

- 1
  - a. accepts
  - b. describes
  - c. generates

2 a.  $(\{\epsilon, \lambda\} \cup \Sigma \cup \Sigma^*)$

~~b~~

c.  $\{\epsilon, \lambda\}$

d.  $Q \times \Sigma^*$

e.  $\{\epsilon, q_0\} \times \Sigma^*$

f.  $F \times \{\epsilon, \lambda\}$

g.  $(Q - F) \times \{\epsilon, \lambda\}$

~~h~~  $\checkmark$

3 a. False

b. False

c. True

d. False

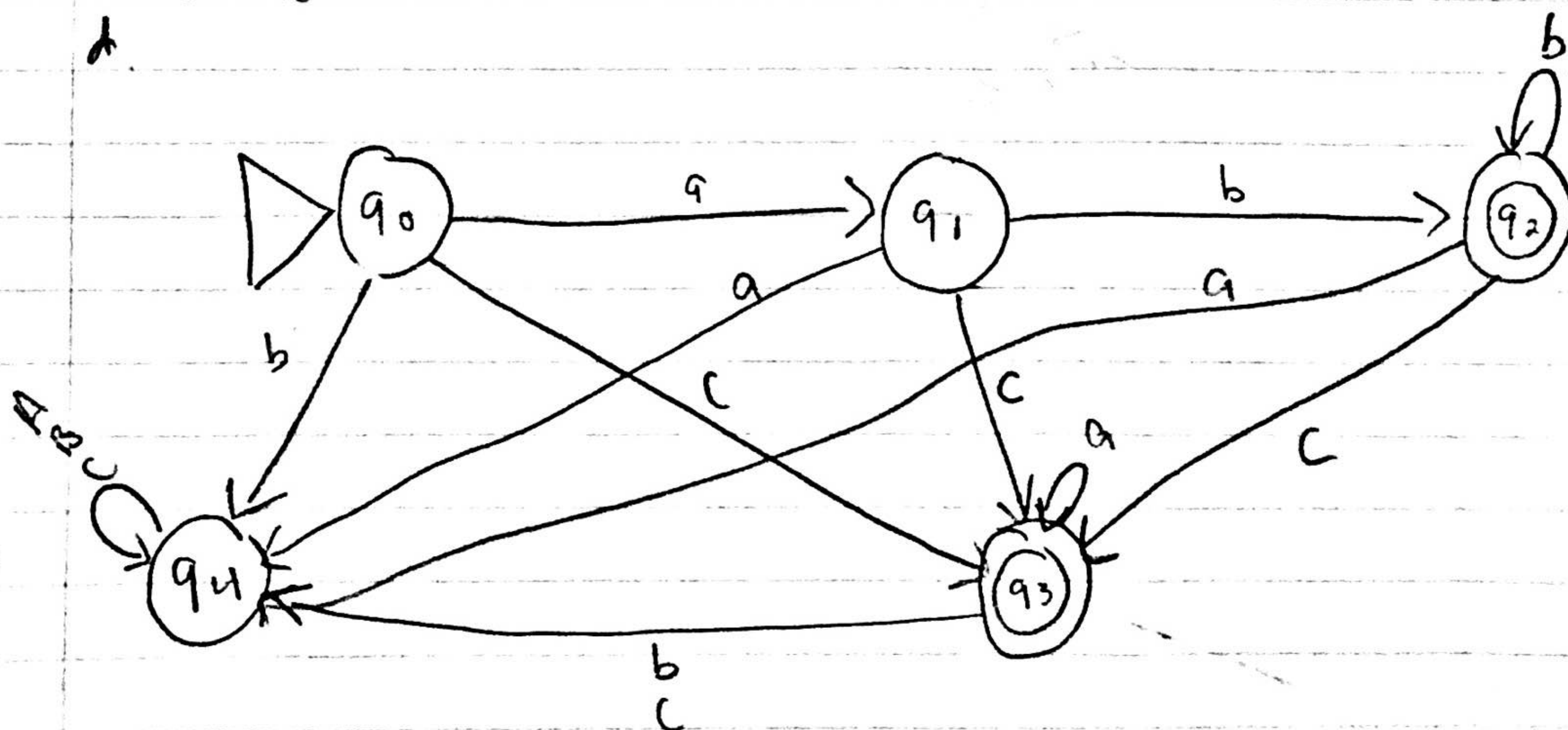
email: Kosa

4 a.  $\Sigma = \{a, b, c\}$

b. 1. c 2. ab 3. ac

c.  $e = (ca^* \cup aca^* \cup abba^* \cup abca^*)$

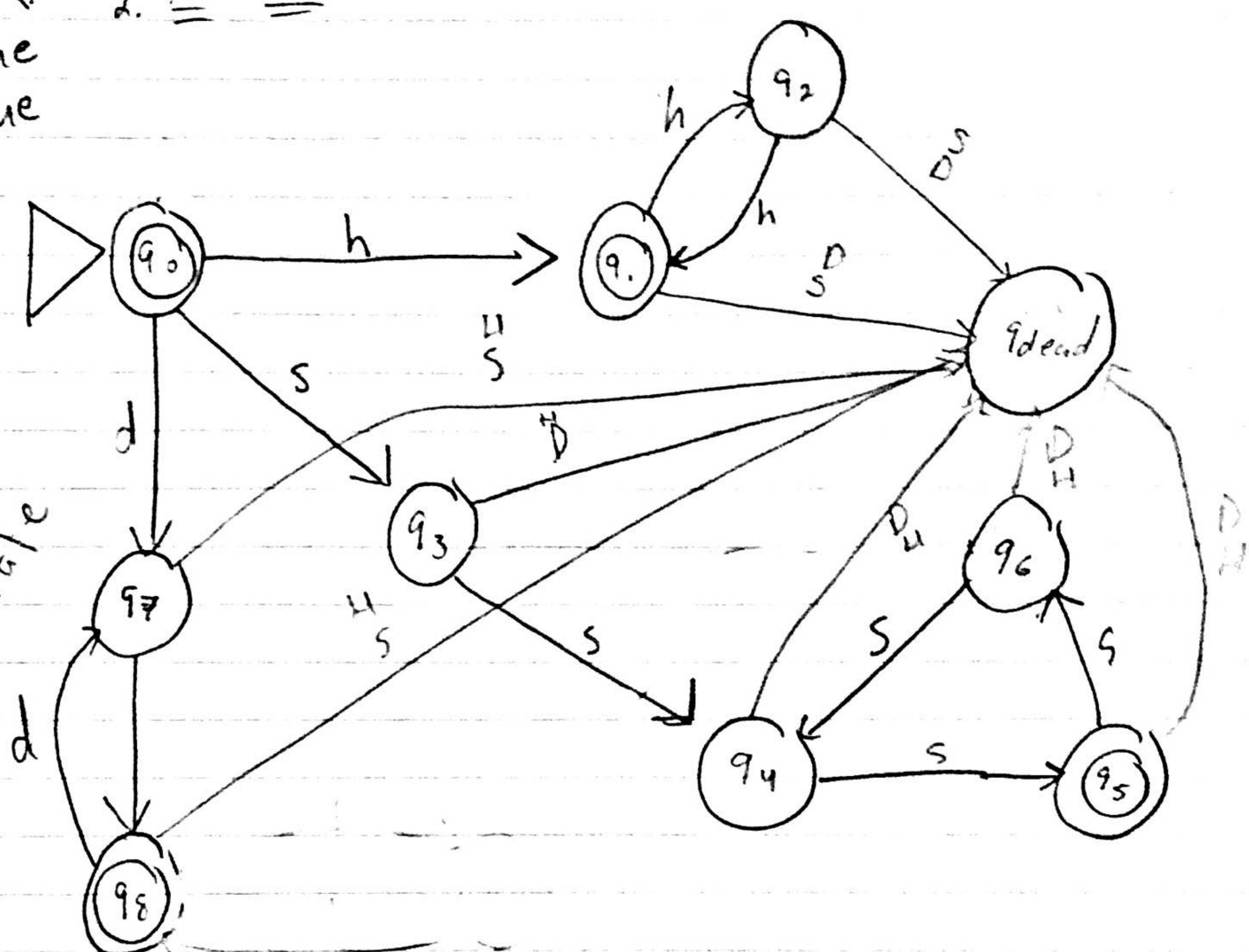
~~d~~



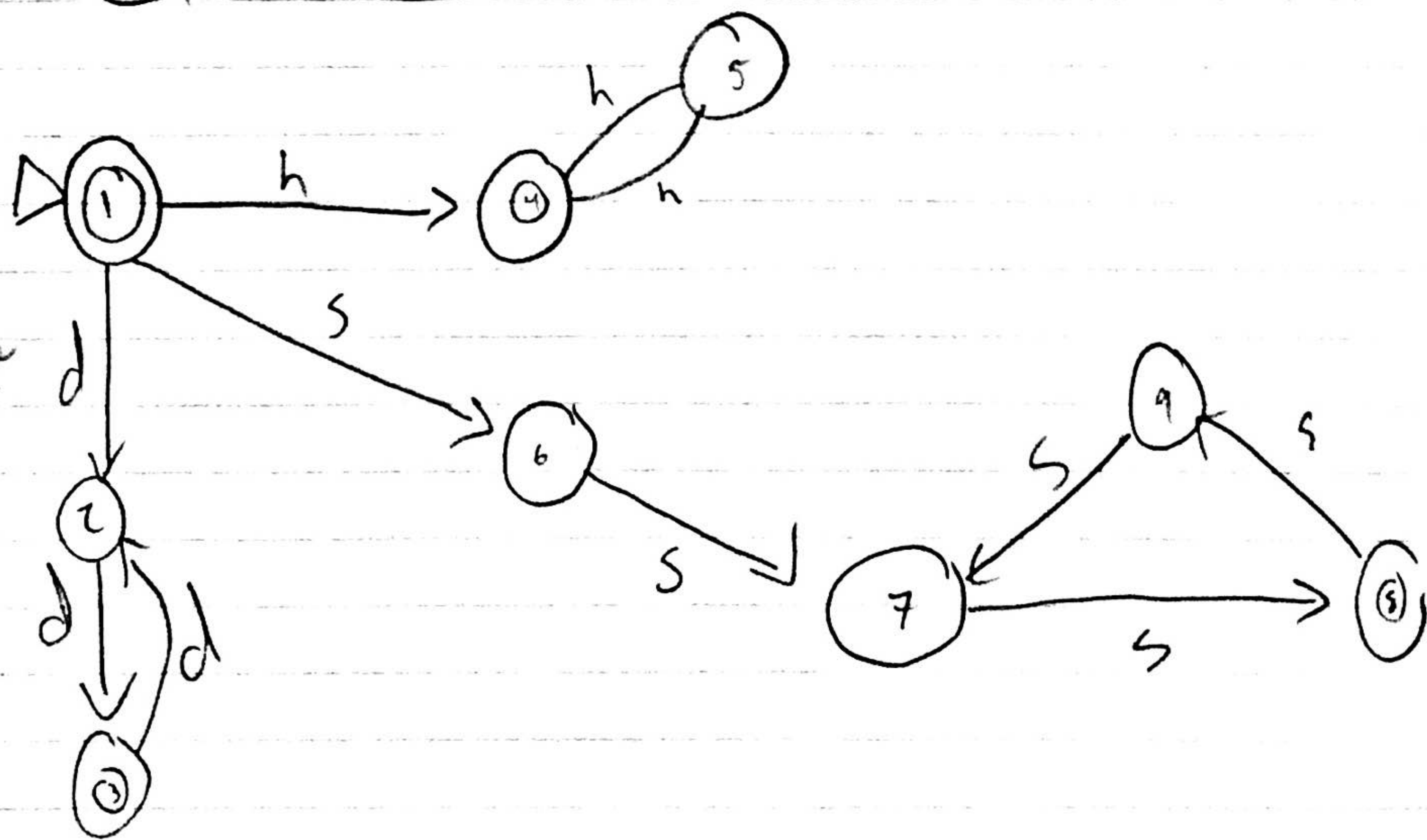


- 5 a. True  
 b. 1. 2. 100 100  
 c. True  
 d. True  
 e.

With  
dead  
state



Without  
dead  
state



$$\begin{aligned}
 S &\rightarrow S \\
 D &\rightarrow \lambda \\
 A &\rightarrow sI \\
 C &\rightarrow sD \\
 D &\rightarrow hI \\
 F &\rightarrow sI \\
 S &\rightarrow sB \\
 D &\rightarrow sH \\
 D &\rightarrow dI \\
 S &\rightarrow dE \\
 A &\rightarrow \lambda \\
 E &\rightarrow dF \\
 F &\rightarrow dE \\
 A &\rightarrow \lambda \\
 S &\rightarrow \lambda \\
 F &\rightarrow \lambda \\
 A &\rightarrow hG \\
 G &\rightarrow hA \\
 F &\rightarrow hI \\
 B &\rightarrow dI \\
 G &\rightarrow dI \\
 S &\rightarrow hA \\
 B &\rightarrow sC \\
 B &\rightarrow hI \\
 E &\rightarrow hI \\
 H &\rightarrow dI \\
 C &\rightarrow hI \\
 G &\rightarrow sI \\
 E &\rightarrow sI \\
 H &\rightarrow sC \\
 H &\rightarrow hI \\
 C &\rightarrow dI
 \end{aligned}$$



f  $S \rightarrow S$

$D \rightarrow \lambda$

$A \rightarrow sI$

$C \rightarrow sD$

$D \rightarrow hI$

$F \rightarrow sI$

$S \rightarrow sB$

$D \rightarrow sH$

$D \rightarrow dI$

$S \rightarrow dE$

$A \rightarrow dI$

$E \rightarrow dF$

$F \rightarrow dE$

$A \rightarrow \lambda$

$S \rightarrow \lambda$

$F \rightarrow \lambda$

$A \rightarrow hG$

$G \rightarrow hA$

$F \rightarrow hI$

$B \rightarrow dI$

$G \rightarrow dI$

$S \rightarrow hA$

$B \rightarrow sC$

$B \rightarrow hI$

$E \rightarrow hI$

$H \rightarrow dI$

$C \rightarrow hI$

$G \rightarrow sI$

$E \rightarrow sI$

$H \rightarrow sC$

$H \rightarrow hI$

$C \rightarrow dI$