1. L is a regular Language if and only If the set of _____ classes of IL is finite.
a) Equivalence
b) Reflexive
c) Myhill
d) Nerode
View Answer
Answer: a
Explanation: According to Myhill Nerode theorem, the corollary proves the given statement correct for equivalence classes.

2. A language can be generated from simple primitive language in a simple way if and only if
a) It is recognized by a device of infinite states
b) It takes no auxiliary memory
c) All of the mentioned
d) None of the mentioned
View Answer
Answer: b
Explanation: A language is regular if and only if it can be accepted by a finite automaton. Secondly, It supports no concept of auxiliary memory as it loses the data as soon as the device is shut down.

3. Which of the following does not represents the given language?
Language: {0,01}
a) 0+01
b) {0} U {01}
c) {0} U {0}{1}
d) {0} ^ {01}
View Answer
Answer: d
Explanation: The given option represents {0, 01} in different forms using set operations and Regular Expressions. The operator like ^, v, etc. are logical operation and they form invalid regular expressions when used.

4. According to the given language, which among the following expressions does it corresponds to?
Language L={x∈{0,1}|x is of length 4 or less}
a) $(0+1+0+1+0+1+0+1)^4$
b) $(0+1)^4$
c) $(01)^4$

d) $(0+1+\varepsilon)^4$

View Answer

Answer: d

Explanation: The extended notation would be $(0+1)^4$ but however, we may allow some or all the factors to be ε. Thus ε needs to be included in the given regular expression.

5. Which among the following looks similar to the given expression?
((0+1). (0+1)) *

a) {xϵ {0,1} *|x is all binary number with even length}
b) {xϵ {0,1} |x is all binary number with even length}
c) {xϵ {0,1} *|x is all binary number with odd length}
d) {xϵ {0,1} |x is all binary number with odd length}

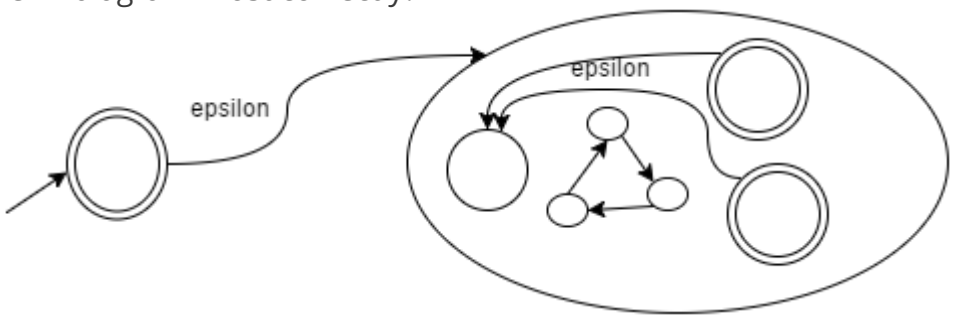
View Answer

Answer: a

Explanation: The given regular expression corresponds to a language of binary strings which is of even length including a length of 0.

Check this: Computer Science Books | Computer Science MCQs

6. If R represents a regular language, which of the following represents the Venn-diagram most correctly?



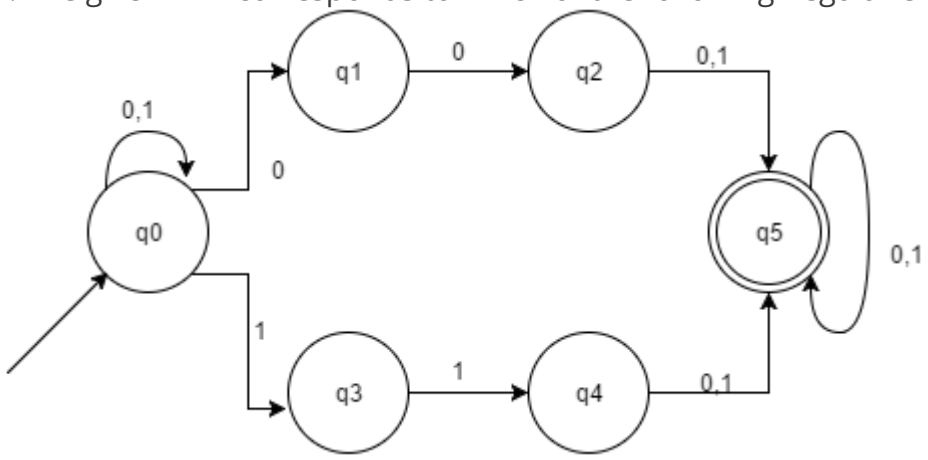
a) An Irregular Set
b) R*
c) R complement
d) R reverse

View Answer

Answer: b

Explanation: The given diagram represents the Kleene operation over the Regular Language R in which the final states become the initial and the initial state becomes final.

7. The given NFA corresponds to which of the following Regular expressions?



a) (0+1) *(00+11) (0+1) *
b) (0+1) *(00+11) *(0+1) *
c) (0+1) *(00+11) (0+1)
d) (0+1) (00+11) (0+1) *
View Answer
Answer: a
Explanation: The transition states shown are the result of breaking down the given regular expression in fragments. For dot operation, we change a state, for union (plus) operation, we diverge into two transitions and for Kleene Operation, we apply a loop.

8. Concatenation Operation refers to which of the following set operations:
a) Union
b) Dot
c) Kleene
d) Two of the options are correct
View Answer
Answer: b
Explanation: Two operands are said to be performing Concatenation operation AB = A•B = {xy: x ∈ A & y ∈ B}.

9. Concatenation of R with Φ outputs:
a) R
b) Φ
c) R.Φ
d) None of the mentioned
View Answer
Answer: b
Explanation: By distributive property (Regular expression identities), we can prove the given identity to be Φ.

10. RR* can be expressed in which of the forms:
a) R+
b) R-

c) R+ U R-
d) R
View Answer
Answer: a
Explanation: RR*=R+ as R+ means the occurrence to be at least once.

1. A finite automaton accepts which type of language:
a) Type 0
b) Type 1
c) Type 2
d) Type 3
View Answer
Answer: d
Explanation: Type 3 refers to Regular Languages which is accepted by a finite automaton.

2. Which among the following are incorrect regular identities?
a) εR=R
b) ε*=ε
c) Φ*=ε
d) RΦ=R
View Answer
Answer: d
Explanation: There are few identities over Regular Expressions which include: RΦ=ΦR=Φ≠R

3. Simplify the following regular expression:
ε+1*(011) *(1*(011) *) *
a) (1+011) *
b) (1*(011) *)
c) (1+(011) *) *
d) (1011) *
View Answer
Answer: a
Explanation: ε+1*(011) *(1*(011) *) *
ε + RR*= ε + R*R= ε + R+= R*

4. P, O, R be regular expression over ∑, P is not ε, then
R=Q + RP has a unique solution:

a) Q*P
b) QP*
c) Q*P*
d) (P*O*) *
View Answer
Answer: b
Explanation: The given statement is the Arden's Theorem and it tends to have a unique solution as QP*.
Let P and Q be regular expressions,
R=Q+RP
R=Q+(Q+RP) P
R=Q+((Q+RP) +RP) +P=Q+QP+RPP+RPP=Q+QP+(Q+RP) PP+(Q+RP) PP=Q+QP+QPP+RPPP+QPP+RPPP,
If we do this recursively, we get:
R= QP*

5. Arden's theorem is true for:
a) More than one initial states
b) Null transitions
c) Non-null transitions
d) None of the mentioned
View Answer
Answer: c
Explanation: Arden's theorem strictly assumes the following;
a) No null transitions in the transition diagrams
b) True for only single initial state

Check this: Computer Science Books | Computer Science MCQs

6. The difference between number of states with regular expression (a + b) and (a + b) * is:
a) 1
b) 2
c) 3
d) 0
View Answer
Answer: a
Explanation:

7. In order to represent a regular expression, the first step to create the transition diagram is:
a) Create the NFA using Null moves
b) Null moves are not acceptable, thus should not be used
c) Predict the number of states to be used in order to construct the Regular expression

d) None of the mentioned
View Answer
Answer: a
Explanation: Two steps are to be followed while converting a regular expression into a transition diagram:
a) Construct the NFA using null moves.
b) Remove the null transitions and convert it into its equivalent DFA.

8. (0+ε) (1+ε) represents
a) {0, 1, 01, ε}
b) {0, 1, ε}
c) {0, 1, 01 ,11, 00, 10, ε}
d) {0, 1}
View Answer
Answer: a
Explanation: The regular expression is fragmented and the set of the strings eligible is formed. '+' represents union while '.' Represents concatenation.

9. The minimum number of states required to automate the following Regular Expression:
(1) *(01+10) (1) *
a) 4
b) 3
c) 2
d) 5
View Answer
Answer: a
Explanation: None.

10. Regular Expression denote precisely the _____ of Regular Language.
a) Class
b) Power Set
c) Super Set
d) None of the mentioned
View Answer
Answer: a
Explanation: Regular Expression denote precisely the class of regular language. Given any regular expression, L(R) is a regular language. Given any regular language L, there is a regular expression R, such that L(R)=L.

1. Which of the following is correct?
Statement 1: ε represents a single string in the set.
Statement 2: Φ represents the language that consist of no string.
a) Statement 1 and 2 both are correct
b) Statement 1 is false but 2 is correct
c) Statement 1 and 2 both are false
d) There is no difference between both the statements, ε and Φ are different notation for same reason
View Answer
Answer: a
Explanation: ε represents a single string in the set namely, the empty string while Statement 2 is also correct.

2. The appropriate precedence order of operations over a Regular Language is
a) Kleene, Union, Concatenate
b) Kleene, Star, Union
c) Kleene, Dot, Union
d) Star, Union, Dot
View Answer
Answer: c
Explanation: If a regular language expression is given, the appropriate order of precedence if the parenthesis is ignored is: Star or Kleene, Dot or Concatenation, Union or Plus.

3. Regular Expression R and the language it describes can be represented as:
a) R, R(L)
b) L(R), R(L)
c) R, L(R)
d) All of the mentioned
View Answer
Answer: c
Explanation: When we wish to distinguish between a regular expression R and the language it represents; we write L(R) to be the language of R.

4. Let for ∑= {0,1} R= (∑∑∑) *, the language of R would be
a) {w | w is a string of odd length}
b) {w | w is a string of length multiple of 3}
c) {w | w is a string of length 3}
d) All of the mentioned
View Answer

Answer: b
Explanation: This regular expression can be used to eliminate the answers and get the result. The length can be even and as well more than 3 when R= (∑∑∑) (∑∑∑) (particular case).

5. If ∑= {0,1}, then Φ* will result to:
a) ε
b) Φ
c) ∑
d) None of the mentioned
View Answer
Answer: a
Explanation: The star operation brings together any number of strings from the language to get a string in the result. If the language is empty, the star operation can put together 0 strings, resulting only the empty string.

Check this: Computer Science MCQs | Computer Science Books

6. The given NFA represents which of the following NFA
a) (ab U a) *
b) (a*b* U a*)
c) (ab U a*)
d) (ab)* U a*
View Answer
Answer: a
Explanation: The Regular expression (ab U a) * is converted to NFA in a sequence of stages as it can be clearly seen in the diagram. This NFA consist of 8 stated while its minimized form only contains 2 states.

7. Which of the following represents a language which has no pair of consecutive 1's if ∑= {0,1}?
a) (0+10)*(1+ε)
b) (0+10)*(1+ε)*
c) (0+101)*(0+ε)
d) (1+010)*(1+ε)
View Answer
Answer: a
Explanation: All the options except 'a' accept those strings which comprises minimum one pair of 1's together.

8. The finite automata accept the following languages:
a) Context Free Languages
b) Context Sensitive Languages
c) Regular Languages
d) All the mentioned
View Answer

Answer: c
Explanation: A finite automaton accepts the languages which are regular and for which a DFA can be constructed.

9. (a + b*c) most correctly represents:
a) (a +b) *c
b) (a)+((b)*.c)
c) (a + (b*)).c
d) a+ ((b*).c)
View Answer
Answer: d
Explanation: Following the rules of precedence, Kleene or star operation would be done first, then concatenation and finally union or plus operation.

10. Which of the following regular expressions represents the set of strings which do not contain a substring 'rt' if ∑= {r, t}
a) (rt)*
b) (tr)*
c) (r*t*)
d) (t*r*)
View Answer
Answer: d
Explanation: As Kleene operation is not on the whole of the substring, it will not repeat and maintain the order of t, r.

11. According to the precedence rules, x-y-z is equivalent to which of the following?
a) (x-y)-z
b) x-(y-z)
c) Both (x-y)-z and x-(y-z)
d) None of the mentioned
View Answer
Answer: a
Explanation: In arithmetic, we group two of the same operators from the left, hence x-y-z is equivalent to (x-y)-z and not x-(y—z).

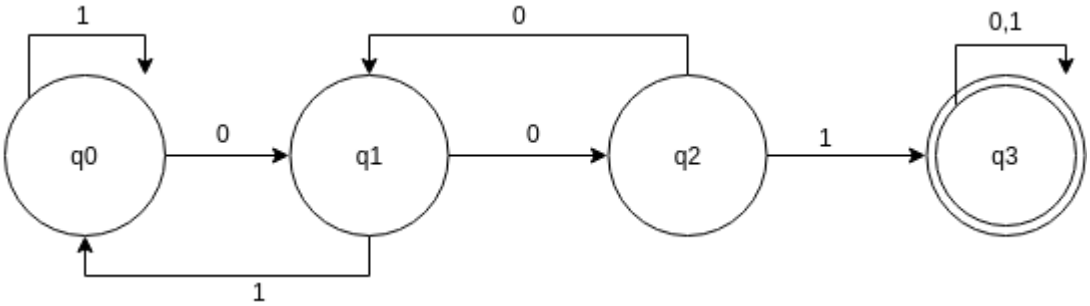
12. Dot operator in regular expression resembles which of the following?
a) Expressions are juxtaposed
b) Expressions are multiplied
c) Cross operation
d) None of the mentioned
View Answer
Answer: a
Explanation: Dot operation or concatenation operation means that the two expressions are juxtaposed i.e. there are no intervening operators in

between. In fact, UNIX regular expressions use the dot for an entirely different purpose: representing any ASCII character.

13. Which among the following is not an associative operation?
a) Union
b) Concatenation
c) Dot
d) None of the mentioned
View Answer
Answer: d
Explanation: It does not matter in which order we group the expression with the operators as they are associative. If one gets a chance to group the expression, one should group them from left for convenience. For instance, 012 is grouped as (01)2.

14.Which among the following is equivalent to the given regular expression?
01*+1
a) (01)*+1
b) 0((1)*+1)
c) (0(1)*)+1
d) ((0*1)1*)*
View Answer
Answer: c
Explanation: Using the rules of precedence on the give expression, c is the appropriate choice with the order of: Bracket>Kleene>Dot>Union

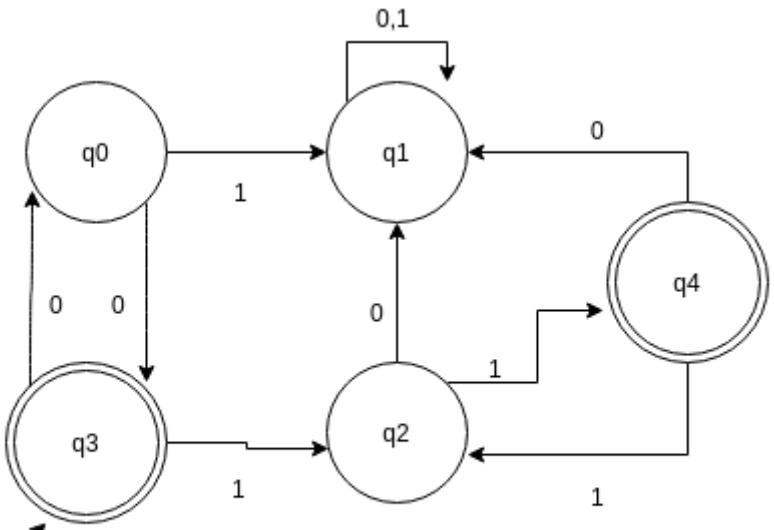
1. Which of the following is same as the given DFA?



a) (0+1)*001(0+1)*
b) 1*001(0+1)*
c) (01)*(0+0+1)(01)*
d) None of the mentioned
View Answer
Answer: a
Explanation: There needs to be 001 together in the string as an essential substring. Thus, the other components can be anything, 0 or 1 or e.

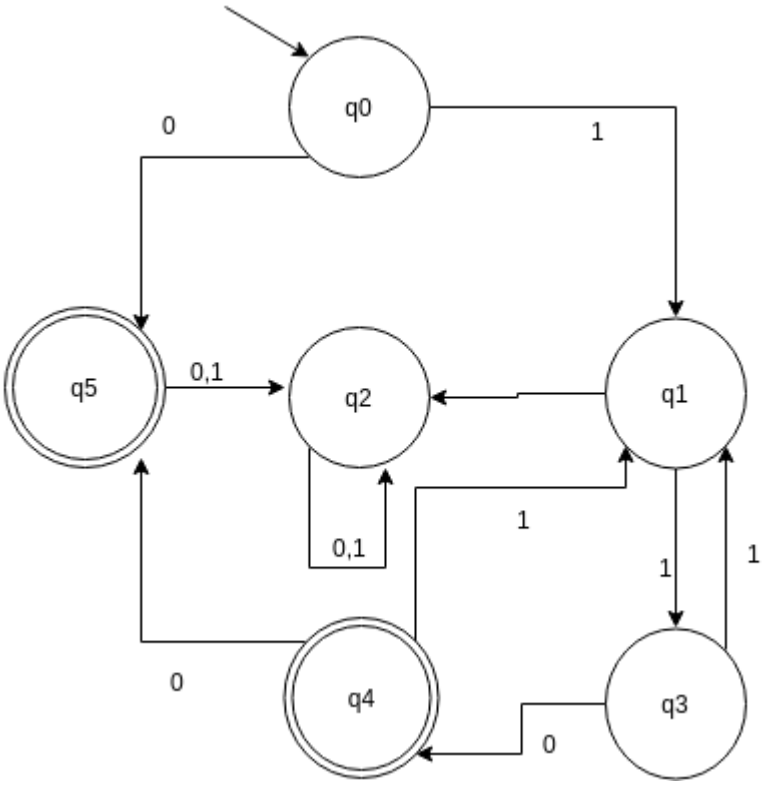
2. Which of the following statements is not true?
a) Every language defined by any of the automata is also defined by a regular expression
b) Every language defined by a regular expression can be represented using a DFA
c) Every language defined by a regular expression can be represented using NFA with e moves
d) Regular expression is just another representation for any automata definition
View Answer
Answer: b
Explanation: Using NFA with e moves, we can represent all the regular expressions as an automata. As regular expressions include e, we need to use e moves.

3. The total number of states required to automate the given regular expression
(00)*(11)*
a) 3
b) 4
c) 5
d) 6
View Answer
Answer: c



Explanation:

4. Which of the given regular expressions correspond to the automata shown?



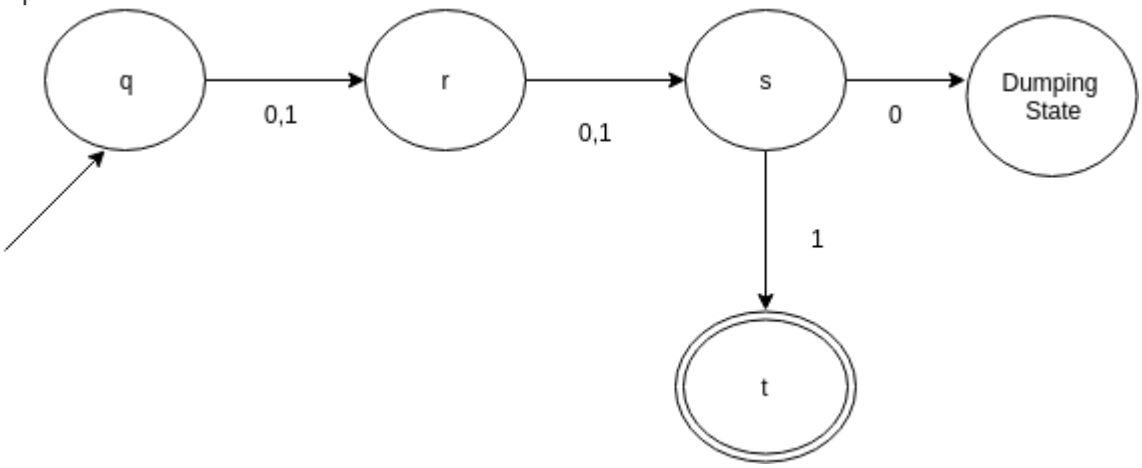
a) (110+1)*0
b) (11+110)*1
c) (110+11)*0
d) (1+110)*1
View Answer
Answer: c
Explanation: There is no state change for union operation, but has two different paths while for concatenation or dot operation, we have a state change for every element of the string.

5. Generate a regular expression for the following problem statement:
Password Validation: String should be 8-15 characters long. String must contain a number, an Uppercase letter and a Lower case letter.
a) ^(?=.*[a-z])(?=.*[A-Z])(?=.*\d).{8,15}$
b) ^(?=.*[a-z])(?=.*[A-Z])(?=.*\d).{9,16}$
c) ^(?=.[a-z])(?=.[A-Z])(?=.\d).{8,15}$
d) None of the mentioned
View Answer
Answer: a
Explanation: Passwords like abc123, 123XYZ, should not be accepted . If one also wants to include special characters as one of the constraint, one can use the following regular expression:
^(?=.*[a-z])(?=.*[A-Z])(?=.*\d)(?=.*[^\da-za-Z]).{8,15}$

Check this: Computer Science MCQs | Computer Science Books

6. Generate a regular expression for the following problem statement:
P(x): String of length 6 or less for å={0,1}*
a) (1+0+e)6
b) (10)6
c) (1+0)(1+0)(1+0)(1+0)(1+0)(1+0)
d) More than one of the mentioned is correct
View Answer
Answer: a
Explanation: As the input variables are under Kleene Operation, we need to include e,thus option c is not correct,thereby option (a) is the right answer.

7. The minimum number of states required in a DFA (along with a dumping state) to check whether the 3rd bit is 1 or not for |n|>=3
a) 3
b) 4
c) 5
d) 1
View Answer
Answer: c
Explanation:



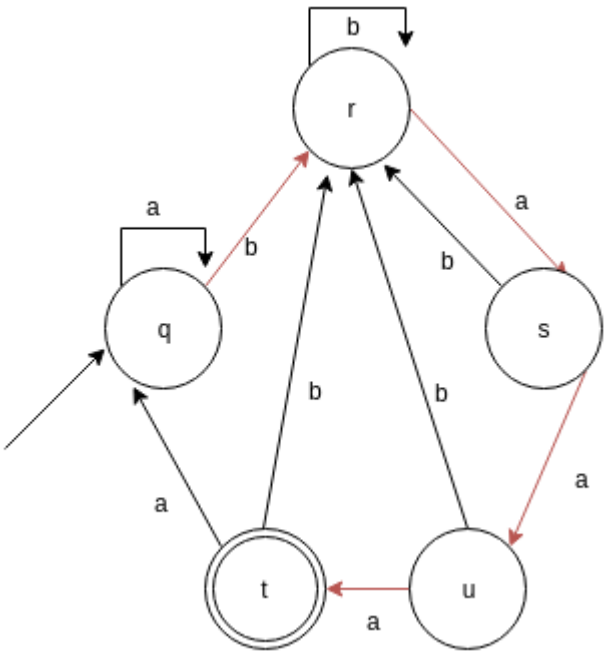
8. Which of the regular expressions corresponds to the given problem statement:
P(x): Express the identifiers in C Programming language
l=letters
d=digits
a) (l+_)(d+_)*
b) (l+d+_)*
c) (l+_)(l+d+_)*
d) (_+d)(l+d+_)*
View Answer

Answer: c
Explanation: Identifiers in C Programming Language follows the following identifiers rule:
a) The name of the identifier should not begin with a digit.
b) It can only begin with a letter or a underscore.
c) It can be of length 1 or more.

9. Generate a regular expression for the given language:l
L(x): {xÎ{0,1}*| x ends with 1 nd does not contain a substring 01}
a) (0+01)*
b) (0+01)*1
c) (0+01)*(1+01)
d) All of the mentioned
View Answer
Answer: c
Explanation: (a) and (b) are the general cases where we restrict the acceptance of a string witrh substring 00 but we ignore the case where the string needs to end with 1 which therby, does not allows the acceptance of e.

10. The minimum number of transitions to pass to reach the final state as per the following regular expression is:
{a,b}*{baaa}
a) 4
b) 5
c) 6
d) 3
View Answer
Answer: a

Explanation:

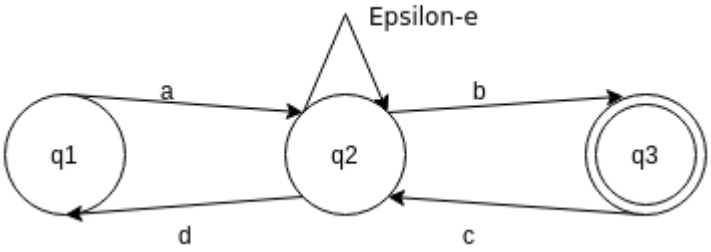


1. Which of the following is an utility of state elimination phenomenon?
a) DFA to NFA
b) NFA to DFA
c) DFA to Regular Expression
d) All of the mentioned
View Answer
Answer: c
Explanation: We use this algorithm to simplify a finite automaton to regular expression or vice versa. We eliminate states while converting given finite automata to its corresponding regular expression.

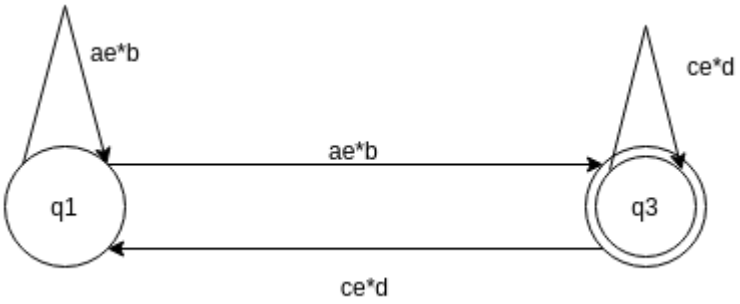
2. If we have more than one accepting states or an accepting state with an outdegree, which of the following actions will be taken?
a) addition of new state
b) removal of a state
c) make the newly added state as final
d) more than one option is correct
View Answer
Answer: d
Explanation: If there is more than one accepting state or if the single accepting state as an out degree, add a new accepting state, make all other states non accepting, and hold an e-transitions from each former accepting state to the new accepting state.

3. Which of the following is not a step in elimination of states procedure?
a) Unifying all the final states into one using e-transitions
b) Unify single transitions to multi transitions that contains union of input
c) Remove states until there is only starting and accepting states
d) Get the resulting regular expression by direct calculation
View Answer
Answer: b
Explanation: While eliminating the states, we unify multiple transitions to one transition that contains union of input and not the vice versa.

4. Can the given state diagram be reduced?



a) Yes
b) No
View Answer
Answer: a
Explanation: The state q2 can be eliminated with ease and the reduced state diagram can be represented as:



5. Which of the following methods is suitable for conversion of DFA to RE?
a) Brzozowski method
b) Arden's method
c) Walter's method
d) All of the mentioned
View Answer
Answer: a
Explanation: Brzozowski method takes a unique approach to generating regular expressions. We create a system of regular expressions with one regular expression unknown for each state in M, and then we solve the system for Rλ where Rλ is the regular expression associated with starting state qλ.

Check this: Computer Science MCQs | Computer Science Books

6. State true or false:
Statement: The state removal approach identifies patterns within the graph and removes state, building up regular expressions along each transition.
a) true
b) false
View Answer

Answer: a
Explanation: This method has the advantage over the transitive closure technique as it can easily be visualized.

7. The behaviour of NFA can be simulated using DFA.
a) always
b) never
c) sometimes
d) none of the mentioned
View Answer
Answer: a
Explanation: For every NFA, there exists an equivalent DFA and vice versa.

8. It is suitable to use _____ method/methods to convert a DFA to regular expression.
a) Transitive Closure properties
b) Brzozowski method
c) State elimination method
d) All of the mentioned
View Answer
Answer: d
Explanation: For converting RE to DFA , first we convert RE to NFA (Thompson Construction), and then NFA is converted into DFA(Subset Construction).

9. State true or false:
Statement: For every removed state, there is a regular expression produced.
a) true
b) false
View Answer
Answer: a
Explanation: For every state which is eliminated, a new regular expression is produced. The newly generated regular expression act as an input for a state which is next to removed state.

10. Is it possible to obtain more than one regular expression from a given DFA using the state elimination method?
a) Yes
b) No
View Answer
Answer: a
Explanation: Using different sequence of removal of state, we can have different possible solution of regular expressions. For n-state deterministic finite automata excluding starting and final states, n! Removal sequences are

there. It is very tough to try all the possible removal sequences for smaller expressions.

1. A regular language over an alphabet a is one that can be obtained from
a) union
b) concatenation
c) kleene
d) All of the mentioned
View Answer
Answer: d
Explanation: None.

2. Regular expression {0,1} is equivalent to
a) 0 U 1
b) 0 / 1
c) 0 + 1
d) All of the mentioned
View Answer
Answer: d
Explanation: All are equivalent to union operation.

3. Precedence of regular expression in decreasing order is
a) * , . , +
b) . , * , +
c) . , + , *
d) + , a , *
View Answer
Answer: a
Explanation: None.

4. Regular expression Φ* is equivalent to
a) ϵ
b) Φ
c) 0
d) 1
View Answer
Answer: a
Explanation: None.

5. a? is equivalent to
a) a
b) a+Φ
c) a+ϵ
d) wrong expression
View Answer
Answer: c
Explanation: Zero or one time repetition of previous character .

Check this: Computer Science MCQs | Automata Theory Books

6. ϵL is equivalent to
a) ϵ
b) Φ
c) L
d) Φϵ
View Answer
Answer: c
Explanation: None.

7. (a+b)* is equivalent to
a) b*a*
b) (a*b*)*
c) a*b*
d) none of the mentioned
View Answer
Answer: b
Explanation: None.

8. ΦL is equivalent to
a) LΦ & Φ
b) Φ & L
c) L & L
d) ϵ & L
View Answer
Answer: a
Explanation: None.

9. Which of the following pair of regular expression are not equivalent?
a) 1(01)* and (10)*1
b) x(xx)* and (xx)*x
c) (ab)* and a*b*
d) x+ and x*x+
View Answer

Answer: c
Explanation: (ab)*=(a*b*)*.

10. Consider following regular expression
i) (a/b)* ii) (a*/b*)* iii) ((ϵ/a)b*)*
Which of the following statements is correct
a) i,ii are equal and ii,iii are not
b) i,ii are equal and i,iii are not
c) ii,iii are equal and i,ii are not
d) all are equal
View Answer
Answer: d
Explanation: All are equivalent to (a+b)*.

1. How many strings of length less than 4 contains the language described by the regular expression (x+y)*y(a+ab)*?
a) 7
b) 10
c) 12
d) 11
View Answer
Answer: c
Explanation: string of length 0 = Not possible (because y is always present).
string of length 1 = 1 (y)
string of length 2 = 3 (xy,yy,ya)
string of length 3 = 8 (xxy,xyy,yxy,yyy,yaa,yab,xya,yya)

2. Which of the following is true?
a) (01)*0 = 0(10)*
b) (0+1)*0(0+1)*1(0+1) = (0+1)*01(0+1)*
c) (0+1)*01(0+1)*+1*0* = (0+1)*
d) All of the mentioned
View Answer
Answer: d
Explanation: None.

3. A language is regular if and only if
a) accepted by DFA
b) accepted by PDA

c) accepted by LBA
d) accepted by Turing machine
View Answer
Answer: a
Explanation: All of above machine can accept regular language but all string accepted by machine is regular only for DFA.

4. Regular grammar is
a) context free grammar
b) non context free grammar
c) english grammar
d) none of the mentioned
View Answer
Answer: a
Explanation: Regular grammar is subset of context free grammar.

5. Let the class of language accepted by finite state machine be L1 and the class of languages represented by regular expressions be L2 then
a) L1<L2
b) L1>=L2
c) L1 U L2 = .*
d) L1=L2
View Answer
Answer: d
Explanation: Finite state machine and regular expression have same power to express a language.

Check this: Automata Theory Books | Computer Science MCQs

6. Which of the following is not a regular expression?
a) [(a+b)*-(aa+bb)]*
b) [(0+1)-(0b+a1)*(a+b)]*
c) (01+11+10)*
d) (1+2+0)*(1+2)*
View Answer
Answer: b
Explanation: Except b all are regular expression*.

7. Regular expression are
a) Type 0 language
b) Type 1 language

c) Type 2 language
d) Type 3 language
View Answer
Answer: d
Explanation: According to Chomsky hierarchy,
Type 0 – Unrestricted Grammar.
Type 1 – Context Sensitive Grammar.
Type 2 – Context Free Grammar.
Type 3 – Regular Grammar.

8. Which of the following is true?
a) Every subset of a regular set is regular
b) Every finite subset of non-regular set is regular
c) The union of two non regular set is not regular
d) Infinite union of finite set is regular
View Answer
Answer: b
Explanation: None.

9. L and ~L are recursive enumerable then L is
a) Regular
b) Context free
c) Context sensitive
d) Recursive
View Answer
Answer: d
Explanation:If L is recursive enumerable and its complement too if and only if L is recursive.

10. Regular expressions are closed under
a) Union
b) Intersection
c) Kleen star
d) All of the mentioned
View Answer
Answer: d
Explanation: According to definition of regular expression.

1. What kind of expressions do we used for pattern matching?
a) Regular Expression
b) Rational Expression
c) Regular & Rational Expression
d) None of the mentioned
View Answer
Answer: c
Explanation: In automata theory, Regular Expression(sometimes also called the Rational Expression) is a sequence or set of characters that define a search pattern, mainly for the use in pattern matching with strings or string matching.

2. Which of the following do Regexps do not find their use in?
a) search engines
b) word processors
c) sed
d) none of the mentioned
View Answer
Answer: d
Explanation: Regexp processors are found in several search engines, seach and replace mechanisms, and text processing utilities.

3. Which of the following languages have built in regexps support?
a) Perl
b) Java
c) Python
d) C++
View Answer
Answer: a
Explanation: Many languages come with built in support of regexps like Perl, Javascript, Ruby etc. While some provide support using standard libraries like .NET, Java, Python, C++, C and POSIX.

4. The following is/are an approach to process a regexp:
a) Construction of NFA and subsequently, a DFA
b) Thompson's Contruction Algorithm
c) Thompson's Contruction Algorithm & Construction of NFA and subsequently, a DFA
d) None of the mentioned
View Answer

Answer: c
Explanation: A regexp processor translates the syntax into internal representation which can be executed and matched with a string and that internal representation can have several approaches like the ones mentioned.

5. Are the given two patterns equivalent?
(1) gray|grey
(2) gr(a|e)y
a) yes
b) no
View Answer
Answer: a
Explanation: Paranthesis can be used to define the scope and precedence of operators. Thus, both the expression represents the same pattern.

Check this: Computer Science Books | Computer Science MCQs

6. Which of the following are not quantifiers?
a) Kleene plus +
b) Kleene star *
c) Question mark ?
d) None of the mentioned
View Answer
Answer: d
Explanation: A quantifier after a token specifies how often the preceding element is allowed to occur. ?, *, +, {n}, {min, }, {min, max} are few quantifiers we use in regexps implementations.

7. Which of the following cannot be used to decide whether and how a given regexp matches a string:
a) NFA to DFA
b) Lazy DFA algorithm
c) Backtracking
d) None of the mentioned
View Answer
Answer: d
Explanation: There are at least three algorithms which decides for us, whether and how a regexp matches a string which included the transformation of Non deterministic automaton to deterministic finite automaton, The lazy DFA algorithm where one simulates the NFA directly, building each DFA on demand and then discarding it at the next step and the process of backtracking whose running time is exponential.

8. What does the following segment of code output?

```
$string1 = "Hello World\n";
if ($string1 =~ m/(H..).(l..)/) {
  print "We matched '$1' and '$2'.\n";
}
```

a) We matched ‘Hel’ and ‘ld’
b) We matched ‘Hel’ and ‘lld’
c) We matched ‘Hel’ and ‘lo ‘
d) None of the mentioned
View Answer
Answer: c
Explanation: () groups a series of pattern element to a single element.
When we use pattern in parenthesis, we can use any of ‘$1’, ‘$2’ later to refer to the previously matched pattern.

9. Given segment of code:

```
$string1 = "Hello\nWorld\n";
if ($string1 =~ m/d\n\z/) {
  print "$string1 is a string ";
  print "that ends with 'd\\n'.\n";
}
```

What does the symbol /z does?
a) changes line
b) matches the beginning of a string
c) matches the end of a string
d) none of the mentioned
View Answer
Answer: c
Explanation: It matches the end of a string and not an internal line.The given segment of code outputs:
Hello
World
is a string that ends with ‘d\n’

10. Conversion of a regular expression into its corresponding NFA :
a) Thompson’s Construction Algorithm
b) Powerset Construction
c) Kleene’s algorithm
d) None of the mentioned
View Answer
Answer: a
Explanation: Thompson construction algorithm is an algorithm in automata theory used to convert a given regular expression into NFA. Similarly, Kleene algorithm is used to convert a finite automaton to a regular expression.

1. The minimum length of a string {0,1}* not in the language corresponding to the given regular expression:
(0*+1*)(0*+1*)(0*+1*)
a) 3
b) 4
c) 5
d) 6
View Answer
Answer: b
Explanation: 0101 or 1010 the strings with minimum length on {0,1}* which does not belong to the language of the given regular expression.Other strings like 111, 000, 1101, etc are accepted by the language .

2. Which of the following regular expression is equivalent to R(1,0)?
R(1,0)={111*}*
a) (11+111)*
b) (111+1111)*
c) (111+11*)*
d) All of the mentioned
View Answer
Answer: a
Explanation: What we observe from the question is that, it includes e and 11 and any number of 1's then. Therefore, its simplifies when we write the same reg. Expression as (11+111)*.

3. The minimum number of 1's to be used in a regular expression of the given language:
R(x): The language of all strings containing exactly 2 zeroes.
a) 2
b) 3
c) 0
d) 1
View Answer
Answer: b
Explanation: It is not required to automate the question if asked theoretically.The number of zeroes fixed is 2. Therefore, we can represent the regular expression as 1*01*01*.

4. The given regular language corresponds to which of the given regular language
e+1+(1+0)*0+(0+1)*11
a) The language of all strings that end with 11 or 00
b) The language of all strings that end with 0 or 1
c) The language of all strings which does not end with 01
d) None of the mentioned
View Answer
Answer: c
Explanation: According to the given regular expression, e is accepted by its language and it does not end with 00 or 11 or 0 or 1. Thus option a and b are eliminated. Further, the regular expression is valid for the third option.

5. Statement: If we take the union of two identical expression, we can replace them by one copy of the expression.
Which of the following is a correct option for the given statement?
a) Absorption Law
b) Idempotent Law
c) Closure Law
d) Commutative Law
View Answer
Answer: b
Explanation: Idempotent Law states that if we take the union of two like expression, we can use a copy of the expression instead i.e. L+L=L. The common arithmetic operators are not idempotent.

Check this: Automata Theory Books | Computer Science MCQs

6. Which among the following can be an annihilator for multiplication operation?
a) 0
b) 1
c) 100
d) 22/7
View Answer
Answer: a
Explanation: An annihilator for an operator is a value such that when the operator is applied to the annihilator and some other value, the result is the annihilator.

7. Statement: A digit, when used in the CFG notation, will always be used as a terminal.
State true or false?

a) True
b) False
View Answer
Answer: a
Explanation: Lowercase letters near the beginning of an alphabet, a, b and so on are terminal symbols. We shall also assume that digits and other characters such as + or parenthesis are terminals.

8. Choose the incorrect process to check whether the string belongs to the language of certain variable or not?
a) recursive inference
b) derivations
c) head to body method
d) All of the mentioned
View Answer
Answer: d
Explanation: There are two approaches to infer that certain string are in the language of a certain variable. The most conventional way is to use the rules from body to head, recursive inference. The second approach is expanding the starting variable using one of its productions whose head is tart symbol and derive a string consisting entirely of terminals(head to body or derivations).

9. Statement: Left most derivations are lengthy as compared to Right most derivations.
Choose the correct option:
a) correct statement
b) incorrect statement
c) may or may not be correct
d) depends on the language of the grammar
View Answer
Answer: c
Explanation: It completely depends on the person who develops the grammar of any language, how to make use of the tools i.e. leftmost and rightmost derivations.

10. A->aAa|bAb|a|b|e
Which among the following is the correct option for the given production?
a) Left most derivation
b) Right most derivation
c) Recursive Inference
d) None of the mentioned
View Answer

Answer: a
Explanation: The given form represents leftmost derivations in which at each step we replace the leftmost variable by one of its production bodies.

1. All the regular languages can have one or more of the following descriptions:
i) DFA ii) NFA iii) e-NFA iv) Regular Expressions
Which of the following are correct?
a) i, ii, iv
b) i, ii, iii
c) i, iv
d) i, ii, iii, iv
View Answer
Answer: d
Explanation: The class of languages known as the regular language has atleast four different descriptions: i) DFA ii) NFA iii) e-NFA iv) Regular Expressions

2. Which of the technique can be used to prove that a language is non regular?
a) Ardens theorem
b) Pumping Lemma
c) Ogden's Lemma
d) None of the mentioned
View Answer
Answer: b
Explanation: We use the powerful technique called Pumping Lemma, for showing certain languages not to be regular. We use Ardens theorem to find out a regular expression out of a finite automaton.

3. Which of the following language regular?
a) $\{a^ib^i|i>=0\}$
b) $\{a^ib^i|0<i<5\}$
c) $\{a^ib^i|i>=1\}$
d) None of the mentioned
View Answer

Answer: b
Explanation: Here, i has limits i.e. the language is finite, contains few elements and can be graphed using a deterministic finite automata. Thus, it is regular. Others can be proved non regular using Pumping lemma.

4. Which of the following are non regular?
a) The set of strings in {a,b}* with an even number of b's
b) The set of strings in {a, b, c}* where there is no c anywhere to the left of a
c) The set of strings in {0, 1}* that encode, in binary, an integer w that is a multiple of 3. Interpret the empty strings e as the number 0
d) None of the mentioned
View Answer
Answer: d
Explanation: All of the given languages are regular and finite and thus, can be represented using respective deterministic finite automata. We can also use mealy or moore machine to represent remainders for option c.

5. If L is DFA-regular, L' is
a) Non regular
b) DFA-regular
c) Non-finite
d) None of the mentioned
View Answer
Answer: b
Explanation: This is a simple example of a closure property: a property saying that the set of DFA-regular languages is closed under certain operations.

Check this: Computer Science MCQs | Computer Science Books

6. Which of the following options is incorrect?
a) A language L is regular if and only if ~L has finite number of equivalent classes
b) Let L be a regular language. If ~L has k equivalent classes, then any DFA that recognizes L must have atmost k states
c) A language L is NFA-regular if and only if it is DFA-regular
d) None of the mentioned
View Answer
Answer: b
Explanation: Let L be a regular language. If ~L has k equivalent classes, then any DFA that recognizes L must have atleast k states.

7. Myphill Nerode does the following:
a) Minimization of DFA
b) Tells us exactly when a language is regular
c) Minimization of DFA and tells us exactly when a language is regular
d) None of the mentioned
View Answer
Answer: c
Explanation: In automata theory, the Myphill Nerode theorem provides a necessary and sufficient condition for a language to be regular. The Myphill Nerode theorem can be used to show a language L is regular by proving that the number of equivalence classes of R_L(relation) is finite.

8. Which of the following are related to tree automaton?
a) Myphill Nerode Theorem
b) State machine
c) Courcelle's Theorem
d) All of the mentioned
View Answer
Answer: d
Explanation: The myphill nerode theorem can be generalized to trees and an application of tree automata prove an algorithmic meta theorem about graphs.

9. Given languages:
i) $\{a^n b^n | n>=0\}$
ii) ^{n} ^{n}
iii) $\{w \in \{a,b\}* | \ \#a(w)=\#b(w)\}$, # represents occurrences
Which of the following is/are non regular?
a) i, iii
b) i
c) iii
d) i, ii, iii
View Answer
Answer: d
Explanation: There is no regular expression that can parse HTML documents. Other options are also non-regular as they cannot be drawn into finite automaton.

10. Finite state machine are not able to recognize Palindromes because:
a) Finite automata cannot deterministically find the midpoint
b) Finite automata cannot remember arbitarily large amount of data
c) Even if the mid point is known, it cannot find whether the second half matches the first

d) All of the mentioned

View Answer

Answer: d

Explanation: It is the disadvantage or lack of property of a DFA that it cannot remember an arbitrarily such large amount of data which makes it incapable of accepting such languages like palindrome, reversal, etc.