Multiply two integers without using multiplication, division and bitwise operators, and no loops

Asked by Kapil

By making use of recursion, we can multiply two integers with the given constraints.

To multiply x and y, recursively add x y times.

Thanks to geek4u for suggesting this method.

```
#include<stdio.h>
/* function to multiply two numbers x and y*/
int multiply(int x, int y)
{
   /* 0  multiplied with anything gives 0 */
   if(y == 0)
     return 0;

   /* Add x one by one */
   if(y > 0 )
     return (x + multiply(x, y-1));

  /* the case where y is negative */
   if(y < 0 )
     return -multiply(x, -y);
}

int main()
{
  printf("\n %d", multiply(5, -11));
  getchar();
  return 0;
}
```


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Time Complexity: O(y) where y is the second argument to function multiply().

Please write comments if you find any of the above code/algorithm incorrect, or find better ways to solve the same problem.

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ARUN • 2 months ago
just compare the a,b ; run the loop less time , then add the number to avoid th

abhishek08aug • a year ago
Intelligent :D

st0le • a year ago
sorry, if (abs(x) < abs(y)) return multiply (x,y)

Hongjoo Lee st0le • 2 months ago
But this will add two abs() calls and one comparison for each recursio difference between the number of figures of the two parameters, or the the difference of figures between the two numbers, I guess it will harm

st0le • a year ago
I suggest the following improvement.

In the begining, if (x < y) return multiply(y,x);

Complexity becomes O(min(x,y))

Complexity becomes O(min(x,y))

3

Joemar Albuna • a year ago

:)

anji.swe • 2 years ago

public int multiplyOLogn(int a, int b) {
int product=0;

product = multiplyOLogn(a, b / 2);
product = product + product;

if (b%2==0) product = product + b;

return product;
}

kartik anji.swe • 2 years ago

The question says without division operator :)

Mathmo • 3 years ago

For multiplying large ints may be better to compare and reorder so the smalles function to handle this with out making lots of unnecessary comparisons).

Also :
if (y 0)
...
else uses 1 less comparison

705

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Also, nomenclature aside, this is effectively a do-while loop but with extra func
function of this is.

Mathmo Mathmo • 3 years ago

sorry this didn't post the way i wanted it to, the if-else bit should be:

```
 if (y < 0){}
else if (y > 0){}
else{/*Here y is known to be 0, no need to check*/}
```

1

Ethan • 3 years ago

A recursive function is a function that keeps calling itself until the answer is fou

Sabarish • 3 years ago

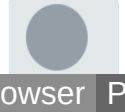
Super... Fantastic...

Kkk. Plz give the detailed explanation of recursive function.

Plz send to mail.

GeeksforGeeks • 4 years ago

@gevorgk & @Mahesh: :-) We have removed method 2 as the method was us
out.



gevorgk • 4 years ago

very nice, question says - WITHOUT MULTIPLICATION, DIVISION AND BITW

And we have

result = _multiply(x, y/2);

Very funny

2 ^ | v •

Mahesh • 4 years ago

The question says do not use division and the second method uses division fc

^ | v •

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