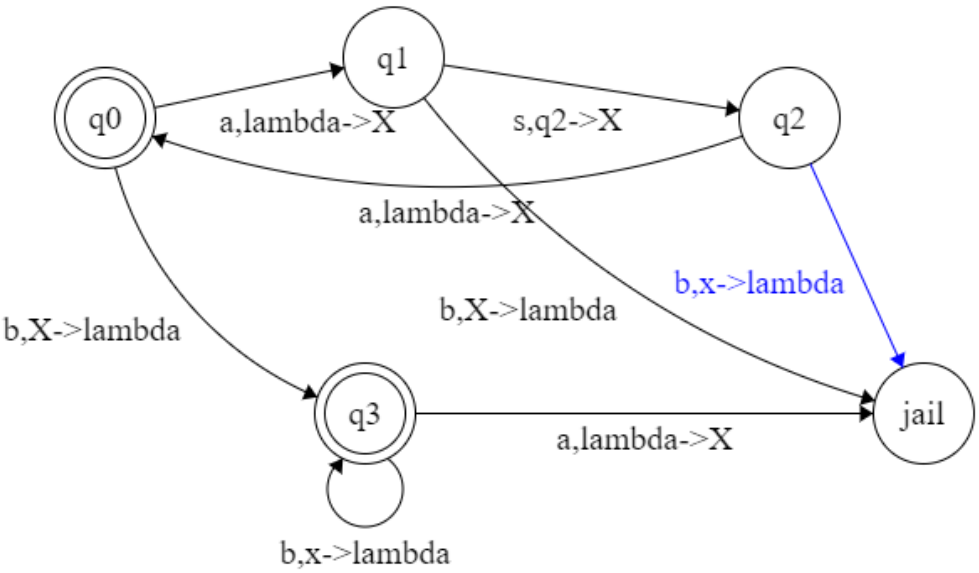
1.

a. $S \rightarrow S_1 | S_2$
   $S_1 \rightarrow aSa \mid bSb \mid X$
   $X_1 \rightarrow aY\ b \mid bY\ a$
   $Y_1 \rightarrow aY \mid bY \mid \lambda$
   $S_2 \rightarrow XY$
   $X_2 \rightarrow aXb \mid \lambda$
   $Y_2 \rightarrow aY \mid \lambda$

b. $S \rightarrow S_1 S_2$
   S1 → aSa | bSb | X
   X1 → aY b | bY a
   Y1 → aY | bY | λ
   S2 → XY
   X2 → aXb | λ
   Y2 → aY | λ

c. $S \rightarrow S_1 S | Lambda$
   S1 → aSa | bSb | X
   X1 → aY b | bY a
   Y1 → aY | bY | λ
   S2 → XY
   X2 → aXb | λ
   Y2 → aY | λ



2.

3. No, the result must be a deterministic CFL not just a CFL