Department of Computer Science Engineering

QUESTION BANK

Subject: Data Structure through C++ **Faculty: B.Balakrishna**
Branch: II/IV B.Tech I Sem

UNIT – I

1. a)Write a C++ program to determine sum of first 'n' natural numbers by using class.
   b) Explain about the friend function with an example. (Reg.NOV.09)
2. a)Write a C++ program to check whether the given string is palindrome of not.
   b) Differentiate between pass by value and pass by reference with an example. (Reg.NOV.09)
3. a) Write a C++ program to arrange the given numbers in ascending order using pointers.
   b)Describe the different types of data types that are used in C++ (Reg.NOV.09)
4. What is constructor? Explain the different types of constructor that are used in C++ with an example. Reg.NOV.09)
5. a)Each class has some special member-functions,which calls can be inserted by the compiler into a code without explicit instruction of the programmer. (Supl.FEB.08)
   b)If when creating a variable the programmer explicitly did not intialize it, in some cases, the compiler itself would give it a certain, predefined initial value, and in some cases the initial value would be unpredictable. What does it depend on?
6. a)Can you think of a situation where your program would crash without reaching the breakpoint which you set at the beginning of main()? (Supl.FEB.08)
   b)When are copy constructors called?
   c)Can a copy constructor accept an object of the same class as parameter, instead of reference of the of the object?
7. a)Explain the need for OOP? And also explain the principals of Object Oriented Programming
   b)Explain the differences between procedural languages and Object Oriented Languages.(Supl.FEB.08)
8. a)Can you think of a situation where your program would crash without reaching the break point which you set at the beginning of main()? (Supl.FEB.08)
   b)When are copy constructors called?
   c)Can a copy constructor accept an object of the same class as parameter, instead of reference of the object?

UNIT – II

1. a)What is template?Explain class templates with an example. (Reg.NOV.09)
   b)Write a C++ program to overload the logical AND operator(&&).
2. Write a C++ program to implement to add two complex numbers by overloading operator using friend function. (Reg.NOV.09)
3. Write a C++ program that substitutes an overloaded += operator for the overloaded operator, = concatenating string such as S1=S2 where S2 is added to S1 and the result is left in S1. (Reg.NOV.09)
4. Write a C++ program using templates to implement for finding the minimum and maximum value contained in an array. (Reg.NOV.09)
5. a) When should my destructor be virtual? (Supl.FEB.08)

b)What is a "Virtual constructor"?
c) What's the difference between how virtual and non-virtual member functions are called?

6. a)Explain the need for "Virtual Destructor"? (Supl.FEB.08)
   b)Can we have " Virtual Constructor?
7. a) What are the different types of polymorphism? (Supl.FEB.08)
   b)What are virtual Function? How to implement virtual function in "C++"
8. a) What is multiple inheritance? Write a program to illustrate the concept of Multiple Inheritance. (Supl.FEB.07)
   b)What is Hybrid inheritance? Write a program to illustrate the concept of Hybrid Inheritance.

UNIT – III

1. a)Explain how linked lists can be used to imlement polynomial operations
   b)Explain the performance analysis of an algorithm. (Reg.NOV.09)
2. Write a program to implement queue using arrays with no headers. (Reg.NOV.09)
3. Write a C++ program to implement to Queue ADT using linked list. (Reg.NOV.09)
4. Write a program to implement stack ADT using linked list.
5. a)Explain about try, catch, throw keywords in C++. (Supl.Feb.08)
   b)Write a program to illustrate the exception handling mechanism in C++.
6. a)Write a program to merge the contents of two given files? (Supl.Feb.08)
   b)Write a program to count the no of lines in the given files?
7. a)Write a program to replace a word with other in a given file? (Supl.Feb.08)
   b)Write a program to count the no of occurrences of a word in a given file?
8. a)What are some ways try/catch/throw can improve software quality?
   b)How can we handle a constructor that fails?
   c)How can we handle a destructor that fails?

UNIT – IV

1. a)Explain about the implementation of class interface for a separate chaining? (Reg.NOV.09)
   b)Give an example of an employee class that can be stored in the generic hash table using the name number as the key?
2. a)Perform the insertion operation using double hashing for the following list. (Reg.NOV.09)
   12,54,62,45,37,78,89,28,61,49
   b)What are the problems associated with quadratic probing?
3. Show the resulting given input{3471,3132,7122,5199,5344,6796, and 1893} and hash function h(n)=x (mod 10). (Reg.NOV.09)
   a)Open addressing has table using quadratic probing.
   b)Open addressing had table with second hash functions h2(x)=7-(xmod7)
4. a)Explain about the skip list representations of dictionary with an example. (Reg.NOV.09)
   b)Write the application of hashing.
5. a)What is a linked list/chain. Write the class header for the class chain. (Supl.Feb.08)
   b)Write the program which gives the Constructor and Copy constructor for chain.
6. Write a method in C++ to join two doubly linked list into a single doubly linked list. In a join the elements of second list are appended to the end of first list. (Supl.Feb.08)
7. Write a method in C++ to join two doubly linked lists into a single doubly linked list. In a join the elements of second list are appended to the end of first list? (Supl.Feb.08)
8. a)What is a disjoint set?Define the ADT for a disjoint set? (Supl.Feb.08)
   b)Write algorithms for the Union and find operations of disjoint sets.

UNIT – V

1. a)Explain how merge sort can be used for external sorting. (Reg.NOV.09)
   b)Explain in detail about multiway merge with an example.
2. a)Write an algorithm to insert an element in the heap. (Reg.NOV.09)
   b)Write an algorithms to delete an element from the heap
3. What are the applications of a priority queue? Explain a method of implementing a priority queue other than heap. (Reg.NOV.09)
4. Develop a class for hash table using linear probing and never Used concept to handle an erase operation. Write complete C++ code for all the methods. Include a method to reorganize the table when(say) 60% of the empty buckets have never used equal to false. The reorgnization should move pairs around as necessary and leave a properly configured hash table in which never Used is true for every empty bucket. (Supl.Feb.08)
5. a)What is the structure to represent node in a skip list. Write the constructor for skip list.
   b)Write a method in C++ to erase a pair in the dictionary with key theKey in a skip list representation. What is the complexity of this method?
6. a)Explain about the skip list representation of dictionary with an example?
   b)What are the data members of skipList class? Write the constructor for skipList.
7. a) What is Linear Probing ? Write a c++ Program that gives the data members and constructors for the hash table class that uses linear probing
   b) Write the C++ program that gives the method search of a hash table.
8. a)Explain about the skip list representation of dictionary with an example?
   b)What are the data members of skiplist class? Write the constructor of skiplist.

UNIT - VI

1. Construct an AVL tree using the following data entered in sequence. 7,14,2,5,10,33,56,30,15,25,66,70,4
2. Explain in detail about B-Tree.
3. What is Binary Search Tree(BST)? Write the procedures to preform insertion, deletion and searching in a binary search tree?
4. What is AVL Tree ? Write the algorithm to search for an element of an AVL Search Tree? What is its time complexity?
5. a)Write a method to delete the pair with the largest key from a Binary Search Tree.
   b)Write a method to find the height of a BST.
6. What is AVL Trees? Explain about the different rotation patterns in AVL trees for balancing with appropriate examples?
7. a) How do you insert elements into a binary search tree.
   b) What is an AVL tree. Write the applications of AVL trees.
8. a) Show the result of inserting 3 , 1 , 4 , 6 , 9 , 2 , 5 , 7 into an initially empty binary search tree. Also show the result after deletion of the root.
   b) What is an AVL tree. Write the differences between an AVL tree and a binary search tree.

UNIT – VII

1. a) Write an algorithm for insert of an element into a B-Tree.
   b)Define B-Tree. What are the properties, of B-Tree?
2. a)Write an algorithm for searching an AVL tree.
   b)Explain in detail application of an AVL tree.
3. Write an algorithm for insertion of an element into an AVL tree, explain it with an example.
4. Write an algorithm for creation of an AVL tree. Explain it with an example.

5. What is balanced searched tree? Describe different types of Balanced Search trees with an example?
6. Draw the order -7 B-Tree resulting from inserting the following keys into an initially empty tree T:4,40,23,50,11,34,62,78,66,22,90,59,25,72,64,77,39,12
7. a) What is the maximum number of disk accesss needed to delete an element ie in a non leaf node of a B-tree of order m.
   b)Describe the B-trees? Explain the advantages of B-Trees?
8. Write in detail about locking regions.

UNIT - VIII

1. Write an efficient algorithm for a string from compressed trie and also analyze its complexity?
2. a)Draw the flow chart for KMP pattern matching?
   b)Write an algorithm for Suffix Tries?
3. Write an algorithm for Boyer Moore Pattern matching and also analyze its complexity?
4. Write an algorithm for Brute Force pattern matching and also analyze its complexity?
5. a)Explain the compressed Trie with an examle.
   b)How will the KMP algorithms behave if the pattern and/or the text are null (have length zero)? Will they "crash"? If not , will their output be meaningfull and correct.
6. a) Explain the KMP flow chart for the pattern"ABAABA"where {A,B,C}
   b)Explain the complexity of Brute Force Pattern Matching Algorithm.
7. a)Explain the compressed Trie with an Example?
   b)What are the advantages and disadvantages of Tries with respect to Bineary Search Tree.
8. a)Explain about inverted files?
   b)What is Tries?Explain different types of tries?