Pb 15 in ch4

5 variables (primes) $\{p_1, \dots\dots p_5\}$

10 minterms (rows/constraints) $\{m_1 \dots\dots m_{10}\}$

Initial setup. $U = 5+1 = 6$

$L = 2$ (MIS = 1) but $L \geq 2$

No reduction on cyclic matrix.

split ~~on p1~~ on prime p_1 $(p_1 = 1)$

	p_2	p_3	p_4	p_5
m_7	1	1	1	0
m_8	1	1	0	1
m_9	1	0	1	1
m_{10}	0	1	1	1

Again cyclic.

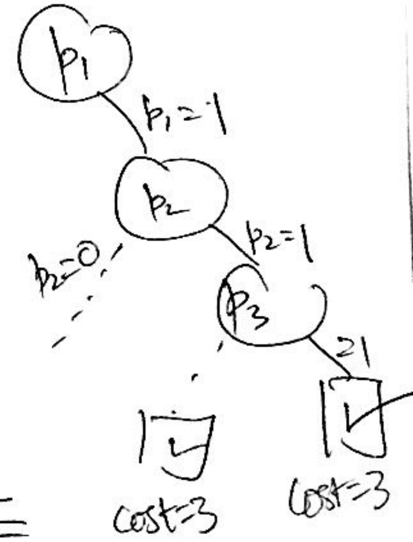
$U = 6$ $L = 2$ still.

Split further on p_2.

	p_3	p_4	p_5
m_{10}	1	1	1

pick p_3.

Current sol = $\{p_1, p_2, p_3\}$



$p_3 = 0 \Rightarrow p_4 + p_5 = 1$

cost = 3

$U = 3$

Backtrack

Cost $= 3 > L$

$p_2 = 0$

	p_3	p_4	p_5
m_7	1	1	0
m_8	1	0	1
m_9	0	1	1
m_{10}	1	1	1

$m_{10} \supset m_9, m_8, m_7$

remove m_{10}

$\Rightarrow$

	p_3	p_4	p_5
m_7	1	1	0
m_8	1	0	1
m_9	0	1	1

cyclic.

$\underline{L=2}$

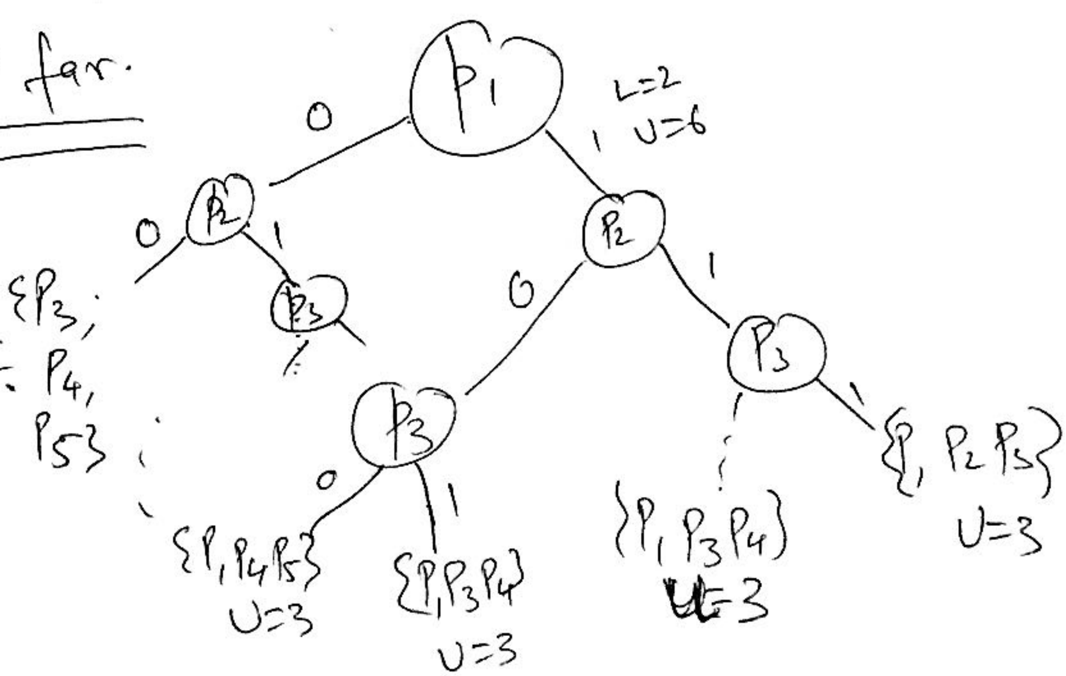
<u>branch on p_3</u>

$p_3 = 1 \Rightarrow$ Soln. $\{p_1\ p_3\ p_4\}$ cost $= 3$.

$p_3 = 0 \Rightarrow$ Soln $\{p_1\ p_4, p_5\}$ cost $= 3$.

<u>So far.</u>

Trace back to $p_1 = 0$



	p_2	p_3	p_4	p_5
m_1	1	1	0	0
m_2	1	0	1	0
m_3	1	0	0	1
m_4	0	1	1	0
m_5	0	1	0	1
m_6	0	0	1	1
m_7	1	1	1	0
m_8	1	1	0	1
m_9	1	0	1	1
m_{10}	0	1	1	1

$$\left\{\begin{array}{l} m_7 \supset m_1 \\ m_8 \supset m_1 \\ m_9 \supset m_2 \\ m_{10} \supset m_6 \end{array}\right.$$

remove $m_7 - m_{10}$

remove

concentrate on <u>upper matrix</u>

Cyclic w/ $L=2$

Select $P_2=1$ & $P_3=1 \Rightarrow \{P_2, P_3, P_4\}$

or $P_2=1$ & $P_3=0 \Rightarrow \{P_2, P_4, P_5\}$ <u>cost = 3</u> still.

Now backtrack $P_2=0$.

	P_3	P_4	P_5	
m_1	1	0	0	$\rightarrow P_3$ = essential
m_2	0	1	0	$\rightarrow P_4$ = "
m_3	0	0	1	$\rightarrow P_5$ "
m_4				
⋮				
m_6				

$\boxed{\text{whatever}}$

<u>Soln</u> $\{P_3 P_4 P_5\}$

Explored the entire search tree.

Solution = 3 primes.

$L=2$ never achieved.