

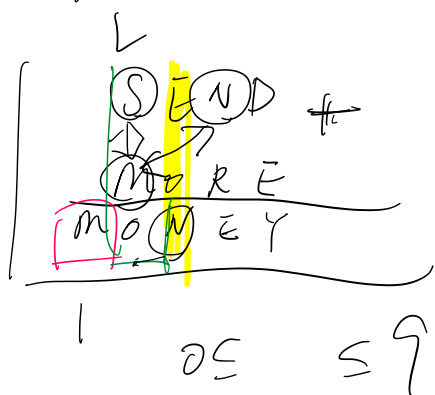
# Part3

Wednesday, 13 January 2021

11:14 am

Act 1

$$\rightarrow S + M = 10 + 0 \text{ or } S + M + 1 = 10 + 0$$



①  $M = 1$  because only 1 can be the carry

② case 1:  $S + 1 = 10 + 0$   $S = 0 + 9$

case 2:  $S + 1 + 1 = 10 + 0$  (carry from later digit)

$S = 0 + 8$

$\Rightarrow D = 0 \text{ or } 1$  (since  $S \leq 9$ )

$\rightarrow$  1 is used, so  $D = 0$

$\Rightarrow$  since  $D = 0$ ,  $S + 0 < 10$

hence  $S = 9$

9 9 9 9  
9 9 9 9

①

③  $E + 0 + 1 = N$  (since  $E \neq N$ )

$$E + 1 = N$$

$$N + R = 10 + E \Rightarrow E + 1 + R = 10 + E \quad R = 9 \text{ taken}$$

$$\text{OR} \quad N + R + 1 = 10 + E \Rightarrow E + 1 + R + 1 = 10 + E \quad R = 8$$

$$\begin{array}{r} 9 \text{ END} + \\ 108E \\ \hline 10NEY \end{array}$$

$E + 1 = N$   
 $D + E = 10 + Y$

Remaining values:

2, 3, 4, 5, 6, 7

$$D + E \leq 6 + 7 = 13, \text{ so } Y = 2 \text{ or } 3$$

$\rightarrow$  if  $Y = 3$ , (most constraining variable),  
 $N = E = 7$ , which is not possible.

Hence  $Y = 2$ ,  $E = 5$ ,  $N = 6$ ,  $D = 7$

Act 2.

Forward Checking and Arc Consistency  
basic forward checking

①	WA	NT	Q	NSW	V	SA	T
	RGB	RGB	RGB	RGB	RGB	RGB	RGB

② R GB GB

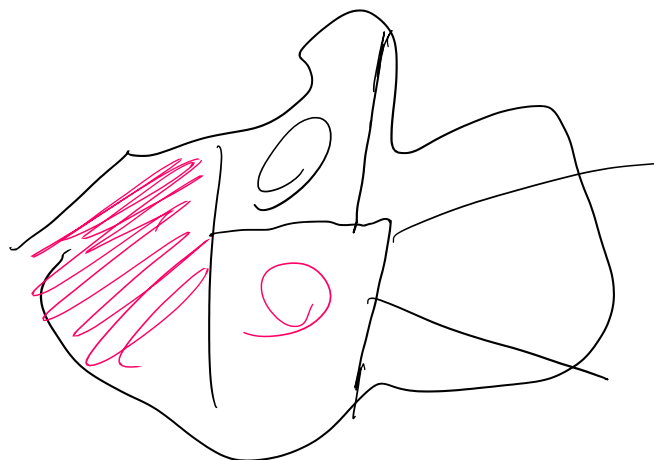
③ B G RB RGB B

④ B B error!

backtrack

arc consistency

in step ③ cross blue for NSW



Red, Green, Blue

Act 3