

Computer Programming

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Session: Quiz and Practice Questions on Structures



Q1. Consider the following structure definition struct X { int Y; char Z;} If "var" is a variable of type struct X, the member Y of var is accessed as: (A) X.var.Y (B) var.Y (D) var.X.Y (C) Y.var



Q2. Which of the following is/are true of structures defined in C++?

- A. All members must have same data type
- **B.** Cannot have arrays as members
- C. Cannot have two different members with same name
- D. Cannot have more than 1000 members



Q3. Consider the structure definition struct X {int Y, Z;} If we declare and initialize a variable "myVar" as $X myVar = \{0, 1\};$ the initialized values of members of myVar are: (A) Y: 0, Z: 0 (B) Y: 0, Z: 1 (D) Y: 1, Z: 1 (C) Y: 1, Z: 0



Q4. Suppose x and y are two variables of struct myStruct. The assignment statement

x = y;

- (A) Is an illegal statement in C++
- (B) Makes the addresses of x and y the same
- (C) Copies values of all members of y to corresponding members of x
- (D) None of the above



Q5. Suppose struct X is a structure with an int member named Y. The declaration X abc[10];

- declares an array of objects of type struct X.
 Which of the following accesses the member Y of the 5th element of the array?
 (A) (abc.Y)[5] (B) (abc[5]).Y
- (C) abc.(Y[5])

(D) abc[Y.5]





A binary tree is a data structure (representation of information) in which data items are related by a parent-child relationship as follows:

- 1. There is a designated data item called "root" with no parent data item
- 2. Every other data item has a unique parent data item





3. Every data item has at most 2 children data items

4. There are designated data items called "leaves" that do not have any children data items.

Practice Question 1









Now consider the following structure definition:



Practice Question 1



We want to use an array A of objects of type struct TreeNode to represent a binary tree as follows:



Practice Question 1



You are given an array A of size 100 of objects of struct TreeNode such that

A[0].value <= A[1].value <= A[99].value AND The values of A[i].leftChild and A[i].rightChild are -1 for all i in {0, ... 99}

Practice Question 1A



You are required to write a function void heapify(TreeNode *A) { // Your code comes here }

that fills in the values of leftChild and rightChild members of all elements of A such that it represents a binary tree in which

Value of every node is <= Value of all its descendants

Assume that the root is A[0], and absence of children is indicated by having leftChild (or rightChild) being -1



Solve the same question as before but now with the additional requirement that we must maximize the number of tree nodes with two children.