

# 시작하기 전에

C++ . , C# Java  
C++ . 가, C++ 가  
. C++ ,  
C++ 가  
 , ,  
가 . C++  
가 . C++ ,  
 , C++  
 . C++ ,  
C++  
 ,  
 . 가  
 , C++  
가 C++  
C++

가?

. 12 , C++ .

A .

가 .

가

“ 가 ” 가 . 가  
/ .

가 . ,  
 . ,  
 가 . Java C#  
 . , C++ . , Java  
 C# , C++ .

, Microsoft Visual C++ Borland  
 C++ Builder C++ 가 .

:

[www.osborne.com](http://www.osborne.com) [www.infopub.co.kr](http://www.infopub.co.kr)

“ C++ ” .  
 가 가 .

C++ , .

- C++ 21 ( , 89-8054-484-7)
- C++ ( , 89-8054-429-4)
- (Effective) STL( , 89-8054-459-6)
- STL 가 ( , 89-8054-469-3)

Java

- Java 2 21 ( , 89-8054-380-8)
- Java ( , 89-8054-481-2)
- Java( , 89-8054-422-7)

C#

- C# ( , 89-8054-461-8)
- C# .NET ( , 89-8054-474-X)
- C# 2nd Edition( , 89-8054-463-4)

Schildt

*Windows 98 Programming From the Ground Up*

*Windows 2000 Programming From the Ground Up*

*MFC Programming From the Ground Up*

*The Windows Programming Annotated Archives*

C

- C 21

Herbert Schildt

# Module 1

C++

- C++
- C++가 C, C#, Java 가
- 
- C++
- 
- 
- if for
- 
- C++
- 
-

C++ .  
 . C++  
 , . C++ Java C#  
 , C++ 가 C++ 가  
 .  
 C++ , C++ 가 가  
 .  
 ,  
 C++ 가 .  
 가 C++  
 , C++  
 C++ .

## C++

C++ C . C++가 C  
 . , C++ C . C++ C ( )  
 . C++  
 C 가 가 . , C++  
 C . , C++  
 , C .

C :

C .  
 . C 가

C Dennis Ritchie, UNIX DEC PDP-11  
 . C BCPL  
 BCPL Martin Richards . BCPL 1970 C Ken  
 Thompson B .

C가

. , C .  
 , , . C  
 , , . C  
 , 가 .

C 1960 (*structured programming*) .  
 가 ,  
 , “ ” ,  
 . 가 ,  
 가 .

Pascal 가 , C ,  
 . C  
 ( 가 ) 가 .  
 , C  
 . , C 1980 가  
 .

C++

, C++가 . C  
 , ? (*complexity*) .  
 , 가 가 ,

가

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가 , 가

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가 가

가  
가 가 , 가  
가 .

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FORTRAN . FORTRAN  
1960 C  
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가  
1970 가

가 가 .

,  
*(OOP : Object Oriented Programming)*

. C++

, C++  
C++ 가  
C++ 가

C++ 가



## C++

C++ 1979 New Jersey, Murray Hill Bjarne Stroustrup  
 . “ 가 C” . , 1983  
 C++ .

Stroustrup C C C++ . 가  
 C . ,  
 Stroustrup  
 . , .

Stroustrup C 가  
 . C++ C . C ,  
 Stroustrup  
 . C  
 가 .

C++ , Stroustrup 가 가 C  
 가 , ,  
 . C++  
 가 C .

C++가 , C  
 . , C++  
 . C++가 , , ,  
 . C++가 C  
 , 가 C++  
 . , C++ .

## C++

C++가 , 가 가  
 . 1985 , 1990 .  
 C++ . , C++  
 . , ANSI(American National Standards Institute) ISO(International  
 Standards Organization) 가 .  
 1994 1 . ANSI/ISO C++ ( )  
 Stroustrup , 가 가 .  
 C++ .

C++ 가 , .  
 Alexander Stepanov가 (Standard Template Library : STL)  
 . STL  
 .  
 C++ STL . STL 가 C++ 가  
 . STL C++  
 .

C++ 가 .  
 가 , . , ANSI/ISO  
 C++ Stroustrup .  
 1997 11 14 , C++ ANSI/ISO 1998  
 . C++ C++ .  
 C++ . Microsoft Visual C++ Borland C++  
 Builder C++ 가 C++ .

## C++ C# 가

, 2, C# Sun Microsystems, C# Microsoft 가 C++ 가 ,

C++ C# 가, , C# 가, C++ C# “ , ” . C++ , C# 가 . C# , C++ . C# C++ . C++ , C++ .

C++ , C# . C++ CPU . , , Intel Pentium , C++가 가 .

C# ( , C# ).

CPU . , 가 가 .

가 . 가 . , 가 , C++ . C# 가 . , , C++ 가 , C# .

가 C++, C#  
가 가 ,  
.



- C++ 가?
- C++가 가?
- C++ C# . 가? 가?

C++ (OOP) . , OOP C++ . , C++ OOP .

가 가

가 ( 가 )

“ ”

- C++ C .
- C++ 가 가 가 .
- .

가

**질문 :** C# 가  
? C++ 가 ?

**답변 :** , C#  
가 , C++  
. C++ , CPU  
. CPU . C++  
 , C++  
가 .  
C# , 가 가  
. C# ,  
*Microsoft Intermediate Language (MSIL)* . ,  
Java Virtual Machine (JVM) . C# Common Language  
Runtime (CLR) . , JVM 가 ,  
. C# CLR ,  
C# CPU , C++  
. C++ C#  
 .

“ ”

가 , 가  
가 . ,  
 .

, C++ OOP  
 , 가 .

가

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가

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가

가

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,

*private,**public**. private*

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,

*private*

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가 *public*

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가

,

*public**private*

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C++

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*. C++*

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C++

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가

**질문 :**

가 ?

**답변 :**

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*. C++**. C#*

가

C++

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( “ , )

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가 가 , (

가 ) . 가 .

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가 ,

가 . C++ 가

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가 .

가 .

가

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An analog stopwatch with a circular face and a single hand pointing to the 15-second mark. The face has markings for every second and half-second. The stopwatch is shown from a slightly elevated angle.

- OOP 가?
- C++ 가?
- C++ 가?

가

**질문 :** (OOP)  
 . , OOP  
 가 . C++ , 가 ?

**답변 :** C++ , C++ /C# , /C# , C++ 가 , C++ ,

- , , OOP .
- C++ .
- C++ .



C++

```
/*  
    C++  
    Sample.cpp  
*/  
  
#include <iostream>  
using namespace std;  
  
// C++  
int main()  
{  
    cout << "C++ is power programming."  
  
    return 0;  
}
```

- 1.
- 2.
- 3.

가

Osborne [www.osborne.com](http://www.osborne.com) .  
 , .  
 .  
 , 가 .  
 text 가 , C++ .  
 , .  
 .  
 C++ .  
 .cpp . C++  
 , .cpp .  
 Sample.cpp .  
 .  
 Sample.cpp  
 . 가, Microsoft Visual C++ Borland C++ builder  
 (IDE) 가 ( )  
 . C++ .  
 .  
 , Visual C++ C++ builder ,  
 가  
 . , Visual C++ Sample.cpp ,  
 .

```
C:\...>cl -GX Sample.cpp
```

-GX . Visual C++  
 VCVAR32.BAT . Visual C++ ( ,  
 Visual Studio .NET | Microsoft Visual Studio. NET  
 Visual Studio .NET ,  
 ). C++ builder Sample.cpp  
 , .

```
C:\...>bcc32 Sample.cpp
```

C++ 가 . , 가  
 , .exe . Sample.cpp  
 가 Sample.exe .

C++ , 가 . C++  
 가 ,  
 . , Sample.exe  
 .

```
C:\...>Sample
```

```
C++ is power programming.
```

, . C++  
 , C++가 가  
 (GUI)

70 . C++ 50  
 가 . 가  
 , C++

Sample.cpp가 , C++ 가

```
/*
    C++
    Sample.cpp
*/
```

가 , C++ 가  
 C++ 가 “ ”  
 /\* ( ) \*/

```
#include <iostream>
```

C++ 가 ,  
 . <iostream> , C++  
 가 . ,  
 .

```
using namespace std;
```

std C++  
 가 . 가  
 .  
 .  
 . std  
 C++ 가  
 . std  
 가 , 가 ( , C ).

```
// C++ main() .
```

“ ” C++ .  
 // , C++ ,  
 , 가  
 . , .  
 , .

```
int main()
```

C++ . ,  
 . C++ 가 , C++  
 가 *main()* . *main()*  
 , ( ) ( , C++ *main()*  
 , *main()* ). *main()* *main()*  
 . *main()* int *main()*  
 . , C++ 가 , *int*  
 .  
 .

```
cout << "C++ is power programming.";
```

“C++ is power programming”  
 << . <<  
 , . *cout*  
 , 가 . ,  
 . , C++  
 .

“C++ is power programming.” . C++  
 . C++ .

.

```
return 0;
```

main() , ( ) 0  
 . 0

. *return* C++ , .  
 ( ) 0 .

(*{}*) .

, , , , ,  
 , . , , ,  
 . C++ ,  
 , main()  
 가 , ,  
 , cout  
 ,  
 가 ,



- C++ 가?
- cout 가?
- #include <iostream> 가?

가

질문 :

가

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답변 :

가

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C++

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가

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C++

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가

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( " ")

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가

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가

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가

가

가 가

.

- C++ main() .
- cout 가 .
- <iostream> .



가  
 , 가 ,  
 ,  
 length 7 , "The length is 7"

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

int main()
{
    int length;    //
    length = 7;    // length 7
    cout << "The length is ";
    cout << length;    // 7
    return 0;
}
```

, C++

VarDemo.cpp

가

```
int length;    //
```

length . C++ ,  
 가, 가  
 (type) , length 가 -32,768  
 32,767 . C++ int  
 C++가  
 ( ).

```
length h = 7; // length h 7 .
```

, length 7 . C++  
 length 7 가  
 length

```
cout << length; // 7 .
```

, cout << length가 7 , 가  
 가 , length  
 .

가 , C++

+

-

\*

/

C++

가

,

(\*)

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

int main()
{
    int length;    //
    int width;     //
    int area;      // 가

    length = 7;    // length 7
    width = 5;     // width 5
    area = length * width; //

    cout << "The area is ";
    cout << area;    // 35

    return 0;
}
```

length width  
area

length, width area 가 . length 7  
, width 5 . area

The area is 35

, area 가 ,

```
// area

#include <iostream>
using namespace std;

int main()
{
    int length;    //
    int width;     //

    length = 7;    // length 7
    width = 5;     // width 5

    cout << "The area is ";
    cout << length * width; // 35
    return 0;
}
```

length \* width

, length width , cout .

가 가 . C++

2 , ,  
, length, width area .

```
int length, width, area; //
```

2

C++



- 가?
- min 가 0 .
- 가 가?

가 7 5

가

가

&gt;&gt;

C++

```
cin >> var;
```

, cin

C++

. cin

var

- C++
- min = 0;
- 2

```
/*  
  
*/  
  
#include <iostream>  
using namespace std;  
  
int main()  
{  
    int length;           //  
    int width;            //  
  
    cout << "Enter the length: ";  
    cin >> length;        //  
  
    cout << "Enter the width: ";  
    cin >> width;         //  
  
    cout << "The area is ";  
    cout << length * width; //  
  
    return 0;  
}
```



length



width

```
Enter the length: 8  
Enter the width: 3  
The area is 24
```

```
cout << "Cin is " << cin.get() << ",\n";
length = 0;
while (cin.get() != '\n')
    length++;
length = length - 1;
cout << "Cin is " << length << " characters long.\n";
```

가

가 cout . , cout  
.  
cout 가 . ,  
. ,

```
cout << "The area is " << length * width;
```

cout  
“The area is”  
가  
.<<

, , - .  
 , . C++ -  
 .  
 n) 가 . \n .

```
/*  
  
 \n .  
*/  
#include <iostream>  
using namespace std;  
int main()  
{  
    cout << "one\n";  
    cout << "two\n";  
    cout << "three";  
    cout << "four";  
  
    return 0;  
}
```

```
one  
two  
threefour
```





- C++ 가?
- cin 가?
- \n 가?

int 가 . , int  
 ,  
 int 18 , 18.3 , int  
 C++ 가  
 C++ float double 가  
 double 가  
 double

```
double result;
```

result double 가 . result  
 88.56, 0.034, -107.03 .

int double .

```
/*
```

```
int double
```

- >> .
- cin .
- \n .

```
*/

#include <iostream>
using namespace std;

int main() {
    int ivar;          // int
    double dvar;        // double

    ivar = 100;         // ivar 100

    dvar = 100.0;       // dvar 100.0

    cout << "Original value of ivar: " << ivar << "\n";
    cout << "Original value of dvar: " << dvar << "\n";
    cout << "\n";      //
                        //
//          3
    ivar = ivar / 3;
    dvar = dvar / 3.0;

    cout << "ivar after division: " << ivar << "\n";
    cout << "dvar after division: " << dvar << "\n";

    return 0;
}
```

```
Original value of ivar: 100
Original value of dvar: 100

ivar after division: 33
dvar after division: 33.3333
```

, ivar 3 가 , ,  
33 가 , dvar 3 ,  
.  
가 가 .

```
cout << "\n"; //
```

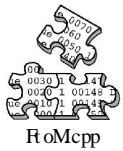
가

**질문 :** C++

? , ?

**답변 :** C++

, ,  
 , float double  
가 ,  
 , C++  
( ,  
) . C++  
.



1-1 : (Feet) (Meter)

C++ 가

C++

1. 3.28 가 double 가 ,

### Step-by-Step

1. FtoM.cpp C++ (C++).

2. , <iostream> , std

```
/*
    1-1
    FtoM.cpp
*/
#include <iostream>
using namespace std;
```

3. f m main()

```
int main() {
    double f; //
    double m; //
```

4. 가

```
cout << "Enter the length in feet: ";
cin >> f; //
```

5. `main` 함수가 끝나는 부분의 코드를 완성하십시오.

```
m=f /3.28;    // 미터로 변환
cout << f << " feet is " << m<< " meters.";
```

6. `main` 함수가 끝나는 부분의 코드를 완성하십시오.

```
return 0;
}
```

7. `main` 함수가 끝나는 부분의 코드를 완성하십시오.

```
/*
    1-1
    1.2
    1.3
    1.4
    1.5
    1.6
    1.7
    1.8
    1.9
    2.0
    2.1
    2.2
    2.3
    2.4
    2.5
    2.6
    2.7
    2.8
    2.9
    3.0
    3.1
    3.2
    3.3
    3.4
    3.5
    3.6
    3.7
    3.8
    3.9
    4.0
    4.1
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    4.3
    4.4
    4.5
    4.6
    4.7
    4.8
    4.9
    5.0
    5.1
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    5.3
    5.4
    5.5
    5.6
    5.7
    5.8
    5.9
    6.0
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    16.7
    16.8
    16.9
    17.0
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    26.1
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    27.7
    27.8
    27.9
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    36.6
    36.7
    36.8
    36.9
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    37.8
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    38.1
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    38.7
    38.8
    38.9
    39.0
    39.1
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    39.4
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    39.6
    39.7
    39.8
    39.9
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    40.1
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    40.4
    40.5
    40.6
    40.7
    40.8
    40.9
    41.0
    41.1
    41.2
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    41.4
    41.5
    41.6
    41.7
    41.8
    41.9
    42.0
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    42.3
    42.4
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8.

Enter the length in feet: 5  
5 feet is 1.52439 meters.

9.



- 가 C++ 가?
- double 가?
- 가?

가

, C++

,

if

C++

*f*

. C++

if

if

, C Java,

C#

. if 가

- 
- int .
  - double 가 .
  - \n .

```
if(condition) statement;
```

*condition* 가 . C++ , 0 가  
 , 0 .  
 , “10 is less than 11” .  
 10 < 11 .

```
if(10 < 11) cout << "10 is less than 11";
```

,

```
if(10 > 11) cout << "this does not display";
```

10 < 11 cout . , if  
 가 , 가 .

C++ (conditional expression)

<

<=

>

>=

==

!=

if

```
// if .

#include <iostream>
using namespace std;

int main() {
    int a, b, c;

    a = 2;
    b = 3;
    if(a < b) cout << "a is less than b\n";

    //
    if(a == b) cout << "you won't see this\n";

    cout << "\n";

    c = a - b;    // c = -1

    cout << "c contains -1\n";
    if(c >= 0) cout << "c is non-negative\n";
    if(c < 0) cout << "c is negative\n";
    cout << "\n";

    c = b - a;    // c = 1
    cout << "c contains 1\n";
    if(c >= 0) cout << "c is non-negative\n";
    if(c < 0) cout << "c is negative\n";

    return 0;
}
```

if



```

a is less than b

c contains -1
c is negative

c contains 1
c is non-negative

```

## for

. C++  
 . C# Java , C++  
 for 가 for 가 가 .  
 for 가 .

```
for(initialization; condition; increment) statement;
```

*initialization* . *condition* 가  
 . *condition* (0 )  
*increment* 가 가 가

```
for , 1 100 .
```

```

// for

#include <iostream>
using namespace std;

int main()

```

```

{
    int count;
    for(count=1; count <= 100; count=count+1)
        cout << count << " ";

    return 0;
}

```

, count 1 가

```
count <= 100
```

가 , count 1 가 . count가 100

, , .

C++

```
count=count+1
```

, C++

가

. 가 ++ ( ) . ++

1 가 . , for

```

for(count=1; count <= 100; count++)
    cout << count << " ";

```

C++ -- . 1



- if 가?
- for 가?
- C++ 가?

C++ (code block) .

, .  
가 . , if for . if .

```
if (w < h) {
    v = w * h;
    w = 0;
}
```

w가 h , ,  
가 ,  
.

- if C++ .
- for C++ .
- ==, !=, <, >, <=, >= .

0

```
//  
  
#include <iostream>  
using namespace std;  
  
int main() {  
    double result, n, d;  
    cout << "Enter value: ";  
    cin >> n;  
  
    cout << "Enter divisor: ";  
    cin >> d;  
  
    // if  
    if(d != 0) {  
        cout << "d does not equal zero so division is OK" << "\n";  
        result = n / d;  
        cout << n << "/" << d << "is " << result;  
    }  
  
    return 0;  
}
```

if

```
Enter value: 10  
Enter divisor: 2  
d does not equal zero so division is OK  
10 / 2 is 5
```

, if . if  
( ) 3 . 0  
.

가

질문 : ? , { }

가 ?

답변 : .

.

, 가 가 .

.

C++ , ,

. 가 ,

. .

, . ,

.

C++ ,

. , C++

```
x = y;
y = y + 1;
cout << x << " " << y;
```

```
x = y; y = y + 1; cout << x << " " << y;
```

```
cout << "This is a long line. The sum is : " << a + b + c +  
d + e + f;
```

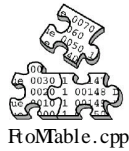
이 코드는, 가

. C++ 가



- 가? 가?
- C++ , \_\_\_\_\_
- C++ . 가 가?

- 
- { } .
  - 
  -



1-2 :

for , if  
 . 10  
 counter  
 가 . counter

### Step-by-Step

1. FoMTable.cpp

2.

```

/*
    1-2
    -
    FoMTable.cpp
*/

#include <iostream>
using namespace std;

int main() {
    double f; //
    double m //
    int counter;

    counter = 0;
    for(f = 1.0; f <= 100.0; f++) {
        m=f /3.28; //
        cout << f << " feet is " << m<< " meters.\n";

        counter++;
        // 10
    }
}

```

0

가

1 가

```

    if(counter == 10) {
        cout << "\n"; //
        counter = 0; //
    }

    return 0;
}

```

← counter가 10 ,

3. 10 counter가
- for 0 ,
- 1 가 counter가 10 ,
- counter 0 .

4. .

```

1 feet is 0.304878 meters.
2 feet is 0.609756 meters.
3 feet is 0.914634 meters.
4 feet is 1.21951 meters.
5 feet is 1.52439 meters.
6 feet is 1.82927 meters.
7 feet is 2.13415 meters.
8 feet is 2.43902 meters.
9 feet is 2.7439 meters.
10 feet is 3.04878 meters.
11 feet is 3.35366 meters.
12 feet is 3.65854 meters.
13 feet is 3.96341 meters.
14 feet is 4.26829 meters.
15 feet is 4.57317 meters.
16 feet is 4.87805 meters.
17 feet is 5.18293 meters.
18 feet is 5.4878 meters.

```



19 feet is 5.79268 meters.  
20 feet is 6.09756 meters.

21 feet is 6.40244 meters.  
22 feet is 6.70732 meters.  
23 feet is 7.0122 meters.  
24 feet is 7.31707 meters.  
25 feet is 7.62195 meters.  
26 feet is 7.92683 meters.  
27 feet is 8.23171 meters.  
28 feet is 8.53659 meters.  
29 feet is 8.84146 meters.  
30 feet is 9.14634 meters.

31 feet is 9.45122 meters.  
32 feet is 9.7561 meters.  
33 feet is 10.061 meters.  
34 feet is 10.3659 meters.  
35 feet is 10.6707 meters.  
36 feet is 10.9756 meters.  
37 feet is 11.2805 meters.  
38 feet is 11.5854 meters.  
39 feet is 11.8902 meters.  
40 feet is 12.1951 meters.

5.

25

C++

. 5

C++

가 , . ,  
 , MyFunc 가 가 . MyFunc  
 .

```
MyFunc();
```

가 , 가  
 . , . ,  
 .  
 . ,  
 MyFunc()가 . 가 . ,  
 , MyFunc() 2 가  
 .

```
MyFunc(2);
```

가 , . 가  
 . 가 .  
 .  
 가 .  
 가 , MyFunc()가  
 , MyFunc .

```
x = MyFunc(2);
```

, MyFunc()가 . MyFunc()가  
 x . , .

```
x = MyFunc(2) + 10;
```

MyFunc() 10 x 가  
가

C++

abs()

. abs()

```
// abs()

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

```
int main()
{
    int result;

    result = abs(-10);

    cout << result;

    return 0;
}
```

abs()  
result

-10, `abs()`, `abs()`, 10, `result`, 10, `<cstdlib>`, `abs()`가  
 , 가 , `main()`,  
 C++ , `abs()`  
 가 가 가  
 , C++ 가 ,  
`getval` `getval()`

C++

, `abs()` C++  
*(standard library)*

C++ , ,  
 , C++  
 가

C++

(class library) C++  
가 .



- 가?
- 가 가?
- C++ 가?

C++

C++ 63 가 . [ 1.1]  
C++ C++ , C++  
C++ overload , C++  
 , .

C++

가 가 .

- 
- C++ .
  - .
  - C++ C++ 가 .

line\_count 가 .

### 1.1 C++

asm	auto	bool	break
case	catch	char	class
const	const_cast	continue	default
delete	do	double	dynamic_cast
else	enum	explicit	export
extern	false	float	for
friend	goto	if	inline
int	long	mutable	namespace
new	operator	private	protected
public	register	reinterpret_cast	return
short	signed	sizeof	static
static_cast	struct	switch	template
this	throw	true	try
typedef	typeid	typename	union
unsigned	using	virtual	void
volatile	wchar_t	while	

. , C++ , myvar MyVar .  
 , C++  
 . , cout .

가 .

Test	x	y2	MaxIncr
up	_top	my_var	simpleInterest23

980K



- for, For, FOR 가?
- C++ ?
- index21 Index21 가?

- 
- for , C++ .
  - C++ , , .
  - . C++ .

1. C++
2. C++ 가 가?
3. 가 가?
4. C++ ?
5. 가?
6. <iostream> 가? 가?  
#include <iostream>
7. 가?
8. 가?
9. 가?  
a. count  
b. \_count  
c. count27  
d. 67count  
e. if
10. 가? 가?
11. if . for .
12. 가?
13. 17% .  
1 100  
25 .



가

16. 5