

Write a program to add two numbers in base 14

Asked by Anshya.

Below are the different ways to add base 14 numbers.

Method 1

Thanks to Raj for suggesting this method.

1. Convert both i/p base 14 numbers to base 10.
2. Add numbers.
3. Convert the result back to base 14.

Method 2

Just add the numbers in base 14 in same way we add in base 10. Add numerals of both numbers one by one from right to left. If there is a carry while adding two numerals, consider the carry for adding next numerals.

Let us consider the presentation of base 14 numbers same as hexadecimal numbers

```
A --> 10
B --> 11
C --> 12
D --> 13
```

Example:

```
num1 =      1  2  A
num2 =      C  D  3
```

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1. Add A and 3, we get 13(D). Since 13 is smaller than 14, carry becomes 0 and resultant numeral becomes D
2. Add 2, D and carry(0). we get 15. Since 15 is greater than 13, carry becomes 1 and resultant numeral is $15 - 14 = 1$
3. Add 1, C and carry(1). we get 14. Since 14 is greater than 13, carry becomes 1 and resultant numeral is $14 - 14 = 0$

Finally, there is a carry, so 1 is added as leftmost numeral and the result becomes 101D

Implementation of Method 2

```
# include <stdio.h>
# include <stdlib.h>
# define bool int

int getNumeralValue(char );
char getNumeral(int );

/* Function to add two numbers in base 14 */
char *sumBase14(char *num1, char *num2)
{
    int l1 = strlen(num1);
    int l2 = strlen(num2);
    char *res;
    int i;
    int nml1, nml2, res_nml;
    bool carry = 0;

    if(l1 != l2)
    {
        printf("Function doesn't support numbers of different"
               " lengths. If you want to add such numbers then"
               " prefix smaller number with required no. of zeroes");
        getchar();
        assert(0);
    }

    /* Note the size of the allocated memory is one
       more than i/p lengths for the cases where we
```



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```

    have carry at the last like adding D1 and A1 */
res = (char *)malloc(sizeof(char)*(l1 + 1));

/* Add all numerals from right to left */
for(i = l1-1; i >= 0; i--)
{
    /* Get decimal values of the numerals of
       i/p numbers*/
    nml1 = getNumeralValue(num1[i]);
    nml2 = getNumeralValue(num2[i]);

    /* Add decimal values of numerals and carry */
    res_nml = carry + nml1 + nml2;

    /* Check if we have carry for next addition
       of numerals */
    if(res_nml >= 14)
    {
        carry = 1;
        res_nml -= 14;
    }
    else
    {
        carry = 0;
    }
    res[i+1] = getNumeral(res_nml);
}

/* if there is no carry after last iteration
   then result should not include 0th character
   of the resultant string */
if(carry == 0)
    return (res + 1);

/* if we have carry after last iteration then
   result should include 0th character */
res[0] = '1';
return res;
}

/* Function to get value of a numeral
   For example it returns 10 for input 'A'
   1 for '1', etc */
int getNumeralValue(char num)
{
    if( num >= '0' && num <= '9')
        return (num - '0');
}

```



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```

if( num >= 'A' && num <= 'D')
    return (num - 'A' + 10);

/* If we reach this line caller is giving
   invalid character so we assert and fail*/
assert(0);
}

/* Function to get numeral for a value.
   For example it returns 'A' for input 10
   '1' for 1, etc */
char getNumeral(int val)
{
    if( val >= 0 && val <= 9)
        return (val + '0');
    if( val >= 10 && val <= 14)
        return (val + 'A' - 10);

    /* If we reach this line caller is giving
       invalid no. so we assert and fail*/
    assert(0);
}

/*Driver program to test above functions*/
int main()
{
    char *num1 = "DC2";
    char *num2 = "0A3";

    printf("Result is %s", sumBase14(num1, num2));
    getchar();
    return 0;
}

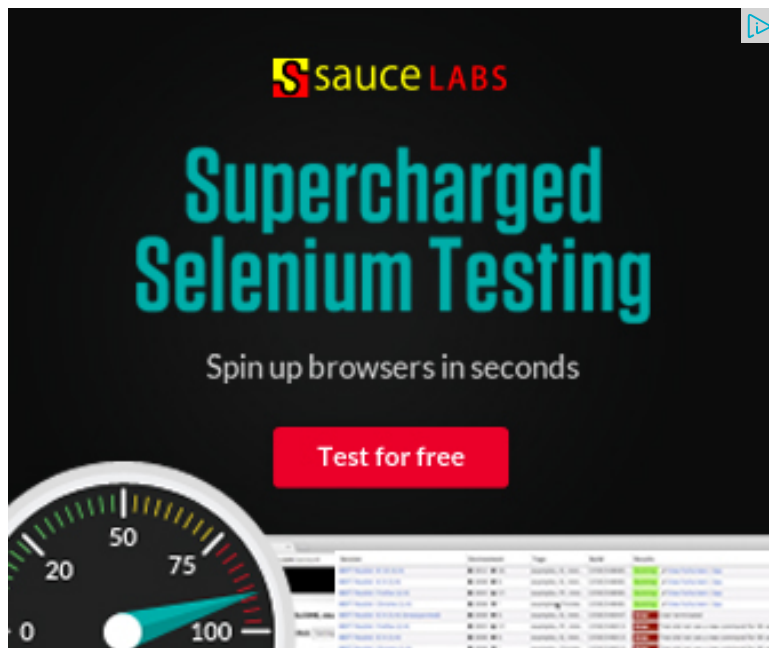
```

Notes:

Above approach can be used to add numbers in any base. We don't have to do string operations if base is smaller than 10.

You can try extending the above program for numbers of different lengths.

Please comment if you find any bug in the program or a better approach to do the same.



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with the algorithm...



EOF • 11 months ago

Can add two numbers of different lengths.

```
/**
 *
 * @author EOF
 * Please Note that the program can add base-14 numbers of length < 100
 * You may observe unpredictable behavior for length > 100.
 */

#include <iostream>
#define MAX_SIZ 100

using namespace std;

//Add three digits d1, d2 and d3 and store the sum in "sum"
//and carry in "carry"
void digitSum(char d1, char d2, char d3, char *sum, char *carry){
    int x, y, z, s, c;
```

see more

^ | v •



Dreamer • 2 years ago

I think NULL or terminating character is missing for res string??

^ | v •



Dreamer • 3 years ago

if(val >= 10 && val = 10 && val <= 13)

^ | v •



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