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import java.util.*;

interface Observer {
    void update();
}

class Observable {
    private List observers = new ArrayList();
    public void addObserver(Observer o){
        observers.add(o);
    }
    public void removeObserver(Observer o){
        observers.remove(o);
    }
    public void notifyObservers() {
        Iterator iter = observers.iterator();
        while(iter.hasNext()){
            ((Observer)iter.next()).update();
        }
    }
}

// IntegerBag implements a Bag containing integers
class IntegerBag extends Observable {
    private List list = new ArrayList();
    public void add(Integer i){
        list.add(i); notifyObservers();
    }
    public void remove(int index){
        list.remove(index); notifyObservers();
    }
    public Integer[] getValues() {
        return (Integer[])list.toArray(new Integer[list.size()]);
    }
}

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// Concrete Observer
class PrintObserver implements Observer {
    private IntegerBag bag;
    public PrintObserver(IntegerBag bag){
        this.bag = bag;
        bag.addObserver(this);
    }
    public void update(){
        System.out.print("Content has changed: [ ");
        Integer[] values = bag.getValues();
        for(int i=0; i<values.length; i++){
            System.out.print(values[i]+" ");
        }
        System.out.println("]");
    }
}

class AdderObserver implements Observer {
    private IntegerBag bag;
    public AdderObserver(IntegerBag bag){
        this.bag = bag;
        bag.addObserver(this);
    }
    public void update(){
        int sum = 0;
        Integer[] values = bag.getValues();
        for(int i=0; i<values.length; i++){
            sum += values[i].intValue();
        }

        System.out.println("Content has changed: new sum is " + sum);
    }
}

public class ObserverTest {
    public static void main(String[] args){
        IntegerBag bag = new IntegerBag();
        new PrintObserver(bag);
        bag.add(new Integer(17));

        new AdderObserver(bag);
        bag.add(new Integer(13));
    }
}

```