Input Format

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1. TS Input Format:

The first line contains two numbers S and T. S refers to the number of states. T refers to the number of transitions. The second line contains a set of initial states. The third line contains A actions Act. The fourth line contains P atomic propositions.

The next T lines contain 3 values (i, k, j) $(0 \leq i, j \leq S-1$, $0 \leq k \leq A-1)$, representing that there exists a transition $s_i \xrightarrow{\alpha_k} s_j$, where $\alpha_k \in Act$.

The next S lines contains the set $L(s_i) \subseteq AP$ of atomic propositions held by state $s_i (0 \leq i \leq s-1)$. If this line only contains -1, then $L(s_i) = \emptyset$.

Consider the following transition system TS:

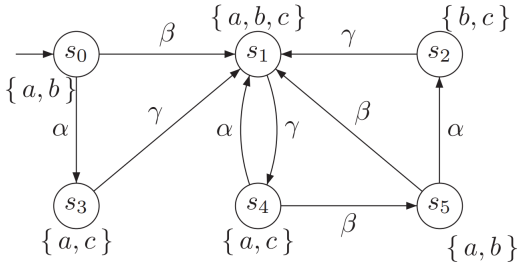

Table 1: Input sample

input	**explanation**
6 9	states: $\{s_0, \cdots, s_5\}$; transitions: $\{t_0, \cdots, t_8\}$
0	s_0 is the initial state
0 1 2	$\alpha_0 = \alpha, \quad \alpha_1 = \beta, \quad \alpha_2 = \gamma$
a b c	$p_0 = a, \quad p_1 = b, \quad p_2 = c$
0 1 1	$t_0 = s_0 \xrightarrow{\alpha_1} s_1$
0 0 3	$t_1 = s_0 \xrightarrow{\alpha_0} s_3$
3 2 1	$\cdots$
1 2 4	$\cdots$
2 2 1	$t_4 = s_2 \xrightarrow{\alpha_2} s_1$
5 0 2	$\cdots$
5 1 1	$\cdots$
4 0 1	$t_7 = s_4 \xrightarrow{\alpha_0} s_1$
4 1 5	$t_8 = s_4 \xrightarrow{\alpha_1} s_5$
0 1	$L(s_0) = \{p_0, p_1\}$
0 1 2	$L(s_1) = \{p_0, p_1, p_2\}$
1 2	$L(s_2) = \{p_1, p_2\}$
0 2	$\cdots$
0 2	$\cdots$
0 1	$L(s_5) = \{p_0, p_1\}$

2. Implement a parser for LTL formulas, where we use ! for $\neg$, $/\backslash$ for conjunction, $\backslash/$ for disjunction, $->$ for implication, X for next, G for always, F for eventually, and U for until. You can assume enough brackets to eliminate ambiguity.