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Comp 182

Prof Wang

Lab5 - Ch.4: ADT List

Purpose: ListArrayBased

Instructions:

Compile - javac ListInterface.java ListArrayBased.java

Run - java ListInterface ListArrayBased

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```
public class ListArrayBased implements ListInterface{
    private static final int MAX_LIST = 50;
    private Object items[];
    private int numItems;

    public ListArrayBased(){
        items = new Object[MAX_LIST];
        numItems = 0;
    }
    public boolean isEmpty(){
        return (numItems == 0);
    }
    public int size(){
        return numItems;
    }
    public void removeAll(){
        items = new Object[MAX_LIST];
        numItems = 0;
    }
    public void add(int index, Object item){
        if(index >= 0 && index <= numItems){
            for(int pos = numItems; pos >= index; pos--){
                items[pos+1] = items[pos];
            }
            items[index] = item;
            numItems++;
        }
    }
    public Object get(int index){
        Object res = 0;
        if(index >= 0 && index < numItems){
            res = items[index];
        }
    }
}
```

```

    }
    return res;
}
public void remove(int index){
    if(index >= 0 && index < numItems){
        for(int pos = index+1; pos <= size(); pos++){
            items[pos-1] = items[pos];
        }
        numItems--;
    }
}

public static void main(String [] args){
    ListArrayBased aList = new ListArrayBased();
    System.out.println("Is list Empty? "+aList.isEmpty());
    aList.add(0,"Cathryn");
    String dataItem = (String)aList.get(0);
    System.out.println(dataItem);
    aList.add(1,"James");
    String dataItem1 = (String)aList.get(1);
    System.out.println(dataItem1);
    aList.add(2,"Mari");
    String dataItem2 = (String)aList.get(2);
    System.out.println(dataItem2);
    aList.add(3,"Max");
    String dataItem3 = (String)aList.get(3);
    System.out.println(dataItem3);
    aList.add(4,"Jonathan");
    String dataItem4 = (String)aList.get(4);
    System.out.println(dataItem4);
    aList.add(5,"Natalie");
    String dataItem5 = (String)aList.get(5);
    System.out.println(dataItem5);

```

```

    System.out.print("Is list Empty? "+aList.isEmpty());

```

```

    int numItems = aList.size();
    System.out.println(" = "+numItems+" items");

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    aList.remove(2);
    int numItems2 = aList.size();
    System.out.println("After removing index 2: "+numItems2+" items left");
    aList.remove(0);
    int numItems3 = aList.size();
    System.out.println("After removing index 0: "+numItems3+" items left");

```

```

String res = (String)aList.get(3);
System.out.println("After removing 2 indexes, who is now at index 3?: "+res);

aList.removeAll();
int numItems4 = aList.size();
System.out.println("After calling method 'removeAll': "+numItems4+" items
left");
}
}

```

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Result:

*Is list Empty? true*

*Cathryn*

*James*

*Mari*

*Max*

*Jonathan*

*Natalie*

*Is list Empty? false = 6 items*

*After removing index 2: 5 items left*

*After removing index 0: 4 items left*

*After removing 2 indexes, who is now at index 3?: Natalie*

*After calling method 'removeAll': 0 items left*

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