5 (15pt) Design a digital lock with one input and one output. The output = 1 (indicating the lock is unlocked) only when the input sequence of 1011 is observed. After unlocking, output is reset to 0 regardless of the input.

6 (15pt) Design a 5-to-32 line decoder using one 2-to-4 line decoder and four 3-to-8 line decoders. Enable input can be added in the decoders.

1010

$S_0: x 1 x$

$S_1: x 1 0 x$

$S_2: x 1 0 1 x$

$S_3 = x 1 0 1 1$

$S_0 \xrightarrow{1} S_0$
   $\searrow^{0} S_1$

$S_1 \xrightarrow{1} S_2$
   $\searrow^{0} S_0$

$S_2 \xrightarrow{1} S_3$
   $\searrow^{0} S_1$

$S_3 \xrightarrow{1} S_0$
   $\searrow S_0$

$D_A = AB'x + A'B x$

$D_B = B'x + AB'$

$y = AB'x$

$8 \times 4 = 32$

$4 + 32 = 36 (9)$

$2 - 4$

$3 - 8 \to 16$

$5 - 32$

16.

32

3bit. 8 4°

4bit.

2×4

4 bit

3bit.
I_0 3×8

E

3×8

I_1

3×8 I_3

3×8

E

A B C D
0 0 0 1
0 0 1 0
0 1 0 0
1 0 0 0