VALLIAMMAI ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Sub Code & Name : EC6301 - OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES

Degree & Branch : B.E. (ECE)

Year & Semester : II year/ 3rd sem

UNIT – I

DATA ABSTRACTION & OVERLOADING

PART A

1. What are the features of Object Oriented Programming?
2. List out some of the benefits of OOP.
3. What is the use of scope resolution operator?
4. List out the advantages of new operator over malloc ().
5. What are the control structures used in C++?
6. State the difference between structures and class.
7. Define a class.
8. List the access modes used within a class.
9. What are the characteristics of member functions?
10. What are the properties of a static data member?
11. What are the properties of a static member function?
12. How can objects be used as function arguments?
13. Define friend function?
14. Define Constructor.
15. List some of the special characteristics of constructor.
16. Give the various types of constructors.
17. What are the ways in which a constructor can be called?
18. Define Destructor.
19. Give the general form of an operator function.
20. What are the types of type conversions?

PART B

1. Explain with the Basic Concepts of object oriented programming.
2. Describe the applications of OOP technology.
3. What is a structure and explain the members of structure with an example program.
4. What is function overloading? Explain with an example program.
5. Briefly explain operator overloading with an example.
6. What is friend function? What is the use of using friend functions in c++? Explain with a

program.

7. What are the advantages of using default arguments? Explain with example program.
8. Write a program to demonstrate how a static data is accessed by a static member function.
9. Write a program to get the student details and print the same using pointers to objects and pointers to members of a class. Create a class student. And use appropriate functions and data members.
10. Explain I) copy constructor and destructor with suitable C++ coding.
    ii) static member and this pointer with suitable code.
11. I)Explain about Unary Operator and Binary Operator Overloading with program.
    Ii)Define a supplier class. Assume that the items supplied by any given supplier are different and varying in number. Use dynamic memory allocation in the constructor function to achieve the solution.
12. What is a proxy class and explain container classes and integrators?

UNIT - II

INHERITANCE & POLYMORPHISM

PART A

1. What are the types of inheritance?
2. Give the syntax for inheritance.
3. Define single inheritance.
4. Define multi-level inheritance.
5. Define multiple inheritance.
6. Define Hierarchical inheritance.
7. Define Hybrid inheritance.
8. What is a virtual base class?
9. What is an abstract class?
10. What are the types of polymorphism?
11. Define 'this' pointer.
12. What is a virtual function?
13. What is a pure virtual function?
14. How can a private member be made inheritable?
15. What is meant meant by Abstract base class?
16. Write short notes on virtual base class.
17. What are the iteration statements used in C++?
18. Mention some of the restrictions while using static keyword?
19. List and define the two types of Polymorphism.
20. Define Message Passing.

PART B

1. Explain the various types of Inheritance with suitable example program.

2. What are virtual functions? Explain their needs using a suitable example. What are the rules associated with virtual functions?
3. Write a brief note on casting class pointers and member functions.
4. What are the different forms of inheritance supported in c++? Discuss on the visibility of base class members in privately and publicly inherited classes.
5. What are abstract classes? Give an example (with the program) to illustrate the use of abstract class.
6. Explain about Code Reuse with program.
7. Write notes on Typing conversions and derived class with program.
8. Define a student class. Inherit that into MCAStudent class and NonMCAStudent. MCA Students inherits into GLSSTudents and NonGLSStudents. A function howPracticalHours can only be applied to MCAStudents. We have a base class Student pointer to a GLSStudent object. Use dynamic_cast ti check that NonMCAS tudents do not S howP racticalHours.
9. Narrate type conversion with example
10. Explain inheritance with example
11. Explain polymorphism with example
12. What is a virtual destructor? Explain the use of it.

UNIT III

LINEAR DATA STRUCTURES

PART A

1. Write down the definition of data structure.
2. Define ADT (Abstract Data Type)?
3. Define linear data structure?
4. What are different types of Linked List?
5. What is the difference between array and linked list?
6. Define a stack?
7. Define push and pop operations.
8. Define a queue?
9. What is single linked list?
10. How to create a new node?
11. Define HEAD pointer and NULL pointer?
12. What is meant by dummy header?
13. Define Circular linked list?
14. Mention applications of stack?
15. Define Infix
16. Define prefix
17. Define postfix notations
18. Define inorder ,preorder,postorder
19. Which ADT is used to evaluate arithmetic expressions?

20. What are the conditions that followed in the array implementation of queue?

PART B

1. Explain about Linked list, its Types, insertion and deletion routines with suitable example.
2. Explain the insertion and deletion operation in singly linked list.
3. Explain array based implementation of list with an example program.
4. Given singly linked list whose first node is pointed to by the pointer variable C formulate an algorithm to delete the first occurrence of X from the list and Insert the element X after the position P in the list.
5. Explain the implementation stack using linked list.
6. Write the ADT operation for insertion and deletion routine in stack.
7. Explain the process of postfix, prefix, infix expression evaluation with an example.
8. Give a procedure to convert an infix expression a+b*c+(d*e+f)*g to postfix notation.
9. Write a routine to insert an element in a linked list
10. What is a queue? Write an algorithm to implement queue.
11. Explain the process of conversion from infix expression to postfix using stack.
12. Write the ADT operation for insertion and deletion routine in linked lists & Queue

UNIT - IV

NON-LINEAR DATA STRUCTURES

PART A

1. Define non-linear data structure?
2. What is a Binary tree?
3. What are the applications of binary tree?
4. What is meant by traversing?
5. What is binary tree traversal?
6. What are the different types of traversing?
7. What are the two methods of binary tree implementation?
8. Define Graph?
9. Define adjacent nodes?
10. Name the different ways of representing a graph?
11. What are the two traversal strategies used in traversing a graph?
12. What is an acyclic graph?
13. Define Degree of a tree.
14. Define Terminal node or leaf?
15. Define Non-terminal node?
16. Define binary tree?

17. Define expression tree?
18. Define path & Cycle.
19. Define Acyclic graph.
20. Explain about Weighted shortest path & depth first spanning tree.

PART B

1. Explain the operations of insertion of nodes into and deletion of nodes from, a binary search tree with code.
2. Narrate insertion deletion with example.
3. Give the analysis of insertion and deletion operations of nodes in binary search tree.
4. Draw the binary search tree for the following input list 60, 25,75,15,50,66,33,44. Trace an algorithm to delete the nodes 25, 75, 44 from the tree.
5. Explain the operations of insertion of nodes into and deletion of nodes from, a binary search tree with code.
6. Explain the two applications of trees with a neat example.
7. How do you insert an element in a binary search tree?
8. What are the graph traversal methods? Explain it with example.
9. Give an algorithm to find minimum Spanning tree, explain it with suitable example.
10. Write an algorithm for finding minimum spanning tree and explain application, illustrate the algorithm with typical data of yours own example.
11. Explain the algorithm for depth first search and breadth first search with the following graph
12. Explain connected component.

UNIT - V

SORTING and SEARCHING

PART A

1. What is meant by sorting?
2. What are the two main classifications of sorting based on the source of data?
3. What is meant by external and internal sorting?
4. What is the purpose of quick sort?
5. What is the advantage of quick sort?
6. What is the purpose of insertion sort?
7. Define merge sort.
8. What are the advantages of merge sort?

9. What is linear search?
10. What is binary search?
11. Differentiate linear search and binary search.
12. Differentiate quick sort and merge
13. Give the advantage of merge sort
14. Distinguish quick sort and insertion sort.
15. Define sorting.
16. Narrate insertion sort with example
17. List examples for various sorting
18. Give the advantage of Merge sort
19. List linear search and binary search with example
20. Narrate insertion sort with example

PART B

1. Sort the sequence 3, 1, 4,7,5,9,2,6,5 using Insertion sort.
2. Explain the operation and implementation of merge sort.
3. Explain the operation and implementation of external sorting.
4. Write quick sort algorithm and explain.
5. Trace the quick sort algorithm for the following list of numbers. 90,77,60,99,55,88,66
6. Write down the merge sort algorithm and give its worst case, best case and average case analysis.
7. Explain the Quick sort algorithm with example
8. Briefly explain about quick sort algorithm
9. Trace the quick sort algorithm for the following numbers   90,77,60,99,55,88,66
10. Explain linear search & binary search algorithm in detail.
11. Explain linear search algorithm with an example.
12. Briefly differentiate linear search algorithm with binary search algorithm.