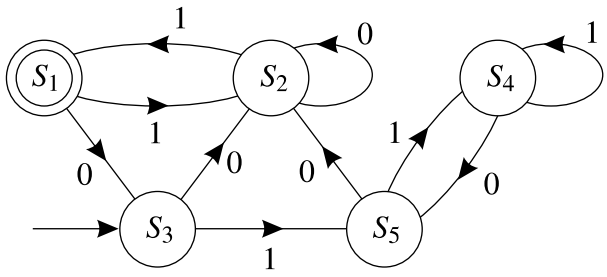
1. Consider the finite state machine



   (a) Calculate $f(S_1, 10100)$ and $f(S_4, 110010)$

   (b) Which of the following words are accepted by this machine and which are rejected? $w_1 = 101, \quad w_2 = 1011010, \quad w_3 = 11001001$

   (c) Write down the state table for this machine.

2. Consider the finite state machine given by

state table	0	1	2
S_1	S_1	S_2	S_3
S_2	S_2	S_3	S_1
S_3	S_3	S_1	S_2

Initial state: S_1
Acceptor state: S_2

   (a) Draw the state diagram for this machine.

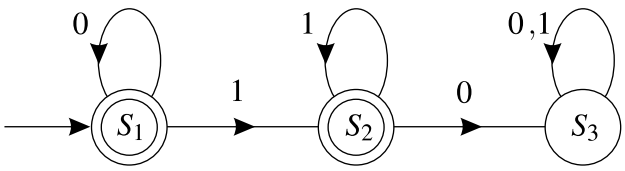
   (b) Calculate $f(S_2, 12121)$

   (c) Calculate $f(S_3, 012012012)$

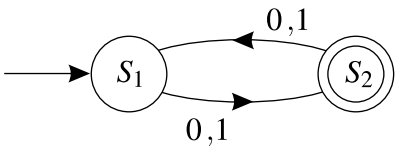
   (d) Is the word $w = 120222$ accepted by this machine?

3. Describe the language accepted by the following finite state machines.

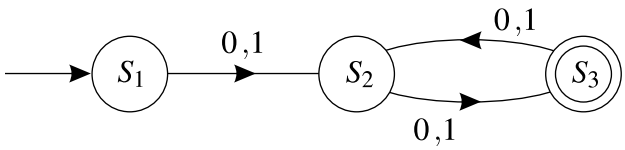
(a)



(b)



(c)



4. In each of the following cases, construct a state diagram for a finite state machine that accepts precisely the language specified.

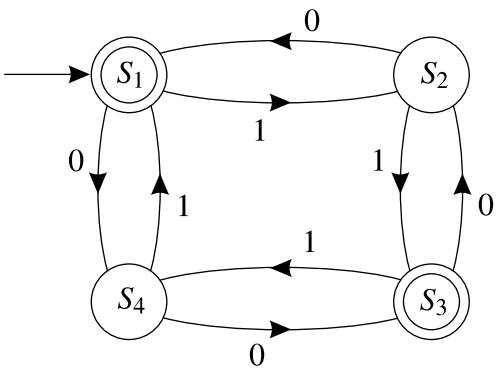
   (a) The set of all binary words ending in (at least) 3 successive ones.

   (b) The set of all binary words containing the sequence 101.

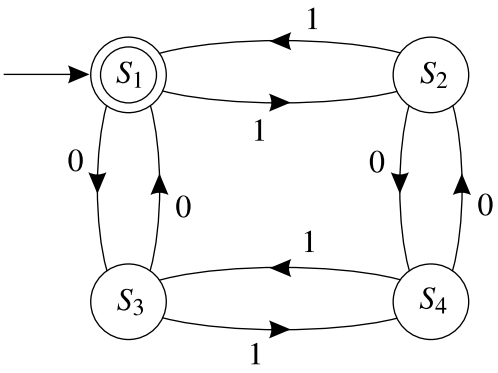
   (c) The set of all binary words which start with two zeros and end with two ones.

5. Describe the language accepted by the following finite state machines.
   Hint: it's something to do with 'odds' and 'evens'.

(a)

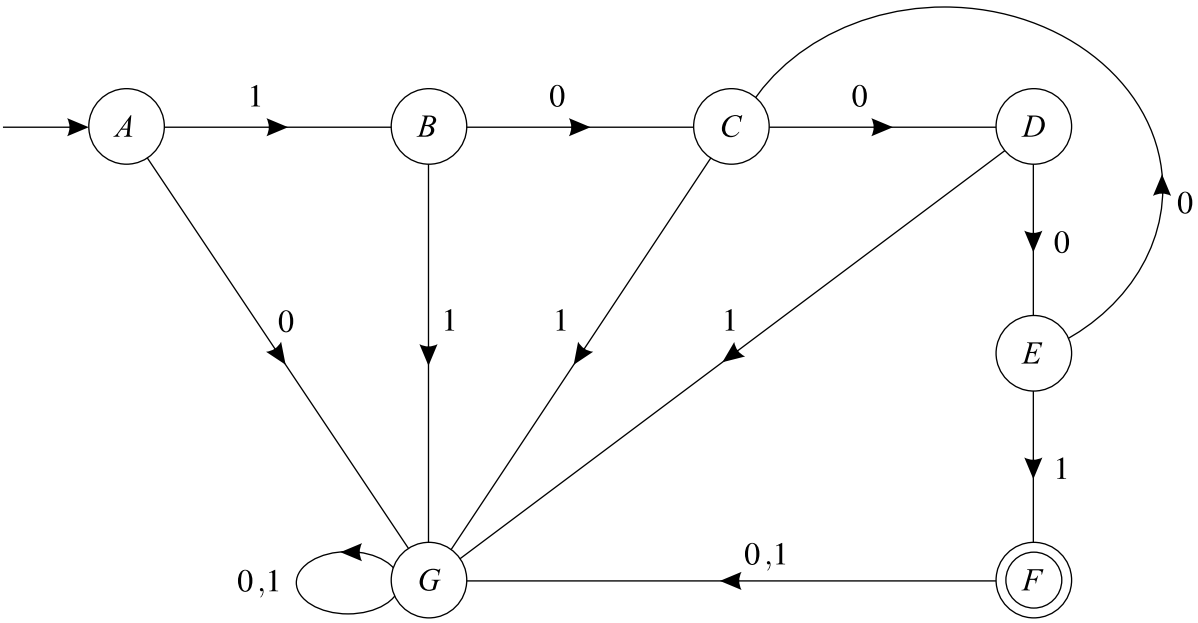


(b)



6. Describe the language accepted by the following finite state machines.

(a)



(b)