SE468

Total No. of Printed Pages:4

S.E.(Electronics & TC) / Electronics & Comm Engg) Semester- IV (Revised Course 2007-08)
EXAMINATION MAY/JUNE 2019
Data Structure Using C++

[Duration : Three Hours] **[Max.Marks : 100]**

Instructions:
1) Answer five questions with atleast one question from each Module.
2) Assume suitable data, if necessary.

MODULE - 1

Q.1 a) A tollbooth at a bridge with car passing by the booth are expected to pay a 50 cent toll. Mostly they do, but sometimes a car goes by, without paying. The tollbooth keeps track of the number of cars that have gone by and the total amount of money collected. **10**
- Model this tollbooth with a class called tollbooth.
- The two data items are of a type unsigned int to hold the total number of cars, and type double to hold the total amount of money collected.
- A constructor initializes both of these to zero.
- A member function called payingCar() increments the Car total and adds 0.50 to the cash total.
- Another function called nopayCar() increments the Car total but adds nothing to the cash total.
- Finally a member function called display () that displays the two totals.

b) Explain how memory management is achieved using new and delete? **05**

c) Define the use of constructors, explain with an example. **05**

Q.2 a) What is encapsulation? Explain with an example. **05**

b) Write a C++ code for a banking application to represent a bank account. **10**
- This model has a Class Bank
- Data members: (1) Name of the depositor
  (2) Account Number
  (3) Type of account
  (4) Balance amount in the account

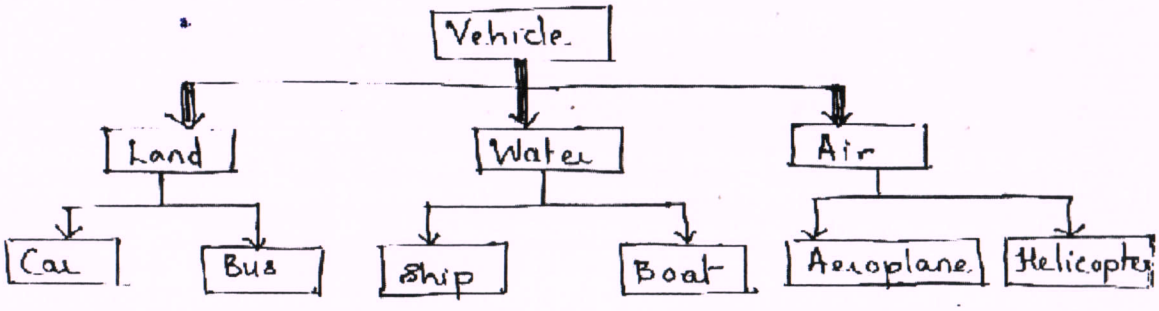
- Member Functions: (1) To assign initial values
  - initial ( )
  (2) To deposit an amount
  - deposit ( )
  (3) To withdraw an amount after checking the balance
  - withdraw ( )
  (4) To display name and Balance
  - display ( )

c) List the benefits of object Oriented Programming. **05**

MODULE - 2

Q.3 a) Explain nesting of classes in C++ with an example **08**

b) Write a C++ program to define the following type of inheritance. Display all details of the vehicles. **12**



Q.4 a) Define polymorphism. Explain in detail different types of polymorphism with an example code. **10**

b) Write a C++ program to overload unary operator. **10**

MODULE – 3

Q.5 a) Write a program to create a circular linked list with following functions **08**

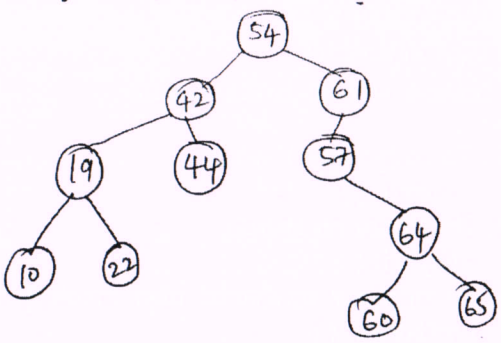
i) Find the sum of all the elements in the list

ii) Search for a specified element in the list

b) Evaluate the following postfix expression using stack data structure **04**

534 − + 263/+ ∗ 2^3 +

c) Consider the following Binary Search Tree. **06**



i) Show the tree would look like after the deletion of nodes containing 19, 57 & 54.

ii) Show how the original tree would look like after insertion of nodes 59, 48, 8 and 9.

d) What are priority queues? **02**

Q.6 a) Reconstruct a binary tree from the data given below **05**

Inorder Traversal	:	D	B	E	A	F	C	G
Preorder Traversal	:	A	B	D	E	C	F	G

b) Write a C++ program to implement the following operations of linear Queue **09**
1) Insert an element
2) Remove an element
3) Display the elements in the queue.

c) Convert the following Infix expressions into Postfix **06**
(1) A/B+C+D*(E+F/G) (2) A$B*C-D+E/F/(G+H)

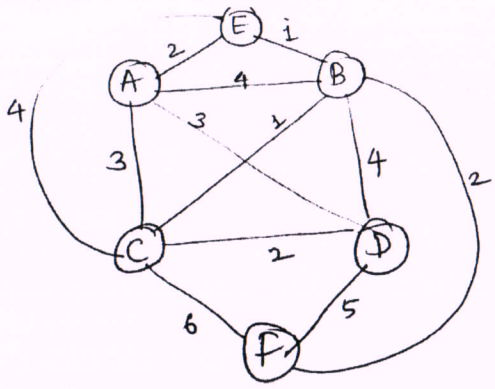
MODULE – 4

Q.7 a) Sort the following elements using Selection Sort **06**
415, 210, 709, 500, 750, 780
Show steps of each iteration.

b) Draw undirected graph for the following specifications **08**
V(G)={1, 2 ,3, 4, 5, 6}
E(G)={<1,2>;<1,3>;<1,4>;<1,6>; <1,5>;
<2,3>; <3,5>; <4,5>;<4,6>}
Perform the following:
i) Adjacency Matrix
ii) Adjacency List
iii) In degree and outdegree
iv) Packed Adjacency List.

c) Explain insertion sort with example. **06**

Q.8 a) Define spanning Tree. Obtain Minimum cost spanning Tree for the following graph using Kruskal's Algorithm. **08**



b) Write C++ program to Implement Binary Search. **08**

c) Explain Quick Sort with example. **04**