Homework 1:

2.1

a. $c^*a(a|c)^*b[abc]^*$

b. $((b|c)^*a(b|c)^*a(b|c)^*)^*$

c. $(011)^*00$

d. $1(01)^*(01)(011)(01)(01)(01)(01)|11(011)(011)(01)(01)|1011(011)(01)|1010(011)$

e. $((a|((ba)^*b)^*(ba)^*c)^*((ba)^*b)^*(ba)^+|(a|((ba)^*b)^*(ba)^*c)^*((ba)^*b)^+|(a|((ba)^*b)^*\cdot(ba)^*c)^*)$

f. $00|0[1-9][0-9]^*|[1-9][0-9]^*|0$

g. $1|10$

2.2

a. 正则表达式与有限自动机一一对应，而有限自动机不能表示与计数有关的字符串.
因为有关数量也能的语言L都需要记忆/计数功能，都非正则.

b. 记录回文字符串需要无限个状态，有限自动机无法实现)

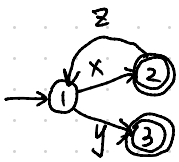
c. C程序需要判断括号是否匹配，这类似回文strings. 同样无法实现)

2.5

a.

	state
0	{}
1	{1,2,3,4}
2	{5,6,7}
3	{6,7}

trans	x	y	z
0	0	0	0
1	2	3	0
2	0	0	1
3	0	0	0

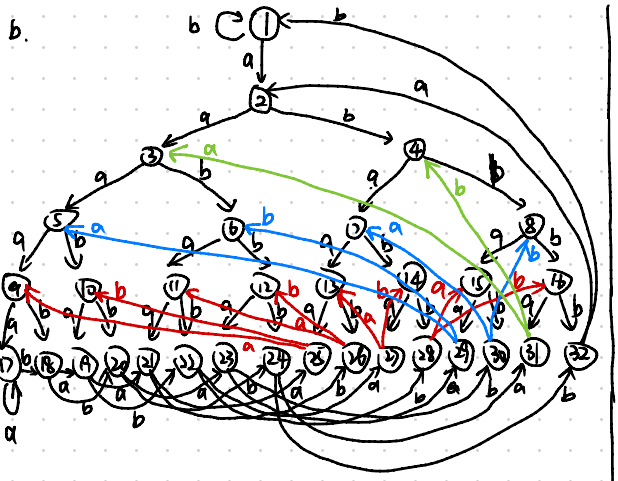


b.

	state
0	{}
1	{1}
2	{1,2}
3	{1,2,3}
4	{1,3}
5	{1,2,3,4}
6	{1,3,4}
7	{1,2,4}
8	{1,4}
9	{1,2,3,4,5}
10	{1,3,4,5}

trans	a	b
0	0	0
1	2	1
2	3	4
3	5	6
4	7	8
5	9	10
6	11	12
7	13	14
8	15	16
9	17	18
10	19	20

b.



Note : state 17 – 32 is final states

11	{1, 2, 4, 5}	11	21	22
12	{1, 4, 5}	12	23	24
13	{1, 2, 3, 5}	13	25	26
14	{1, 3, 5}	14	27	28
15	{1, 2, 5}	15	29	30
16	{1, 5}	16	31	32
17	{1, 2, 3, 4, 5, 6}	17	17	18
18	{1, 3, 4, 5, 6}	18	19	20
19	{1, 2, 4, 5, 6}	19	21	22
20	{1, 4, 5, 6}	20	23	24
21	{1, 2, 3, 5, 6}	21	25	26
22	{1, 3, 5, 6}	22	27	28
23	{1, 2, 5, 6}	23	29	30
24	{1, 5, 6}	24	31	32
25	{1, 2, 3, 4, 6}	25	9	10
26	{1, 3, 4, 6}	26	11	12
27	{1, 2, 4, 6}	27	13	14
28	{1, 4, 6}	28	15	16
29	{1, 2, 3, 6}	29	5	6
30	{1, 3, 6}	30	7	8
31	{1, 2, 6}	31	3	4
32	{1, 6}	32	2	1

2.b