Direction: Submit your typed work in the Exams directory of your github repository and/or as an attachment on Google classroom under the Exam01 assessment. All submissions should have their appropriate extensions.

Section	Maximum Points	Points Earned
Runtime	5	
Problem Solving	5	
Implementation	10	
Total	20	

Runtime

1. **Construct the runtime table and determine the runtime functions of the following function for the worst-case scenario. Let the cost of every operation be 1. Write the function in terms of n and state what n represents**

```
int F(double a[],double b[],int s)
{
  int c = 0;
  double t = 0;

  for(int i = 0;i < s;i += 1)
  {
    if(a[i] > 0)
    {
      t += a[i];
      c += 1;
      b[c-1] = t / c;
    }
    else if(a[i] < 0)
    {
      t += -1 * a[i];
      c += 1;
      b[c-1] = t / c;
    }
  }
  return c;
}
```

Problem Solving

2. Write the definition of an int function named `MaximumCount()` whose header is

$$\text{int MaximumCount(int data[],int n)}$$

Given that *n* represents the size of *data*, the function returns the amount of time the maximum value in *data* appears. For instance, if *data* = [1,2,3,1,4,2,4,1,3,2,1,1,3], then the function will return **2** since 4 is the maximum value and it appears twice.

Implementation

3. Write a header file that consist of

   i.   the class definition of the class *Date* that contains:

- private string fields named *month*
- private unsigned short fields named *day*
- private unsigned int field named *year*
- public special member functions such that the default values of the fields are `"January"`, `1` and `1900` for *month*, *day* and *year* respectively.
- public constant getter method for each field.
- public setter method for each field.
- public string constant method named `ToString()` that takes no parameters. It returns a string in the format

$$\text{"}x \ y, \ z\text{"}$$

  where *x*, *y* and *z* are the values of *month*, *day* and *year* respectively.
- a friend overloaded ostream operator. It displays is in the same format as the return of `ToString()`

   ii.   the class definition of the class *Timestamp* that publicly inherits *Date* that contains:

- private unsigned int field named *time*
- public special member functions such that the default value of the field *time* is 0 and the default values of the fields of *Date* remain the same.
- public constant getter method for *time*.
- public setter method for *time*.
- public string constant method named `ToString()` that takes no parameters. It returns a string in the format

$$\text{"}x \ y, \ z; \ s\text{s"}$$

  where *x*, *y*, *z* and *s* are the values of *month*, *day*, *year* and *time* respectively.
- a friend overloaded ostream operator. It displays is in the same format as the return of `ToString()`