APS ASSIGNMENT 2

Q-1 Given an array A, you now know how to find a Sub-Array sum i.e., A[i]+ A[i+1] + ... + A[j]. A sub-array is defined by its starting index i and its ending index j (0 <= i <= j < N). Can you find the maximum sum of a sub-array.

Input:
First line contains N, number of elements in the array (1 <= N <= 100000).
Second line contains N integers in range [-10^4,10^4], separated by spaces.

Output:
Print the maximum sum possible for a sub-array of A. (Followed by a '\n' which is just for a newline, no need to display)

Sample Cases:

Input:
4
1 -2 1 2

Output:
3\n

Explanation:
Sum(0..0) = 1, Sum(0..1) = -1, Sum(0..2) = 0, Sum(0..3) = 2, . . . , Sum(2..3) = 3, . . . , Sum(3,3) = 2
Among all possible SubArray sums, Sum(2..3) = 3 has the maximum value.

Q-2 A magic no is a no whose divisiors' sum can be used to generate all the numbers from 1 to that number. Eg 12 is a magic number as its divisiors 1,2,3,4,6,12 can be used to generate all the numbers from 1 to 12 (5 = 3+2 or 4+1 , 7 = 6 +1, ... 11 = 6+4+1).
N<= 10^12, T<=10

Input
First line contains T, no of test cases.
Following T lines contain an integer, N

Output:
Print “Yes\n” if no is a magic no
Print “No\n” otherwise

Sample Input:
4
10
2
3
12

Sample Output:
No
Yes
No
Yes

Q-3 Find the number of binary sequences of length N possible with no consecutive zeroes and without leading zeroes.

N<=1000000, T<=10

INPUT:

First line contains T, no of test cases

Following T lines contain an integer N (length of binary sequence)

OUTPUT:

Output the number of possible binary sequences for each test case.

Output can be large , so print (output mod 1000000007)

INPUT:

2

2

3

OUTPUT:

2
3

Explanation:

For input 1 , {1} is only possible . So output is 1.

For input 2, {10,11} are possible so output is 2.

For input 3, {101,110,111} are possible so output is 3.

Q-4 Here is a very easy linear recurrence for you to solve,

F(k) = 2.F(k-1) + 5.F(k-2) + 3

Initial Cases: F(0) = 1, F(1) = 2.

Input: Given n and M
Constraints: 0 <= n <= 10^9 , 2 <= M <= 10^9
Output: find the value of F(n) % M

Sample Case:
1)
Input:
4 15
Output:
2\n

2)
Input:
3 40
Output:
37\n

Q-5 You are given a set of digits, your task is to find the maximum integer that you can make from these digits. The made number must be divisible by 2, 3, 5 without a residue. It is permitted to use not all digits from the set, it is forbidden to use leading zeroes.
Each digit is allowed to occur in the number the same number of times it occurs in the set.

Input
A single line contains a single integer n ($1 \le n \le 1000$) — the number of digits in the set.
The second line contains n digits, the digits are separated by a single space.

Output
On a single line print the answer to the problem. If such number does not exist, then you should print -1.

Sample test case:
Input
11
3 4 5 4 5 3 5 3 4 4 0

Output
5554443330

Happy Coding