

Bit Manipulation

Logics

8) $n \wedge n \rightarrow$ we get zero why because

Bit 1 Bit 2 Output
 0 0 0

$5 \wedge 5$

0 0 0

0101

1 0 0

0101

0	1	1
1	0	1

0000

9) Without using a third variable we can swap two numbers $n_1 = 5, n_2 = 6$

$$n_1 = n_1 \wedge n_2 \quad \downarrow \rightarrow n_1 = 5 \wedge 6 \rightarrow 3$$

$$n_2 = n_1 \wedge n_2 \quad \downarrow \rightarrow n_2 = 3 \wedge 6 \rightarrow 5$$

$$n_1 = n_1 \wedge n_2 \quad \downarrow \rightarrow n_1 = 3 \wedge 5 \rightarrow 1$$

$$\begin{array}{r} 5 \rightarrow 1 \\ 2 \rightarrow 0 \\ \hline 1 \end{array} \quad \begin{array}{r} 101 \\ 110 \\ \hline 011 \rightarrow 3 \rightarrow n_1 \end{array}$$

$$\begin{array}{r} 6 \rightarrow 0 \\ 3 \rightarrow 1 \\ \hline 1 \end{array} \quad \begin{array}{r} 011 \\ 110 \\ \hline 101 \rightarrow n_2 \end{array}$$

$$\boxed{n_1 = 6 \\ n_2 = 5}$$

→ This way we swap

$$\begin{array}{r} 011 \\ \swarrow \downarrow \downarrow \downarrow \\ 001 \end{array} \quad \begin{array}{r} 011 \\ 101 \\ \hline 110 \end{array}$$

Q3) ~~Q3~~ n+1 Using Bitwise

$$- \sim n \rightarrow - \sim 5$$

$$\begin{array}{r} -(-6) \\ = \underline{\underline{6}} \end{array}$$

$$\begin{array}{r} 0101 \\ \rightarrow 1's\ com \\ \bullet \underline{010} \\ 1 \rightarrow 2^1 \\ \hline \underline{011} \rightarrow -6 \end{array}$$

Q4) 0100P UPPercase letter's A to Z

for (`char ch='A' to ch<='Z'`)

② Convert each upper case letter to lowercase
using OR-ing with 32

$$\text{Ex } 'A' (65) | 32 = 'a' (97)$$

$$\begin{array}{r} 10000001 \\ 01000000 \rightarrow 32 \\ \hline 1100001 \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 1x2^6 \quad 1x2^5 \quad 0 \quad 0 \quad 0 \quad 0 \quad 1x2^0 \\ 64 \quad 32 \quad 64 + 32 + 1 = 97 \rightarrow 'a' \end{array}$$

$$\begin{array}{r} 2 \mid 65 \rightarrow 1 \quad 2 \mid 32 \rightarrow 0 \\ 2 \mid 32 \rightarrow 0 \quad 2 \mid 16 \rightarrow 0 \\ 2 \mid 16 \rightarrow 0 \quad 2 \mid 8 \rightarrow 0 \\ 2 \mid 8 \rightarrow 0 \quad 2 \mid 4 \rightarrow 0 \\ 2 \mid 4 \rightarrow 0 \quad 2 \mid 2 \rightarrow 0 \\ 2 \mid 2 \rightarrow 0 \quad 1 \end{array}$$