

1.

$G = (\{S, A, B, C\}, \{a, b\}, S, P)$

LHS		RHS
S	→	aAB
A	→	aCB
C	→	aCB
C	→	b
B	→	b

2.

$G = (\{\langle S \rangle, \langle A \rangle\}, \{a, b\}, S, P)$

$\langle S \rangle ::= a\langle S \rangle a$

$\langle S \rangle ::= b\langle S \rangle b$

$\langle S \rangle ::= a\langle A \rangle b$

$\langle A \rangle ::= a\langle A \rangle b$

$\langle A \rangle ::= ab$

3.

$G = (\{S, A, B, C, D, E, F\}, \{a, b\}, S, P)$

LHS	RHS
S	→ CA
C	→ AS
A	→ a
B	→ b
S	→ DB
D	→ BS
S	→ EB
E	→ AF
F	→ EB
F	→ AB

4. $M = (\{q_0, q_1, q_2, q_3, q_4, q_5, q_6\}, \{a, b\}, \{1, Z\}, \delta, q_0, z, \{q\})$

$$\delta(q_0, a, Z) \rightarrow \{(q_2, Z)\}$$

$$\delta(q_3, b, 1) \rightarrow \{(q_4, 1)\}$$

$$\delta(q_2, b, Z) \rightarrow \{(q_3, Z)\}$$

$$\delta(q_4, b, 1) \rightarrow \{(q_6, 1)\}$$

$$\delta(q_3, a, Z) \rightarrow \{(q_5, 1Z)\}$$

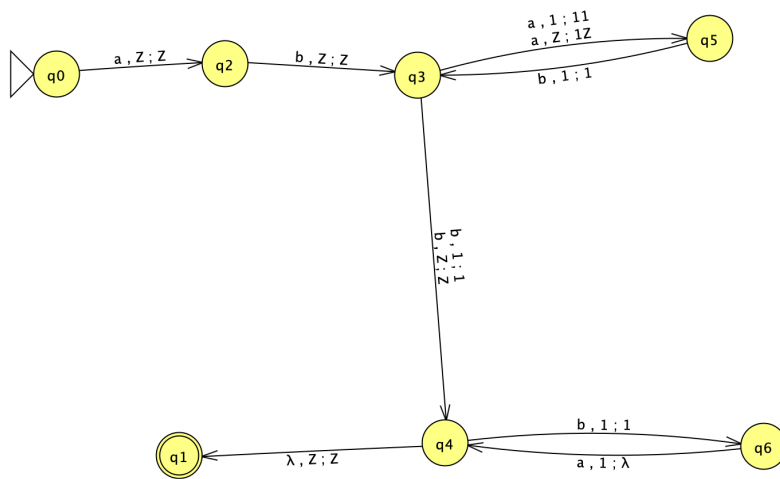
$$\delta(q_6, a, 1) \rightarrow \{(q_4, \lambda)\}$$

$$\delta(q_3, a, 1) \rightarrow \{(q_5, 11)\}$$

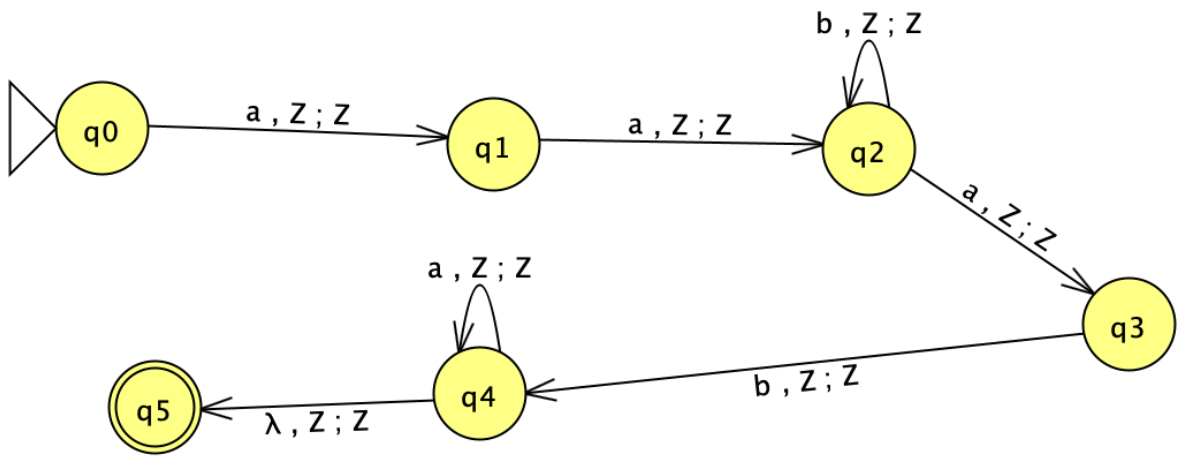
$$\delta(q_5, b, 1) \rightarrow \{(q_3, 1)\}$$

$$\delta(q_3, b, Z) \rightarrow \{(q_4, Z)\}$$

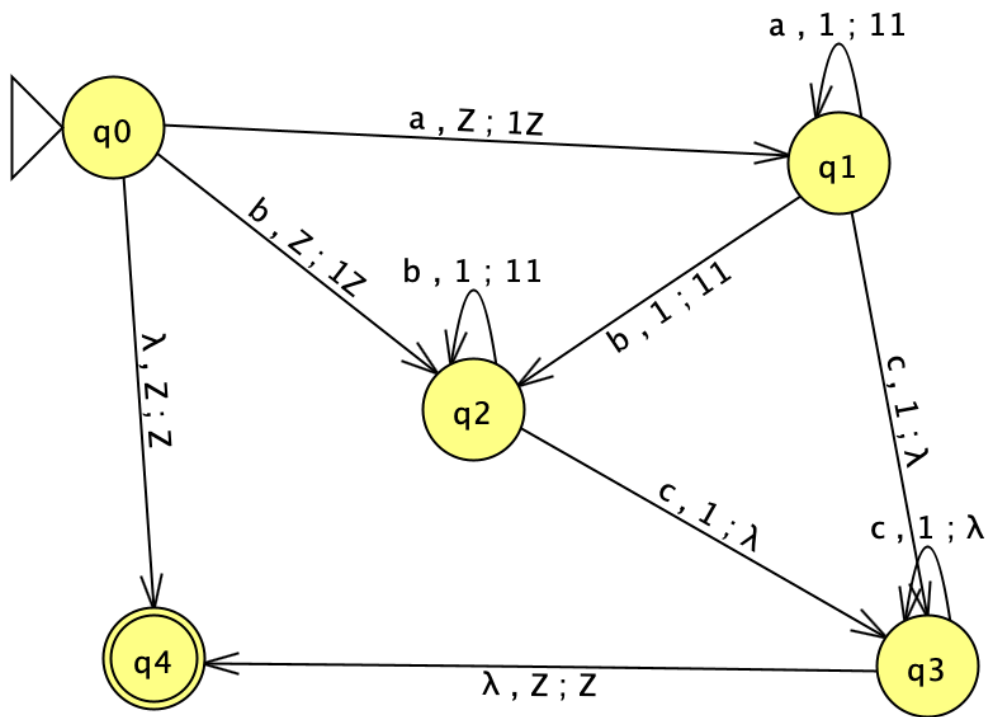
$$\delta(q_4, \lambda, Z) \rightarrow \{(q_1, Z)\}$$



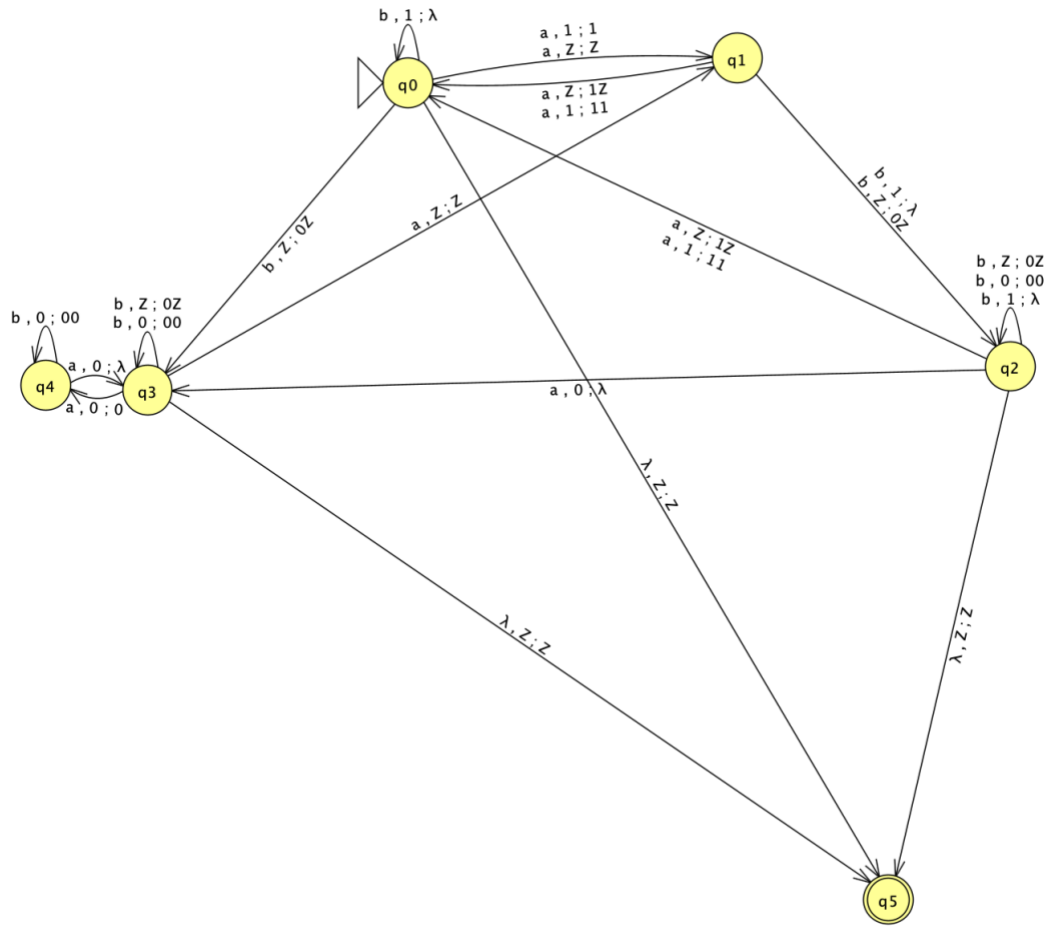
5.



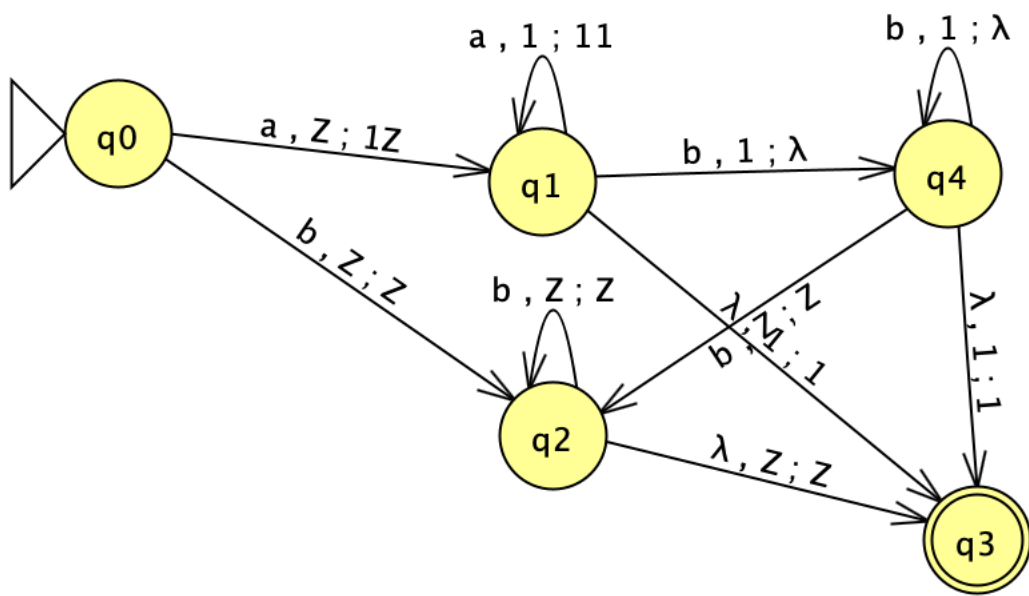
6.



7.



8.



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