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Military message

7 points

Introduction

It is 1942 and World War II is at its final stage, so it is critical to have a reliable communication channel to transfer messages. There is a rudimentary machine for that communication, but it is quite slow (remember, it is 1942...) and all the sent and received messages have to be manually processed. To replace that slow machine, you are in charge of the important task of implementing an automatic mechanism to send and receive messages.

It is important to take also into account the military ranks when sending and receiving a message. The military ranks are, from higher to lower:

Admiral > Captain > Commander > Lieutenant > Officer

If the sender of a message has a higher rank than the receiver, the first field of the transmitted message will be the word "URGENT", and the interpretation of the received message must start with "<<< URGENT >>>" always (a received message could be missing that word due to an error when sending it).

Input

The first line of the input is a word which must contain either "S" or "R" to indicate that we have to "send" or "receive" a message, respectively.

If the first line is "S", it will be followed by 6 lines, each one of them being: the name of the sender, the rank of the sender, the name of the receiver, the rank of the receiver, the message text and the time in the format hhmm (being hh the hour and mm the minute).

If the first line is "R", it will be followed by a single line containing all the data of the message that has been received.

Output

If the input is a message that has to be sent (S), the output must be the transmitted message in a single line, with all the input fields separated by commas. Remember to put an extra field "URGENT" at the beginning of the message if the rank of the sender is higher than the rank of the receiver.

If the input is a received message (R), the output must be the interpretation of that message, as shown in the Example 2 below. If it is an "URGENT" message, remark that putting the word in between "<<< >>>", as shown in Example 2.

If the first line is neither "S" nor "R", you must indicate that there is an error in the input by showing the message "Invalid input.". Show that message also if any of the given military ranks is invalid. Be careful, because both sent and received messages may contain an invalid rank.

Example 1

Input

```
S
Bobby Shaftoe
Lieutenant
Lawrence Waterhouse
Officer
Bring coffee!
2357
```

Output

```
URGENT,Bobby Shaftoe,Lieutenant,Lawrence Waterhouse,Officer,Bring
coffee!,2357
```

Example 2

Input

```
R
Bobby Shaftoe,Lieutenant,Lawrence Waterhouse,Officer,Bring coffee!,2357
```

Output

```
<<< URGENT >>>
From: Bobby Shaftoe
From rank: Lieutenant
To: Lawrence Waterhouse
To rank: Officer
Content: Bring coffee!
Timestamp: 2357
```

Example 3

Input

M

URGENT,Bobby Shaftoe,Lieutenant,Lawrence Waterhouse,Officer,Bring
coffee!,2357

Output

Invalid input.