

Data Structures Homework 2 Written

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1 Problem 1

```
public static <E> void printLots(List<E> L, List<Integer> P)
{
    Iterator<E> itr = L.iterator();
    int position = 0;
    while (itr.hasNext())
    {
        E item = itr.next();
        if (P.contains(position++))
        {
            System.out.println(item);
        }
    }
}
```

2 Problem 2

```
public static <E> List<E> and(List<E> list1, List<E> list2)
{
    List<E> result = new List<>();
    Iterator<E> itr = list1.iterator();
    while (itr.hasNext())
    {
        Integer value = itr.next();
        if (list2.contains(value) && !result.contains(value))
        {
            result.add(value);
        }
    }
    return result;
}
```

3 Problem 3

```
public class MyStacks<E>
{
    public MyStacks()
    {
        stacks = new E[];
        index1 = -1;
        index2 = -1;
    }

    public MyStacks(int length)
    {
        stacks = new E[length];
        index1 = -1;
        index2 = length + 1;
    }

    /**
     * Adds element to top of specified stack.
     * @param stack the first stack (0) or the second stack (1)
     * @param element the element to be added
     */
    public void push(int stack, int element)
    {
        if (stack == 0) index1++;
        else index2--;
        if (index1 == index2) throw new StackOverflowException();
        else
        {
            if (stack == 0) stacks[index1] = element;
            else stacks[index2] = element;
        }
    }

    /**
     * Pops element at top of specified stack.
     * @param stack the first stack (0) or the second stack (1)
     */
    public int pop(int stack)
    {
        if (stack == 0) return stacks[index1--];
        else return stacks[index2++];
    }
}
```

```

}

 /**
 * Peeks element at top of specified stack.
 * @param stack the first stack (0) or the second stack (1)
 */
public int top(int stack)
{
    if (stack == 0) return stacks[index1];
    else return stacks[index2];
}

private E[] stacks;
private int index1;
private int index2;
}


```

4 Problem 4

4.1 Part A

Given input track I , output track O , and holding tracks A , B , and C , this is a solution:

1. 4 ($I \rightarrow C$)
2. 3 ($I \rightarrow C$)
3. 1 ($I \rightarrow O$)
4. 8 ($I \rightarrow B$)
5. 2 ($I \rightarrow O$)
6. 7 ($I \rightarrow B$)
7. 6 ($I \rightarrow B$)
8. 9 ($I \rightarrow A$)
9. 3 ($C \rightarrow O$)
10. 4 ($C \rightarrow O$)
11. 5 ($I \rightarrow O$)
12. 6 ($B \rightarrow O$)
13. 7 ($B \rightarrow O$)

14. 8 ($B \rightarrow O$)

15. 9 ($A \rightarrow O$)

4.2 Part B

A train of length 9 that cannot be rearranged in increasing order using 3 holding tracks is this:

[3,2,1,9,8,7,6,5,4]