Assignment

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CSC 2105: Data Structure

Name: -------	**ID: --------**	**Section: ---**

Problem:

American International University-Bangladesh is going to arrange a health camp. Every individual of this institute will get a free medical checkup. The camp will open only one both to provide medical help due to lack of interested volunteer. An automated machine will take patients' name & age. Afterward it will call the patient by their name when his/her turn will come.

Patient with elderly age would be served first in the camp independent of their arrival time.

The camp will be open from 10:00 am to 4:00 pm. The volunteer will stop taking queue to provide service after 3:00 pm. In the meantime everyone will get the chance to get service.

Which data structure would you prefer to automatize the queue number procedure so that less volunteer will be required on this regard?

Answer

I will prefer **Heap Sort** data structure for automatizing the queue. So that the elderly aged patients would be served first in the health camp of AIUB. As mentioned, the automated machine will take patients' name and age as data entry but it will call elderly patients first.

So, we need to select a data structure that will sort the list from maximum age to minimum age. For sorting from maximum **Heap** is the best choice for AIUB.

Why did you choose this data structure rejecting others?

Answer

I reject binary search tree, minimum spanning tree, breadth first search, death first search. Because if we use those data structures, we cannot get numbers according to the dissenting order. We have to get numbers according to the dissenting order. So that patient with elderly age would be served first in the camp independent of their arrival time.

Binary Search Tree: Binary search tree is a node based binary tree data structure. Binary key follows the left subtree of a node contains only nodes with keys lesser than the nodes key. The right subtree of a node contains only nodes with keys greater than the nodes key. The left and right subtree each must also be a binary search tree.

So, if we use binary search tree, we cannot get numbers according to the dissenting order. That's why I reject binary search tree data structure.

Minimum Spanning Tree: Minimum spanning tree for a weighted, connected and undirected graph is a spanning tree with weight less than or equal to the weight of every other spanning tree. The weight of a spanning tree is the sum of weights given to each edge of the spanning tree.
So, if we use Minimum Spanning Tree, we cannot get numbers according to the dissenting order. That's why I reject Minimum Spanning Tree data structure.

Breadth First Search: Breadth first search is for vertex-based technique for finding the shortest path in a graph. it uses a queue data structure which follows first in first out. in BSF one vertex is selected at a time when its visited and marked then its adjacent are visited and shorted in the queue.
So, if we use Breadth First Search, we cannot get numbers according to the dissenting order. That's why I reject Breadth First Search data structure.

Depth first search: Depth first search is an edge-based technique. It uses the stack data structure, performs two stages, first visited vertices are pushed into the stack and second if there are no vertices then visited vertices are popped.
So, if we use Depth first search, we cannot get numbers according to the dissenting order. That's why I reject Depth first search data structure.

HEAP: Heap is a special tree-based data structure in which the tree is a complete binary tree. Heaps can be 2 types.
Max heap: In max heap the key present at the root node must be greatest among the key present at all of its children. The same property must be recursively true for all subtrees in that binary tree.
Min Heap: In min heap the key present at the root node must be the minimum amount the keys present at all of its children. The same property must be recursively true for all subtrees in the binary tree.

Using Max heap, we get numbers according to dissenting order easily. So, when automated machine takes patient name and age, we short patient name by his/her age using max heap sort. So that patient with elderly age would be served first in the camp independent of their arrival time. That we can call all patients according to his/her name without any problem and everyone will get the chance to get service.

That's why I chose heap sort so that everyone will get the chance to get service according to elderly age.

Thank You