Project 1

CSE 619 -50

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How to run code

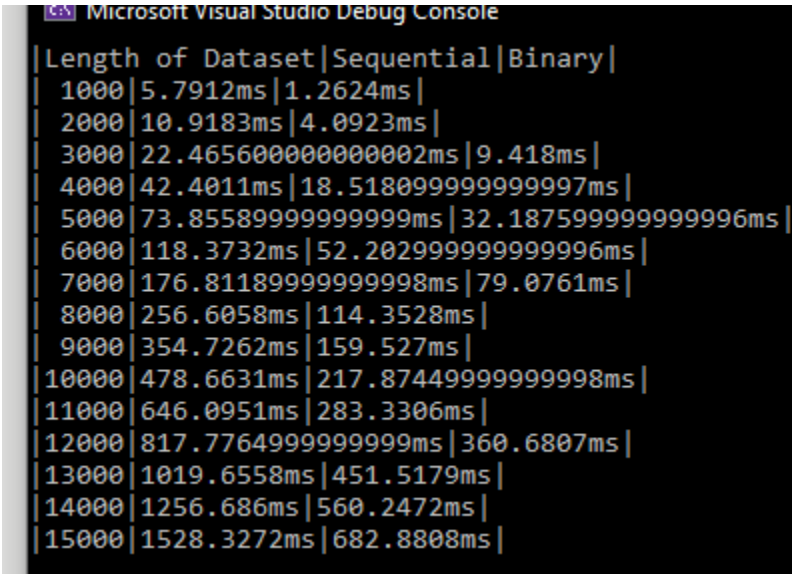
Code is written in C# Console application
Assuming Visual Studio 2019 is installed!
Dowload *619_Project1.csproj* and *Program.cs* into a folder
Double click *619_Project1.csproj*
This will open Visual Studio
Click Start or Press F5
View output

Code for ease

```
/// <summary>
/// Sorts an array using insertion sort with a sequential
/// search on the array.
/// </summary>
/// <param name="array">The array that is being sorted</param>
public static void InsertionSortSequential(int[] array)
{
    int position = 1;
    while (position < array.Length) {
        int sub_position = position;
        // Walk backwards looking for the position
        while (sub_position > 0 && array[sub_position - 1] > array[sub_position])
        {
            // Swap the slots
            int num = array[sub_position - 1];
            array[sub_position - 1] = array[sub_position];
            array[sub_position] = num;
            sub_position -= 1;
        }
        position += 1;
    }
}
```

```
/// <summary>
/// Sorts an array using insertion sort with a binary
/// search on the sorted portion of the array
/// </summary>
/// <param name="array">The array that is being sorted</param>
public static void InsertionSortBinary(int[] array)
{
    int position = 1;
    while (position < array.Length) {
        int sub_position = position;

        int low_position = 0;
        int mid_position = 0;
        int high_position = sub_position;

        int found_position = -1;

        while (low_position <= high_position) {
            // Set the mid point
            mid_position = (high_position + low_position) / 2;
            if (array[sub_position] > array[mid_position]) {
                low_position = mid_position + 1;
            } else if (array[sub_position] < array[mid_position]) {
                high_position = mid_position - 1;
            } else {
                found_position = mid_position;
                break;
            }
        }

        if (found_position == -1) {
            // Position was not found it is low
            found_position = low_position;
        }

        // Everything needs to move
        int num = array[sub_position];
        for(int i = sub_position; i > found_position; i--) {
            array[i] = array[i - 1];
        }
        array[found_position] = num;

        position += 1;
    }
}
```

Code Output



Output Graph