SHEET OF EXERCISES:

Part B:

Ex1: Write a program that takes from the user n characters and returns the number of unique characters entered. The value of n is given by the user.

Example:

Input: 10

a b d a b d d d b c

Output: 4

Ex2: Jojo has just bought n colored balls for his sister Momo as a gift on her birthday. He decided to group the balls using special magic bags that have infinite capacity. Each bag can contain at most k different colors. Each bag costs y units of money. What is the least amount of money Jojo must pay to group the balls successfully.

The input consists of t test cases. For each test case you will be given:

- n , the number of balls. (n<10^5)
- a sequence of n integers where the ith integer represents the color of the ith ball. Each element has a value between 1 and n inclusively.
- Y , the cost of one bag.
- K, the maximum number of colors a bag can contain.

Example:

Input: 2

6

1 2 2 1 4 1

10

3

5

1 2 3 4 5

20

2

Output:

10

60

Ex3: (Advanced)

It's finally the birthday of Nono. Toto doesn't want to miss the chance of sending her a birthday message , but he thought that being the last person to say "Happy Birthday" would be more impressive as she won't then forget his message quickly. Unfortunately , Nono doesn't check her phone all the time , so Toto won't risk sending a message that won't be read instantly. After months of observation, Toto has noticed that Nono checks her phone usually at specific instants of time everyday. However , Toto's phone battery runs out of charge at the kth instant of Nono's birthday and he has no charger. Help Toto find the latest instant at which he can send a birthday message that would be read by Nono immediately.

Input format:

- n, the number of instant recorded by Toto. These are the instants at which Nono checks her phone. (Instants aren't unique)
- n integers follow representing the recorded instants
- k, the instant at which Toto's phone battery runs out of charge.

Output:

If the answer exists, print "happy birthday" followed by the required answer.

If the answer doesn't exist, print "saddy birthday"

Example 1:

Input : 7

5 2 2 1 34 1 10

6

Output: happy birthday 5

Example 2:

Input : 7

5 2 2 1 34 1 10

1

Output: saddy birthday

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