**Блог пользователя Swift**

# C++ Tricks

Автор Swift, 5 лет назад,

I see lots of programmers write code like this one:

```
pair<int, int> p;
vector<int> v;
// ...
p = make_pair(3, 4);
v.push_back(4); v.push_back(5);
```

while you can just do this:

```
pair<int, int> p;
vector<int> v;
// ...
p = {3, 4};
v = {4, 5};
```

## 1. Assign value by a pair of {} to a container

I see lots of programmers write code like this one:

```
pair<int, int> p;
// ...
p = make_pair(3, 4);
```

while you can just do this:

```
pair<int, int> p;
// ...
p = {3, 4};
```

even a more complex `pair`

```
pair<int, pair<char, long long> > p;
// ...
p = {3, {'a', 8ll}};
```

What about `vector`, `deque`, `set` and other containers?

```
vector<int> v;
v = {1, 2, 5, 2};
for (auto i: v)
    cout << i << ' ';
cout << '\n';
// prints "1 2 5 2"


deque<vector<pair<int, int>>> d;
d = {{{3, 4}, {5, 6}}, {{1, 2}, {3, 4}}};
for (auto i: d) {
```

→ Лидеры (рейтинг)

| № | Пользователь | Рейтинг |
|---|---|---|
| 1 | MiFaFaOvO | 3681 |
| 2 | Um_nik | 3567 |
| 3 | tourist | 3520 |
| 4 | maroonrk | 3421 |
| 5 | apiadu | 3397 |
| 6 | 300iq | 3317 |
| 7 | ecnerwala | 3309 |
| 8 | Benq | 3283 |
| 9 | LHiC | 3229 |
| 10 | TLE | 3223 |

Страны | Города | Организации Всё →

→ Лидеры (вклад)

| № | Пользователь | Вклад |
|---|---|---|
| 1 | Errichto | 194 |
| 1 | antontrygubO_o | 194 |
| 3 | pikmike | 181 |
| 4 | vovuh | 177 |
| 5 | Ashishgup | 171 |
| 6 | Radewoosh | 169 |
| 7 | Um_nik | 166 |
| 7 | tourist | 166 |
| 9 | ko_osaga | 163 |
| 10 | McDic | 162 |

```
    for (auto j: i)
        cout << j.first << ' ' << j.second << '\n';
    cout << "-\n";
}
// prints "3 4
//         5 6
//         -
//         1 2
//         3 4
//         -"
```

```
set<int> s;
s = {4, 6, 2, 7, 4};
for (auto i: s)
    cout << i << ' ';
cout << '\n';
// prints "2 4 6 7"
```

```
list<int> l;
l = {5, 6, 9, 1};
for (auto i: l)
    cout << i << ' ';
cout << '\n';
// prints "5 6 9 1"
```

```
array<int, 4> a;
a = {5, 8, 9, 2};
for (auto i: a)
    cout << i << ' ';
cout << '\n';
// prints "5 8 9 2"
```

```
tuple<int, int, char> t;
t = {3, 4, 'f'};
cout << get<2>(t) << '\n';
```

Note that it doesn't work for `stack` and `queue`.

## 2. Name of argument in macros

You can use '#' sign to get exact name of an argument passed to a macro:

```
#define what_is(x) cerr << #x << " is " << x << endl;
// ...
int a_variable = 376;
what_is(a_variable);
// prints "a_variable is 376"
what_is(a_variable * 2 + 1)
// prints "a_variable * 2 + 1 is 753"
```

## 3. Get rid of those includes!

Simply use

```
#include <bits/stdc++.h>
```

This library includes many of libraries we do need in contest like `algorithm`, `iostream`, `vector` and many more. Believe me you don't need to include anything else!

## 4. Hidden function (not really hidden but not used often)

Всё →

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Хэндл:

Найти

→ Прямой эфир

eva_fan → Mifafaovo VS Tourist?

MikeMirzayanov → Эксперимент: обучение программированию с нуля через задачки

kazakhThunder → Need help in proving time complexity of code.

Stepavly → Codeforces Round #650 (Div. 3)

aop → Vasya and good Sequences

mohammedehab2002 → Codeforces round #649 editorial

Cache → Invitation to CodeChef June Long Challenge 2020

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hungrytired → Love of CF with 1337?

shejibri → One problem with several strange and pretty solutions.

Jellyman102 → An Efficient (and quite common) Way to Navigate Grid Problems [C++]

LM10_Piyush → Why std::cout gave me runtime error?

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Stepavly → Codeforces Round #644 (Div. 3) Editorial

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Okrut → Codeforces Round #647 Editorial

FastestFinger → Editorial — Codeforces Round #648

arujbansal → An Introduction To Difference Arrays

fantactic → Здравствуйте, не могли бы подсказать как удалить свой аккаунт?

pikmike → Разбор Educational Codeforces Round 86

Детальнее →

one)

```
__gcd(value1, value2)
```

You don't need to code Euclidean Algorithm for a gcd function, from now on we can use. This function returns gcd of two numbers.

**e.g.** __gcd(18, 27) = 9.

two)

```
__builtin_ffs(x)
```

This function returns 1 + least significant 1-bit of x. If x == 0, returns 0. Here x is `int` , this function with suffix 'l' gets a `long` argument and with suffix 'll' gets a `long long` argument.

**e.g.** __builtin_ffs(10) = 2 because 10 is '...10 **1** 0' in base 2 and first 1-bit from right is at index 1 (0-based) and function returns 1 + index.

three)

```
__builtin_clz(x)
```

This function returns number of leading 0-bits of x which starts from most significant bit position. x is `unsigned int` and like previous function this function with suffix 'l gets a `unsigned long` argument and with suffix 'll' gets a `unsigned long long` argument. If x == 0, returns an undefined value.

**e.g.** __builtin_clz(16) = 27 because 16 is ' **...** 10000'. Number of bits in a `unsigned int` is 32. so function returns 32 — 5 = 27.

four)

```
__builtin_ctz(x)
```

This function returns number of trailing 0-bits of x which starts from least significant bit position. x is `unsigned int` and like previous function this function with suffix 'l' gets a `unsigned long` argument and with suffix 'll' gets a `unsigned long long` argument. If x == 0, returns an undefined value.

**e.g.** __builtin_ctz(16) = 4 because 16 is '...1 **0000** '. Number of trailing 0-bits is 4.

five)

```
__builtin_popcount(x)
```

This function returns number of 1-bits of x. x is `unsigned int` and like previous function this function with suffix 'l' gets a `unsigned long` argument and with suffix 'll' gets a `unsigned long long` argument. If x == 0, returns an undefined value.

**e.g.** __builtin_popcount(14) = 3 because 14 is '... **111** 0' and has three 1-bits.

**Note:** There are other `__builtin` functions too, but they are not as useful as these ones.

**Note:** Other functions are not unknown to bring them here but if you are interested to work with them, I suggest this website.

## 5. Variadic Functions and Macros

We can have a variadic function. I want to write a sum function which gets a number of ints, and returns sum of them. Look at the code below:

```
int sum() { return 0; }

template<typename... Args>
int sum(int a, Args... args) { return a + sum(args...); }
int main() { cout << sum(5, 7, 2, 2) + sum(3, 4); /* prints "23" */ }
```

In the code above I used a template. sum(5, 7, 2, 2) becomes 5 + sum(7, 2, 2) then sum(7, 2, 2), itself, becomes 7 + sum(2, 2) and so on... I also declare another sum function which gets 0 arguments and returns 0.

I can even define a any-type sum function:

```
int sum() { return 0; }

template<typename T, typename... Args>
T sum(T a, Args... args) { return a + sum(args...); }

int main() { cout << sum(5, 7, 2, 2) + sum(3.14, 4.89); /* prints "24.03" */ }
```

Here, I just changed `int` to `T` and added `typename T` to my template.

In C++14 you can also use `auto sum(T a, Args... args)` in order to get sum of mixed types. (Thanks to **slycelote** and **Corei13**)

We can also use variadic macros:

```
#define a_macro(args...) sum(args)

int sum() { return 0; }

template<typename T, typename... Args>
auto sum(T a, Args... args) { return a + sum(args...); }

int main() { cout << a_macro(5, 7, 2, 2) + a_macro(3.14, 4.89); /* prints
"24.03" */ }
```

Using these 2, we can have a great debugging function: (thanks to **Igorjan94**) — *Updated!*

```
#include <bits/stdc++.h>

using namespace std;

#define error(args...) { string _s = #args; replace(_s.begin(), _s.end(), ',',
' '); stringstream _ss(_s); istream_iterator<string> _it(_ss); err(_it, args);
}

void err(istream_iterator<string> it) {}
template<typename T, typename... Args>
void err(istream_iterator<string> it, T a, Args... args) {
	cerr << *it << " = " << a << endl;
	err(++it, args...);
}

int main() {
	int a = 4, b = 8, c = 9;
	error(a, b, c);
}
```

Output:

```
a = 4
b = 8
c = 9
```

This function helps a lot in debugging.

## 6. Here is C++0x in CF, why still C++?

Variadic functions also belong to C++11 or C++0x, In this section I want to show you some great features of C++11.

one) Range-based For-loop

Here is a piece of an old code:

```
set<int> s = {8, 2, 3, 1};
for (set<int>::iterator it = s.begin(); it != s.end(); ++it)
    cout << *it << ' ';
// prints "1 2 3 8"
```

Trust me, that's a lot of code for that, just use this:

```
set<int> s = {8, 2, 3, 1};
for (auto it: s)
    cout << it << ' ';
// prints "1 2 3 8"
```

We can also change the values just change `auto` with `auto &` :

```
vector<int> v = {8, 2, 3, 1};
for (auto &it: v)
    it *= 2;
for (auto it: v)
    cout << it << ' ';
// prints "16 4 6 2"
```

two) The Power of `auto`

You don't need to name the type you want to use, C++11 can infer it for you. If you need to loop over iterators of a set<pair<int, pair<int, int> > > from begin to end, you need to type `set<pair<int, pair<int, int> > >::iterator` for me it's so suffering! just use auto it = s.begin()

also x.begin() and x.end() now are accessible using begin(x) and end(x).

There are more things. I think I said useful features. Maybe I add somethings else to post. If you know anything useful please share with Codeforces community :)

From **Ximera**'s comment:

this code:

```
for(i = 1; i <= n; i++) {
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " ";
    cout << "\n";
}
```

is equivalent to this:

```
for(i = 1; i <= n; i++)
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " \n"[j == m];
```

And here is the reason: `" \n"` is a `char*` , `" \n"[0]` is `' '` and `" \n"[1]` is `'\n'` .

From **technetium28**'s comment:

Usage of `tie` and `emplace_back` :

```
#define mt make_tuple
#define eb emplace_back
typedef tuple<int,int,int> State; // operator< defined
```

```
int main(){
  int a,b,c;
  tie(a,b,c) = mt(1,2,3); // assign
  tie(a,b) = mt(b,a); // swap(a,b)

  vector<pair<int,int>> v;
  v.eb(a,b); // shorter and faster than pb(mp(a,b))

  // Dijkstra
  priority_queue<State> q;
  q.emplace(0,src,-1);
  while(q.size()){
    int dist, node, prev;
    tie(dist, ode, prev) = q.top(); q.pop();
    dist = -dist;
    // ~~ find next state ~~
    q.emplace(-new_dist, new_node, node);
  }
}
```

And that's why `emplace_back` faster: `emplace_back` is faster than `push_back` 'cause it just construct value at the end of vector but `push_back` construct it somewhere else and then move it to the vector.

Also in the code above you can see how `tie(args...)` works. You can also use `ignore` keyword in `tie` to ignore a value:

```
tuple<int, int, int, char> t (3, 4, 5, 'g');
int a, b;
tie(b, ignore, a, ignore) = t;
cout << a << ' ' << b << '\n';
```

Output: `5 3`

I use this macro and I love it:

```
#define rep(i, begin, end) for (__typeof(end) i = (begin) - ((begin) > (end));
i != (end) - ((begin) > (end)); i += 1 - 2 * ((begin) > (end)))
```

First of all, you don't need to name the type you want to use. Second of all it goes forwards and backwards based on (begin > end) condition. e.g. `rep(i, 1, 10)` is 1, 2, ..., 8, 9 and `rep(i, 10, 1)` is 9, 8, ..., 2, 1

It works well with different types e.g.

```
vector<int> v = {4, 5, 6, 4, 8};
rep(it, end(v), begin(v))
    cout << *it << ' ';
// prints "8 4 6 5 4"
```

Also there is another great feature of C++11, lambda functions!

Lambdas are like other languages' closure. It defines like this:

```
[capture list](parameters) -> return value { body }
```

one) Capture List: simple! We don't need it here, so just put `[]`

two) parameters: simple! e.g. int x, string s

three) return value: simple again! e.g. pair<int, int> which can be omitted most of the times (thanks to **Jacob**)

four) body: contains function bodies, and returns return value.

e.g.

```
auto f = [] (int a, int b) -> int { return a + b; };
cout << f(1, 2); // prints "3"
```

You can use lambdas in `for_each` , `sort` and many more STL functions:

```
vector<int> v = {3, 1, 2, 1, 8};
sort(begin(v), end(v), [] (int a, int b) { return a > b; });
for (auto i: v) cout << i << ' ';
```

Output:

```
8 3 2 1 1
```

From **Igorjan94**'s comment:

Usage of `move` :

When you work with STL containers like `vector` , you can use `move` function to just move container, not to copy it all.

```
vector<int> v = {1, 2, 3, 4};
vector<int> w = move(v);

cout << "v: ";
for (auto i: v)
    cout << i << ' ';

cout << "\nw: ";
for (auto i: w)
    cout << i << ' ';
```

Output:

```
v:
w: 1 2 3 4
```

As you can see `v` moved to `w` and not copied.

## 7. C++0x Strings

one) Raw Strings (From **IvayloS**'s comment)

You can have UTF-8 strings, Raw strings and more. Here I want to show raw strings. We define a raw string as below:

```
string s = R"(Hello, World!)"; // Stored: "Hello, World!"
```

A raw string skips all escape characters like `\n` or `\"` . e.g.

```
string str = "Hello\tWorld\n";
string r_str = R"(Hello\tWorld\n)";
cout << str << r_str;
```

Output:

```
Hello	World
Hello\tWorld\n
```

You can also have multiple line raw string:

```
string r_str =
R"(Dear Programmers,
I'm using C++11
Regards, Swift!)";
cout << r_str;
```

Output:

```
Dear Programmer,
I'm using C++11
Regards, Swift!
```

two) Regular Expressions (regex)

Regular expressions are useful tools in programming, we can define a regular expression by `regex` e.g. `regex r = "[a-z]+";` . We will use raw string for them because sometimes they have `\` and other characters. Look at the example:

```
regex email_pattern(R"(^[a-zA-Z0-9_.+-]+@[a-zA-Z0-9-]+\.[a-zA-Z0-9-.]+$)"); //
This email pattern is not totally correct! It's correct for most emails.

string
valid_email("swift@codeforces.com"),
invalid_email("hello world");

if (regex_match(valid_email, email_pattern))
    cout << valid_email << " is valid\n";
else
    cout << valid_email << " is invalid\n";

if (regex_match(invalid_email, email_pattern))
    cout << invalid_email << " is valid\n";
else
    cout << invalid_email << " is invalid\n";
```

Output:

```
swift@codeforces.com is valid
hello world is invalid
```

**Note:** You can learn Regex in this website.

three) User-defined literals

You already know literals from C++ like: `0xA` , `1000ll` , `3.14f` and so on...

Now you can have your own custom literals! Sounds great :) So let's see an example:

```
long long operator "" _m(unsigned long long literal) {
        return literal;
}

long double operator "" _cm(unsigned long long literal) {
        return literal / 100.0;
}

long long operator "" _km(unsigned long long literal) {
        return literal * 1000;
}

int main() {
        // See results in meter:
        cout << 250_m << " meters \n"; // Prints 250 meters
        cout << 12_km << " meters \n"; // Prints 12000 meters
        cout << 421_cm << " meters \n"; // Prints 4.21 meters
}
```

Note that a literal should start with an underscore ( `_` ). We declare a new literal by this pattern:

```
[returnType] operator "" _[name]([parameters]) { [body] }
```

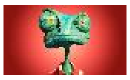
> note that parameters only can be one of these:
>
> `(const char *)`
>
> `(unsigned long long int)`
>
> `(long double)`
>
> `(char)`
>
> `(wchar_t)`
>
> `(char16_t)`
>
> `(char32_t)`
>
> `(const char *, size_t)`
>
> `(const wchar_t *, size_t)`
>
> `(const char16_t *, size_t)`
>
> `(const char32_t *, size_t)`
>
> Literals also can used with templates.

Обсуждение Test
c++, c++0x, tricks

+971 Swift 5 лет назад 208

## Комментарии (208)

Написать комментарий?


mm_kishor

5 лет назад, # | +7

Its awesome. Thanks Swift :)
→ Ответить

slycelote

5 лет назад, # | +7

Your `sum` function returns an incorrect result for `sum(1, 1.5)` . To fix, declare the return type as `auto` .
→ Ответить

Swift

5 лет назад, # ^ | ← Rev. 2 +5

My sum function designed to sum numbers from one type. I mean integers, doubles, ... not mix of these types. BTW, How should I use auto in that function?

I mean you can't have a `auto` return type for any function as far as I know.
→ Ответить

slycelote

5 лет назад, # ^ | +6

http://ideone.com/6l4Wc7
→ Ответить

Swift

5 лет назад, # ^ | +5

Interesting! my Xcode can't compile that code. I'll edit blog post.

Thank you.
→ Ответить

4 года назад, # ^ | ☆ 0

Ahmadshallouf

my xcode doesn't allow __gcd or any function that start with __builtin. and doesn't allow bits/stdc++.h

how do you do it in your Xcode ?

and thanks for the entry.

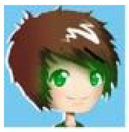
→ Ответить

3 года назад, # ^ | ☆ 0

_Noor

Download this file :https://gist.github.com/reza-ryte-club/97c39f35dab0c45a5d924dd9e50c445f and then include stdc++.h to your code, before submitting your code change it to bits/stdc++.h .

→ Ответить


EeOneGuy

5 лет назад, # ^ | ☆ +5

Why not? http://pastie.org/9817864

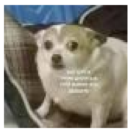
→ Ответить

Swift

5 лет назад, # ^ | ☆ ← Rev. 2 +5

Your code has `decltype` (actually because of `->`). Xcode won't compile code without it. However IDEONE compiles it. So I edited my post.

→ Ответить


nic11

5 лет назад, # ^ | ☆ +5

Isn't `decltype` C++14?

→ Ответить

Swift

5 лет назад, # ^ | ☆ +5

I suppose not.

→ Ответить

interestingLSY

7 месяцев назад, # ^ | ☆ 0

It's supported since c++14. :)

→ Ответить

EeOneGuy

5 лет назад, # | ☆ ← Rev. 4 -23

Комментарий скрыт по причине большого числа негативных отзывов о нем, нажмите здесь для его просмотра

→ Ответить

determinism

5 лет назад, # | ☆ ← Rev. 2 +5

It's better to use auto& in range-based loop when the object is not primitive (e.g pair, vector). UPD: I realized that you mention it at the end, but there are some code written poorly because of that in the first part.

→ Ответить

samiemad

4 года назад, # ^ | ☆ 0

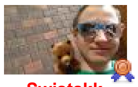
actually, compiler optimizations will get rid of the extra copy operations if you are not modifying the element. so I don't think it will be any slower in runtime compared to auto&.

You can use auto& if you are too suspicious, but I don't think that the first part is categorized as 'written poorly'. it is just OK.
→ Ответить

retrograd

4 года назад, # ^ | ☆ 0

`const auto&` is even better if you want to be really strict about it.
→ Ответить


Swistakk

5 лет назад, # | ☆ +18

"these things are belong to C++11" — https://www.youtube.com/watch?v=8fvTxv46ano :)
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

LMAO =))
→ Ответить

GiveMinus

5 лет назад, # | ☆ -72
→ Ответить

Комментарий скрыт по причине большого числа негативных отзывов о нем, нажмите здесь для его просмотра

Swistakk

5 лет назад, # | ☆ +4

**mukel** already has written nice "C++11 for dummies" tutorial http://codeforces.com/blog/entry/10124 . I think it's a good idea to provide that link directly in entry.
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

Excellent tutorial, I'll add it at top of blog.
→ Ответить

IWillBeRed

5 лет назад, # | ☆ +10

Could you give link to compiler that you use? Because I get CE on my GNU 4.7.1:)
→ Ответить

Swift

5 лет назад, # ^ | ☆ ← Rev. 2 +5

In CF, use `GNU C++0x 4` instead of `GNU C++ 4.7` .

Get latest GCC, and from your terminal/cmd use one of these flags `-std=gnu++11` or `-std=c++11` You can download it for your computer: Windows —
→ Ответить

shashanktandon

5 лет назад, # | ☆ 0

Thanks for such a nice explanation...
→ Ответить

fushar

5 лет назад, # | ☆ +5

Anyone knows how to include <bits/stdc++.h> on OS X? I am already using gcc but it cannot found that header...
→ Ответить

5 лет назад, # ^ | ☆ 0

1. Go to:

1. Go to: `/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1`
2. Create a folder named `bits`
3. Add a file into that named `stdc++.h`
4. Edit it and include libraries

Swift

→ Ответить

J4T8Z9

5 лет назад, # ^ | ☆ 0

yeah, that works, I did the same :)

→ Ответить

fushar

5 лет назад, # ^ | ☆ 0

What is the content of the file (stdc++.h)?

→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

Here: https://gist.github.com/eduarc/6022859

→ Ответить

fushar

5 лет назад, # ^ | ☆ 0

Ah, forgot to say. Thank you! It worked :)

→ Ответить

josemanuel101

5 лет назад, # ^ | ☆ ← Rev. 2 0

Thanks for sharing! Works like a breeze. For those who don't have Xcode, but have the command line developer tools installed, go to: `/Library/Developer/CommandLineTools/usr/include/c++/v1` in step one.

→ Ответить

MrNull

4 года назад, # ^ | ☆ 0

there is another way: install GCC using brew terminal package manager!

→ Ответить

Corei13

5 лет назад, # | ☆ +4

The second sum function (with `auto` ) is `C++14` standard, not `C++11` . `C++11` doesn't allow function without a return type.

→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

Thanks for sharing your knowledge to us! That's why Xcode couldn't compile that. Now I tested it with C++14 and everything is OK. So let's make it clear in blog.

→ Ответить

Corei13

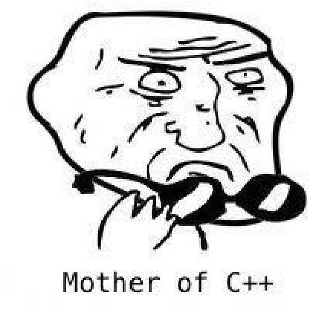
5 лет назад, # ^ | ☆ +32

And it is still possible to write sum (or other) functions for mixed type using `std::common_type`

```
template <typename A, typename B>
auto sum(A a, B b) -> typename common_type<A,
B>::type {
    return static_cast<typename common_type<A,
B>::type>(a) + static_cast<typename common_type<A,
B>::type>(b);
}

template <typename A, typename B, typename ... Args>
template <typename A, typename B, typename... Args>
auto sum(A a, B b, Args... args) -> typename
common_type <A, B, Args...>::type {
    return sum(sum(a, b), args...);
}

int main() {
    cout << sum(5, 7, 2, 2) + sum(3.14, 4.89) <<
endl;      // 24.03
    cout << sum (complex <double>(1, 2), 1.3, 2) <<
endl;   // (4.3,2)
}
```
→ Ответить

5 лет назад, # ^ | ☆ +65

Swift



→ Ответить

5 лет назад, # | ☆ +3

Baklazan

As for `__gcd()` , it may be a little tricky at some compilers.
→ Ответить

5 лет назад, # | ☆ ← Rev. 2 +30

Na2a

The best thing is that you can write like this (C++11 vs C++) :D

```
vector<pair<int, int>> v;
```

instead of this

```
vector<pair<int, int> > v;
```
→ Ответить

5 лет назад, # ^ | ☆ -54
→ Ответить

GiveMinus

Комментарий скрыт по причине большого числа негативных отзывов о нем, нажмите здесь для его просмотра

5 лет назад, # ^ | ☆ +27

Xellos

→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

If C++ is that bad, why all of your codes are in this language?

→ Ответить

GiveMinus

5 лет назад, # ^ | ☆ 0

give a kiss baby :)

→ Ответить

Swift

5 лет назад, # ^ | ☆ +65

Here you are:

→ Ответить

GiveMinus

5 лет назад, # ^ | ☆ +1

tanx

→ Ответить

Batman

5 лет назад, # ^ | ☆ +9

Cause he don't do them...

(cheat)

→ Ответить

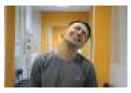
0

Swift

5 лет назад, # |

Yep. I also do this in my post: `deque<vector<pair<int, int>>> d;`

→ Ответить


Ximera

5 лет назад, # | ← Rev. 2 +31

May be you can tell something more about this

```
for(i = 1; i <= n; i++) {
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " ";
    cout << "\n";
}

for(i = 1; i <= n; i++)
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " \n"[j == m];
```

→ Ответить

Swift

5 лет назад, # | ← Rev. 3 +32

Well, Great creativity :)

`" \n"` is a char*, " \n"[0] is ' ' and " \n"[1] is '\n'.

Also this is a correct one too:

```
for (int i = 1; i <= n; i++)
                for (int j = 1; j <= m; j++)
                        cout << a[i][j] << (j == m)[" \n"];
```

It's because e.g. a[8] and 8[a] are the same thing both of them are (a + 8)* and (8 + a)*.

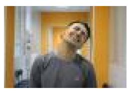
→ Ответить

GiveMinus

5 лет назад, # | -13

no

→ Ответить


Ximera

5 лет назад, # | 0

Actually `" \n"[j == m]` was correct, but that doesn't matter at all now :)

→ Ответить

Swift

5 лет назад, # | 0

Oops! You're right!

→ Ответить

Nizil

8 месяцев назад, # | 0

They aren't exactly equivalent to the original because in the original there is one extra space at the end of each line. I still like the idea.

→ Ответить

__builtin__wolfy

5 лет назад, # | +1

For a while, I thought that this is Iverson's bracket :D

→ Ответить

5 лет назад, # | ← Rev. 2 +14

Do you know tie and emplace ?

```
#define mt make_tuple
```

tubo28

```
#define mt make_tuple
#define eb emplace_back
typedef tuple<int,int,int> State; // operator< defined

int main(){
  int a,b,c;
  tie(a,b,c) = mt(1,2,3); // assign
  tie(a,b) = mt(b,a); // swap(a,b)

  vector<pair<int,int>> v;
  v.eb(a,b); // shorter and faster than pb(mp(a,b))

  // Dijkstra
  priority_queue<State> q;
  q.emplace(0,src,-1);
  while(q.size()){
    int dist, node, prev;
    tie(dist, ode, prev) = q.top(); q.pop();
    dist = -dist;
    // ~~ find next state ~~
    q.emplace(-new_dist, new_node, node);
  }
}
```

→ Ответить

5 лет назад, # ^ | ☆ 0

Swift

Such a great feature.

`emplace_back` is faster than `push_back` 'cause it just construct value at the end of vector but `push_back` construct it somewhere else and then move it to the vector.

→ Ответить

5 лет назад, # | ☆ 0

HekpoMaH

Can you get the previous element in an, let's say, vector using `auto` ? Here is why `auto` is not the best option for dp-like tasks where you need information from the previous elements.

→ Ответить

5 лет назад, # ^ | ☆ ← Rev. 3 +4

Swift

Use this approach:

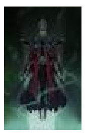
```
vector<int> dp = {4, 5, 6, 4, 8};
for (auto i = ++dp.begin(); i != dp.end(); ++i)
    *i += *(i - 1);
for (auto i: dp)
    cout << i << '\n';
```

Output:

```
4
9
15
19
27
```

Use range-based for-loop only when you want exact element, when you need to access other elements use normal for-loop, but this doesn't mean that you can't use auto in that for-loop.

→ Ответить


HekpoMaH

5 лет назад, # ^ | ☆ 0

Hm, I didn't know it could be done. Still, it is easier with normal for loop.

→ Ответить

Swift

5 лет назад, # ^ | ☆ ← Rev. 3 +3

Btw, using `auto` is just for inferring type you are working with. If your type is `int`, it's better to use that ('cause it's just 3 characters) but if your type is `std::vector<std::pair<std::set<int>, bool>>::iterator` so I think using `auto` is a must :)

→ Ответить

HekpoMaH

5 лет назад, # ^ | ☆ 0

XD yeah I agree about this one.

→ Ответить

Rezwan.Arefin01

3 года назад, # ^ | ☆ 0

Just saying. Cumulative sum can be done only with this-

```
vector<int> dp = {4, 5, 6, 4, 8};
partial_sum(dp.begin(), dp.end(), dp.begin());
```

→ Ответить

rlac

5 лет назад, # | ☆ +13

In 2, I use:

`#define DB(x) cerr << __LINE__ << ": " << #x << " = " << (x) << endl`

In this way I get the number of the line in which this instruction is executed. It's useful when we have more than one variable with the same name. Also, x needs to be enclosed in parenthesis due to operators precedence.

→ Ответить

aremo

5 лет назад, # | ☆ 0

would you please tell me about vector ,i don't know anything about that !

→ Ответить

yarak

5 лет назад, # ^ | ☆ ← Rev. 2 0

vector

→ Ответить

yzmyyff

5 лет назад, # | ☆ 0

Its useful! Thanks for sharing.

→ Ответить

determinism

5 лет назад, # | ☆ ← Rev. 2 +6

You say that "Variadic functions also belong to C++11", but that's not really correct. Even C had variadic functions. New feature in C++11 is variadic templates.

→ Ответить

Swift

5 лет назад, # ^ | ☆ +3

Yeah. You're right. Here I used variadic template so I said it's for C++11.

→ Ответить

Baklazan

5 лет назад, # | ☆ +1

I thing you should consider defining short version of your blog post, now that it is on the main page.

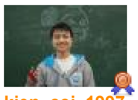
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

OK. I'll do it.

→ Ответить


kien_coi_1997

5 лет назад, # | ☆ +27

In my country, at this time, we are not allowed to use C++11 in national contest.

→ Ответить

I_love_Hoang_Yen

5 лет назад, # ^ | ☆ 0

Is C++11 being used in IOI? If this is the case, I guess it should not be hard to convince the judge committee to change.

→ Ответить

Tensor

5 лет назад, # | ☆ 0

if i have a vector < pair<int, pair<int, int> > > a;

could i use emplace_back to insert {1, {2, 3} }? i tries to emplace_back(1, 2, 3); but of course it's an error.

thanks in advance :-)

→ Ответить

riadwaw

5 лет назад, # ^ | ☆ 0

You could emplace_back($^1$, mp(2,3))

→ Ответить

Tensor

5 лет назад, # ^ | ☆ 0

thank you for replying. i was looking forward for a method like that above something like (1, 2, 3); as i don't like using macros, something that's faster to write.

thanks in advance :)

→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

Don't use `pair<int, pair<int, int>>` ! Code less and use `tuple<int, int, int>` :

```
vector<tuple<int, int, int>> v;
v.emplace_back(1, 2, 3);
```

→ Ответить

Baklazan

5 лет назад, # ^ | ☆ +3

Well, actually sometimes `pair<int, pair<int,int> > x;` may make more sense than `tuple<int,int,int> x;` , for instance when `x.second` are coordinates of some point and `x.first` is some property of this point.

→ Ответить

Swift

5 лет назад, # ^ | ☆ ← Rev. 2 +10

When working with tuples, you don't really use get(tuple) you do use tie:

```
tie(point_property, pointx, pointy) =
some_tuple;
```

And that makes sense.

→ Ответить

5 лет назад, # ^ | ☆ 0

then you probably have that point as a variable, not

riadwaw

then you probably have that point as a variable, not as two coordinates.

→ Ответить

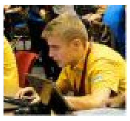
Baklazan

5 лет назад, # ^ | ☆ 0

I often use

```
#define X first
#define Y second
#define pii pair<int, int>

pii point;
```

→ Ответить


Rubanenko

5 лет назад, # ^ | ☆ +25

Yeah let's write ugly unreadable code with nested pairs and macros instead of class/struct.

→ Ответить

Baklazan

5 лет назад, # ^ | ☆ +8

I totally agree that classes/structs are more readable. I just wanted to point out that in some cases `tuple<int,int,int>` is less readable (at least for me) than `pair<int, pair<int,int> >`.

→ Ответить

EvgeniSergeev

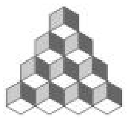
4 года назад, # ^ | ☆ 0

The real solution to this would be something that lets us write

```
struct dist_xy {
    const int dist, x, y;
};
```

and then would supply a commonsense `bool operator< (..)` automatically.

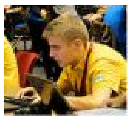
→ Ответить


AkshajK

5 лет назад, # | ☆ 0

Thanks for this! I'm sure many of us would also be interested in a Java tricks article! :)

→ Ответить


Rubanenko

5 лет назад, # ^ | ☆ +38

The advantage of Java is that there are no tricks.

→ Ответить

Swift

5 лет назад, # ^ | ☆ ← Rev. 2 0

I can also write an article about **Swift**'s tricks. But no one here, cares about that language :)

→ Ответить

Igorjan94

5 лет назад, # | ☆ ← Rev. 2 +3

your debugging function doesn't work for `#args` with spaces so, I think it's better to rewrite split to more universal

```
vector<string> split(const string& s, char c) {
    vector<string> v;
    stringstream ss(s);
    string x;

    while (getline(ss, x, c))
    while (getline(ss, x, c))
        v.eb(x); //emplace_back
    return std::move(v);
}
```

(Note no copying because of move, another cpp trick)
and macro will be:

```
#define err(args...) {\
    vector<string> _v = split(#args, ',');\
    err(_v.begin(), args);\
}
```

→ Ответить

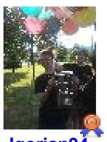
Swift

5 лет назад, # ^ | ☆ 0

It also brings default space before arguments, e.g. `err(a, b)` outputs:

```
a = value1
 b = value2
```

but it's better for arguments like `a + b` so I'll replace it with my code.
→ Ответить



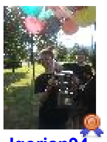
Igorjan94

5 лет назад, # ^ | ☆ ← Rev. 3 0

oh, yep, I forgot I changed your err to

```
void err(vector<string>::iterator it) {}
template<typename T, typename... Args>
void err(vector<string>::iterator it, T a, Args...
args) {
        cerr << it->substr((*it)[0] == ' ') << " = "
<< a << '\n';
        err(++it, args...);
}
```

→ Ответить



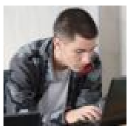
Igorjan94

5 лет назад, # ^ | ☆ 0

if you are interested in it, I also have writeln and readln on variadic templates, which helps to write smth like this:

```
int n; vector<pair<int, pair<int, long long>>> a;
long long l; char c; string s; double d; // just any
combination of fundamental types + vector/pair
readln(n, a, l, c, s, d);
writeln(n, a, l, c, s, d);
```

you can find it here 9388829(I deleted all spaces for more compact view)
if trailing space is unimportant, half of code can be deleted:)
it can be simply extended on user's types by overloading ostream and istream operators
this template is with cin/cout, and this->9316393 with scanf/printf
yes, looks awful, and for only prewritten use:)
→ Ответить



dj3500

5 лет назад, # ^ | ☆ +6

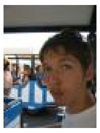
Actually this use of `std::move` is superfluous. The compiler will move the return value automatically (search for: return value optimization).
→ Ответить

5 лет назад, # | ☆ ← Rev. 3 +1

One can omit return type in lambda expression in most cases.

P.S. I have to say, 'tie' looks awesome. I need to start using it.

P.S. I have to say, tie looks awesome, I need to start using it.
→ Ответить


Jacob

5 лет назад, # | ☆ +4

Kvark161

You haven't to specify return type in lambda functions if all return values are the same type.

```
auto f1 = [](int a, int b) {return a < b;}; // ok: return type is
bool

auto f2 = [](int a, double b) {
             if (a == 0)
                 return b;
             else
                 return a;}; // error: is return type double or int?

auto f3 = [](int a, double b)->double {
             if (a == 0)
                 return b;
              else
                 return a;}; // ok: return type is double

auto f4 = [](double a, double b) {
             if (a < 0)
                 return a;
             else
                 return pow(a, b);}; // ok: return type is double
```

see more about lambda functions
→ Ответить

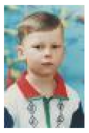
5 лет назад, # | ☆ +1

Tensor

you can even write your own recursive functions inside the main in lambdas, that's really cool and useful for less code.

But here instead of using auto you should specify the return type and the parameters type of the lambda expression.

see my submission here
→ Ответить


anthonycherepkov

5 лет назад, # | ☆ 0

Thanks. Useful information.
→ Ответить

hsnprsd

5 лет назад, # | ☆ 0

Thank you so much :) I learned a lot :D
→ Ответить

CFpolice

5 лет назад, # | ☆ -16

+669 for vain' blog !why?
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

You are **GiveMinus**! Both of you have a comment "give a kiss baby :)"

give a kiss baby :)
→ Ответить

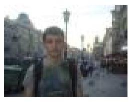
+21

**Xellos**

5 лет назад, # ^ | ☆

+726 for a lot of useful info, that's why.

→ Ответить



**n.eugene**

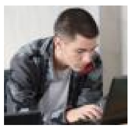
5 лет назад, # | ☆ ← Rev. 20 +9

```
warning: ISO C does not permit named variadic macros [-Wvariadic-
macros]
#define error(args...)
             ^
```

could write:

```
#define error(...) { vector<string> _v = split(#__VA_ARGS__, ',');
err(_v.begin(), __VA_ARGS__);}
```

→ Ответить



**dj3500**

5 лет назад, # | ☆ 0

The example which is now given for `move` (define `w = move(v)` and then output contents of `v` ) is actually undefined behaviour. What the compiler will actually do in this situation is just swap the contents of the two vectors ( `v` with the empty `w` ); however, in theory `v` is now "junk" and should not be touched at all (it can not even be a vector with arbitrary contents, but just something referring to some arbitrary place in memory, which might, in theory, no longer correspond to any correct contents of a vector, and it can do basically anything when its methods (such as the range-based for loop) are called).

→ Ответить

**SirNickolas**

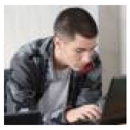
5 лет назад, # ^ | ☆ +25

http://cplusplus.com/reference/vector/vector/operator=

"The move assignment (2) moves the elements of x into the container (x is left in an unspecified **but valid state**)."

We'd better call `v.clear()` after `w = move(v)` to bring `v` to a determinate (empty, actually) state. And then we can access it.

→ Ответить



**dj3500**

5 лет назад, # ^ | ☆ 0

Didn't know that. Thanks for the correction!

→ Ответить

**sparks**

5 лет назад, # | ☆ ← Rev. 2 0

Variadic functions and macros are awesome. Now I've got unique functions for debug, input and output, no more gi2, gi3, ... !!!

→ Ответить

**IvayloS**

5 лет назад, # | ☆ ← Rev. 3 +20

I like the string literals fucntionality. Sometime it can make code much simpler, especially for competitions:

```
#include <iostream>
using namespace std;

int main() {
        string test = R"END(
                let's test a multiline string
                that can have special chars like ''
                or even ""
                and not to forget \
                and no need to escape!
                This rocks !)END";
        cout << test << endl;
        return 0;
```

```
    return 0;
}
```

And the result on ideone can be seen here.

→ Ответить

Swift

5 лет назад, # | ☆ 0

I didn't know about this! Thank you. Could you please write a tutorial about this, I'll move it to this post.

→ Ответить

IvayloS

5 лет назад, # | ☆ +5

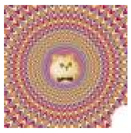
c++11 also introduces a set of new string literals. Some of them are really useful for professional programming, but not very helpful for competitions(like UTF-8, UTF-16 and UTF-32 literals) and thus they are not that much of an interest(you can read about them in the wiki article that I link to). However one type of string literal is particularly interesting — the raw string literal. To write a raw string literal you need to prefix the opening quotes with R and immediately after the quotes you should write some delimiter, the delimiter can be a string of up to 16 characters and should not contain whitespace or control characters, You should terminate the string with the same delimiter before the closing quote and also the string should be in brackets(after the delimiter). Here is an example usage:

```
int main() {
        string test = R"END(
                let's test a multiline string
                that can have special chars like ''
                or even ""
                and not to forget \
                and no need to escape!
                This rocks !
                )END";
        cout << test << endl;
        return 0;
}
```

And the output can be seen here.

Note that the string can span multiple lines and that you don't need to escape special characters in it. In this case I use END as my delimiter.

→ Ответить


vsamsonov

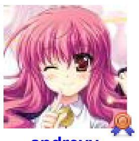
5 лет назад, # | ☆ ← Rev. 4 +17

Following is also useful for GCC. Very fast ASM bit operations:

Note, that **offset** can be >=32, any valid offset will work. However, I didn't know if inline assembly allowed in CF. Should work.

```
/* Read bit and set to zero */
inline bool btr (volatile void * mem, size_t offset) {
        bool result;
        __asm__ (
                "btr %2, %1; setc %0;"
                : "=r" (result), "+m" (* (volatile long *) mem)
                : "r" (offset)
                : "cc");
        return result;
}

/* Read bit and set to one */
inline bool bts (volatile void * mem, size_t offset) {
        bool result;
        __asm__ (
                "bts %2, %1; setc %0;"
                "bts %2, %1; setc %0;"
                : "=r" (result), "+m" (* (volatile long *) mem)
                : "r" (offset)
                : "cc");
        return result;
}

/* Bit value */
inline bool bittest (volatile void * mem, size_t offset) {
        bool result;
        __asm__ (
                "bt %1, %2; setc %0;"
                : "=r" (result)
                : "r" (offset), "m" (* (volatile long *) mem)
                : "cc");
        return result;
}

/* Set bit to one */
inline void bitset1 (volatile void * mem, size_t offset) {
        __asm__ ("bts %1, %0;" : "+m" (* (volatile long *) mem) : "r"
(offset) : "cc");
}

/* Set bit to zero */
inline void bitset0 (volatile void * mem, size_t offset) {
        __asm__ ("btr %1, %0;" : "+m" (* (volatile long *) mem) : "r"
(offset) : "cc");
}
```

→ Ответить

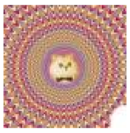


andreyv

5 лет назад, # ^ | ☆ 0

Why do you need `volatile` everywhere?

→ Ответить

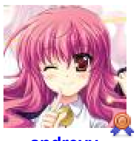


vsamsonov

5 лет назад, # ^ | ☆ ← Rev. 2 0

Just to make sure that value is actually changed. It gives information to the compiler that memory is changed indirectly (inside **asm** block), to avoid unexpected optimizations. Modern compilers have aggressive optimizations. If you used some value from memory, compiler probably saved it to intermediate register. Let's imagine, that you then called bitset on that memory and used value again. Compiler may decide: "Ok, he didn't even touched that **mem** variable, I'll use the old value". But it's wrong. You changed it inside **asm** block. Everything inside **asm** — direct instructions to processor, compiler doesn't know what you are doing there.

→ Ответить



andreyv

5 лет назад, # ^ | ☆ +11

Yes, GCC does not know what is inside the asm block. However, GCC does know which variables are used and modified — you specified this yourself in the asm block input/output operands! In particular, `"+m"` should tell GCC that this variable/location in memory is read and modified.

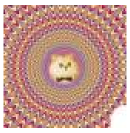
You can see that GCC indeed reloads the value as it should here: http://goo.gl/Jz8SYH. If GCC thought the variable was unmodified, it would do

```
movl    $31, %eax
```

instead (comment out the `btr()` call to see this).

Bottom line: `volatile` is not needed in correct code. The only valid uses for `volatile` I can think of are signal handler flags and hardware

think of are signal handler flags and hardware registers that are mapped in memory.
→ Ответить


vsamsonov

5 лет назад, # ^ | ☆ 0

Well, it seems like `volatile` is indeed redundant in this case. Clobber "+m" should take care of all things. I put it there just in case. Because redundant information isn't a problem, but lack of information is. `volatile` also comes in handy in multithreaded programs, when you are messing up with custom synchronization/locking technique. Actually anything that involves shared memory involves volatile somehow. In regular programs volatile rarely used, because everything is already written (like synchronization primitives/threadsafe data structures...) and program uses high-level functions for this.
→ Ответить

andreyv

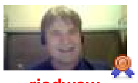
5 лет назад, # ^ | ☆ +8

I'm sorry for being a nerd, but `volatile` can't be used to implement thread synchronization primitives too. Even `volatile sig_atomic_t` won't do. You are confusing `volatile` with atomic operations, which are two different things.
→ Ответить

IvayloS

5 лет назад, # | ☆ 0

Please note that regex is part of the standard but it is not part of g++(at least prior to 4.9). Have a look here. I'm not 100% sure but I think code with regex will not compile on codeforces.
→ Ответить


riadwaw

5 лет назад, # ^ | ☆ 0

actually, regex's compile fine on g++4.6 or 4.7 (I don't remember) but they just worked incorrectly.
→ Ответить

IvayloS

5 лет назад, # ^ | ☆ 0

As is mentioned in the bug I relate to, some of the functionality is not working as expected and some of not implemented at all. As per the comments in the bug I think this is fixed in 4.9. However I think codeforces uses an earlier version.
→ Ответить

LittleDreamer

5 лет назад, # | ☆ 0

array<int, 4> a; a = {5, 8, 9, 2};

This code fails on c++11 compilation with error error: no match for ‘operator=’ in ‘a’ no known conversion for argument 1 from ‘’ to ‘const std::array<int, 4ul>&’

Need additional braces a = {{5, 8, 9, 2}};
→ Ответить

5 лет назад, # | ☆ ← Rev. 3 -19

I use some tricks too, for example:

Input in vector n elements:

levonog

`for ( int i = 0 ; i < n ; cin >> vec [ i++ ] );`

Or analog of:

```
for(i = 1; i <= n; i++) {
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " ";
   cout << "\n";
}

//

for(i = 1; i <= n; i++ , cout << endl)
    for(j = 1; j <= m; j++)
        cout << a[i][j] << " ";
```

→ Ответить

nic11

5 лет назад, # ^ | ☆ +14

I would call it not a C++ trick, but a creative way to use for in C++. It's indeed shorter (just a little), but the code is unreadable IMHO.

→ Ответить

multisystem

5 лет назад, # | ☆ +11

This is really priceless!

Just another two tricks that might help.

`std::string to_string( int value ); // Converts a numeric value to std::string.`

`int stoi( const std::string& str, std::size_t* pos = 0, int base = 10 ); // Interprets a signed integer value in the string str.`

For more information, review std::to_string and std::stoi.

→ Ответить

TERMINATOR_228

5 лет назад, # | ☆ +1

Thanks, very interesting. Let's do blogs like this often!

→ Ответить

xpertcoder

5 лет назад, # | ☆ ← Rev. 2 0

Can someone tell what I am doing wrong with trick `__builtin_popcount` where it's written `function with suffix 'l' gets a unsigned long argument and with suffix 'll' gets a unsigned long long argument` in this problem

485C - Bits

Solution 9506498 gives WA because of overflow.

→ Ответить

sparik

5 лет назад, # ^ | ☆ +1

`1ll<<i`

→ Ответить

xpertcoder

5 лет назад, # ^ | ☆ 0

Thanks man!! and after that contest I cursed `__builtin_popcount` for making me lose points :P .

I wonder then what is the difference between `__builtin_popcount` and `__builtin_popcountll` as both solution give AC. I thought `__builtin_popcount` should give wrong result if I send long long as an argument.

9506854 --> __builtin_popcountll

and 9506856 __builtin_popcount

→ Ответить

Alsh_compiler

5 лет назад, # | ☆ 0

please show us some tricks in swift language :D :D

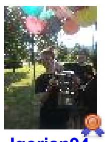
→ Ответить

Hepic_Antony_Skarlatos

5 лет назад, # | ☆ 0

One of the best quick C++/STL tutorials,I have ever read. Congratulations to people who helped for this tut.

→ Ответить


Igorjan94

5 лет назад, # | ☆ ← Rev. 2 +11

It is not part of c++11(only one of this), but useful cpp functions

```
    vector<int> a(n), b(n), c(n);
    iota(a.begin(), a.end(), 1); //c++11
// a = 1..10
    random_shuffle(a.begin(), a.end());
// a = random permutation of a
    partial_sum(a.begin(), a.end(), b.begin());
// b[i] = sum(a[j], j <= i)
    adjacent_difference(a.begin(), a.end(), c.begin());
// c[i] = a[i] - (i == 0 ? 0 : a[i - 1])
    cout << accumulate(a.begin(), a.end(), 123) << "\n";
// x = 123 + sum(a[i])
    cout << inner_product(a.begin(), a.end(), b.begin(), 234) <<
"\n";
// x = 234 + sum(a[i] * b[i])
```

All functions have two iterators as input, some of them have outputIterators and init values. All operators, used in these functions can be user-defined or standard:

```
    cout << accumulate(a.begin(), a.end(), 1, multiplies<int>()) <<
"\n";
// x = product(a[i])
// foldl in functional languages
    adjacent_difference(a.begin(), a.end(), c.begin(), [](int a, int
b){return a * b;});
// c[i] = a[i] * (i == 0 ? 1 : a[i - 1])
```

These functions are defined in <numeric>

→ Ответить

Hepic_Antony_Skarlatos

5 лет назад, # | ☆ ← Rev. 3 +3

**Swift** ,I think you forgot a semicolon in your perfect tutorial,right here:

"""""" auto f = [] (int a, int b) -> int { return a + b; } ..HERE.. cout << f(1, 2); // prints "3" """"""

→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

Thanks, now corrected.

→ Ответить

5 лет назад, # | ☆ +11

Using `complex` `p.real() = x` or `cin >> p.real()` don't work in

DarthKnight

Using `complex`, `p.real() = x` or `cin >> p.real()` don't work in C++11 but they do in C++98.
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

You can use `p.real(x)` in C++11. I don't know any way to `cin` real.
→ Ответить

__builtin__wolfy

5 лет назад, # | ☆ 0

Here is a trick that might interest you. In C++, a class can inherit from a template instantiation of itself. So you can write `class X: vector<X> {...};` for example. Class X inherits the members of vector and you can use this trick to implement multidimensional arrays, tries, and other useful data structure without using pointers. More here.
→ Ответить

AKP

5 лет назад, # | ☆ ← Rev. 2 -11

**C++11 Tricks or Traps?**

One should not use this:

```
vector<int> s(5);
for(int i=0;i<5;i++) s[i]=(101*i)%37;
for(int z:s) cout<<s[z]<<' ';
```

instead of this:

```
vector<int> s(5);
for(int i=0;i<5;i++) s[i]=(101*i)%37;
for(int z=0;z<s.size();z++) cout<<s[z]<<' ';
```

or, am I missing something?
→ Ответить

natsukagami

5 лет назад, # ^ | ☆ ← Rev. 2 +8

```
for(int z:s) cout<<s[z]<<' ';
```

should be

```
for(int z:s) cout<< z <<' ';
```

→ Ответить

AKP

5 лет назад, # ^ | ☆ 0

Oh I see, misunderstood that, thanks.
→ Ответить

Swift

5 лет назад, # ^ | ☆ 0

You trapped in your own mistake!
→ Ответить

nakeep

5 лет назад, # | ☆ 0

`for(auto& e: ...)` will cause compile error on `vector<bool>`. use universal reference instead: `for(auto&& e: ...)`
→ Ответить

z4120

5 месяцев назад, # ^ | ☆ 0

Note that it's equivalent to this code:

```
std::vector<bool> a{0,0,0};
```

```
std::vector<bool> a{0,0,0};
for(auto x:a) x=1;
```

It will set all elements of `a` to 1. In order to copy the values, it's necessary to use

```
std::vector<bool> a{0,0,0};
for(bool x:a) x=1; // no-operation
```

→ Ответить

5 лет назад, # | ☆ 0

yhylord

There is a tiny typo in the section 6, dijkstra's part: `tie(dist, ode, prev) = q.top(); q.pop();`

should be: `tie(dist, node, prev) = q.top(); q.pop();`

→ Ответить

4 года назад, # | ☆ +46

lonerz

Here's another trick:

For max/min functions, **these functions don't need to take two parameters, they can take more** :)

Instead of writing,

```
int a = 5, b = 6, c = 2, d = 10;
cout << max(a,max(b,max(c,d))) << endl;
```

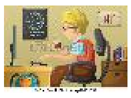
You can just use "{ }" braces around your parameters and insert a list into the max function (works the same for min function) like below:

```
int a = 5, b = 6, c = 2, d = 10;
cout << max( {a,b,c,d} ) << endl;
```

Here's a source code for reference: http://ideone.com/lllqIK

→ Ответить

4 года назад, # ^ | ☆ 0



foundLoveOfMyLife

Hey is there a shortcut to Something like:

a = max(a , Something being computed);

I always wanted something like: a+=Something being computed for max too. Although a function with variable parameters can be defined in a template but I don't like working with templates! :)

→ Ответить

4 года назад, # ^ | ☆ ← Rev. 3 0

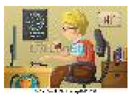
TimonKnigge

What's wrong with templates? This would work just fine:

```
    template<class T>
    void maxx(T &l, T r) {
        if (l < r) l = r;
    }
```

→ Ответить

4 года назад, # ^ | ☆ 0



foundLoveOfMyLife

Probably I fear them! Can you suggest some source to read more about templates and classes and stuff!

→ Ответить

18 месяцев назад, # ^ | ☆ 0

How does this works? Why "&" only before l and not before r?

→ Ответить

→ Ответить

harrypotter0

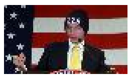
jheel4

18 месяцев назад, # ^ | ☆ 0

Since we are only changing l while we iterate and not r.

→ Ответить

4 года назад, # | ☆ +5



Bredor

Here's another trick:

You can write `return 14 / 88` instead of `return 0`

→ Ответить

harrypotter0

18 месяцев назад, # ^ | ☆ 0

How is it useful?

→ Ответить

4 года назад, # | ☆ -8

Can I write a void which like

Faster

```
void read(T &a,Args... args) {
    cin << a;
    read(args...);
}
```

and got the result `a=1, b=2, c=3, d=4` if I have input 4 numbers 1, 2, 3, 4 when run `read(a,b,c,d)` ?

→ Ответить

Swift

4 года назад, # ^ | ☆ 0

Yes. Why do you ask? You can simply test it by doing so!

→ Ответить

Faster

4 года назад, # ^ | ☆ 0

I got this error

```
/home/tunc/Documents/try_C++11.cpp: In instantiation of
‘void read(T&, Args ...) [with T = int; Args = {int,
int, int}]’:
/home/tunc/Documents/try_C++11.cpp:36:14:   required
from here
/home/tunc/Documents/try_C++11.cpp:14:9: error: no
match for ‘operator<<’ (operand types are ‘std::istream
{aka std::basic_istream<char>}’ and ‘int’)
     cin << A;
         ^
/home/tunc/Documents/try_C++11.cpp:14:9: note:
candidates are:
In file included from
/usr/include/c++/4.8/bitset:1578:0,
                 from /usr/include/x86_64-linux-
gnu/c++/4.8/bits/stdc++.h:65,
                 from
/home/tunc/Documents/try_C++11.cpp:1:
/usr/include/c++/4.8/debug/bitset:405:5: note:
template<class _CharT, class _Traits, long unsigned int
_Nb> std::basic_ostream<_CharT, _Traits>&
std::__debug::operator<<(std::basic_ostream<_CharT,
_Traits>&, const std::__debug::bitset<_Nb>&)
     operator<<(std::basic_ostream<_CharT, _Traits>&
__os,
     ^
etc.
```

when I ran that code. How to fix it?
→ Ответить

_index

4 года назад, # ^ | ☆ ← Rev. 2 +1

lol, change

```
cin << a
```

to

```
cin >> a;
```

→ Ответить

Faster

4 года назад, # ^ | ☆ Rev. 3 0

I changed it, but when i ran with `1 2 3 4` the result was `1 0 0 0`. How to fix it?

p/s: haha, I learnt to code for a while but now I still get that mistake =)) so ashame =))
→ Ответить

Nizil

8 месяцев назад, # ^ | 0

You probably need to pass the rest of the arguments by reference somehow, not only the first one.
→ Ответить

dendi239

4 месяца назад, # ^ | ☆ Rev. 4 0

Here's how.

```
template <>
void read() {}

template <class
Arg, class ...Rest>
void read(Arg &arg,
Rest &...rest) {
    cin >> arg;
    read(rest...);
}
```

→ Ответить

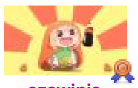
Zeus_NoT_Zues

3 недели назад, # ^ | ☆ 0

I think you've made a small typo as this code isn't compilable from first glance (and so I'm adding a fix).

```
void read () {
}

template
```

```
<typename T,
typename...
Args>
void read (T&
t, Args&...
args) {
        cin >>
t;
        read(a
rgs...);
}
```
→ Ответить


szawinis

4 года назад, # | ☆ 0

The Dijkstra code that uses emplace_back + tie has a little typo: node is spelt as ode

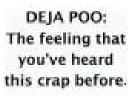
→ Ответить

Hossam

4 года назад, # | ☆ 0

Thanks a lot! I am beginning to love C++ <3

→ Ответить


DEJA POO:
The feeling that
you've heard
this crap before.
SarvagyaAgarwal

4 года назад, # | ☆ 0

How do I define the "rep" macro if i want to include the end indexes too ?

Like -> rep(i,1,10) prints 1...10 rep(i,10,1) prints 10....1 .

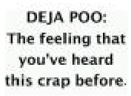
→ Ответить

totsamyzed

4 года назад, # ^ | ☆ +6

An ugly way, but it works. link

→ Ответить


DEJA POO:
The feeling that
you've heard
this crap before.
SarvagyaAgarwal

4 года назад, # ^ | ☆ +1

The link you mentioned isn't working . Can you post it on ideone ?

→ Ответить

4 года назад, # ^ | ☆ 0

```
#define ftoa(i, x, y, a) for(int i = (x); i != (((x)
< (y)) ? (((y)-(x))/a+1)*a+(x) : (x)-(((x)-
(y))/a+1)*a); i += ((x) < (y)) ? (a) : -(a))
```

I have use this code and try 1000 test cases to make sure that it is correct.

Here is 3 codes:

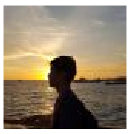
By `ftoa`

By normal `for`

Make test case

*Note:* to make the test cases you download these 3 codes and then run the third one. It will automatically run.

→ Ответить


thienlongtpct

tera_coder

3 года назад, # | ☆ 0

Thanks for the great tips; but are all of them usable without C++14?

→ Ответить

AlexandruValeanu

3 года назад, # ^ | ☆ 0

Most of them are. Is there any reason why you would use C++11?

→ Ответить

tera_coder

3 года назад, # ^ | ☆ 0

Because of onsite contest limitations.

→ Ответить

tera_coder

3 года назад, # ^ | ☆ 0

Which one's aren't needing C++14? Thank you.

→ Ответить

egor.okhterov

3 года назад, # | ☆ 0

Why would you use

```
array<int, 4> a;
```

instead of

```
int a[4];
```

?

→ Ответить

Swift

3 года назад, # ^ | ☆ +5

To use it as elements of vector for example.

`vector<array<int, 4>> v`

→ Ответить

egor.okhterov

3 года назад, # ^ | ☆ 0

What are the advantages of `vector<array<int, 4>> v;` over `vector<vector<int>> v;` ?

→ Ответить

MrDindows

3 года назад, # ^ | ☆ 0

Memory will be allocated only once.

→ Ответить

AlexandruValeanu

3 года назад, # ^ | ☆ 0

Because you can compare arrays, access elements with bound-checking or get iterators support.

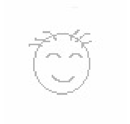
→ Ответить

ShafinKhadem

2 года назад, # ^ | ☆ 0

I think biggest advantage is `map<long long int, array<int,4> > m`

→ Ответить



M.A.H.M.O.O.D

3 года назад, # | ☆ ← Rev. 5 -13

Why the downvotes I didn't say anything wrong did I ???

Here's a submission by me using what I described (the check function)23252012(I got WA because the idea is wrong not the implementation)

My life now is a lot easier...Thank you **Swift**.

:)

I'm not sure if this is well known but in C++ you can give a default value to a function for example:

void DFS(int node, int par = -1){

...

}

int main(){

// input a graph

DFS(1);

// rest of the code

}

the DFS function works as a normal function but when you don't provide a second parameter it will take the default value you have given it as its value...hope this helps.

:)

→ Ответить

seenu

3 года назад, # | ☆ ▲ 0 ▼

thanks Swift

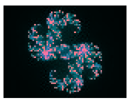
→ Ответить

iit_sujal

3 года назад, # | ☆ ▲ 0 ▼

Great Work Man

→ Ответить


ekzhang

3 года назад, # | ☆ ▲ +10 ▼

Old post, but one important mistake: there should be no `std::move()` call at the end of your `split()` function. `std::move()` should never be used to move automatic objects out of functions.

Source

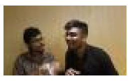
→ Ответить

Swift

3 года назад, # | ☆ ▲ 0 ▼

*Auto comment: topic has been updated by **Swift** (previous revision, new revision, compare).*

→ Ответить


mochow

2 года назад, # | ☆ ▲ -10 ▼

Now that C++17 is here in CF, is there anything new and useful in the newer edition that we can use in competitive programming?

→ Ответить

KarlisS

2 года назад, # ^ | ☆ ← Rev. 2 ▲ +8 ▼

Gcd, structured bindings, clamp.

→ Ответить

iLoveIOI

2 года назад, # ^ | ☆ ▲ 0 ▼

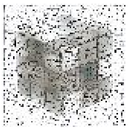
how do you write GCD function in c++17

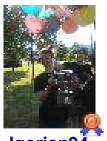
→ Ответить

2 года назад, # ^ | ☆ ▲ 0 ▼

std::gcd

→ Ответить


Jakube


Igorjan94

2 года назад, # ^ | ☆ +1

Here are you

→ Ответить

atlasworld

2 года назад, # | ☆ 0

nice blog !

→ Ответить

retrograd

2 года назад, # | ☆ ← Rev. 2 0

Also, one more cool thing C++(11?) has is the `throw` instruction and `try/catch`. You can get out of recursive call stacks and treat "No solution" / "Solution found" cases much more easily.

Example:

```
try {
   DFS(0);
   PrintSolution();
} catch (int) {
   PrintNoSolution();
}
```

→ Ответить

ShafinKhadem

2 года назад, # | ☆ ← Rev. 2 0

Thanks a lot for the awesome tutorial, specially for the debug function. But it doesn't work perfectly if there is space in the macro parameter, e.g. `error(get<0> (tuple1), get<0> (tuple2));` Besides, replacing comma with spaces is also unnecessary, when we can tokenize based on comma:

```
#define bug(args...) { cout<<__LINE__<<": "; string s = #args;
istringstream ss(s); err(ss, args); }

void err(istringstream &ss) { cout<<"\n"; }
template<typename T, typename... Args>
void err(istringstream &ss, const T &a, const Args & ... args) {
    string token;
    getline(ss, token, ',');
    cout << token << " = " << a << "; ";
    err(ss, args...);
}
```

→ Ответить

harrypotter0

18 месяцев назад, # ^ | ☆ 0

ShafinKhadem Could you provide some working of this debugger?

Thank you.

→ Ответить

ShafinKhadem

18 месяцев назад, # ^ | ☆ +1

After some days, I realized that tokenizing on comma is a bad idea, as it fails in cases like bug(func(a,b),func(c,d)), but if we tokenize based on space, we can easily avoid and add some spaces to make it work. Now-a-days I use it like this:

```
#include <bits/stdc++.h>
using namespace std;
```

```
#define bug(args ...) cerr << __LINE__ << ": ",
err(new istringstream(string(#args)), args), cerr <<
'\n'
void err(istringstream *iss) {}
template<typename T, typename ... Args> void
err(istringstream *iss, const T &_val, const Args &
... args) {
    string _name;
    *iss >> _name;
    if (_name.back()==',') _name.pop_back();
    cerr << _name << " = " << _val << "; ", err(iss,
args ...);
}

int func(int a, int b) {
    return a+b;
}

int main() {
    int x = 1, y = 2, n = 3, m = 4;
    bug(x, y, func(x,y), m, n, func(m,n));
    bug(m, n, m*n, x, y, x*y);
    return 0;
}
```

Notes: After every token u must add both comma and space and there should not be space in single token (e.g. func(x,y), x*y). It won't compile in versions older than c++11.

→ Ответить

harrypotter0

18 месяцев назад, # ^ | ☆ 0

Okay thanks for the explanation and fast reply :)

→ Ответить

CountZero

18 месяцев назад, # | ☆ +3

use std::tie to write complex comparators:

```
// before
bool cmp(int i, int j) {
  if (x[i] != x[j]) return x[i] < x[j];
  if (y[i] != y[j]) return y[i] < y[j];
  return z[i] < z[j];
}
// after
bool cmp(int i, int j) {
  return tie(x[i], y[i], z[i]) < tie(x[j], y[j], z[j]);
}
```

range-for:
you can use it for input:

```
vector<int> v(n);
for (auto& x: v) cin >> x;
```

works with C-style arrays too:

```
int v[5];
for (auto& x: v) cin >> x;
```

actually you can use std::array instead of C-style arrays:

```
// before
int a[maxn], b[maxn], c[maxn], d[maxn];
// after
array<int, maxn> a, b, c, d;
```

how to reference the global variable if there's local one with the same name:

how to reference the global variable if there's local one with the same name:

```
int v[5];
void f() {
  bool v = false;
  ::v[0] += 1;
}
```

→ Ответить

mynk322.0

17 месяцев назад, # | ☆ 0

It's awesome thanks for the blog!!

→ Ответить

redimer

11 месяцев назад, # | ☆ ← Rev. 2 +3

c++ 17 Better (for faster execution) used *int* instead *short* or *bool* or *__int64*

example: const int MAX = 1e4; vector< int > v(MAX); //instead vector< bool > v(MAX); int score;

//to use logical operations: for (int a=0;a<1e4;++a) for (int b=0;b<1e4;++b) score += (v[a] ^ v[b]);

you can be sure of solving the problem http://acmp.ru/index.asp?main=task&id_task=659

→ Ответить

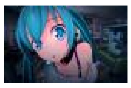
adi_1992

9 месяцев назад, # | ☆ ← Rev. 3 0

define rep(i, begin, end) for (__typeof(end) i = (begin) — ((begin) > (end)); i != (end) — ((begin) > (end)); i += 1 — 2 * ((begin) > (end)))

does not work with set and map container as iterators dont support operator>

→ Ответить


DarkMagician09

9 месяцев назад, # | ☆ -8

That (bits/stdc++.h) Library doesn't actually include everything like these two.

```
#include<unordered_map>
#include<regex>
```

If you didn't know or you miss this information, because I searched for hours on the error for calling unordered_map in my code when including that bits only :D , so I suggest editing the post for these two.

→ Ответить

NRK7

9 месяцев назад, # ^ | ☆ +11

If you use c++11 or later (which I think everyone should), using bits/stdc++.h includes them too.

→ Ответить

heyyolol

9 месяцев назад, # | ☆ +8

Are variables in namespace initialised to 0 for c++? Thanks in advance.

→ Ответить

NeverRegret

5 месяцев назад, # ^ | ☆ 0

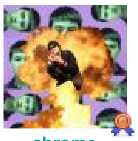
For better clearification

C++ does not initialize most variables to a given value (such as zero) automatically. Thus when a variable is assigned a memory location by the compiler, the default value of that variable is whatever (garbage) value happens to already be in that memory location!

→ Ответить

8 месяцев назад, # | ☆ 0

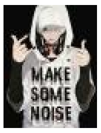
In c++17 we can do things like this:


chrome

In C++17 we can do things like this:

```
std::map<std::string, int> m = {{"first", 1}, {"second", 2}};

for (auto &[key, value] : m) {
  std::cout << key << " " << value << std::endl;
}

struct state {
  int a, b, c;
};

std::vector<state> v = {{1, 2, 3}, {4, 5, 6}};

for (auto &it : v) {
  // we can use this, instead of std::tie operator
  auto [a, b, c] = it;
  std::cout << a * b * c << std::endl;
}
```

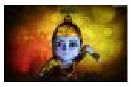
→ Ответить


ritik_patel05

7 месяцев назад, # ^ | ☆ 0

That's something new I saw. Thanks :)

→ Ответить


IWanna_MightiestDisciple

7 месяцев назад, # | ☆ 0

eagerly waiting for +1000 :D <3 such a good blog post :D

→ Ответить

Manan_shah

4 месяца назад, # | ☆ 0

Another useful thing would be to precompile the <bits/stdc++.h> header to reduce the compilation time. Just compile it as you normally compile in the folder having that file. The compiled file would have a .gch extension.

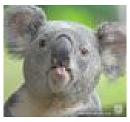
→ Ответить

ubc_123

3 месяца назад, # | ☆ ← Rev. 2 -6

.

→ Ответить


X_Toba_X

3 месяца назад, # | ☆ 0

are these tricks still useful until now or they are just outdated ?

→ Ответить

moodcode

2 месяца назад, # ^ | ☆ 0

nope they are still useful , but it depend on us how we use them

→ Ответить

Datastorm

6 недель назад, # | ☆ 0

In C++17 there is also an inbuilt function for LCM e.g. cout<<lcm(3,4); //prints 12

→ Ответить

backBencher24

2 недели назад, # ^ | ☆ 0

for using this function directly, you need to include boost library and in codeforces you're not allowed to include external libraries

→ Ответить

2 недели назад, # ^ | ☆ ← Rev. 2 0

No you don't need to use boost library it is defined in header

Datastorm

No you don't need to use boost library it is defined in header file numeric i.e. `#include<numeric>` or if are using `#include<bits/stdc++.h>` no need to include numeric header file

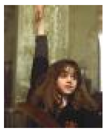
⟶ Ответить

backBencher24

2 недели назад, # ^ | ☆ 0

yes , you are right but i don't know why it showing me compilation error on using this function I have G++17(Gcc 9.3) version on my PC,I tried it on Codechef IDE where this compiled well, but in other online IDE like https://www.jdoodle.com/online-compiler-c++/ it failed

⟶ Ответить



Datastorm

2 недели назад, # ^ | ☆ 0

By default GCC version>=5 compiles c++ code in c++14 If you are using command line e.g. cmd or powershell ( in windows ) or terminal ( in linux ) try adding `-std=c++17` flag while compiling If you are using any IDE on your PC try finding and enabling c++17 flag. For command line try `g++ -std=c++17 filename.cpp -o filename` replace filename with your current file name, Or if it does not fixed your error try attaching a screenshot of your error and code.

Happy Coding

⟶ Ответить

backBencher24

2 недели назад, # ^ | ☆ 0

Thanks:), it is working now

⟶ Ответить

sumit.h

2 недели назад, # | ☆ 0

Nice tricks.

⟶ Ответить