In the name of GOD

Midterm Exam(Finite Automata)

A DFA consisting of a single state, which is final, and with self-loop transitions on every symbol in the alphabet,Σ,recognizes

□)is an incorrect DFA

□)the empty language,Ø

□)the language {**λ**}

□)non-regular languages

□)Σ*

If G is grammer then

□)L(G) can be accepted by a PDA

□)L(G) can be accepted by a DFA

□)L(G) can be accepted by a NFA

□)L(G) can be accepted by a regular experssion

□)None of the above

If L is a language accepted by a NFA then

□)L is finite

□)L is infinite

□)L is uncountable

□)There is a DFA M1 such that L(M1)=L(M)

□)None of the above

The pumping lemma is generally used to

□)Show that there are languages that are not infinite

□)Prove that a given language is not regular

□)Pump more transitions out of a regular grammer

□)Prove tha a string w does not belong to a language

□)None of the above

The language { $a^i b^j c^k$:i=j+k } is generated by which one of the following CFGs?

□)S ⟶ aSc | T   T ⟶ aTb | **λ**

□)S ⟶ aT | **λ**   T ⟶ aTb | aTc | ab | ac

□)S ⟶ aTc | **λ**   T ⟶ aTb | aTc

□)S ⟶ aTb | aTc   T ⟶ aTb | aTc | **λ**

□)S ⟶ T|aTc   T ⟶ aTc | Tb | b

Let L be a finite language. Which of the following is definitely true?

□)L contains a word of even length

□)L is not context-free

□)L is regular

□)L contains a word of length 1

□)L is not regular

Regular languages are closed under several set operations except

□)Complement

□)Concatenation

□)Star

□)Intersection

□)None of the above

Consider the non-regular language $\{ww : w \in \{0,1\}^*\}$.
In applying the Pumping Lemma, whatis the incorrect starting string for s?

□)0^m10^m1

□)$0^m1^m0^m1^m$

□)1^m01^m0

□)$(01)^m(01)^m$

□)10^m10^m

Let L1 and L2 be non-regular languages

□)L1 $\cup$L2 is non-regular

□)L1 $\cap$L2 is non-regular

□)L1 – L2 is non-regular

□)L1* is non-regular

□)There are regular R0 and R1 such that R0 $\subset$ L1 $\subset$ R1

Let be a regular language.Define PREFIX(L) to be the set of prefixes of words in L, and SUFFIX(L) to be set of the suffixes of the words in L

□)SUFFIX(L) is regular

□)PREFIX(L) SUFFIX(L) is regular

□)L $\cup$PREFIX(L) is regular

□)PREFIX(L) is regular

□)All of the above

If the construct the minimum DFA recognizing$(1+\lambda)(00^*1)^*0^*$
What is the language accepted by this DFA?

□)Strings that do not have two successive 1s,and which end in a 1.

□)Strings that have two successive 1s.

□)Strings that do not have two successive 1s,and which end in a 0.

□)Strings that do not have successive 1s.

□)None of the above

Let L1 be a regular language and L2 be a non-regular language such that L1 $\cap$L2= Ø.
Let L= L1 $\cup$L2.

□)L is necessarily non-regular

□)For some choices of L1 and L2,L is regular

□)For some choices of L1 and L2,Lis not regular

□)L is necessarily regular

□)None of the above

Let M be a DFA over the alphabet {a,b} with exactly 2 states.Suppose further that M accepts a finite number n of distinct words.What is the maximum value of n?

□)4

□)3

□)2

□)1

□)There is not fixed maximum value of n.

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□)is an incorrect DFA

□)the empty language, Ø

□)the language {**λ** }

□)non-regular languages

□)∑*

Suppose that M and N are context-free languages.Which of the following is definitely true?

□)M ∩N might be regular

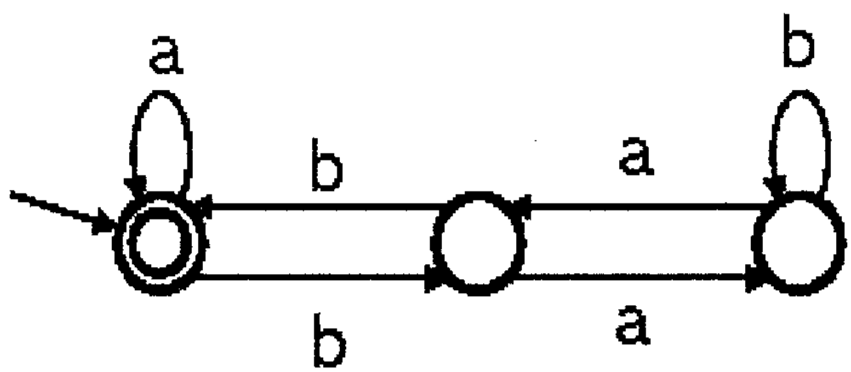
□)M ∩N is finite

□)M ∩N is infinite

□)M ∩N is context-free

□)M ∩N is not context-free

Consider the FA M defined by:



Which of the following regular experssions represent the L(M)?

□)a*b(ba*b)*b

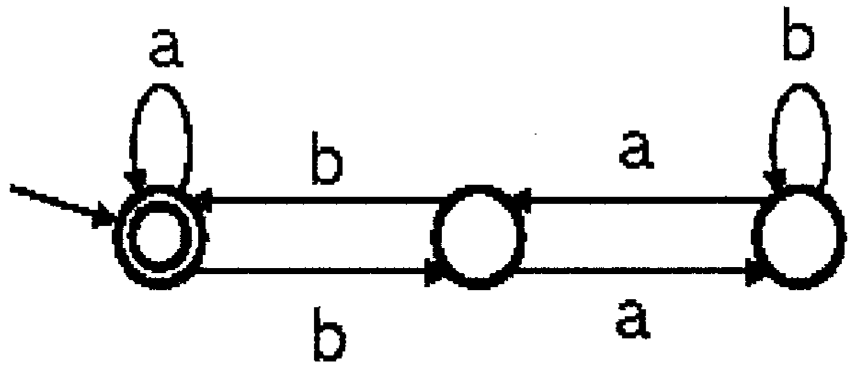
□)(a+b(ab*a)*b)*

□)a*b(ba*b)a(baa)*

□)a*(bb)*a

□)((((aab+baa)*)*ba*+a*)*) Ø+**λ**

Consider the FA M defined by:



Which of the following regular experssions does not represent a subset of L(M)?

□)a*b(ba*b)*b

□)(a+b(ab*a)*b)*

□)a*b(ba*b)a(baa)*

□)a*(bb)*a*

□)((((aab+baa)*)*ba*+a*)*) Ø+λ

Let L be the language containing all binary strings with the same number of 0's as 1's.
Then L can be described by which regular expression?

□)(0110+1100+10+01)*

□)(0(10+01)*1+1(10+01)0)*

□)(01+10)*

□)(01)*

□)There is no regular experssion for L

A non-Deterministic Finite Automaton with λ rules

□)Accept the same language as a deterministic one

□)Can not be transformed to an equivalent deterministic machine

□)Is very difficult to build given a regular experssion

□)Is More powerful(accepts a larger language)than a deterministic one

□)None of the above

Let L $\subseteq$ {a,b}* be the language generated by the following non-context free grammer:

$$S \longrightarrow AB \mid T$$
$$A \longrightarrow \lambda \mid Aa$$
$$aB \longrightarrow Bab \mid ab$$
$$T \longrightarrow aaTb \mid aab$$

Which of the following regular experssions does represent a subset of L?

□)$(ab)^+ + (aab)^+$

□)$(ab)^+(abab)^*$

□)(ab)*

□)$(ab+aab)^+$

□)None of the pervious

Good Luck