

**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.