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**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 2**

* **Task (List down the tasks performed in the Assignment)**
* **Implement three methods of class *Timer*.**
* **Implement *InsertionSort*;**
* **Implement a main program to run the following benchmark:**
  + **Measure the running time;**
  + **Use random, ordered, partially-ordered, and reverse-ordered arrays as input parameter separately;**
  + **Use doubling method for choosing and test at least five values of .**
  + **Draw any conclusions from your observations regarding the order of growth.**
* **Provide screen shots of the unit tests all passing.**
* **Relationship Conclusion:**
* **Evidence to support the conclusion:**
* **Let , .**
  + **Apply doubling method into the experiment. .**
  + **For each trail, generate a *random array*. Use this array to obtain the *ordered*, *reverse-order,* and *partially ordered arrays*.**
  + **Use *Timer.repeat* method to the average runtime in milliseconds. (In the experiment, I set for 100 repetitions.**
  + **Graphical user interface, text

    Description automatically generated**
  + **Plot a standard graph and a *log-log* graph.**
  + **Chart, line chart

    Description automatically generated**
  + **Chart, line chart

    Description automatically generated**
  + **It is obvious that .**
* **Unit tests result: All PASS.**
* ***Part 1: Timer***
  + ***Benchmark Test***
    - ***Graphical user interface, text, application

      Description automatically generated***
  + ***Timer Test***
    - ***Graphical user interface, text

      Description automatically generated***
* ***Part 2: Insertion Sort Test***
  + ***Graphical user interface, text

    Description automatically generated***