Gate Assignment

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1. In a given 8-bit general purpose micro-controller there are following flags. C-Carry, A-Auxiliary Carry, O-Overflow flag, P-Parity (0 for even, 1 for odd) $R0$ and $R1$ are the two general purpose registers of the micro-controller.After execution of the following instructions, the decimal equivalent of the binary sequence of the flag pattern $[CAOP]$ will be _____.

   $MOV\ R0, +0{\times}60$
   $MOV\ R1, +0{\times}46$
   $ADD\ R0, R1$

   Solution:

   $MOV\ R0, +0{\times}60$; $R0 \leftarrow 60H$
   $MOV\ R1, +0{\times}46$; $R1 \leftarrow 46H$
   $ADD\ R0, R1$; $R0 \leftarrow [R0]+[R1]$

   $$\begin{array}{r} D_4 \quad D_3 \\ 0110\ 0000 \\ 0100\ 0110 \\ 1 \\ \hline 1010\ 0110 \end{array}$$

   $60H + 46H = A6H$ i.e., 10100110

   Overflow$(O) \rightarrow 1$; Since if the two 8- bit data were considered as signed data then the result shows negative i.e., $MSB = 1$ in $A6H$ but both data bytes are positive.

Parity(P) $\rightarrow$ Even, as there are four binary $1's$ in result $A6H$.

$P \rightarrow 0$.

For Carry Flag ($C \rightarrow 0$).... No carry bit out of Mantisa.

For auxillary carry ($AC \rightarrow 0$).

No carry from $D4$ to $D3$ bit.

$[CAOP] \rightarrow [0010]_2 = (2)_{10}$.