



# Accessory Collection

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Problem

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Victoria is splurging on expensive accessories at her favorite stores. Each store stocks  $A$  types of accessories, where the  $i^{\text{th}}$  accessory costs  $i$  dollars ( $1 \leq i \leq A$ ). Assume that an item's type identifier is the same as its cost, and the store has an unlimited supply of each accessory.

Victoria wants to purchase a total of  $L$  accessories according to the following rule:

Any  $N$ -element subset of the purchased items must contain *at least*  $D$  different types of accessories.

For example, if  $L = 6$ ,  $N = 3$ , and  $D = 2$ , then she must choose **6** accessories such that *any* subset of **3** of the **6** accessories will contain *at least* **2** distinct types of items.

Given  $L$ ,  $A$ ,  $N$ , and  $D$  values for  $T$  shopping trips, find and print the maximum amount of money that Victoria can spend during each trip; if it's not possible for Victoria to make a purchase during a certain trip, print SAD instead. You must print your answer for each trip on a new line.

## Input Format

The first line contains an integer,  $T$ , denoting the number of shopping trips.

Each of the  $T$  subsequent lines describes a single shopping trip as four space-separated integers corresponding to  $L$ ,  $A$ ,  $N$ , and  $D$ , respectively.

## Constraints

- $1 \leq T \leq 10^6$
- $1 \leq D \leq N \leq L \leq 10^5$
- $1 \leq A \leq 10^9$
- The sum of the  $L$ 's for all  $T$  shopping trips  $\leq 8 \cdot 10^6$ .

## Output Format

For each shopping trip, print a single line containing either the maximum amount of money Victoria can spend; if there is no collection of items satisfying her shopping rule for the trip's  $L$ ,  $A$ ,  $N$ , and  $D$  values, print SAD instead.

## Sample Input

```
2
6 5 3 2
2 1 2 2
```

## Sample Output

```
24
SAD
```

## Explanation

Shopping Trip 1:

We know that:

- Victoria wants to buy  $L = 6$  accessories.
- The store stocks the following  $A = 5$  types of accessories:  $\{1, 2, 3, 4, 5\}$ .
- For any grouping of  $N = 3$  of her  $L$  accessories, there must be *at least*  $D = 2$  distinct types of accessories.

Victoria can satisfy her shopping rule and spend the maximum amount of money by purchasing the following set of accessories:  $\{3, 4, 5, 5, 4, 3\}$ . The total cost is  $3 + 4 + 5 + 5 + 4 + 3 = 24$ , so we print **24** on a new line.

#### Shopping Trip 2:

We know that:

- Victoria wants to buy  $L = 2$  accessories.
- The store stocks  $A = 1$  type of accessory:  $\{1\}$ .
- For any grouping of  $N = 2$  of her  $L$  accessories, there must be *at least*  $D = 2$  distinct types of accessories.

Because the store only carries **1** type of accessory, Victoria cannot make a purchase satisfying the constraint that there be at least  $D = 2$  distinct types of accessories. Because Victoria will not purchase anything, we print that she is **SAD** on a new line.

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Submissions: [857](#)


Max Score: 60




Difficulty: Hard

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Java 7   

```

1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
8
9     public static void main(String[] args) {
10         Scanner in = new Scanner(System.in);
11         int T = in.nextInt();
12         for(int a0 = 0; a0 < T; a0++){
13             int L = in.nextInt();
14             int A = in.nextInt();
15             int N = in.nextInt();
16             int D = in.nextInt();
17         }
18     }
19 }
20

```

Line: 1 Col: 1

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☐ Test against custom input

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