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Department of Computer Science & Engineering
MCA I Semester (End Semester Exam)
November 2016

Programming and Problem Solving: (CA3101)

M.Marks: 60

Time : 180 Minutes

NOTE:

- All sections are compulsory
- Attempt the questions **strictly** in sequential order.
- Answers should be justified & to the point

SECTION A [4*8=32 Marks]

1/ Using short code snippets illustrate the following

- a) Pass a 1 d array to a function.
- b) Pass a 2 d array to a function.
- c) Return pointer to 2 d array through function
- d) Pass and return structure to a function using call by value and call by reference.

2. Answers the following questions

- a) Is it really true that there is no limit on the length of identifier? Explain.
- b) What does scanf do if it is asked to read a number but the user enters nonnumeric character?
- c) Why are the rules for using the / and % operators with negative operands so complicated?
- d) There is no logical exclusive OR operator in C; Can it be simulated anyway?

3/ Differentiate between structure & array. Define a structure named **Player** that contains following fields: Player name, Team name and Runs. Declare an array of structure variables with 10 elements of type Player and write a program in C to read the information about all 10 players and print a team-wise list containing names of players with their runs.

4/ Write a program in C that would sort a list of names in alphabetical order.

SECTION B: [10+8+10 Marks]

1. Answers the following questions.

- a. What is the purpose of function prototype?
 - b. Differentiate between break and continue.
 - c. How can we return multiple values from a function? Explain with an example.
 - d. Write the function definition of `strlen()` that should return length of a string.
2. Given an array of integers, find the first repeating element in it. Write a program in C to find the element that occurs more than once and whose index of first occurrence is smallest.
3. Given an array containing positive and negative numbers. The array represents checkpoints from one end to other end of street. Positive and negative values represent amount of energy at that checkpoint. Positive numbers increase the energy and negative numbers decrease. Write a program in C to find the minimum initial energy required to cross the street such that Energy level never becomes 0 or less than 0.

Note: The value of minimum initial energy required will be 1 even if we cross street successfully without losing energy to less than and equal to 0 at any checkpoint. The 1 is required for initial check point.

Input : `arr[] = {4, -10, 4, 4, 4}`

Output: 7

Suppose initially we have energy = 0, now at 1st checkpoint, we get 4. At 2nd checkpoint, energy gets reduced by -10 so we have $4 + (-10) = -6$ but at any checkpoint value of energy can not less than equals to 0. So initial energy must be at least 7 because having 7 as initial energy value at 1st checkpoint our energy will be $= 7+4 = 11$ and then we can cross 2nd checkpoint successfully. Now after 2nd checkpoint, all checkpoint have positive value so we can cross street successfully with 7 initial energy.

Input : `arr[] = {3, 5, 2, 6, 1}`

Output: 1

We need at least 1 initial energy to reach first checkpoint

Input : `arr[] = {-1, -5, -9}`

Output: 16

$-1-5-9$
 $-6-9$