Assessment On

Course Title: Theory Of Computing

Course Cord: CSI-317

Department of computer Science & Engineering

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Ans to the Q. No - 3(b)

Difference between regular language and context-free-language.

RLs	CFLs
* Regular expns.	* Context free grammars
* Or	* = NDPDAs
* = DFSMs	* Parse
* Recognize	* Find unambiguous grammars
* minimize FSMs	* Reduce nond eterminism in PDAs
	* Find efficient parsers
* close under:	* closed under:
* concatenation	* concatenation
* union	* union
* kleene star	* kleene star
* complement	* Intersection w/reg lang
* intersection	
* Pumping theorem	* pumping theorem
* D = ND	* D ≠ ND

Ans to the Q. No - 5 (a)

Definition of turing maching : A Turing Machine consists of the following —

① An Alphabet Σ of input letters.

② An Input tape partitioned into cells, having infinite many locations in one direction. The input string is placed on the tape starting its first letters on the cell. i, the rest of the tape is initially filled with blanks (Δ's).

Ans to the Q. No-3 (a)

The chomsky hierarchy, as originally defined by Noam chomsky, comprises four types of languages and their associated grammars and machine.

languages	Grammar	Machine	example
Regular language	Regular grammar * Right liner grammar * left-liner grammar	Deterministic or nond deterministic finit-state acceptor	a^*
context-free language	context free grammar	Nondeterministic pushdown automaton	$a^n b^n$
context-sensitive language	context-sensitive grammar	Liner-bounded automation	$a^n b^n c^n$
Recursively	enumerable language	Turing machine	Any computable function

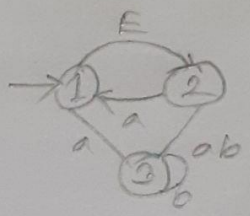
This language from a strict hierarchy; that is Regular language ⊂ context free language ⊂ context sensitive language ⊂ recursively enumerable language.

Ans to the Q. No-1(b)

Given,

~~NFA -~~

NFA - M_1



$M_1 = (Q_1, \Sigma_1, q_1, F_1, S_1)$

$Q_1 = \{1, 2, 3\}$

$\Sigma_1 = \{a, b\}$

$q_1 = 1$

$F = \{2\}$

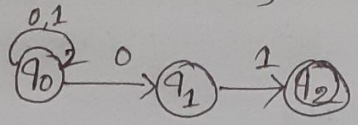
Ans to the Q. No-1(c)

Non-Terminals are syntactic variables that denote sets of strings. The Non-terminals define sets of strings that help define the language generated by the grammar. a set of token, known as terminal symbols (Σ). Terminals are the basic symbols from which strings are formed.

Ans to the Q.no-1(a)

$L = \{w/w \text{ in } 01\}$

NFA:



O_N	0	1
→ q_0	$\{q_0 q_1\}$	$\{q_0\}$
q_1	$\emptyset$	$\{q_2\}$
*q_2	$\emptyset$	$\emptyset$

Ans to the Q. No-4(b)

Build a DFA for the following language:

$L = \{w/w$ is a bit string which contains the substring $11\}$

* Start Design:

* q_0 : start state (initially at), also means the most recent input was not a_1.

* q_1 : has never seen 11 but the most recent input was a_1.

* q_2 : has seen at least once.