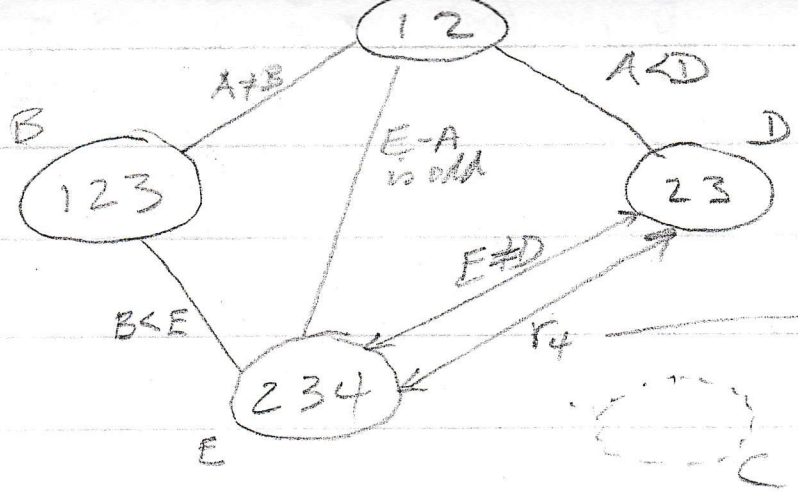
1a) 4^5 (or $4 \times 4 \times 4 \times 4 \times 4$) $= 1024$

1b) $2 \times 3 \times 2 \times 2 \times 3 = 72$



D	E
2	2
2	3
2	4
3	2
3	3

Eliminate D

$E \neq D \wedge r_4$ =

D	E
2	3
2	4
3	2

$= r_5$

$A < D$

A	D
1	2
1	3
2	3

$\bowtie$ r_5

D	E
2	3
2	4
3	2

=

A	D	E
1	2	3
1	2	4
1	3	2
2	3	2

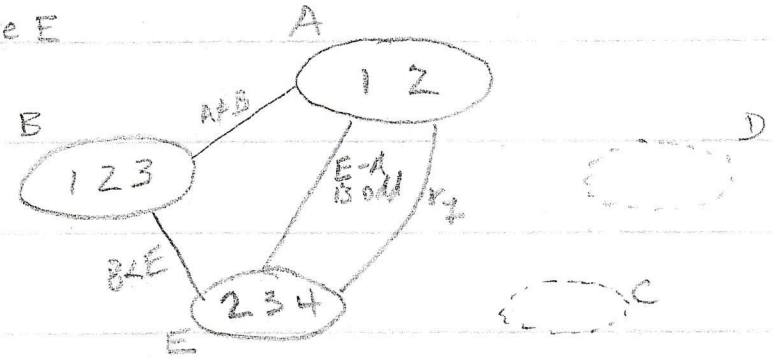
$= r_6$ (*)

$\Pi_{AE}(r_6) =$

A	E
1	3
1	4
1	2
2	2

$= r_7$

Eliminate E



E-A is odd $\wedge\ r_7$ =

A	E
1	4
1	2

$= r_8$

$B<E$

1	2
1	3
1	4
2	3
2	4
3	4

$\bowtie$

1	4
1	2

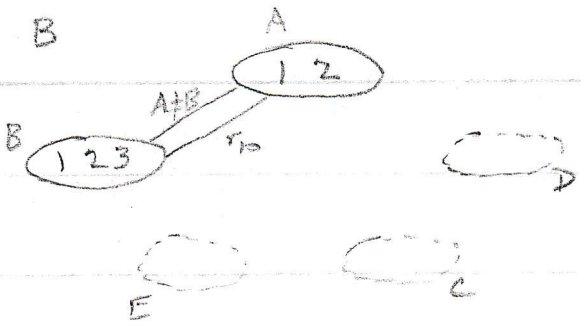
$=$

1	1	2
1	1	4
1	2	4
1	3	4

$= r_9$ (*)

$$\pi_{AB}(r_9) = \begin{array}{cc} A & B \\ 1 & 1 \\ 1 & 2 \\ 1 & 3 \end{array} = r_{10}$$

Eliminate B



$$A \neq B \wedge r_{10} = \begin{array}{cc} A & B \\ 1 & 2 \\ 1 & 3 \end{array} = r_{11}$$ (*)

$$\pi_A(r_{10}) = \begin{array}{c} A \\ 1 \end{array}$$

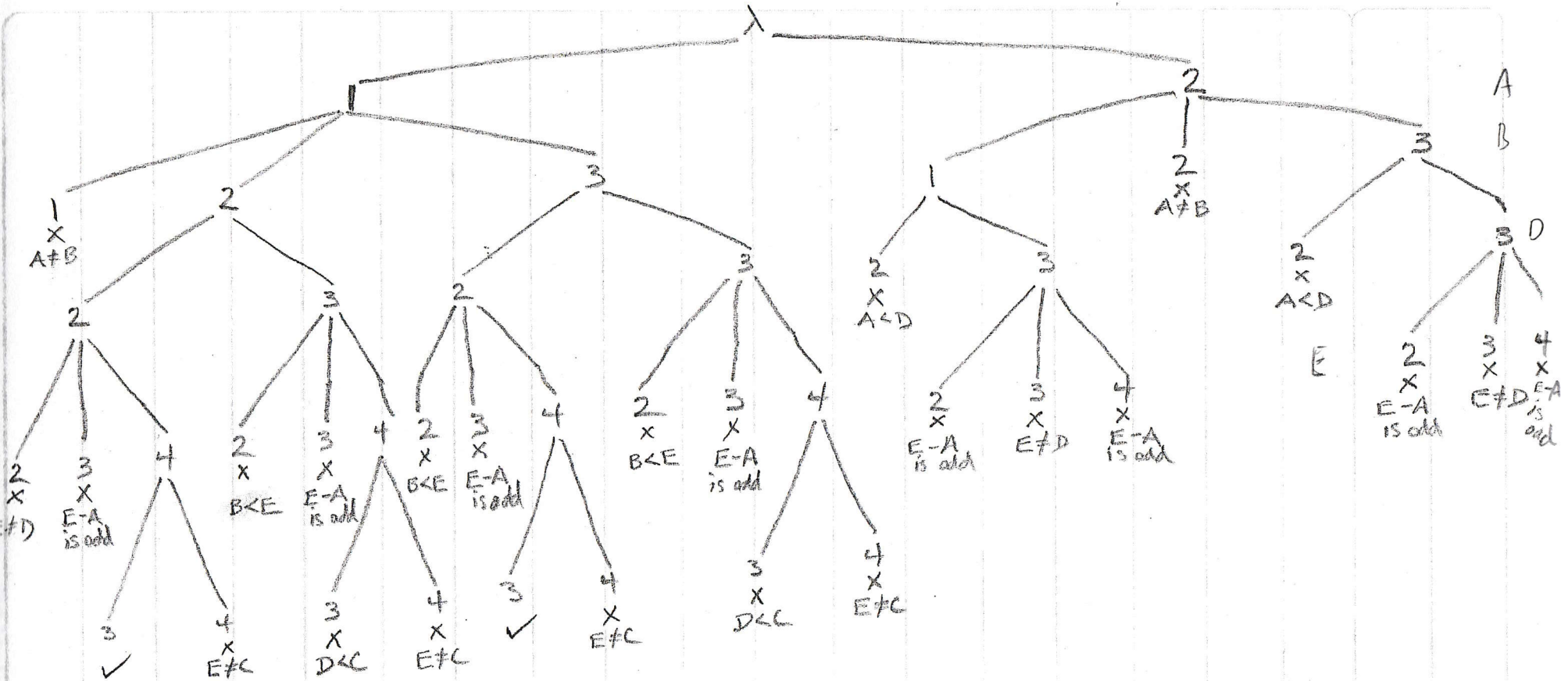
$$A \bowtie r_{11} = \begin{array}{cc} A & B \\ 1 & 2 \\ 1 & 3 \end{array} = r_{12}$$

$$r_{12} \bowtie r_9 = \begin{array}{ccc} A & B & E \\ 1 & 2 & 4 \\ 1 & 3 & 4 \end{array} = r_{13}$$

$r_{13} \bowtie r_6 = \begin{matrix} 1 & 2 & 2 & 4 \\ 1 & 3 & 2 & 4 \end{matrix} = r_{14}$

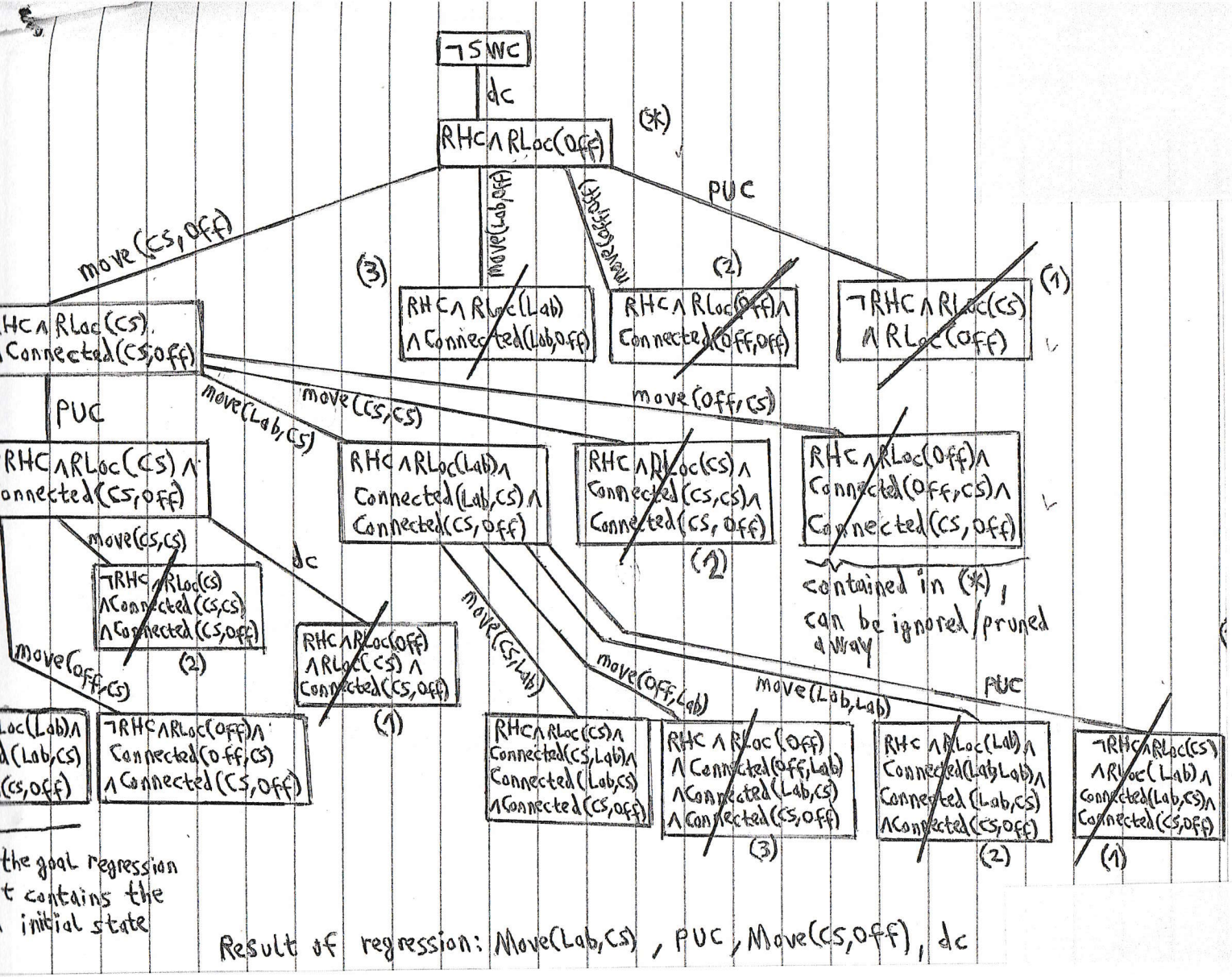
$$r_{14} \bowtie r_3 = \begin{matrix} A & B & C & D & E \\ 1 & 2 & 3 & 2 & 4 \\ 1 & 3 & 3 & 2 & 4 \end{matrix} = r_{15}$$

r_{15} is two solutions to the CSP



Solutions :

A	B	C	D	E
1	2	3	2	4
1	3	3	2	4



the goal regression
t contains the
initial state

Result of regression: Move(Lab,CS), PUC, Move(CS,Off), dc