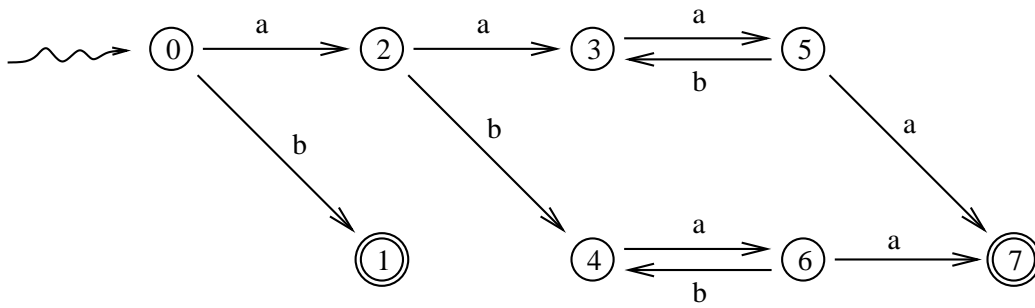


## Practice for the Final Examination: Part I

1. Design a minimal DFA equivalent to the DFA shown below.



2. Let  $L$  be the language consisting of all strings over the binary alphabet which contain the substring 011. Design a minimal DFA which accepts  $L$ .

3. Design a DPDA which accepts the language over  $\{a, b\}$  consisting of all strings which have equal numbers of each symbol. (For example,  $ab$ ,  $ba$ ,  $abba$ , and  $abbaab$ .)

4. Let  $L$  be the language of all regular expressions over  $\{a, b\}$ . Give a context-free grammar for  $L$ .

5. Consider the NFA shown below.

- (i) Write a transition table for a minimal DFA equivalent to that NFA.
- (ii) Write a regular expression which describes the language accepted by that NFA.
- (iii) Give a regular grammar which generates the language accepted by that NFA.

