Lab 2: Functions

Part A: Learn how to create a function in C++

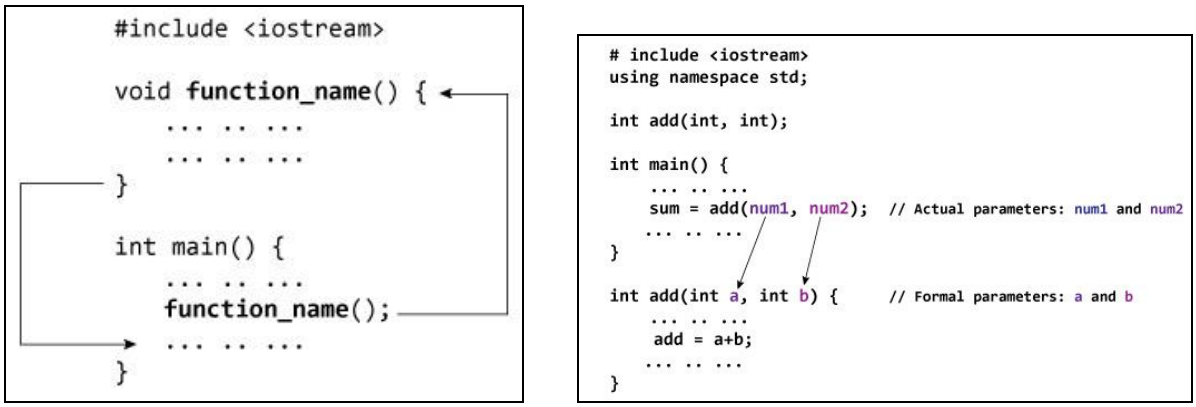

Figure 1: Sample user-defined functions work in C++

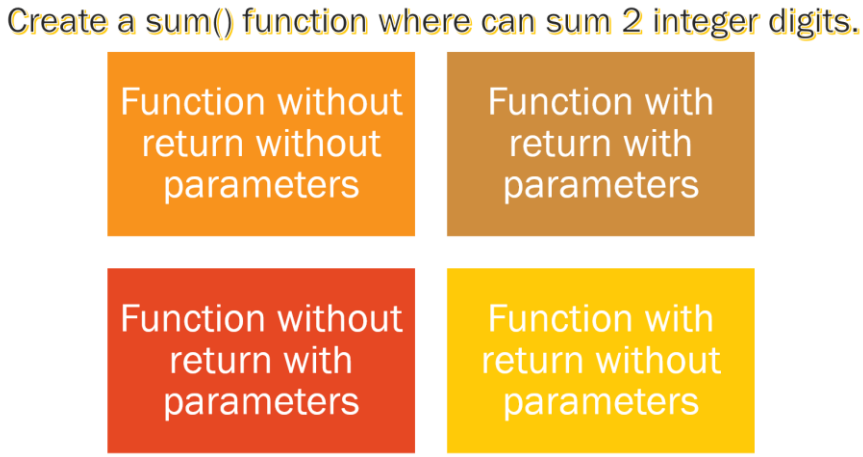

Figure 2: Type of functions

1. Write a C++ program to add two integers. Make four different functions of `add()` (refer to Figure 2) to add integers and display sum in `main()` function. These function will / will not return any result back to the `main()` function.

```
Enters two integers: 8
-4
Sum = 4
```

[Estimate Finish Time: 20 minutes]

Part B: Test yourself questions

1. Write a C++ program to receive a start value and an end value from the user. Then, reverse print the values between the start value and end value by using a function and then use another function to find the total sum for these numbers by using the recursive concept. Repetition loop is not allowed to be used in this question. Display the final total sum answer in `main()` function.

```
1   #include <iostream>
2   using namespace std;
3
4   void reverseDisplayNumber(int number1, int number2, int number3) { ... }
21  int reverseDisplayNumberandSum(int number1, int number2) { ... }
29  int main()
30  {
31      int startvalue, endvalue;
32      cout << "Enter a start value: ";
33      cin >> startvalue;
34      cout << "Enter a end value: ";
35      cin >> endvalue;
36      cout << endl;
37      //e.g display same as figure 3: " 8 + 7 + 6 + 5 "
38      reverseDisplayNumber(startvalue, endvalue, startvalue);
39      //e.g display same as figure 3: " = 26 "
40      cout << "= " << reverseDisplayNumberandSum(startvalue, endvalue) << endl;
41      return 0;
42  }
43
```

```
Microsoft Visual Studio Debug Console
Enter a start value: 5
Enter a end value: 8

8 + 7 + 6 + 5 = 26

C:\Users\mienmay\source\repos\DSTRC++Lab1Group26\x64\D
ebug\DSTRC++Lab1Group26.exe (process 1768) exited with
 code 0.
Press any key to close this window . . .
```

Figure 3: Sample output

[Estimate Finish Time: 25 minutes]

2. Create a function to reverse the string and a function to determine whether the string is a palindrome. Note: User Defined Array is not allowed in this question. You are not allowed to use the system built-in function to do this question.

```cpp
#include <iostream>
using namespace std;

string reverseString(string text); // to reverse the text
bool compareString(string text1, string text2); // to compare the texts

int main()
{
    string text;
    cout << "Enter an string : ";
    cin >> text;

    string reversedtext = reverseString(text);
    cout << "Reverse entered string : " << reversedtext << endl;

    if (compareString(text, reversedtext))
    {
        cout << "The entered string is a palindrome!" << endl;
    }
    else
    {
        cout << "The entered string is NOT a palindrome!" << endl;
    }
    return 0;
}
```

```
Microsoft Visual Studio Debug Console
Enter an string : hello
Reverse entered string : olleh
The entered string is NOT a palindrome!

C:\Users\mienmay\source\repos\C++ Week 2\Debug\C++ Week 2.exe (
To automatically close the console when debugging stops, enable
sole when debugging stops.
Press any key to close this window . . .
```

```
Microsoft Visual Studio Debug Console
Enter an string : abba
Reverse entered string : abba
The entered string is a palindrome!

C:\Users\mienmay\source\repos\C++ Week 2\Debug\C++ Week 2.ex
To automatically close the console when debugging stops, enal
sole when debugging stops.
Press any key to close this window . . .
```

[Estimate Finish Time: 25 minutes]

3. Modify the calendar program given by your lecturer, by adding some of the below functions.

monthInputValidation() & yearInputValidation() – check the month and year input

findDaysinMonth() – find the days for that month and also change the month value to text

isLeapYear() – check the leap year

displayCalendar() – display the monthly calendar

Output:

```
Microsoft Visual Studio Debug Console
Enter calendar's year: 2020
Enter calendar's month: 6

                    Calendar Title : June - 2020
------------------------------------------------------------------------------------------------------------------------
    Sunday          Monday          Tuesday         Wednesday         Thursday          Friday          Saturday
------------------------------------------------------------------------------------------------------------------------
                         1               2               3               4               5               6
         7               8               9              10              11              12              13
        14              15              16              17              18              19              20
        21              22              23              24              25              26              27
        28              29              30
------------------------------------------------------------------------------------------------------------------------

Do you want to see other month? 1 = Yes, others = No: 0
```

```
int main()
{
//step 1: declare the required variables
int year, month, days;

//step 2: input + input validation
cout << "Enter calendar's year: ";
cin >> year;
year = yearInputValidation(year);

cout << "Enter calendar's month: ";
cin >> month;
month = monthInputValidation(month, year);

//Step 3: process
days = findDaysInMonth(month, year);

//step 4: output
displayCalendar(month, year, days);
}
```

[Estimate Finish Time: 40 minutes]

Part C: Practice Yourself with More Questions.

Submit your answer (*in doc / pdf*) to Moodle before 24th November 2023. Your answer should include your code and your program screenshot.

1. A program is required to prompt for and accept a time and compute the number of seconds elapsed since midnight. The time should be entered in the format HH:MM:SS. Define a function to check the input validation and define another function to process the Elapsed time in seconds.

   Output sample:

   ```
   Please enter your elapsed time (in HH:MM:SS format) = 00:02:44
   Elapsed time in seconds = 164 seconds
   ```

   [Estimate Finish Time: 20 minutes]

2. Develop an interactive program that will keep track of the weather forecast in a month. On any given day, the weather forecast may be hot, rainy, or cloudy. Your program should input the weather forecast for each day in the month and should display the number of hot, rainy, and cloudy days in a month. You should use a loop and a conditional structure to develop this program. Array is not allowed to be used in this question.

   ConvertLetterString() - convert the letter in the month string
   FindDaysInMonth() - compare the month and find the correct days
   weatherReport() - : determine how many rainy day, sunny day and cloudy day in that month
   displayReport() - display the result in a graph

   ```
   C:\Users\mienmay\source\repos\homework\x64\Debug\homework.exe
   Enter Your Month (e.g. August 2019): February 2019
   Day 1 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 2 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 3 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 4 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 5 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 6 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 7 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 8 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 9 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 10 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 11 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 12 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): r
   Day 13 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 14 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 15 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 16 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 17 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 18 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 19 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 20 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): c
   Day 21 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 22 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 23 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 24 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 25 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 26 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 27 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Day 28 : Enter "H" for Hot, "R" for Rainy, "C" for Cloudy, ("E" to end): h
   Number of hot days this month: 9
   Number of rainy days this month: 10
   Number of cloud days this month: 9
   Press any key to continue . . .
   ```

   Sample of graph:

   ```
   The analysis star design as below:
   ------------------------------------------------------------------------------------------
   1 - 10  |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
   11 - 20 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
   21 - 30 |   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
   ```

   [Estimate Finish Time: 40 minutes]