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14PCD13/23

First/Second Semester B.E. Degree Examination, June/July 2015 Programming in C and Data Structures

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE questions, selecting ONE full question from each part.

PART – 1

- 1 a. What are data types? Mention the different data types supported by C language, giving an example to each. (05 Marks)
- b. Write a C program which takes as input p, t, r, compute the simple interest and display the result. (05 Marks)
- c. What is an operator? List and explain various types of operators. (10 Marks)

- 2 a. What is a token? What are different types of tokens available in C language? Explain. (08 Marks)
- b. Write C expressions corresponding to the following (Assume all quantities are of same type)

i) $A = \frac{5x + 3y}{a + b}$	ii) $B = \sqrt{s(s-a)(s-b)(s-c)}$	iii) $C = e^{ x+y-10 }$
iv) $D = x^{25} + y^{35}$	v) $X = \frac{e^{\sqrt{x}} + e^{\sqrt{y}}}{x \sin \sqrt{y}}$	vi) $X = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

 (06 Marks)
- c. What is the value of 'x' in following code segments? Justify your answers :

i) int a, b ; float x ; a = 4 ; b = 5 ; x = b/a ;	ii) int a, b ; float x ; a = 4 ; b = 5 ; x = (float) b/a ;
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 (06 Marks)

PART – 2

- 3 a. What are different types of conditional decision making statements? Explain each with examples. (10 Marks)
- b. Write a C program to simulate simple calculator that performs arithmetic operations using switch statement. Error message should be displayed, if any attempt is made to divide by zero. (10 Marks)

- 4 a. Explain with examples formatted input output statements in C. (06 Marks)
- b. List four differences between while loop and do-while loop along with syntax and example. (06 Marks)
- c. Design and develop a C program to reverse a given four digit integer number and check whether it is a palindrome or not. (08 Marks)

**PART – 3**

- 5 a. What is an array? Explain different methods of initialization of single dimensional arrays. (06 Marks)
- b. Write a C program to read N integers into an array A and to
- find the sum of odd numbers
 - find the sum of even numbers
 - find the average of all numbers
- Output the results computed with appropriate headings. (06 Marks)
- c. How string is declared and initialized? Explain any FOUR string manipulation functions with examples. (08 Marks)
- 6 a. Explain function call, function definition and function prototype with examples to each. (06 Marks)
- b. What are actual parameters and formal parameters? Illustrate with example. (06 Marks)
- c. What is recursion? Write a C program to compute the factorial of a given number 'n' using recursion. (08 Marks)

PART – 4

- 7 a. How structure is different from an array? Explain declaration of a structure with an example. (06 Marks)
- b. Explain with an example, how to create a structure using 'typedef'. (04 Marks)
- c. Write a C program to input the following details of 'N' students using structure :
Roll No : integer, Name : string, Marks : float, Grade : char
Print the names of the students with marks $\geq 70.0\%$. (10 Marks)
- 8 a. Explain following file operations along with syntax and examples :
i) fopen() ii) fclose() iii) fscanf() iv) fprintf() v) fgets(). (10 Marks)
- b. Write a C program to read the contents from the file called abc-text, count the number of characters, number of lines and number of white spaces and output the same. (10 Marks)

PART – 5

- 9 a. Define point variable. Explain with an example, the declaration and initialization of pointer variable. (06 Marks)
- b. Explain following C functions along with syntax and example to each :
i) malloc() ii) calloc() iii) realloc() iv) free(). (08 Marks)
- c. Develop a C program to read two numbers and function to swap these numbers using pointers. (06 Marks)
- 10 Write short notes on following :
- Preprocessor directives
 - Primitive and non primitive data types
 - Stack operations
 - Types of queues.
- (20 Marks)