

CSE 202 Midterm 3

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I. QUESTION (DISJOINT SET) (15 POINTS)

Given the index of a set, write a function that returns the indexes of children of that set.

```
LinkedList getChildren(int index)
```

II. QUESTION (DISJOINT SET) (15 POINTS)

Write a function that returns the indexes of disjoint sets in a disjoint set structure.

```
LinkedList getSets()
```

III. QUESTION (HEAP) (20 POINTS)

Write a function that returns the index of the maximum valued grandchild (children of children) of a heap node given its index.

```
int maxGrandChild(int no)
```

IV. QUESTION (HEAP) (15 POINTS)

Write a function that returns the index of a heap node's grandparent (parent of parent) given its index.

```
int grandParent(int no)
```

V. QUESTION (GRAPH) (20 POINTS)

A node in a graph is said to be an *island* if there are no incoming edges to it and no outgoing edges from it. Given the adjacency matrix representation of unweighted graph G , write a function that calculates the number of islands in that graph.

```
int islands()
```

VI. QUESTION (GRAPH) (15 POINTS)

Given the adjacency list representation of a graph G , find the incoming nodes to a given node i .

```
LinkedList incomingNodes(int i)
```