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4) Solve the Crypt-Arithmetic Problem using following Input and output.

$$\begin{array}{r} \text{KANSAS} \\ + \text{OHIO} \\ \hline \text{OREGON} \end{array}$$

Then find the value of
 $G + R + O + S + S$
(The value of $O = 5$)

Solution:

$$\boxed{O = 5}; \quad \left[G + R + O + S + S \Rightarrow 1 + 0 + 5 + 2 + 2 \right] \quad \boxed{\Rightarrow 10}$$

$$\begin{array}{r} \text{KANSAS} \\ (+) \quad \text{OHIO} \\ \hline \text{OREGON} \end{array}$$

$$\Rightarrow \begin{array}{r} \text{KANSAS} \\ (5) \text{HI}(5) \\ \hline (5) \text{REGON} \end{array}$$

$$\Rightarrow K + 1 = 'O' \quad ; \quad \boxed{O = 5}$$

$$K + 1 = 5$$

$$4 + 1 = 5$$

$$\therefore \boxed{K = 4}$$

<u>code</u>	<u>char</u>
0	- 'R'
1	- 'G'
2	- 'S'
3	- 'E'
4	- 'K'
5	- 'O'
6	- 'I'
7	- 'N'
8	- 'H'
9	- 'A'

If $A + 1 = R \Rightarrow R$ is must be two digit number

So:-

$\Rightarrow 9 + 1 = '10' \Rightarrow 10$ means the 1 is in carry
So the 0 is the Ans.

$$\therefore \boxed{A = 9}; \quad \boxed{R = 0};$$

$$\begin{array}{r}
 \overset{14}{(4)} \overset{11}{(9)} N S (9) S \\
 (5) H I (5) \\
 \hline
 (5)(0) E G (5) N
 \end{array}$$

$$\Rightarrow 9 + I = 15 \quad \boxed{I = 6;}$$

$$9 + 6 = 15$$

$\Rightarrow S + S = N$ \therefore The N value doesn't have two digit.
Therefore the value of ' S ' must be between 1 to 4.

If $S = 1, 2, 3, 4$

$$S + S = N \Rightarrow 1 + 5 = 6$$

(6) is already assigned

$$\Rightarrow 4 + 5 = 9$$

(9) is also already assigned.

\therefore The value of S

$$\Rightarrow \boxed{2} \text{ (or) } \boxed{3}$$

Let us check with the two values:

$$\Rightarrow \begin{array}{cc} 2 + 5 = 7 \\ (S) & (N) \end{array}$$

$$\Rightarrow 7 + 5 = E$$

$$7 + 5 = 12 \quad \text{so 12 is not possible}$$

$$\Rightarrow 2 + H = G \quad \therefore G \text{ is must be a two digit number}$$

$$1 + 2 + 8 = 1$$

$$\Rightarrow \text{Here } H + 2 + 1 = \text{two digit}$$

$$\therefore 1 + 2 + 5 = 7$$

$$1 + 2 + 8 = 11$$

$$\therefore \boxed{N = 7;} \quad \boxed{G = 1;} \quad \boxed{H = 8;}$$

$$\boxed{S = 2;} \quad \boxed{E = 3;}$$