1. **Bit - Difference**

You're given a number **N**.

Find out the absolute difference between number of **1** bits and number of **0** bits in the binary representation of **N**.

Input Format:
First line of input contains **T**, denoting number of testcases.
Next **T** lines contain single integer denoting **N** in each line.

Output Format:
Print the output according to the description.

Constraints:
$1 \quad \leq T \leq 10^20 \quad \leq N \quad \leq 10^9$

Sample I/O:

Input 1:
3
10
7
3
Output 1:
0
3
2

Input 2:
5
57
30
9
72
128
Output 2:
2
3
0
3
6

2. **Holy Cow!!!**

Krishna had some cows, but last night, a thief stole all of them. So he decided to go to the market to purchase new ones.

At the market, there were 10 cows available, some were whites (denoted as **0**) and some were blacks (denoted as **1**). Krishna has a total of ***N*** units of money to spend.

The prices of the cows are as follows:

- 1st cow costs 1 unit
- 2nd cow costs 2 units
- 3rd cow costs 3 units
- ....

- 10th cow costs 10 units

Krishna will feel **Happy** if he can buy **X** white cows. Otherwise he will feel **Sad**.

Your task is to determine how Krishna feels based on what he can affort to buy.

Input Format:
First line of input contains two integers **N** and **X**, denoting units of money Krishna has and no. of white cows he wants to buy respectively.

Second line of input contains 10 space separated integers.
0 denotes white cow and **1** denotes black cow.

Output Format:
Print either **Happy** or **Sad** according to description.

Constraints:
$1 \quad \leq N \leq 10^3 1 \quad \leq X \quad \leq 10$

Sample I/O:

Input 1:
8 3
0 1 0 0 1 1 1 0 1 0
Output 1:
Happy

Input 2:
7 3
0 1 0 0 1 1 1 0 1 0
Output 2:
Sad

Input 3:
15 3
1 1 0 1 0 1 0 0 0 0
Output 3:
Happy

Input 4:
10 3
1 1 0 1 0 1 0 0 0 0
Output 4:
Sad