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BSC IN COMPUTER SCIENCE

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DESIGN & ANALYSIS OF ALGORITHMS

ASSIGNMENT

IMPLEMENTATION OF STACK ADT USING LINKED LIST

A linked list is a collection of nodes that form a linear ordering where each node has stores an object in this case a shape and a reference 'next' to another node. I chose the top of the stack to be the head of the list so as to maintain $O(1)$ time for efficiency.

I created an interface (DoubleStack) as the abstract class to define the methods of the stack which include:

- Size() – it returns an integer. It gives the number of elements in the list.
- isEmpty() - returns a Boolean depending on whether the stack contains elements or not.
- removeFirst() -it removes and returns the first element of the stack and gives an error if the stack is empty.
- addFirst() -inserts a new element at the beginning of the stack.
- addAt(position p) – it adds a new element at the position p specified.
- First()- it outputs the element at the top of the stack
- Last()- it outputs the element at the bottom of the stack

The interface is then implemented in the class I created (LinkedListDoubleStack). I proceeded to create a different class to create different shapes with different colors that I used as objects to be stored in the stack and another GUI class to create buttons and to Improve the UI of the stack. All the classes are then run by the main class which builds successfully into the stack.