CSCI 340 — Homework 3
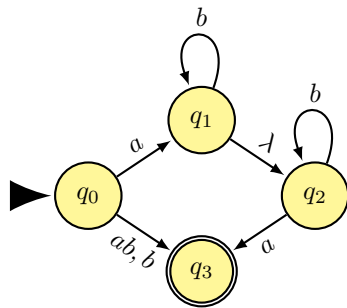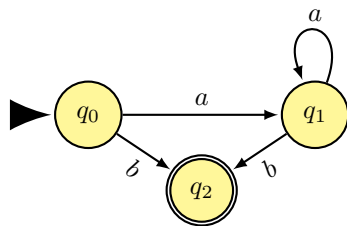
1. For each of the ten following words, decide which of the 6 machines below accept the given word: λ a b aa ab aba $abba$ bab $baab$ $abbb$
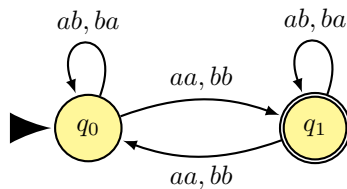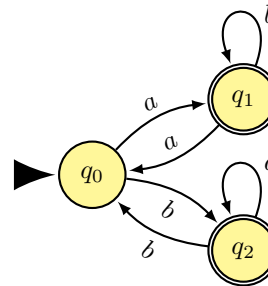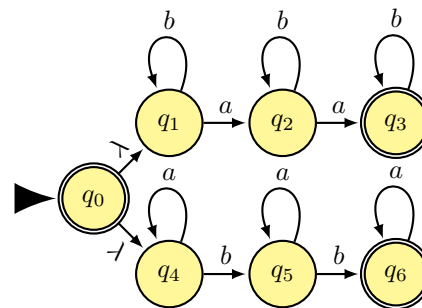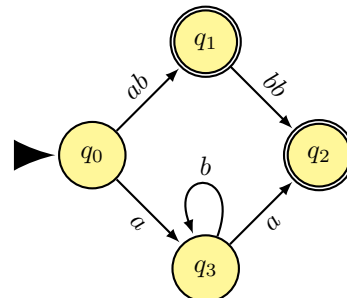
(a)

(d)

(b)

(e)

(c)

(f)

2. Build a TG that accepts the language L_1 of all words that begin and end with the same double letter, either of the form $aa \ldots aa$ or $bb \ldots bb$.
   Note: aaa and bbb are not words in this language

3. Prove that for every TG there is another TG that accepts the same language but only has one final/accepting state.

4. Given a TG, called TG_1, that accepts the language L_1 and a TG, called TG_2, that accepts the language L_2, show how to build a new TG (called TG_3) that accepts exactly the language $L_1 + L_2$.

5. A student walks into a classroom and sees on the blackboard a diagram of a TG with two states that accepts only the word λ. The student reverses the direction of exactly one edge, leaving all other edges, labels, initial states, and final states the same. But now the new TG accepts the language a^*. What was the original machine?