

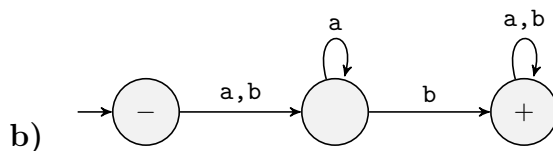
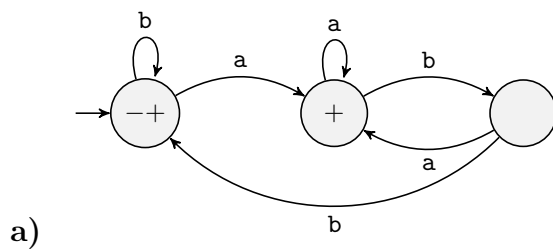
Assignment 3: Chapter 5 and 6

PROBLEM #1 (21 POINTS):

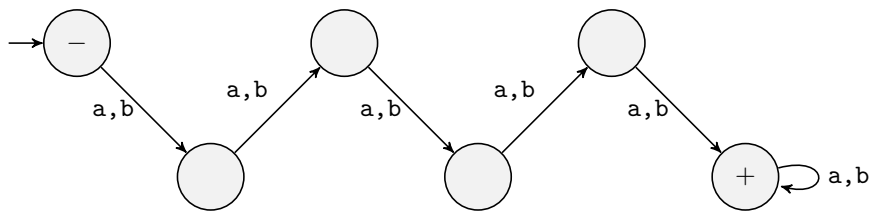
Let $\Sigma = \{a, b\}$

- a) Build an FA that accepts only those words that do not end in ab .
- b) Build an FA that accepts only the language of all words with b as the second letter. Find the regular expression for the language.
- c) Build an FA that accepts only those words that have more than four letters.
- d) Build an FA that accepts only those words that have fewer than four letters.
- e) Build an FA that accepts only those words with exactly four letters.
- f) Build an FA that accepts only those words that begin or end with a double letter.

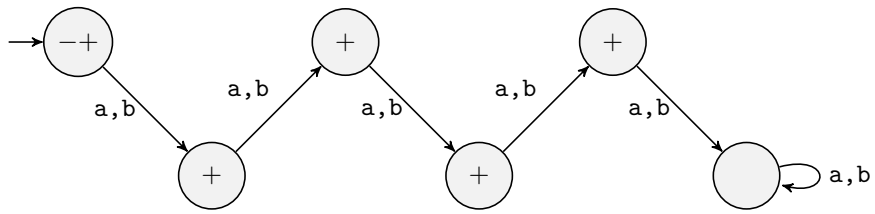
SOLUTION:



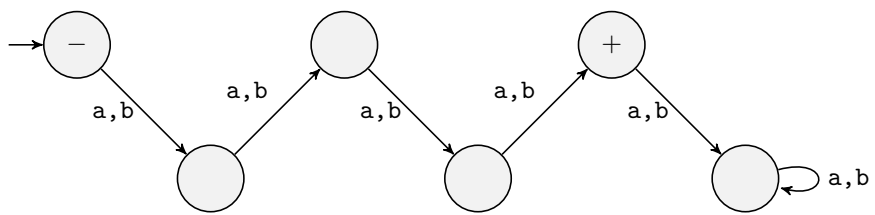
c)



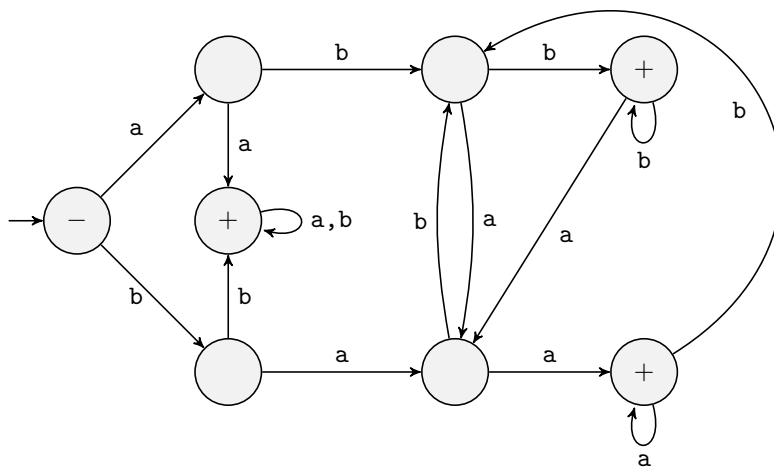
d)



e)

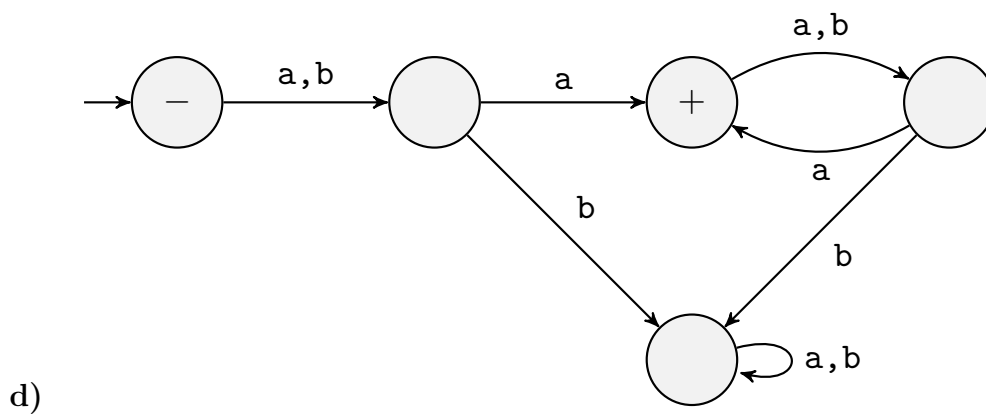
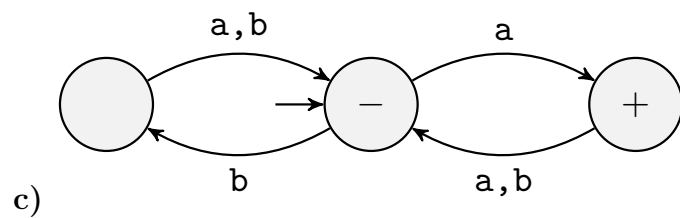
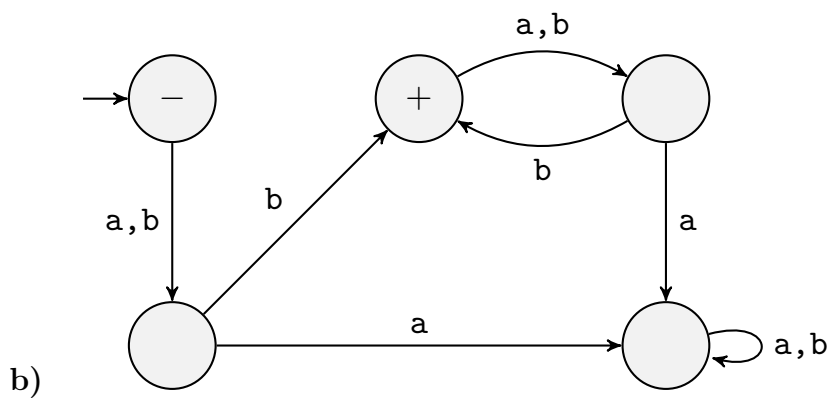
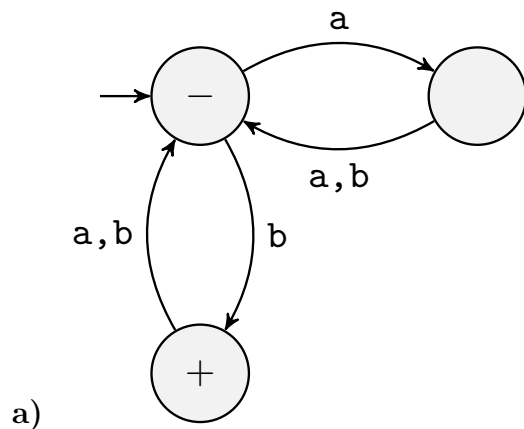


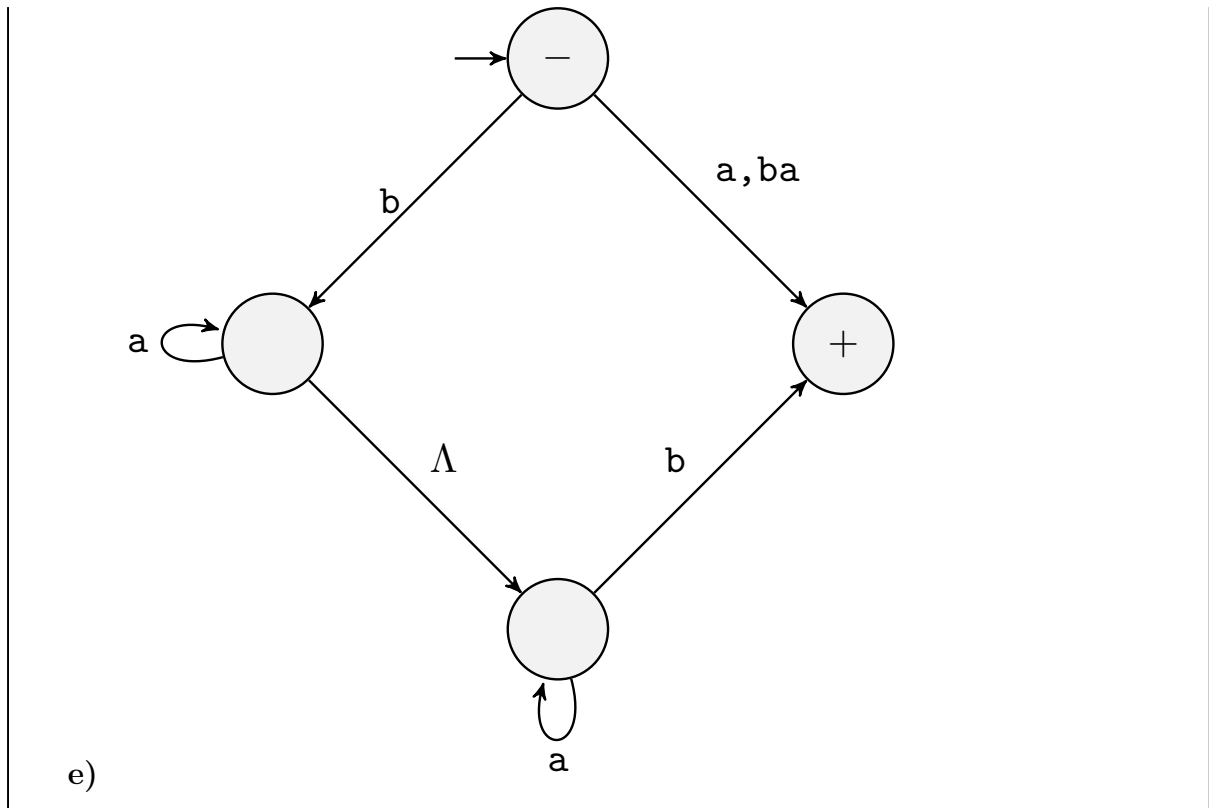
f)



PROBLEM #2 (15 POINTS):

Describe in English words the definition of the language and give a regular expression for the language accepted by each of the following FAs and TGs.





SOLUTION:

- a) This FA accepts all odd length words that end with a b . The regular expression of this FA is: $((a + b)(a + b))^*b$
- b) This FA accepts all words that do not have the sequence aa or ba and ends with b . The regular expression of this FA is: $(a + b)b((a + b)b)^*$
- c) This FA accepts all words of odd length that end with an a . The regular expression of this FA is: $a + ((a + b)(a + b)a)^*$.
- d) This FA accepts all words of even length that end with a and do not have the sequence bb . The regular expression of this FA is: $(a + b)a((a + b)a)^*$
- e) This TG accepts the words a, ba and $ba \dots ab$ with any number of a 's between.

PROBLEM #3 (15 POINTS):

For each of the FAs and TGs in Problem 2, build a transition graph that accepts the same language but has fewer states.

SOLUTION:

