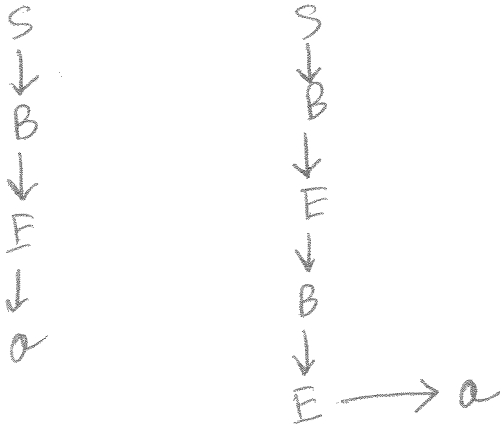


**2. Grammars, Ambiguity, Precedence (60 points)**

Below is a grammar with two operators:

 $S ::= B$  $B ::= B \# E \mid B \odot E \mid E$  $E ::= B \mid a \mid b$ 

a) (10 points) This grammar is ambiguous. Using the shortest sequence of terminals possible, prove that the grammar is ambiguous.

b) (5 points) What is precedence of # wrt  $\odot$ ? (choose one)# higher precedence than  $\odot$  \_\_\_\_\_# equal precedence to  $\odot$   \_\_\_\_\_# lower precedence than  $\odot$  \_\_\_\_\_

c) (10 points) Give evidence to support your answer to part b.

$$\begin{aligned}
 B &\rightarrow B \# E \mid B \odot E \mid E \\
 \Rightarrow B &\rightarrow B K E \mid E \\
 K &\rightarrow \# \mid \odot
 \end{aligned}$$

K shows no precedence.