
# Independent University, Bangladesh

School of Engineering, Technology and Sciences
Department of Computer Science & Engineering
Summer, 2020-21, CSC-301-1
**CSC501, CSC301, CSE437, CEN437: Finite Automata and Computability**

## Assignment – 04

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Answer to the question no - 1

Prob def : The FSP reads the inputs symbol Left to right. It starts initially at state $q_0$ and read symbol $Q_0$.

FSA computes value $q_1 = F(q_0, Q_0)$

Regular Grammars contain only those language that are accepted by FSA. It represent by its transition diagram.

(a) A FSA that accepts the set of all natural number that divisible by 4

Here FSA consist of 5 tuples $\{I, Q, q_0, A, F\}$

where,

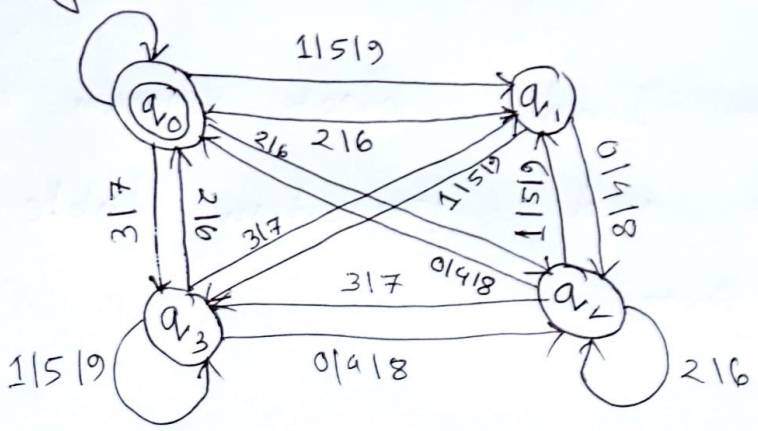
$I = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$Q = \{q_0, q_1, q_2, q_3, q_4\}$, $q_0$ is the initial state $q_0 \in Q$

$A = \{q_0\}$

F is the set of rules.

(b) The diagram




(c) Input and Transition in Tabular format

| Input | | | | | | Transition |
|---|---|---|---|---|---|---|
| 4 | 8 | 3 | 2 | 1 | 4 | $q_0 \to q_0$, $q_0 \to q_0$, $q_0 \to q_3$, $q_3 \to q_0$, $q_0 - q_1$, $q_1 - q_2$ |
| 5 | 0 | 0 | 4 | 0 | 6 | $q_0 \to q_1$, $q_1 \to q_2$, $q_2 \to q_0$, $q_0 \to q_0$, $q_0 \to q_0$, $q_0 \to q_0$, $q_0 \to q_0$ |
| 3 | 9 | 1 | 0 | 0 | 4 | $q_0 \to q_3$, $q_3 \to q_3$, $q_3 \to q_3$, $q_3 \to q_3$, $q_3 \to q_2$, $q_2 - q_0$, $q_0 \to q_0$ |
| 3 | 2 | 4 | 2 | 1 | 1 | $q_0 \to q_3$, $q_3 \to q_0$, $q_0 \to q_0$, $q_0 \to q_2$, $q_2 \to q_1$, $q_1 - q_3$ |

Answer to the question no- 2

Prob def – $L(B)^*$ is the set contains concatenations of all string from $L(B)$ with each other. Larger languages are defined by doing operation through smaller languages.

$L(B)^n = P(P^n - 1)(P-1)$ and $L(B)^n$ tends to $\infty$.

(a) Given,

$$L(B) = \{0, 1, a, b\}$$

We know: $L(B)^n = P(P^n - 1)/(P-1)$

$\therefore$ $n = 4$; $L(B) = \{0, 1, 7, 6\}$

$P = 4$,

$\therefore$ Possible number of string $= \frac{4(4^4 - 1)}{4}$

$= 340$ string

(b) given,

$$L(B) = \{0, 1, a, b\}$$

we know $L(B)^n = P(P^n - 1)/(P-1)$

$\therefore n = 4; \quad P = 4$

Possible number of string $= \frac{4(4^{12}-1)}{4-1}$

$= 22369620$ string

(c) given,

$$L(B) = \{0, 1, a, b\}$$

we know, $L(B)^n = P(P^n - 1)/(P-1)$

$\therefore n = 26, \quad P = 4$

Possible number of string $= \frac{4(4^{26}-1)}{4-1}$

$= 600479950316$
$0660$
string.

Conclusion –

1. we find block diagram with edge and symbols, and transition table by using the theory.

2. Using kleen's closume theory, we find the possible number of string. with followin concatenations.