3.1 Write three strings that would be accepted by the following finite state machine. Have the strings be at least 5 characters long.

aaaaaaaaaaaab
bbbbbbbbbbbb
babababababab

3.2 Write two strings that would NOT be accepted by the previous finite state machine. Have the strings be at least 5 characters long.

aaaaaaaaaaa
bbbbbbbbbba
bababababaa

3.3 Write the output string that would be produced by the following finite state machine for each of the following input strings. Also, list what the final state would be for each input string.

a. 100101001

010010100 S1

b. 110110111

011011011 S1

c. 011100010

001110001 S2

3.4 Do the decimal expansion for the following numbers. Write the place values, put the digits in the place values, and write the result of multiplying the digit and the place value. Finally write the value in decimal.

a. 11010010_2

$2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$1*2^7+1*2^6+0*2^5+1*2^4+0*2^3+0*2^2+1*2^1+0*2^0$

128+64+16+2

$11010010_2 = 210_{10}$

b. 254_7

$7^2\ 7^1\ 7^0$

$2*7^2+5*7^1+4*7^0$

98+35+4

$254_7 = 137_{10}$

c. $13C_{16}$

$C_{16} = 12_{10}$

$16^2\ 16^1\ 16^0$

$1*16^2+3*16^1+12*16^0$

256+48+12

$13C_{16} = 316_{10}$

3.5 Write the table with columns for x, b, q, and r as shown in Learning Activity: Integer Properties that shows each step in converting the following decimal numbers to the specified base. Then write the complete number in the specified base.

a. 93 to base 2

X	B	Q	R
93	2	46	1
46	2	23	0
23	2	11	1
11	2	5	1
5	2	2	1
2	2	1	0
1	2	0	1

1011101_2

b. 164 to base 5

X	B	Q	R
164	5	32	4
32	5	6	2
6	5	1	1
1	5	0	1

1124_5

c. 328 to base 16

X	B	Q	R
328	16	20	8
20	16	1	4
1	16	0	1

148_{16}