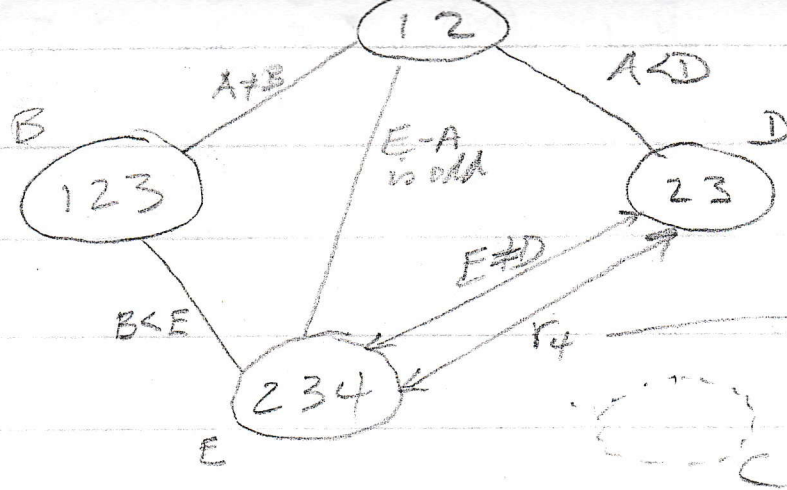


$$1a) 4^5 \text{ (or } 4 \times 4 \times 4 \times 4 \times 4) = 1024$$

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



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

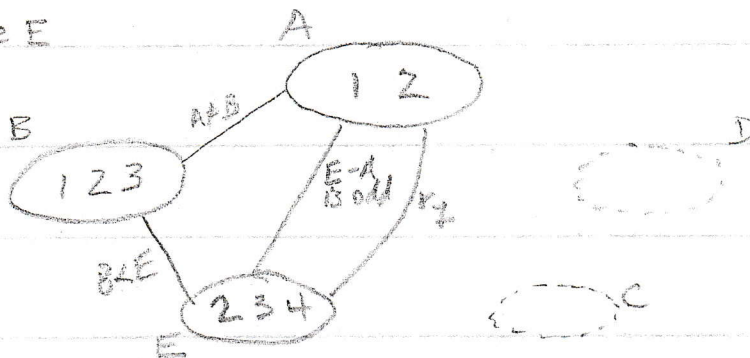
Eliminate D

$$E \neq D \wedge r_4 = \begin{array}{cc} D & E \\ 2 & 3 \\ 2 & 4 \\ 3 & 2 \end{array} = r_5$$

$$A < D \quad \begin{array}{cc} A & D \\ 1 & 2 \\ 1 & 3 \\ 2 & 3 \end{array} \quad \wedge \quad \begin{array}{cc} D & E \\ 2 & 3 \\ 2 & 4 \\ 3 & 2 \end{array} = \begin{array}{ccc} A & D & E \\ 1 & 2 & 3 \\ 1 & 2 & 4 \\ 1 & 3 & 2 \\ 2 & 3 & 2 \end{array} = r_6 (*)$$

$$\pi_{AE}(r_6) = \begin{array}{cc} A & E \\ 1 & 3 \\ 1 & 4 \\ 1 & 2 \\ 2 & 2 \end{array} = r_7$$

Eliminate E



$$E - A \text{ is odd} \wedge r_7 = \begin{array}{cc} A & E \\ 1 & 4 \\ 1 & 2 \end{array} = r_8$$

$B < E$

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

\bowtie

1	4
1	2

$=$

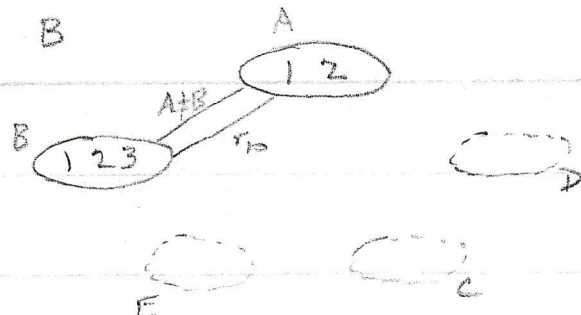
1	1	2
1	1	4
1	2	4
1	3	4

$= r_9$

$*$

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

Eliminate B



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

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

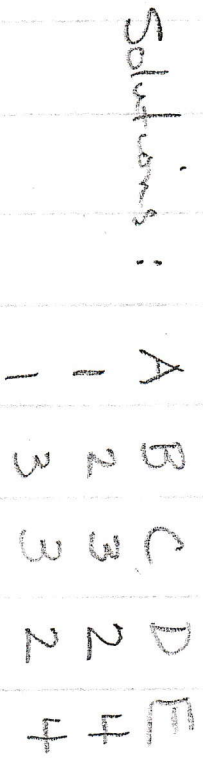
$$A \bowtie r_{11} = \begin{array}{cc} A & B \\ 1 & 2 \\ 1 & 3 \end{array} = r_{12}$$

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

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

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

r_{15} is two solutions to the CSP



1. The first part of the document is a letter from the author to the reader, explaining the purpose of the study and the methods used. The letter is dated 1st January 1998 and is addressed to the reader.

7 7 7

