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## What is \_\_builtin\_popcount in c++?

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### 5 Answers



Pratik Shenoy, first\_language

Updated Oct 27, 2016

There is **NO** \_\_builtin\_popcount in c++, it's a **built in function of GCC**.

The function prototype is as follows:

```
int __builtin_popcount(unsigned int)
```

It returns the numbers of set bits in an integer (the number of ones in the binary representation of the integer).

For **example**,

```
cout<< __builtin_popcount (4);
```

The above code gives "1" as output.

*Why to use it?*

This function tries to use CPU specific instructions, which will always be orders of magnitude faster than any algorithm you manage to come up with.

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David Vandevor, Invented techniques. Coined SFINAE. Fixed angle brackets...

Answered Aug 4, 2017

As others have noted, there is currently no such standard function in C++, but it is available in GCC, Clang, and EDG. (And, as others also noted, it returns the number of 1-bits in the binary representation of the operand. Modern CPUs compute that in one cycle using a specialized instruction, and the intrinsic is mapped to that instruction.)

It is, however, among the bit operations that Jens Maurer has proposed for inclusion in the standard: [P0553R0: Bit operations](#) . My understanding is that at the 2017 Kona meeting, SG6 (the numerics working group) suggested it be put in the pipeline for C++20.

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Apoorv Singh, B.Tech Bachelor of Technology in Computer Science and Engineering (2020)

Answered Jul 17, 2017

**\_\_builtin\_popcount** is a **built in function of GCC compiler** not of any header file of C++.

**\_\_builtin\_popcount(int)** function is used to count the number of one's(set bits) in an integer.

prototype of \_\_builtin\_popcount is as follows

```
int __builtin_popcount(int N)
```

```
ex- int n=__builtin_popcount(4);
```

```
cout<<n;
```

Output: 1

If N is negative , it will still give correct answer (as negative numbers are stored in memory in 2's compliment form).

You can also make your own function to count number of set bits

```
int count_setbits(int N)
```

```
{ int cnt=0;
```

```
while(N>0)
```

```
{
```

```
cnt+=(N&1);
```

```
N=N>>1;
```

```
}
```

```
return cnt;
```

```
}
```

But the above function will work fine only for positive numbers.

ThankYou!

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Matthew Lai, Research Engineer @ Google DeepMind

Answered Jul 16, 2015

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Siraj Memon, 1+1 = 10

Answered Feb 28, 2017

`__builtin_popcount()`

Use: To count set bits in an integer.

Method: It uses lookup table to count set bits. Overall time complexity of this function is  $O(c)$  where  $c$  is a constant.

[Bit Twiddling Hacks](#)

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