Assignment-III
CS 201
Data Structures
Department of Computer Science and Engineering
National Institute of Technology Silchar

1. How to generate unique string hash value? For instance, input: "CSE Rocks", Output: Some integer value
2. Benchmark the performance of Insertion sort technique for average case, best case and worst cases. Draw the chart.
3. Write a program to generate a set of prime numbers using Sieve of Eratosthenes. Input range n = $2^{64}-1$.
4. Write a program to create library for the array A[] of size n of the following functions
   a. InsertItemAtLast(int A[], int n, int key), return void
   b. InsertItemAtFirst(int A[], int n, int key), return void
   c. InsertItemAtIndex(int A[], int n, int i, int key), return void
   d. DeleteItemFromLast(int A[], int n, int key), return void
   e. DeleteItemfromFirst(int A[], int n, int key), return void
   f. DeleteItemFromIndex(int A[], int n, int i, int key), return void
   g. FindItemUnsorted(int A[], int n, int key), return index
   h. FindItemSorted(int A[], int n, int key), return index
   i. SortArray(int A[], int n), return void
   j. ExtractSubest(int A[], int n, int i, int j), return new array
   k. DeleteSubset(int A[], int n, int i, int j), return void
   l. SplitIntoTwoArray(int A[], int n), return new subarray
   m. CloneArray(int A[], int n, int B[]), return new subarray
   n. ShiftLeftArray(int A[], int n, int r), return void
   o. ShiftRightArray(int A[], int n, int r), return void
   p. RotateArrayClockwise(int A[], int n, int r), return void
   q. RotateArrayAntiClockwise(int A[], int n, int r), return void
   r. FindMin(int A[], int n), return index
   s. FindMax(int A[], int n), return index
   t. FillArrayPseudoRandom(int A[], int n), return void
   u. FillArrayTrueRandom(int A[], int n), return void
   v. IncreaseArraySize(int A[], int n, int m), return new array
   w. SetArrayToZero(int A[], int n), returns void
   x. DeleteAllItemOfArray(int A[], int n), returns void
   y. DeleteArray(int A[], int n), returns void
   z. AllocateArray(int A[], int n), returns address

   where i, and j are index, key is to be searched/inserted/deleted, r is the total number of rotations/shifting.