

# AIML ASSIGNMENT-2

1) Apply CSP problem concept to solve the give cryptarithmic problem  $BASE + BALL = GAMES$  with the constraints. Variable can take values from 0-9, No two variables should take same values and the values should be selected such a way that it should comply with arithmetic properties.

A) 
$$\begin{array}{r} BASE \\ BALL \\ \hline GAMES \end{array}$$

if B is the maximum value

$$G = 1$$

$$B = 7$$

$$A = 4$$

$$S = 8$$

$$L = 5$$

$$G = 1$$

$$M = 9$$

$$E = 3$$

$$E + L = S \rightarrow \textcircled{a} \text{ (without carry)}$$

$$E + L = S + 10 \rightarrow \textcircled{b} \text{ (with carry)}$$

$$E = S - L + 10 \rightarrow \textcircled{d}$$

From  $G \Rightarrow S + L = E$  put in  $\textcircled{d}$

$$S + L = S - L + 10$$

$$2L = 10$$

$$L = 5$$

Step-2:-

$$E + L = S \text{ (a)}$$

$$S - E = L$$

$$S - E = 5$$

$$B + B = A + 10$$

choosing  $B = 6$  and combination (7, 2) for (S, E)

$$6 + 6 = 12$$

$A = 2$  already choosen

Possible

$$(5, 0) \times$$

$$(6, 1) \times$$

$$(7, 2)$$

$$(8, 3)$$

$$(9, 4)$$



Choosing  $B=7$  and combined  $(8,3)$  for  $(s,E)$

$$7 + 7 = 14$$

$$A = 4$$

$$A + A = 4$$

$$4 + 4 = m$$

$$m = 9$$

$\Rightarrow$  as there can be carry from

St L in  $C_2$  to  $C_3$

BASE  
BALL  
GAMES

$$\Rightarrow \begin{array}{r} 7 \ 4 \ 83 \\ 7 \ 4 \ 55 \\ \hline 14 \ 9 \ 38 \end{array}$$

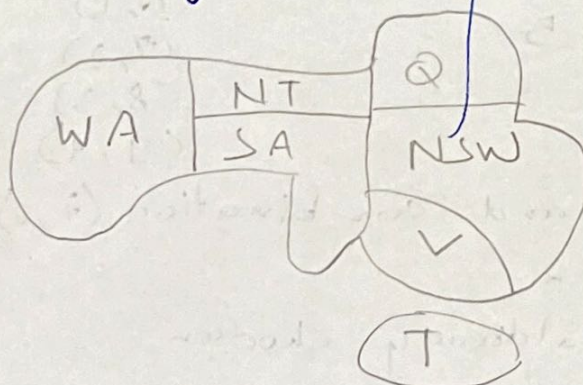
- 2) Apply CSP problem concept to solve the search problem of map colouring for the given vertices for the domain specific colours. Variables are WA, NT, Q, NSW, V, SA, T. Domains  $D_i = \{\text{red, green, blue}\}$  Constraints: adjacent regions must have different colours. eg:  $WA \neq NT$ , or  $(WA, NT) \in \{(\text{red, green}), (\text{red, blue}), (\text{green, red}), (\text{green, blue}), (\text{blue, red}), (\text{blue, green})\}$

A) MSP

$$V = \{WA, NT, Q, NSW, V, SA, T\}$$

$$D = \{\text{red, green, blue}\}$$

constraints = Adjacent cant have same colours





	WA	NT	SA	Q	NSW	V	T
Initial	RGB	RGB	RGB	RGB	RGB	RGB	RGB
WA $\rightarrow$ R	R	GB	GB	RGB	<del>RGB</del>	RGB	RGB
NT $\rightarrow$ G	R	G	B	RB	RGB	RGB	RGB
<del>SA</del> $\rightarrow$ B	R	G	B	RB	RG	RG	RGB
Q $\rightarrow$ R	R	G	R	R	G	RG	RGB
NSW $\rightarrow$ G	R	G	B	R	G	R	RGB
V $\rightarrow$ R	R	G	B	R	G	R	GB
T $\rightarrow$ G	R	G	B	R	G	R	GB

WA  $\rightarrow$  R

NT  $\rightarrow$  G

SA  $\rightarrow$  B

Q  $\rightarrow$  R

NSW  $\rightarrow$  G

V  $\rightarrow$  R

T  $\rightarrow$  G

