Tutorial 5
C++ String Manipulations

Program 1

Determine the output printed by each of the cout statements in the following programs.

Notes: The program for this question has been provided. However, do attempt the question before looking at the program.

```
1  #include<iostream>
2  #include<string>
3  using namespace std;
4
5  int main()
6  {
7      string p("Welcome to");
8      string q("UTM Skudai", 3);
9
10     string s = "100";
11     string t = "1";
12     string u = "";
13
14     cout << p << endl;   // (i).
15     cout << q << endl;   // (ii).
16     cout << p.length() << endl;   // (iii).
17
18     u = s + t;
19     cout << u << endl;   // (iv).
20
21
22     cout << p.compare(q) << endl;   // (v).
23     cout << p.substr(0, 3) << endl;   // (vi).
24
25     p.insert(0, "Hello ");
26     cout << p << endl;   // (vii).
27
28     s.replace(0,2,"99");
29     cout << s << endl;   // (viii).
30
31     system("pause");
32
33     return 0;
34 }
```

Program 2

Write a program that allows the user to enter his or her full name and Malaysian ID number. The program then prints the following output onto the screen:

- Full name (in capital letters)
- ID number
- Gender
- Age
- Date of birth in the form of DD Mmm YYYY (e.g. 20 Feb 1999)

Complete all the tasks in **program2.cpp**

Notes:

A Malaysian ID is a 12-digit number. The first six digits represent the date of birth.

The gender is determined from the last digit. An odd value indicates male, while an even value is for female.

Guides to complete the program2.cpp:

1. Use the method `substr` of the class `string` to extract strings
2. Use the function `stoi` to convert a C++ string to its integer value.
3. Use the function `toupper` to convert a character to capital letter. Thus, for a C++ string, you also need to use a loop.
4. Use the modulus operator (`%`) to determine the gender.
5. Use the arrays `MONTHS` to determine the name of a 'numbered' month. E.g. 1 is "Jan", 2 is "Feb", and so on.
6. For the year, the conversion is made as follows:
    a. If the year is 0 to 18, it becomes 20XX.
    b. If the year is 19 to 99, it becomes 19XX.
7. The age is cacluated as 2018 – year_of_birth.

Example run of the program

```
Enter your full name => Siti Aminah Abdul Karim
Enter your ID Number => 990220011234

Output:

Name                 : SITI AMINAH ABDUL KARIM
ID                   : 990203011234
Gender               : Female
Age                  : 19 years old
DOB                  : 20 Feb 1999
```

Notes for those who are using DevC++ IDE:
Setting up DevC++ so that you can use stoi function. This is for a non-project compilation.

1. Go to: **Tools >> Compiler Options >> Compiler set to configure** (Select the compiler type) >> **General t**ab
2. Check on the option **"Add the following commands when calling the compiler"**.
3. Add this in the text view: **-std=c++11**

Program 3

Write a program that performs basic arithmetic operations read in from the keyboard as a line of string. Assume that the operands and operator are separated by a single space each. Complete the tasks in **program3.cpp**

Example runs of the program:

Run 1: `Enter an arithmetic operation=>` **2017 + 3** `Result: 2020`	*Run 2:* `Enter an arithmetic operation=>` **5 - 100** `Result: -95`
Run 3: `Enter an arithmetic operation=>` **1000 x 80** `Result: 80000`	*Run 4:* `Enter an arithmetic operation=>` **5 / 2** `Result: 2.5`

Guides to complete the program3.cpp:

1. As the length of each operand varies (i.e., it can be one digit, two digits, and so on), thus you need to determine the operand accordingly. Here, you can use the method `find` of the class `string` to determine the location of a space in the string.
2. Use the method `substr` of the class `string` to extract the string for the operands and operator.
3. Use the method `compare` of the class `string` to compare strings (here, you will use this for determining the type of operator, i.e, +, - and so on).
4. Use the function `stod` to convert a C++ string to its double value.

Program 4

Write a program to perform the addition and subtraction operations on numbers one to five. The user is required to enter the operation in english words in a single string, for example "`Two Plus One`", and "`one minus three`". The result of the calculation should also be displayed in words, for example, "`one minus three is negative two`".

Besides the main function, your program should also define two other functions as follows

a. a function that converts all characters in a string to lower case. for example, "`TWO plus One`" to "`two plus one`"
b. a function that converts a number in word to its integer value, for example, "`one`" to 1, "`two`" to 2 and so on. The following figure shows some example runs of what your program should look like. Note that the bold text in each example indicates the input entered by the user.

Complete all the tasks in **program4.cpp**

Run 1	What is: **Two Plus One** Answer: two plus one is three
Run 2	What is: **one minus three** Answer: one minus three is negative two
Run 3	What is: **FIVE MINUS FIVE** Answer: five minus five is zero
Run 4	What is: **five plus five** Answer: five plus five is ten