Sean Carter
10/2/16

FoCS

2. a)
$$S_0 \to S$$
$$S \to 0S0$$
$$S \to 1S1$$
$$S \to \epsilon$$

b)
$$S \to AB$$
$$A \to aAb \mid \epsilon$$
$$B \to cB \mid \epsilon$$

c)
$$S \to AB$$
$$A \to aA \mid \epsilon$$
$$B \to bBc \mid \epsilon$$

d) i.
$$S \to abS \mid \epsilon$$

ii.
$$S \to A$$
$$A \to aBb \mid \epsilon$$
$$B \to bAa \mid \epsilon$$

---

4. a) i.

S
|
aS
|
aSbS
| |
ε   ε

ii.

S
|
aSbS
| |
aS ε
|
ε
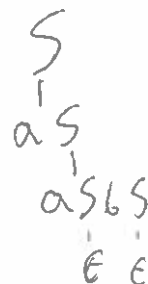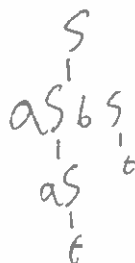
b) i. $S \Rightarrow aS \rightarrow aaSbS \rightarrow aabS \rightarrow$ "aab"
   ii. $S \rightarrow aSbS \rightarrow aaSbS \rightarrow aabS \rightarrow$ "aab"

c) i. $S \rightarrow aS \rightarrow aaSbS \rightarrow aaSb \rightarrow$ "aab"
   ii. $S \rightarrow aSbS \rightarrow aSb \rightarrow aaSb \rightarrow$ "aab"