Problem 06: Illegal Input

Points: 15

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Problem Background

Validating input from users is an important part of maintaining the security of any application. Illegal inputs could cause any number of problems; usually, these are fairly minor and would only impact the person who provided the input. However, if the user has malicious intentions, they can design input specifically designed to attack your application or the underlying system. A recently discovered vulnerability with the popular Log4J library allowed exactly this; by entering a specifically formatted string, an attacker could hijack servers by making them run any command they wanted.

Problem Description

Your team is working for Lockheed Martin's Corporate Information Security division. In the aftermath of the Log4J vulnerability, your team has been asked to design a common utility program that can be incorporated into existing Lockheed Martin programs to protect against a number of various code injection attacks. Your program will be given a string input by a user and must scan it for a series of common attack vectors, listed below. For each of these vectors, the phrase `<ANY>` represents any text string, of any length; other characters are part of the attack vector.

- `'; <ANY> --`
- `' OR 1=1` *(case-insensitive)*
- `${<ANY>}`
- `$(<ANY>)`
- `&& sudo`
- `&& su -`
- `;;`
- `<script` *(case-insensitive)*
- `%s`
- `%x`
- `%n`

If any of these phrases are identified anywhere within the input string, you should reject the input so the application does not process it any further and fall victim to a possible attack. If the string is free of attacks, you can return the original string to allow the application to continue normally.

Sample Input

The first line of your program's input, **received from the standard input channel**, will contain a positive integer representing the number of test cases. Each test case will include a single line containing a user-input string of text. Input may contain any printable ASCII character.

```
4
This is valid input.
This is'; DROP TABLE scoreboard; --not valid
Perhaps you could " && sudo make-me-a-sandwich
This looks suspicious $[jndi:sudo shutdown --now] but it's not a threat.
```

Sample Output

For each test case, your program must print a single line containing:

- The word "REJECTED" if the input appears to contain an attack vector listed above, or
- The original input string, otherwise

```
This is valid input.
REJECTED
REJECTED
This looks suspicious $[jndi:sudo shutdown --now] but it's not a threat.
```