

Homework 1 - Thomas DeMasse

- 1.) The formal description of the set is $\{aba\}$.
- 2.) The Power set of B is:
 $P(B) = \{\emptyset, \{x\}, \{y\}, \{x, y\}\}$.
- 3.) This statement is False because the sum of indegrees and outdegrees in any directed graph must be equal. The total # of edges going into a vertex must be equal to the total # of edges going out of the vertex. If the sums have to be equal for each indegree and outdegree respectively then the sums must be equal which isn't always true.
- 4.) The condition can be satisfied with a substring 5 characters long so long as they are in the alphabet $\{a, b, c\}$. So $\{a, a, a, a, a\}$ or $\{b, b, b, b, b\}$ or $\{c, c, c, c, c\}$, etc. satisfy the conditions.

5.) (a) L_0 accepts a "0" or any number of "0s" followed by a single "1"

(b)

String	$\in L_0$	$\notin L_0$
ϵ		✓
1	✓	
0		✓
00		✓
10		✓
11		✓
100		✓
001	✓	
1011		✓
10001		✓
00001	✓	
00100		✓

(c) $Q = \{Q_1, Q_2, Q_3\}$: Set of all states.

$\Sigma = \{0, 1\}$

Transition Function: State Q takes input from Σ and proceeds to a state in Q .

Starting State: Q_1

Final state: Q_2

6.)

