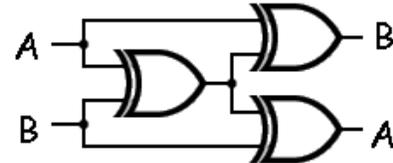


# Problem J

## Yet Satisfiability Again!

Problem ID: sat  
Time Limit: 5 seconds

Alice recently started to work for a hardware design company and as a part of her job, she needs to identify defects in fabricated integrated circuits. An approach for identifying these defects boils down to solving a satisfiability instance. She needs your help to write a program to do this task.



Picture from Wikimedia Commons

### Input

The first line of input contains a single integer, not more than 5, indicating the number of test cases to follow. The first line of each test case contains two integers  $n$  and  $m$  where  $1 \leq n \leq 20$  indicates the number of variables and  $1 \leq m \leq 100$  indicates the number of clauses. Then,  $m$  lines follow corresponding to each clause. Each clause is a disjunction of literals in the form  $X_i$  or  $\sim X_i$  for some  $1 \leq i \leq n$ , where  $\sim X_i$  indicates the negation of the literal  $X_i$ . The “or” operator is denoted by a ‘v’ character and is separated from literals with a single space.

### Output

For each test case, display `satisfiable` on a single line if there is a satisfiable assignment; otherwise display `unsatisfiable`.

Sample Input	Sample Output
<pre> 2 3 3 X1 v X2 ~X1 ~X2 v X3 3 5 X1 v X2 v X3 X1 v ~X2 X2 v ~X3 X3 v ~X1 ~X1 v ~X2 v ~X3 </pre>	<pre> satisfiable unsatisfiable </pre>