भारतीय सूचना प्रौद्योगिकी संस्थान गुवाहाटी

Indian Institute of Information Technology Guwahati

DATA STRUCTURES LAB (CS111)

ASSIGNMENTS–02

1. Create an array of integers with dynamic memory allocation. The size of the array is a user input. Read the elements of the array as inputs. Perform the following operations on the elements of the array using a separate function for each operation:
   i. Print the elements of the array.
   ii. Find the indices of the maximum and the minimum element of the array. Let the name of the function be `findMinMax`. It should return a (dynamically created) array of two elements, such that the first element is the index of the minimum value and the second element is the index of the maximum value.
   iii. Write a function `swapMinMax` to swap the array's maximum and minimum elements. `swapMinMax` must make use of `findMinMax`.
   iv. Find the sum of all the elements of the array. Let the name of the function be `sum`.
   v. Find the average of all the elements of the array. It must make use of `sum`.
   vi. Write a function find that would return the index of a given value (user input) in the array. If the value is absent in the array, it should return -1.
   vii. Print the address of each element of the array.
2. Write a function to allocate the memory of a lower triangular matrix dynamically. The number of elements of the ith row should be i. Write another function to make the allocated memory free.
3. Write a function to allocate a two-dimensional matrix dynamically. Take two two-dimensional matrices as user inputs. Let the size of the matrices be $m \times n$ and $n \times p$, respectively. Write a function to multiply the matrices. It should dynamically allocate the memory for the $m \times p$ resultant matrix and return a pointer to the matrix.