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Question Paper Code : 40899

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Second Semester

Computer Science and Engineering

CS6202 – PROGRAMMING AND DATA STRUCTURES – I

(Common to : Information Technology)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the advantages and limitations of using functions in a program ?

2. What are the preprocessor derivative ?

3. Differentiate structure and union.

4. In what different modes files can be opened using fopen function ?

5. Define Abstract Data Type (ADT). What are the advantages of using ADT ?

6. What are the disadvantages of using simple array implementation of lists ?

7. Differentiate Stack and Queue ADT.

8. List and justify any two real world applications of Queue ADT.

9. Compare Bubble Sort, Insertion Sort, Merge Sort and Quick Sort in terms of their average and worst case time complexities.

10. Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function h (x) = x mod 10, show the resulting Separate Chaining hash table. Assume that the collisions are added to the end of the list.

PART – B (5×16=80 Marks)

11. a) Explain function pointers in detail, highlighting their need, use and advantages with an example. (16)

(OR)

b) i) Write a C program to implement the function int Myatoi (const char *str) which converts given string into an integer, without using C's atoi library function. Assume that given string contains a positive integer only. Write appropriate main() function and trace your program for the input string "30462".

(8)

ii) Write a C program to find roots of a quadratic equation ($ax^2 + bx + c$) when a, b and c values are given. Assume that the roots are real numbers.

(8)

12. a) Write a C program to implement the following.

(16)

1) Define a structure for employees with employee ID number (integer), name (64 characters), salary (floating point value) and performance rating (valid values are integers 1, 2, 3, 4 and 5).

2) Get user input entries for 100 employees to get ID, name, salary and performance rating value.

3) Then allow user to search using employee ID. Once the matching employee is found, print all details about the employee. Continue till user wants to continue searching.

4) Then compute bonus amount for each employee, using table below. Finally display all employee IDs and their corresponding bonus amounts.

Performance rating	Bonus percentage on salary
1	5
2	10
3	15
4	20
5	25

(OR)

b) i) Write a C program to concatenate the content of two text files into a third file.

(8)

ii) Define the following terms with respect to file handling, with an example each.

1) Data Field

2) Record

(2)

3) File

(2)

4) File Access Method

(2)

(2)

40899

13. a) Implement Singly Linked List with insert, delete and display operations. Trace your code for inserting 1, 2, 3, 4, 5 in an initially empty singly linked list, delete 4 and then display the remaining values in the list. (16)

(OR)

    b) Discuss how to represent single-variable polynomials using linked lists. Provide C program to add two polynomials. With an example show that your code works. (16)

14. a) Illustrate implementation of queue along with algorithms for insert (enqueue) and delete (dequeue). (16)

(OR)

    b) Write a C implementation for circular queue. (16)

15. a) i) Provide recursive algorithm for merge sort. (8)

      ii) Using the merge sort algorithm sort the following and provide detailed tracing : 39, 9, 81, 45, 90, 27, 72, 18. (8)

(OR)

    b) Explain Collision Resolution by Open addressing Linear Probing. Consider a hash table of size 10. Using linear probing, insert the keys 72, 27, 36, 24, 63, 81, 92 and 101 into the table. (16)