Maximum Subarray Sum ★

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We define the following:

- A subarray of array a of length n is a contiguous segment from $a[i]$ through $a[j]$ where $0 \leq i \leq j < n$.
- The sum of an array is the sum of its elements.

Given an n element array of integers, a, and an integer, m, determine the maximum value of the sum of any of its subarrays modulo m.

Example

$a = [1, 2, 3]$

$m = 2$

The following table lists all subarrays and their moduli:

```
              sum     %2
  [1]          1       1
  [2]          2       0
  [3]          3       1
  [1,2]        3       1
  [2,3]        5       1
  [1,2,3]      6       0
```

The maximum modulus is 1.

Function Description

Complete the maximumSum function in the editor below.

maximumSum has the following parameter(s):

- long a[n]: the array to analyze
- long m: the modulo divisor

Returns

- long: the maximum (subarray sum modulo m)

Input Format

The first line contains an integer q, the number of queries to perform.

The next q pairs of lines are as follows:

- The first line contains two space-separated integers n and (long)m, the length of a and the modulo divisor.
- The second line contains n space-separated long integers $a[i]$.

Constraints

- $2 \leq n \leq 10^5$
- $1 \leq m \leq 10^{14}$
- $1 \leq a[i] \leq 10^{18}$
- $2 \leq$ the sum of n over all test cases $\leq 5 \times 10^5$

Sample Input

```
STDIN         Function
-----         --------
1             q = 1
5 7           a[] size n = 5, m = 7
```

```
3 3 9 9 5
```

Sample Output

```
6
```

Explanation

The subarrays of array $a = [3, 3, 9, 9, 5]$ and their respective sums modulo $m = 7$ are ranked in order of length and sum in the following list:

1. $[9] \Rightarrow 9 \% 7 = 2$ and $[9] \rightarrow 9 \% 7 = 2$
   $[3] \Rightarrow 3 \% 7 = 3$ and $[3] \rightarrow 3 \% 7 = 3$
   $[5] \Rightarrow 5 \% 7 = 5$
2. $[9, 5] \Rightarrow 14 \% 7 = 0$
   $[9, 9] \Rightarrow 18 \% 7 = 4$
   $[3, 9] \Rightarrow 12 \% 7 = 5$
   $[3, 3] \Rightarrow 6 \% 7 = 6$
3. $[3, 9, 9] \Rightarrow 21 \% 7 = 0$
   $[3, 3, 9] \Rightarrow 15 \% 7 = 1$
   $[9, 9, 5] \Rightarrow 23 \% 7 = 2$
4. $[3, 3, 9, 9] \Rightarrow 24 \% 7 = 3$
   $[3, 9, 9, 5] \Rightarrow 26 \% 7 = 5$
5. $[3, 3, 9, 9, 5] \Rightarrow 29 \% 7 = 1$

The maximum value for *subarray sum % 7* for any subarray is **6**.

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```csharp
 1    using System.CodeDom.Compiler;
 2    using System.Collections.Generic;
 3    using System.Collections;
 4    using System.ComponentModel;
 5    using System.Diagnostics.CodeAnalysis;
 6    using System.Globalization;
 7    using System.IO;
 8    using System.Linq;
 9    using System.Reflection;
10    using System.Runtime.Serialization;
11    using System.Text.RegularExpressions;
12    using System.Text;
13    using System;
14
15    class Result
16    {
17
18        /*
19         * Complete the 'maximumSum' function below.
20         *
21         * The function is expected to return a LONG_INTEGER.
22         * The function accepts following parameters:
23         *  1. LONG_INTEGER_ARRAY a
24         *  2. LONG_INTEGER m
25         */
26
27        public static long maximumSum(List<long> a, long m)
```

Line: 87 Col: 1

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