B.Tech. II CSE CS 208 Automata and Formal Languages Mid Semester Examination

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* Required

Which of the following regular expressions over {0,1} denotes the set of all string not containing 100 as a substring? * 1 point

- [ ] 0*1*01*
- [ ] 0*1010*
- [x] 0*(10+1)*
- [ ] 0*(1*0)*

DFA can recognize * 1 point

- [ ] only CFG
- [ ] only unambiguous grammar
- [ ] any grammar
- [x] only regular language

(a*ab+ba)*a* is equivalent to * 1 point

- (ab + ba + aba)
- (aba + bab)*
- (a + b + ab)*
- (a + ab + ba)*

Identify which of the following conditions does not hold * 1 point

- $(r_1\ r_2)^* = (r_1^* + r_2^*)^*$
- $(r_1\ r_2)^* = (r_1^* + r_2^*)$
- $(r_1\ r_2)^* = r_1^*\ r_2^*$
- $(r_1\ r_2)^* = (r_1^*\ r_2^*)^*$

Which of the following pairs are equivalent * 1 point

- (ab)*a and a(ba)*
- (a+b)* and (a* + b*)
- None of these
- (a* + b) and (a+b)*

(1 + 00*1) + (1 + 00*1) (0 + 10*1)* (0 + 10*1) = 0*1(0+10*1)* * 1 point

- False
- True

DFA has * 1 point

- [ ] more than one initial states
- [x] unique path (for a set of inputs) to the final state
- [ ] all of the these
- [ ] single final state

The set of regular languages over a given alphabet set is not closed under * 1 point

- [x] None of these
- [ ] intersection
- [ ] union
- [ ] complement

Find the true statement * 1 point

- [ ] There is nothing like non-determinism in finite state automata.
- [ ] it depends from case to case.
- [ ] Non-determinism adds to the recognition power of finite-state automata.
- [x] Non-determinism does not add to the recognition power of finite-state automat.

Given an arbitrary non-deterministic finite automation with N states the maximum number of states is an equivalent minimized DFA is at least * 1 point

- [ ] N^2
- [x] 2^N
- [ ] N!
- [ ] 2N

The intersection of (a+b)*a and b(a+b)* is given by * 1 point

- (a+b)*ab(a+b)*
- ab(a+b)*
- [x] b(a+b)*a
- a(a+b)*b

Which of the following is regular? * 1 point

- [x] Strings of odd number of zeroes
- Strings of all palindromes made up of 0's and 1's
- Strings of 0's whose length is a prime number
- Strings of 0's whose length is a perfect square

The basic limitation of finite state machine is that * 1 point

- it sometimes recognizes non regular language
- all the these
- it sometimes does not recognizes regular language
- [x] it can't remember arbitrary large information

The set of all strings 0's and 1's such that every pair of adjacent 0's appears before any pair of adjacent 1's * 1 point

- (10 + 0)* (epsilon + 1)* (epsilon + 0)
- (10 + 0)* (epsilon + 1) (01 + 01)* (epsilon + 0)
- [x] (10 + 0)* (epsilon + 1) (01 + 1)* (epsilon + 0)
- (100)* (epsilon + 1) (01 + 1)* (epsilon + 0)

The rules for DFA state that * 1 point

- every state of a DFA must always have at most one existing transition arrow for each symbol in the alphabet.
- every state of a DFA must always have exactly one existing transition arrow for each symbol in the alphabet.
- every state of a DFA may have one, or many existing transition arrow for each symbol in the alphabet.
- every state of a DFA may have zero, one, or many existing transition arrow for each symbol in the alphabet.

(0 + 1 + 00)* = ? * 1 point

- 0*1*
- (0 + 1)*
- 0* + 1*
- (01)*

(1+00*1)+(1+00*1)(0+10*1)*(0+10*1) = ? * 1 point

- (1+00*1)(0+10*1)*
- (0+10*1)*0*1
- None of these
- 0*1(0+10*1)*

The language generated by a deterministic finite automata is * 1 point

- ○ context free language
- ○ informal language
- ◉ regular language
- ○ context sensitive language

The set of all strings which are either strings of a's followed by one b or strings of b's followed by one a * 1 point

- ○ a*+(ab+a)*
- ○ (aa+b)*(bb+a)*
- ○ a(a+b)*ab
- ◉ a*b+b*a

L is a nonempty language such that any w in L has length n, then any DFA accepting L must have * 1 point

- ◉ exactly (n+1) states
- ○ atleast (n+1) states
- ○ atmost (n+1) states
- ○ exactly n states

Identify which of the following conditions hold * 1 point

- (r_1* r_1*)* = r_1*
- r_1* r_1* = r_1*
- (r_1 + r_1)* = (r_1*)*
- (r_1*)* = r_1*

For text searching applications which of them is used * 1 point

- NFA
- DFA
- CFG
- NCFG

0(0+1)*+(0+1)*00(0+1)* = ? * 1 point

- (01*)0*1*
- ((01*)0*1*)*
- None of these
- ((1*0)*01*)*

(11 + 111)* = (111*)* * 1 point

- False
- True

Find the regular expression for the set of all strings having atmost one pair of 0's or atmost one pair of 1's * 1 point

- (1+01)* + (1+00)* (1+10)* + (1+10)* + (1+10)*11(0+10)*
- (1+01)* + (1+01)*00(1+01)* + (0+10)* + (0+10)* 11 (0+10)*
- (1+00)*+(1+01)*(1+10)* + (1+11)* + (0+10)*11 (0+10)*
- None of the these

Select which of following represent a set of all strings with a and ending with ab * 1 point

- a*+(ab+a)*
- a*b + b*a
- (aa+b)*(bb+a)*
- a(a+b)*b

Identify which of the following conditions hold * 1 point

- $(r_1 + r_2)^* = (r_1^* r_2^*)$
- $(r_1 + r_2)^* = (r_1^* r_2^*)^*$
- $(r_1 + r_2)^* = (r_1^* + r_2^*)$
- $(r_1 + r_2)^* = (r_1^* + r_2^*)^*$

A language L = {awa: w in of form {a, b}+} is * 1 point

- context sensitive
- None of these
- regular
- congext free

Applications of finite automata can not be found in * 1 point

- String matching
- Spelling checkers
- Lexical analyzers
- Storage purpose

What is the regular expression defining the language of all words with an odd number of b's is * 1 point

- a*b + (a*ba + b)* + a*
- a*b(a*ba*b)*a*
- None of these
- a*(a*b)*a*

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