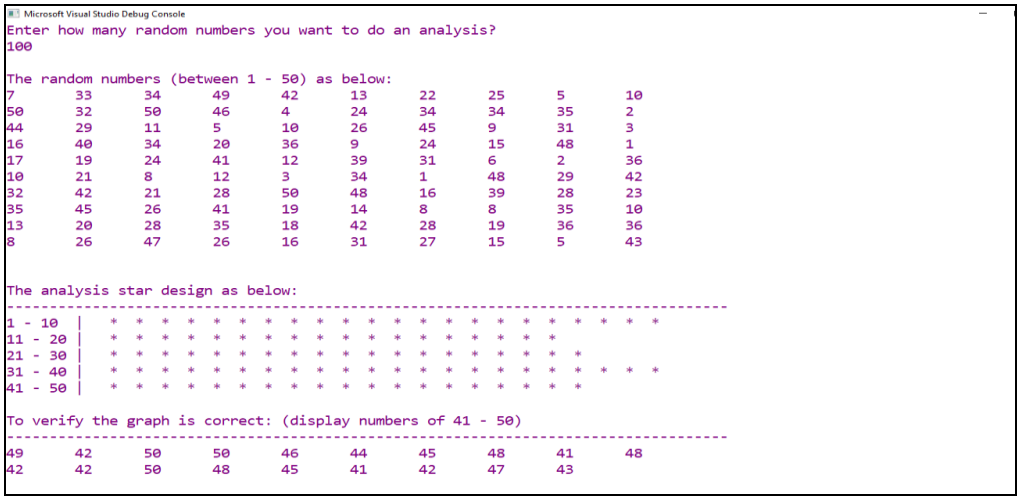
   if the average score =90% =>grade=A
   if the average score >= 70% and <90% => grade=B
   if the average score>=50% and <70% =>grade=C
   if the average score<50% =>grade=F

Student Name	Student TP	Quiz (20)	Mid term (50)	Final Exam (30)	Total Score (100)	Grade
Tan Chi Yong	TP001234	70	88	45	?	?
Lim Jie Jing	TP001235	88	66	70	?	?
Jason Leong	TP001236	45	55	66	?	?
Monday Johnny	TP001237	22	66	34	?	?
Holiday James	TP001238	55	88	94	?	?

   The given score has not yet converted to Percentage. Thus, you need to develop functions to convert those scores:

   ChangeQuizScoreToPercentage() – return all students quiz percentage = 20 Marks
   ChangeMidTermScoreToPercentage() – return all students mid term percentage = 50Marks
   ChangeFinalScoreToPercentage() – return all students final percentage = 40 marks
   Check_Grade() – return grade

2. By using the concepts of function and array, develop an interactive program that can analyze a set of random numbers by drawing a graph as below.



```
Microsoft Visual Studio Debug Console
Enter how many random numbers you want to do an analysis?
100

The random numbers (between 1 - 50) as below:
7       33      34      49      42      13      22      25      5       10
50      32      50      46      4       24      34      34      35      2
44      29      11      5       10      26      45      9       31      3
16      40      34      20      36      9       24      15      48      1
17      19      24      41      12      39      31      6       2       36
10      21      8       12      3       34      1       48      29      42
32      42      21      28      50      48      16      39      28      23
35      45      26      41      19      14      8       8       35      10
13      20      28      35      18      42      28      19      36      36
8       26      47      26      16      31      27      15      5       43


The analysis star design as below:
-------------------------------------------------------------------------------
1 - 10  |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
11 - 20 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
21 - 30 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
31 - 40 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
41 - 50 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

To verify the graph is correct: (display numbers of 41 - 50)
-------------------------------------------------------------------------------
49      42      50      50      46      44      45      48      41      48
42      42      50      48      45      41      42      47      43
```