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Question Paper Code : 91392

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third Semester

Computer Science and Engineering

CS 6301 – PROGRAMMING AND DATA STRUCTURES – II

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6301 – Programming and Data Structures – II for B.E.

(Part-Time) – Second Semester – Computer Science and Engineering

– Regulations – 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Write the differences between C and C++ programming language.
2. Compare C++ reference variables with C++ pointers.
3. Outline the role of copy constructors in C++.
4. Explain the dynamic memory allocation operators of C++.
5. Identify the standard header files used for I/O operations in C++.
6. Write in brief about the keywords used in C++ exception handling.
7. Illustrate the purpose of amortized analysis.
8. Define Disjoint-set data structure.
9. Define indegree and outdegree of a directed graph.
10. Write short notes on Kruskal's Algorithm.

PART – B

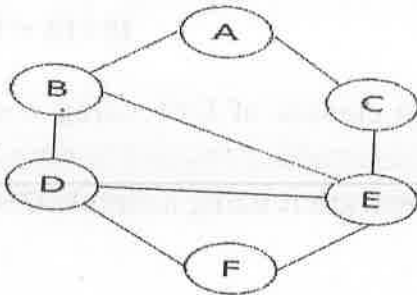
(5×13 = 65 Marks)

11. a) i) Explain the different types of storage classes of C++ using a simple program. **(4+4)**
ii) State the use of 'this' pointer and demonstrate it using a simple C++ program. **(2+3)**

(OR)



- b) i) Define Constructor in C++ class. Explain how it differs from normal member functions. Differentiate default and parameterized constructors using a simple C++ program. (2+2+3+3)
- ii) Define Destructor of C++ class. List the various cases, when does destructor being called in a C++ program (3)
12. a) i) Describe function overloading and demonstrate it using a suitable C++ program (4+6)
- ii) Differentiate compile and runtime polymorphism. (3)
- (OR)
- b) i) Explain operator overloading and demonstrate it using a suitable C++ program. (4+6)
- ii) Discuss the use of "nested classes" using C++ program. (3)
13. a) i) Define templates used in C++ language. Explain the syntax and the role of function and class templates using a C++ program. (2+4+4)
- ii) Discuss the use of "abstract class" using C++ program. (3)
- (OR)
- b) i) Demonstrate exception handling with multiple catch blocks using C++ program. (6)
- ii) Write file handling routines to copy one file content into another file. (7)
14. a) i) Insert the following keys 10, 20, 15, 45, 60 and 5 into an empty AVL tree one by one. (7)
- ii) Insert the keys 1, 10, 2, 9 and 3 into empty Splay tree. (6)
- (OR)
- b) i) Write the properties of B-tree. (3)
- ii) Insert the keys 1 – 10 into B-tree of order 3. Delete the key 10. (10)
15. a) Perform depth first search and breadth first search for the given graph. Write procedures. Illustrate each traversal using stack or queue. (5+5+3)

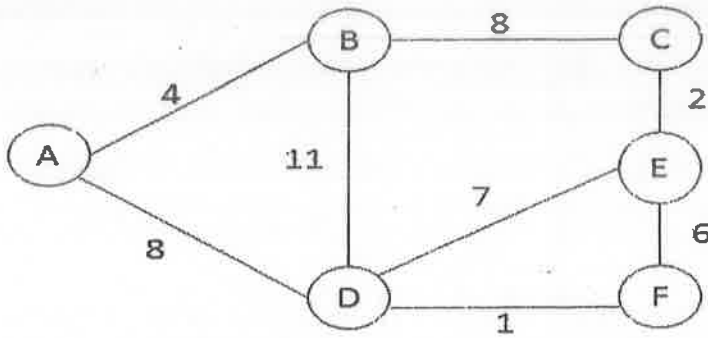


(OR)



b) Apply Prim's Algorithm to find the minimum spanning tree. Write procedure.

(10+3)



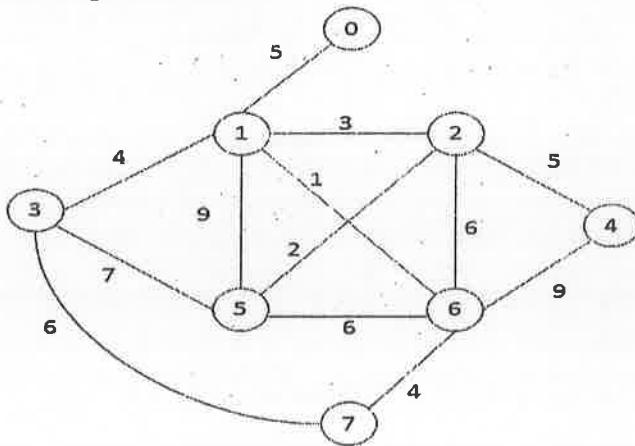
PART - C

(1×15 = 15 Marks)

16. a) Write a C++ program to implement the following. Let Employee be a parent class and Manager and Clerk derived from this class. Use virtual function calculatePay() appropriately such that the C++ program calculates payment for manager and clerk separately. Make necessary assumptions for calculation of salary/pay. (15)

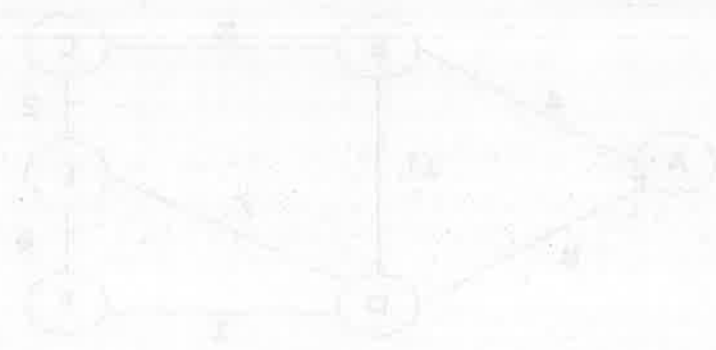
(OR)

b) Apply Dijkstra's shortest path algorithm for the given graph from the vertex 0. Write procedure. (10+5)



to apply Prim's algorithm to find the minimum spanning tree. Write

(10)



(10 marks)

PART - C

10. Write a C++ program to implement the following. Use `Employee` as a parent class and `Manager` and `Clerk` derived from this class. Use `vector` container (class) to store the data. The `Employee` class should have attributes: `id`, `name`, `salary`, `department`. The `Manager` class should have attributes: `id`, `name`, `salary`, `department`, `subordinates`. The `Clerk` class should have attributes: `id`, `name`, `salary`, `department`. Make necessary accessor and mutator methods for each class.

(10)

(OR)

11. Apply Dijkstra's shortest path algorithm for the given graph from the vertex 0. Show procedure.

(10)

