

A. Complete DFSA to RegEx Translator

time limit per test: 1 second

memory limit per test: 16 megabytes

input: input.txt

Implement a DFSA to RegEx Translator. Given an DFSA description in the input.txt (see input file format) your program should output to console an error description (see validation errors) OR a regular expression that corresponds to the given DFSA. The regular expression should be built according to a slightly modified version of the Kleene's algorithm (see Kleene's algorithm).

Input

states=[s1,s2,...] // s1 , s2, ... ∈ latin letters, words and numbers

alpha=[a1,a2,...] // a1 , a2, ... ∈ latin letters, words, numbers and character '_'(underscore)

initial=[s] // s ∈ states

accepting=[s1,s2,...] // s1, s2 ∈ states

trans=[s1>a>s2,...] // s1,s2,... ∈ states; a ∈ alpha

Examples

input	Copy
<pre>states=[on,off] alpha=[turn_on,turn_off] initial=[off] accepting=[on] trans=[off>turn_on>off,on>turn_off>on]</pre>	
output	Copy
E6: Some states are disjoint	

input	Copy
<pre>states=[0,1] alpha=[a,b] initial=[0] accepting=[1] trans=[0>a>0,0>b>1,1>a>1,1>b>1]</pre>	
output	Copy
<pre>((a eps)(a eps)*(b) (b))({})(a eps)*(b) (a b eps))*({})(a eps)*(b) (a b eps) ((a eps)(a eps)*(b) (b)))</pre>	

input	Copy
<pre>states=[on,off] alpha=[turn_on,turn_off] initial=[off] accepting=[] trans=[off>turn_on>on,on>turn_off>off]</pre>	
output	Copy
E3: Set of accepting states is empty	

Note

Errors: The errors may appear in the inputs, which should lead to error message according to the priority given below. Only 1 error message should be shown, if required. It should be assumed that for each line read from the inputs all the possible errors should be checked in the given priority, if applicable for the current line.

- E1: Input file is malformed
- E2: Initial state is not defined
- E3: Set of accepting states is empty
- E4: A state 's' is not in the set of states
- E5: A transition 'a' is not represented in the alphabet

IU TCS Spring 2023

Private

Participant



→ Group Contests

- TCS Assignment 2
- TCS Assignment 1

TCS Assignment 2

Finished

Contestant



→ Languages

The following languages are only available languages for the problems from the contest

TCS Assignment 2:

- GNU G++17 7.3.0
- GNU G++20 13.2 (64 bit, winlibs)
- GNU G++23 14.2 (64 bit, msys2)
- Java 21 64bit
- Java 8 32bit
- Python 2.7.18
- Python 3.8.10
- PyPy 2.7.13 (7.3.0)
- PyPy 3.6.9 (7.3.0)
- PyPy 3.10 (7.3.15, 64bit)

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Last submissions

Submission	Time	Verdict
205640537	May/12/2023 22:26	Perfect result: 15 points
205096304	May/08/2023 15:40	Perfect result: 15 points
205095259	May/08/2023 15:37	Perfect result: 15 points
204988916	May/07/2023 18:00	Partial result: 8.25 points
204987640	May/07/2023 17:48	Partial result: 12.75 points
204971672	May/07/2023 15:27	Partial result: 9.75 points
204971501	May/07/2023 15:25	Partial result: 9.75 points

- E6: Some states are disjoint
- E7: FSA is nondeterministic

Kleene's Algorithm:

The Kleene's Algorithm should be used as presented in the Lab 10, but with following modifications:

- Denote \emptyset as {}
- Denote ϵ as eps
- Define update rule with the additional parentheses:
$$R_{ij}^k = (R_{ik}^{k-1})(R_{kk}^{k-1}) * (R_{kj}^{k-1})|(R_{ij}^{k-1})$$
- At each step each regular expression should be surrounded by parentheses, e.g.
$$R_{ij}^k = ((a|eps)(a|eps) * (a|eps)|(a|eps))$$
- Optimization of the regular expressions should NOT be done
- The regular expression parts' content should be in lexicographical order, but ϵ should be at the end of each part, e.g. $(a|b|eps)*$
- Assume that input files and standard outputs should end with a new line character

204971121	May/07/2023 15:22	Partial result: 9.75 points
204970930	May/07/2023 15:20	Partial result: 9.75 points
204970344	May/07/2023 15:15	Partial result: 9.75 points

→ Your points	
	Points
A	15
Total	15

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