

## Efficient way to multiply with 7

We can multiply a number by 7 using bitwise operator. First left shift the number by 3 bits (you will get  $8n$ ) then subtract the original number from the shifted number and return the difference ( $8n - n$ ).

### Program:

```
# include<stdio.h>

int multiplyBySeven(unsigned int n)
{
    /* Note the inner bracket here. This is needed
       because precedence of '-' operator is higher
       than '<<' */
    return ((n<<3) - n);
}

/* Driver program to test above function */
int main()
{
    unsigned int n = 4;
    printf("%u", multiplyBySeven(n));

    getchar();
    return 0;
}
```

**Time Complexity:**  $O(1)$

**Space Complexity:**  $O(1)$

Note: Works only for positive integers.

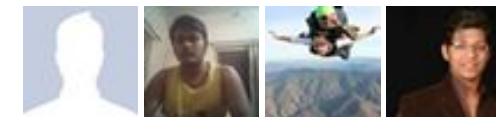
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Same concept can be used for fast multiplication by 9 or other numbers.



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**Nimish** • 7 months ago

why not  $n+(n<<1)+(n<<2)$  ?

as bit shifts are still three only, though not don at once, but instead of one "-" w  
using "+" can be more efficient than using "-" i guess.

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**vindhya** • 2 years ago

someone plz explain this..how does it give  $O(1)$  complexity??sorry i m weak a

```
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**vindhya** → vindhya • 2 years ago

oh..!!understood..:)

```
/* Paste your code here (You may delete these lines if not wri
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**frankc** • 3 years ago

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by 7 or 15?

```
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```

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**bala** · 3 years ago

Sometimes ,we do have to take care of overflow even if multiplication by 7 or 1

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**nitesh.gami008** → bala · 3 years ago

@bala....Please give some example....

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Consider this binary number

0100 0000

how will you shift 3 times without handling overflow

Correct me if i am wrong

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