

C++

PROGRAMMING LANGUAGE

L03-CONTROL STRUCTURE

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Control Structure

Control Structure

- If \ else
- While
- do \ while
 - Executed at least once whatever the condition is.
- for
- switch

Control Structure

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

void main(void)
{
    int x = 4;
    if ( x == 4 )
    {
        cout << "True " << endl;
    }
    else
    {
        cout << "False " << endl;
    }
}
```

True

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

void main(void)
{
    int x = 4;
    if ( x = 4 )
    {
        cout << "True " << endl;
    }
    else
    {
        cout << "False " << endl;
    }
}
```

True

Control Structure

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

void main(void)
{
    int x = 4;
    if ( x = 5 )
    {
        cout << "True " << endl;
    }
    else
    {
        cout << "False " << endl;
    }
}
```

True

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

void main(void)
{
    int x = 4;
    if ( x!= 4 )
    {
        cout << "True " << endl;
    }
    else
    {
        cout << "False " << endl;
    }
}
```

False

Control Structure

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

void main(void)
{
    int x = 4;
    if ( x == 4 )
        cout << "True " << endl;
    else
        cout << "False " << endl;
        cout << "foo" << endl;
}
```

True
foo

```
#include <iostream>
using namespace::std;
int s = 0;

void main(void)
{
    int x = 0;
    if (x = 0)
    {
        cout << "joo" << endl;
    }
    cout << "yoo" << endl;
    system("pause");
}
```

yoo
Every other number other than 0 means true

Control Structure

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

void main(void)
{
    int x = 5;
    while (x!= 10)
    {
        x++;
        cout << x << endl;
    }
}
```

```
6
7
8
9
10
```

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

void main(void)
{
    int x = 5;
    while (x!= 10)
    {
        cout << x++ << endl;
    }
}
```

```
5
6
7
8
9
```

Control Structure

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

void main(void)
{
    int x = 5;
    while (x!= 10)
    {
        cout << ++x << endl;
    }
}
```

```
6
7
8
9
10
```

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

void main(void)
{
    int x = 5;
    while (x!= 10)
    {
        ++x;
        cout << x << endl;
    }
}
```

```
6
7
8
9
10
```


Control Structure

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

void main(void)
{
    int x = 5;
    while (x < 10)
    {
        cout << x*x << endl;
    }
}
```

25
25

Indefinitely

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

void main(void)
{
    int x = 5;
    while (x*x < 10)
    {
        cout << x*x << endl;
    }
}
```

Control Structure

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

void main(void)
{
    int x = 5;
    while (cin)
    {
        cin >> x;
        cout << x*x << endl;
    }
}
```

```
2
4
4
16
6
36
8
64
1
1
2
4
^Z
4
Press any key to continue
```

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

void main(void)
{
    int x = 5;
    do
    {
        cout << x << endl;
        x++;
    } while ( x < 10 );
}
```

```
5
6
7
8
9
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 5;
    do
    {
        cout << x << endl;
        x++;
    } while ( x < 10 )
}
```

Compiler error, missing ";" after the while();

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

void main(void)
{
    int x = 5;
    do
    {
        cout << x << endl;
    } while ( x < 4 );
}
```

5
do while execute at least one, even though the condition is not fulfilled.

Control Structure

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

void main(void)
{
    int x = 5;
    do
    {
        cout << "Enter the x:" << endl;
        cin >> x;
        cout << "You have entered, x = " << x
        << endl;
        cout << "_____ "
        << endl;
    } while ( x!= 0 );

}
```

```
Enter the x:
2
You have entered, x = 2
```

```
Enter the x:
3
You have entered, x = 3
```

```
Enter the x:
4
You have entered, x = 4
```

```
Enter the x:
23
You have entered, x = 23
```

```
Enter the x:
0
You have entered, x = 0
```

```
Press any key to continue
```

Control Structure

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

void main(void)
{
    int i = 0;
    int c = 5;
    do
    {
        ++c;
        cout << "beep!, number = " << i << endl;
        i++;
    } while ( ++c < 10 );
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
Press any key to continue
```

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

void main(void)
{
    int i = 0;
    int c = 5;
    do
    {
        ++c;
        cout << "beep!, number = " << i << endl;
        i++;
    } while ( c++ < 10 );
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int i = 0;
    int c = 5;
    do
    {
        ++c;
        cout << "beep!, number = " << i << endl;
        i++;
    } while ( ++c <= 10 );
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
Press any key to continue
```



Code Cracking

Control Structure

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

void main(void)
{
    for (int i = 0; i < 10; i++)
    {
        cout<<"beep!, number = "<<i<<endl;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
beep!, number = 3
beep!, number = 4
beep!, number = 5
beep!, number = 6
beep!, number = 7
beep!, number = 8
beep!, number = 9
finished
Press any key to continue
```

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

void main(void)
{
    int i = 5;
    for (int i = 0; i < 10; i++)
    {
        cout << "beep!, number = " << i
        << endl;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
beep!, number = 3
beep!, number = 4
beep!, number = 5
beep!, number = 6
beep!, number = 7
beep!, number = 8
beep!, number = 9
finished
Press any key to continue
```


Control Structure

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

void main(void)
{
    int i = 5;
    int c = 5;
    for (int i = 0; i < 10; i++)
    {
        cout << "beep!, number = "
        << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 2
beep!, number = 4
beep!, number = 6
beep!, number = 8
finished
```

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0; i < 10; i++);
    {
        cout << "beep!, number = " << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 66
finished
Press any key to continue
```

Watch out for the semi colon ";" after the for statement Coz it close it

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0; i < 10; )
    {
        cout << "beep!, number = " << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
beep!, number = 3
beep!, number = 4
beep!, number = 5
beep!, number = 6
beep!, number = 7
beep!, number = 8
beep!, number = 9
finished
Press any key to continue
```

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0; i < 10; );
    {
        cout << "beep!, number = " << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

infinte loop, Nothing to print

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0;; )
    {
        cout << "beep!, number = " << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 1
beep!, number = 2
beep!, number = 3

beep!, number = 9

beep!, number = 455343

Un-infinte loop!
```

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0;; i++ )
    {
        cout << "beep!, number = " << i << endl;
        i++;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 0
beep!, number = 2
beep!, number = 4
beep!, number = 6

beep!, number = 10

beep!, number = 455340

infinte loop!
```

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    for ( )
    {
        cout << "beep!, number = " << i << endl;
    }
    cout << "finished" << endl;
}
```

Compiler error

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (i = 2; i<5; i++ )
    {
        cout << "beep!, number = " << i << endl;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 2
beep!, number = 3
beep!, number = 4
finished
Press any key to continue
```

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0, j = 3; i<5; i++ )
    {
        cout << "beep!, number = " << j++ << endl;
    }
    cout << "finished" << endl;
}
```

```
beep!, number = 3
beep!, number = 4
beep!, number = 5
beep!, number = 6
beep!, number = 7
finished
Press any key to continue
```

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0; j = 3; i<5; i++ )
    {
        cout << "beep!, number = " << j++ << endl;
    }
    cout << "finished" << endl;
}
```

Compiler error ; and not,

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    for (int i = 0, int j = 3; i<5; i++ )
    {
        cout << "beep!, number = " << j++ << endl;
    }
    cout << "finished" << endl;
}
```

Compiler error
j undeclared identifier

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

void main(void)
{
    int i = 66;
    int c = 5;
    int j = 2;
    for (int i = 0, j; i<5; i++, j-- )
    {
        cout << j << endl;
    }
}
```

0
-1
-2
-3
-4

Control Structure

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i++ << endl;
        if ( i == 34)
        {
            break;
        }
    }
}
```

0
0
0
0
0

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i++ << endl;
        break;
    }
}
```

0

Control Structure

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

void main(void)
{
    int i = 66;
    int c = 5;
    int j = 4;
    for (int i = 0, j=0; i<5; i++, j-- )
    {
        cout << j++ << endl;
    }
}
```

0
2
4

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 34)
        {
            break;
        }
    }
}
```

0
1
2
3
4

Control Structure

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 2)
        {
            break;
        }
    }
}
```

0
1
2

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        if ( i == 2)
        {
            break;
        }
        cout << i << endl;
    }
}
```

0
1

Control Structure

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 2)
        {
            break;
        }
    }
}
```

Compiler error, = = not ==

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 2)
        {
            cout << "WEWEEEE!!!!";
            break;
        }
    }
}
```

```
0
1
2
WEWEEEE!!!!
```

Control Structure

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        if ( i == 2)
        {
            continue;
        }
        cout << i << endl;
    }
}
```

0
1
3
4

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        if ( i == 2)
        {
            continue;
        }
        cout << "WeeWeee" << endl;
    }
    cout << i << endl;
}
```

0
1
3
4

Control Structure

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 2)
        {
            cout << "WeeeWeee" << endl;
            continue;
        }
    }
}
```

```
0
1
2
WeeeWeee
3
4
Press any key to continue
```

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << i << endl;
        if ( i == 2)
        {
            cout << "WeeeWeee" << endl;
        }
    }
}
```

```
0
1
2
WeeeWeee
3
4
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
    case 1:
        cout << "WOW, i can't believe it!, you entered x = 1" << endl;
        break;
    case 2:
        cout << "WOW, i can't believe it!, you entered x = 2" << endl;
        break;
    }
}
```

```
Enter x:
2
You have entered, x = 2
WOW, i can't believe it!, you entered x = 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
        case 1:
            cout << "WOW, i can't believe it, you entered x = 1" << endl;
            break;
        case 2:
            cout << "WOW, i can't believe it, you entered x = 2" << endl;
            break;
    }
}
```

```
Enter x:
4
You have entered, x = 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
        case 1:
            cout << "WOW, i can't believe it, you entered x = 1" << endl;
            break;

        case 2:
            cout << "WOW, i can't believe it, you entered x = 2" << endl;
            break;

        default:
            cout << "Not a 1 or 2 " << endl;
            break;
    }
}
```

```
Enter x:
3
You have entered, x = 3
Not a 1 or 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
    case 1:
        cout << "WOW, i can't believe it, you entered x = 1" << endl;
        break;

    case 2:
        cout << "WOW, i can't believe it, you entered x = 2" << endl;
        break;

    default:
        cout << "Not a 1 or 2 " << endl;
    }
}
```

```
Enter x:
3
You have entered, x = 3
Not a 1 or 2
Press any key to continue
```


Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
    case 1:
        cout << "WOW, i can't believe it, you entered x = 1"
        << endl;

    case 2:
        cout << "WOW, i can't believe it, you entered x = 2"
        << endl;

    default:
        cout << "Not a 1 or 2 " << endl;
    }
}
```

```
Enter x:
1
You have entered, x = 1
WOW, i can't believe it, you entered x = 1
WOW, i can't believe it, you entered x = 2
Not a 1 or 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x; // 1
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
    case 1:
        cout << "WOW, i can't believe it, you entered x = 1" << endl;
        cout << x++ << endl;

    case 2:
        cout << "WOW, i can't believe it, you entered x = 2" << endl;

    default:
        cout << "Not a 1 or 2 " << endl;
    }
}
```

```
Enter x:
1
You have entered, x = 1
WOW, i can't believe it, you entered x = 1
1
WOW, i can't believe it, you entered x = 2
Not a 1 or 2
Press any key to continue
```

Control Structure

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

void main(void)
{
    int x = 3;
    cout << "Enter x: " << endl;
    cin >> x;
    cout << "You have entered, x = " << x << endl;
    switch (x)
    {
    case 1:
        cout << "WOW, i can't believe it, you entered x = 1" << endl;
        cout << x++ << endl;
        break;

    case 2:
        cout << "WOW, i can't believe it, you entered x = 2" << endl;
        break;

    default:
        cout << "Not a 1 or 2 " << endl;
    }
}
```

```
Enter x:
1
You have entered, x = 1
WOW, i can't believe it, you entered x = 1
1
Press any key to continue
```

Control Structure

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


```
void main(void)
{
    int x = 3;
    if (x)
        cout << x << endl;
}
```

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

```
void main(void)
{
    int x = 0;
    if (x)
        cout << x << endl;
}
```

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

```
void main(void)
{
    int x;
    if (x)
        cout << x << endl;
}
```



Quiz

Quiz 1, 2

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

void main(void)
{
    int x = 5;
    while (x!= 10)
    {
        cout << x*x << endl;
    }
}
```

25
25

Indefinitely

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

void main(void)
{
    int i = 0;
    int c = 5;
    do
    {
        ++c;
        cout << "beep!, number = " << i << endl;
        i++;
    } while ( c++ <= 10 );
}
```

beep!, number = 0
beep!, number = 1
beep!, number = 2
beep!, number = 3
Press any key to continue

Quiz 3, 4

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

void main(void)
{
    int i = 66;
    int c = 5;
    int j = 2;
    for (int i = 0, j; i<5; i++, j-- )
    {
        cout << ++j << endl;
    }
}
```

1
1
1
1
1
1

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

void main(void)
{
    for (int i = 0; i<5; i++ )
    {
        cout << ++i << endl;
        if (i = 34)
        {
            break;
        }
    }
}
```

1

Quiz 5, 6

```
#include <iostream>
using namespace::std;
int x = 0;

float f2 (int z )
{
    cout << z << endl;
    z*=2;
    return z;
}

void f1 ( int &x )
{
    x+2;
    cout << x << endl;
    f2(x);
    cout << x << endl;
}

void main(void)
{
    int x = 4;
    cout <<::x++ << endl;
    f1(x);
    f1(::x);
    cout << ++::x << endl;
}
```

0
4
4
4
1
1
1
2

```
#include <iostream>
using namespace::std;
int s = 0;

int Sum(int n)
{
    if (n == 1 )
        return 1;
    else
    {
        ::s =::s + n + Sum(n-1);
    }
}

void main(void)
{
    cout << Sum(4) << endl;
    cout <<::s << endl;
}
```

0
4

Quiz 7

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

void main()
{
    enum Cars { Nissan = 1, BMW, Mercedes = 1, Ferrari, Renault };
    Cars MyCars;
    for (int i=0; i=10; i++)
    {
        cout << MyCars;
    }
}
```

[illegible]