

## Programming and Data Structures Laboratory, 2018-19 Spring semester, Section 6

### March 5, 2019: Tutorial and Assignment 5 (Arrays and strings)

#### Tutorial

Write a program to accept a string S from the input. S can be of an arbitrary length, with maximum length 100. Then calculate the length of the string S, without using any string library function.

Do the above exercise using different ways of taking the string as input - (i) using scanf, (ii) using gets. What is the difference between using these two functions? How can you take as input a string containing two words separated by whitespace (e.g., "IIT Kharagpur" or "PDS Laboratory")?

#### Assignment (for evaluation – write on machine and submit to Moodle before end of class)

1. [15 marks] In this assignment, we will perform set operations (on sets of integers) using arrays. Write a program that stores two sets of integers A and B as two integer arrays, and performs the three operations (i) union of A and B, (ii) intersection of A and B, (iii) the set difference A - B.

The elements of each set (integers) should be input from the user. Each set will have at most 20 elements. Note that if the user inputs the same element multiple times for a set, the element should be included in the set only once. You can consider having a special marker (e.g., 999) to mark the end of a set in an array.

The program should print out the two sets A and B, and the results of the three set operations. Sets should be printed in the following example format: { 1, 2, 3, 4, 5 }.

2. [15 marks] You are given a character string where each character is distinct. You are required to generate all permutations of the given character string. Write a C program with a recursive function for generating and printing all permutations of the character string. Do not use any string library function for this assignment.

Input: ab

Output: ab, ba

Input: %

Output: %

Input: abc

Output: abc, acb, bac, bca, cab, cba

3. [15 marks] Write a program that does the following. The program asks the user to enter lines of characters. Each time the user enters a line of characters and presses enter, the program asks the user if she wishes to enter more lines. The user answers by typing 'y' or 'n'. If the user types 'n', print the longest line that the user has entered. Else, wait for the user to enter the next line. Assume that the maximum length of each line is 1000 characters. Do not use any string library function for this assignment.

Submission instructions:

Submit one compressed file, named as **<roll number>\_A5.tar.gz** or **<roll number>\_A5.zip**

The compressed file should contain four source files:

**<roll number>\_A5\_1.c, <roll number>\_A5\_2.c, <roll number>\_A5\_3.c**