Indian Institute of Information Technology Vadodara

Lab Assignment 2

CS162: Introduction to Data Structures Laboratory

1. **Code and compare the running time of Bubble and Selection Sort.**
   Do as directed:
   a. Take an array of at least 100 numbers in the range of 1000 – 10000.
   b. Implement Bubble Sort and Selection Sort.
   c. Make the following measurements:
      i.   Time for sorting when numbers are in **random order**.
      ii. Time for sorting when numbers are in **ascending order**.
      iii. Time for sorting when numbers are in **descending order**.
   d. Repeat these measurements for 10 times and take out the average value.
   e. Fill the table below with your readings and attach it with your submission file.

Note: Do not use any built in sorting libraries.

S.No.	Sorting Algorithm	Number of elements in the Array	Average Time (in ms) Random Order	Average Time (in ms) Ascending Order	Average Time (in ms) Descending Order
1.	Bubble Sort				
2.	Selection Sort				

Hint:
   A. Use the snippet below to calculate the time.

```
long start = System.nanoTime();
 // your code goes here
 long end = System.nanoTime();
 long elapsedTime = end - start;
```

   Note: This code calculates time in nanoseconds. You need to report the time in milliseconds upto 3 decimal places
   B. You can also use the random number generator to generate 100 numbers instead of hard coding them.

2. Pattern Printing:

Write a program to print the hourglass pattern using loops:

Note: Ask the user for the number of rows as an input.

Eg: if number of rows = 4, the pattern printed as follows

```
* * * *
 * * *
  * *
   *
  * *
 * * *
* * * *
```

3. Problem based on array

Given an integer array, find whether it is pretty or not. We define an array is a pretty array if it begins with a 0 and all the rest of its elements are divisible by their respective indices.

Ex - Input: 0 2 6 21 16 15
    Output: True
    Explanation: each value is divisible by it's index.
Ex - Input: 0 2 3 21 16 15
    Output: False
    Explanation: value at index 2 (i.e., 3) is not divisible by 2.