Cairo University
Faculty of Engineering
Electronics & Communication
Department

CMP 1171
C++ Programming & Data
Structures
$1^{st}$ Year 2022-2023
Quiz 1
Time: 25 min

## Model Answer

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

const int MAX = 20;
int fun(int n)
{
   static int memory[MAX] = {0};
   memory[0] = 0;
   memory[1] = 1;
   if(memory[n] == 0 && ……………(1)…………..)
   {
      ………………………(2)………………………
      return memory[n];
   }
   else
      return memory[n];
}




int main()
{
   for (int i = 0; i < 10; i++)
   {
      cout<<fun(i)<<" ";
   }

   return 0;
}
```

Output : 0  1  1  2  3  5  ………………………………………

Q1) Take a look at the Code snippet above then answer the following questions:

a) Complete the code above so that the function returns a correct result.

1) n != 0

2) memory[n] = fun(n - 1) + fun(n - 2);

b) From the output of the function, what does the function fun() do? Complete the output of the program

fun() calculate the value of nth term in Fibonacci series

output : 0 1 1 2 3 5 8 13 21 34

c) If the value of MAX changed to 50, and the iterations of the loop in main() changed to 50, the output is……………………..

1. Correct
2. **Incorrect**
3. Compilation error
4. Runtime error

Why?

The output is incorrect as the value of the Fibonacci terms becomes larger than the max value that int variable can store so overflow occurs and the values becomes wrong.

Q2) Write a function that return the number of occurrences of a certain element in an array then write a program that read a string of upper & lower letters, then compute the frequency of letters and print them like the example. For uppercase letters, treat them like lowercase ones.

Input: baaaBBzzA

Output: a  4

b  3

z  2

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

int no_of_occurances(char target, char str[])
{
    int occurances = 0;
    for (int i = 0; str[i]; i++)
    {
        if(target == str[i])
            ++occurances;
    }
    return occurances;
}
```

```cpp
int main(int argc, char const *argv[])
{
    char str[100];
    cin.getline(str, 100);
    int freq[28] = {0};
    for (int i = 0; str[i]; i++)
    {
        if('A'<=str[i] && str[i]<='Z' )
            str[i] = str[i] - 'A' + 'a'; //converting capital letters to small
    }
    for (int i = 0; i < 28; i++)
    {
        char ch = 'a' + i;
        freq[i] = no_of_occurances(ch, str);
        if(freq[i])
            cout<<ch<<"   "<<freq[i]<<endl;
    }

    return 0;
}
```