CODECON

Memory Limit: 1024 MB
Time Limit: 5 s

Murder at Mary Mead Hall (700 points)

Introduction

There's murder afoot at St Mary Mead Hall; The country's most dangerous mansion! Lots of nefarious characters are frequently seen creeping around the building. There are so many crimes that the police don't have enough men and women to work on them all so they've asked you to create a crime-solver.

Input Specifications

You will be given clues based around 4 criteria: - Suspect Name, Weapon, Room and Time

Each criterion is only associated with one of each other type of criterion. i.e. A suspect's fingerprints are only found on one weapon, they were only seen entering one room at one particular time. No room was entered twice. No two people were in the building simultaneously, etc. You must associate each suspect with their room, weapon and time and then wait for evidence from the forensics lab to select your prime suspect.

The first 5 lines of input are metadata in the form of:

1) The number of criterions in each list. There will be the same number of suspects as rooms, weapons and times. This number will be between 2 and 10.

Then 4 space delimited lists follow, (which will also be terminated with a space):

2) List of suspects

3) List of rooms

4) List of weapons

5) List of times (given as single integers to the nearest hour of a 24h clock time)

The metadata will be followed by an unlimited number of clues which will be in the format:

<criterion>"=="<criterion>

or

<criterion>"!="<criterion>

For example, "RIPPER==AXE" means that Ripper's fingerprints were found on the axe, while "STUDY!=16" means there was no one in the study at 16:00.

You will always be given enough clues to deduce the relationship between all criteria

Lastly you will be given a piece of forensic evidence starting with ## which will positively identify either a room, weapon or murder time from which you must deduce who the killer was.

Output Specifications

You must submit the name of the prime suspect as output

Sample Input/Output

Input

```
3
RIPPER CRIPPEN BORDEN
LIBRARY STUDY KITCHEN
AXE ACID KNIFE
14 16 18
RIPPER==AXE
RIPPER==16
CRIPPEN==18
CRIPPEN==KNIFE
ACID==KITCHEN
STUDY!=16
##ACID
```

Output

```
BORDEN
```

Explanation

from the data above, it's possible to deduce:- Borden = Acid = 14 = Kitchen, Crippen = Knife = 18 = Study, Ripper = Axe = 16 = Library Then by processing the final piece of forensic evidence, you can see that Borden is the culprit