Indian Institute of Technology Kharagpur

AUTUMN Semester, 2015
COMPUTER SCIENCE AND ENGINEERING

CS19001: Programming and Data Structure Laboratory

Assignment – 7

Full Marks: 10

Time allowed: 3 hours

INSTRUCTIONS: Please see the questions and write C programs step by step. Ensure proper indentations to improve the readability of your code. All these features are necessary and absence will lead to deduction of marks.
Please do not forget to upload files to *Moodle* before you leave.

Pointers in C

1. Write a complete C program that takes some integer values from the user and stores them in an array of length-10. Then, it calls a function `double calculate_SD (int *arr, int len)` to calculate the standard deviation of the numbers. Note that the function `double calculate_SD(int *arr, int len)` takes two arguments: the base address of the integer array and the number of elements in the array for which the standard deviation is to be calculated. (3 marks)

2. Write a complete C program to implement you version of the `strcmp()` function using pointers. Collect two strings from the user (each with maximum 10 characters), and then call a function `int mystrcmp(char *str1, char *str2)` which will take the address of the two strings as input and return the ASCII value difference between the first mismatched character (if any), and 0 if the two strings are identical. Note that the two strings might be of unequal lengths. (3 marks)

3. Write a complete C program to multiply an 3×3 matrix of integers with an 3×1 vector of integers using the following scheme:

  (a) Declare a length-3 array of integer pointers.

  (b) Allocate memory dynamically (in a loop) to hold each column of the matrix. The starting address of each column of the matrix should be held as one value in the array of pointers defined in the previous step. Also, allocate memory dynamically for the result (product) vector.

  (c) Populate the columns of the matrix by values entered by the user (in a loop).

  (d) Calculate the result (product) vector using the scheme described in class and print it.

  (e) Finally, free all dynamically allocated memory (for both the matrix and the vector). You would need to free the memory allocated for the matrix using a loop. (4 marks)