programming in C++

Jonas Vejlin

Parts

Part 1

Basic programming

Part 2

Control structure such as loops and if-else (Today)
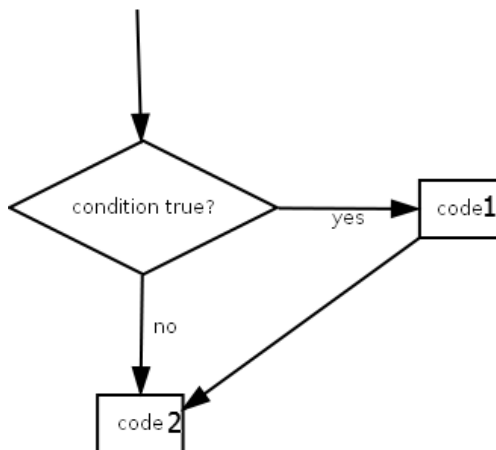
Part 3

Vector,Functions and Input/Ouput

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Graphical Representation

if
○●○

if else
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Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is true

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int aValue=3;
    int aAnotherValue=3;
    if(aValue==aAnotherValue)
    {
        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3
aAnotherValue = 3

if
○●○

if else
○○○

Intro to loops

For loop
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While loop
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while or for
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Output

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aValue = 3

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if
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While loop
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#include <iostream>
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        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3

aAnotherValue = 3

if
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Intro to loops

For loop
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While loop
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        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue $= 3$

aAnotherValue $= 3$

if
○●○

if else
○○○

Intro to loops

For loop
○○

While loop
○○

while or for
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#include <iostream>
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int main()
{
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    {
        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

3 and 3 are the same

data

aValue = 3
aAnotherValue = 3

When if is true

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int aValue=3;
    int aAnotherValue=3;
    if(aValue==aAnotherValue)
    {
        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

3 and 3 are the same
done with if

data

aValue = 3
aAnotherValue = 3

if
○○●

if else
○○○

Intro to loops

For loop
○○

While loop
○○

while or for
○

when if is false

Source Code

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#include <iostream>
using namespace std;
int main()
{
    int aValue=3;
    int aAnotherValue=3;
    if(aValue!=aAnotherValue)
    {
        cout<<"3 and 3 are
different"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3
aAnotherValue = 3

when if is false

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
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    int aValue=3;
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different"<<endl;
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Output

data

aValue = 3
aAnotherValue = 3

when if is false

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different"<<endl;
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}
```

Output

data

aValue = 3
aAnotherValue = 3

when if is false

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    }
    cout<<"done with
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cin.get();
}
```
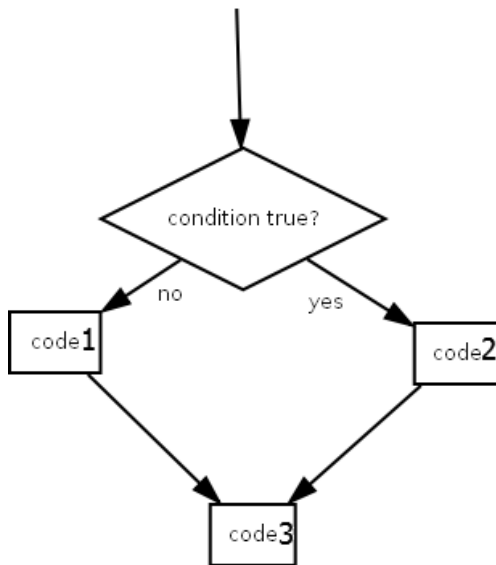
Output

done with if

data

aValue = 3
aAnotherValue = 3

if
○○○

if else
○○○

Intro to loops
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if else
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Intro to loops

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oo

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Output

data

aValue = 3
aAnotherValue = 3

if
ooo

if else
o●o

Intro to loops

For loop
oo

While loop
oo

while or for
o

When if is true

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Output

data

aValue = 3

aAnotherValue = 3

if
○○○

if else
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Intro to loops

For loop
○○

While loop
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while or for
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    }
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cin.get();
}
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Output

data

aValue = 3

aAnotherValue = 3

When if is true

Source Code

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int main()
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Output

data

aValue = 3
aAnotherValue = 3

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
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When if is true

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different"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

3 and 3 are the same

data

aValue $= 3$
aAnotherValue $= 3$

if
○○○

if else
○●●

Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is true

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        cout<<"3 and 3 are
different"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

3 and 3 are the same
done with if

data

aValue = 3
aAnotherValue = 3

if
○○○

if else
○○●

Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is false

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int main()
{
    int aValue=3;
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        cout<<"3 and 3 are
different"<<endl;
    }
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        cout<<"3 and 3 are the
same"<<endl;
    }
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if"<<endl;
cin.get();
}
```

Output

data

aValue = 3
aAnotherValue = 3

if
○○○

if else
○○●

Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is false

Source Code

```
int main()
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    int aValue=3;
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same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3

aAnotherValue = 3

if
000

if else
00●

Intro to loops

For loop
00

While loop
00

while or for
0

When if is false

Source Code

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int main()
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Output

data

aValue = 3

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if
○○○

if else
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Intro to loops

For loop
○○

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○○

while or for
○

When if is false

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    }
    else {
        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3

aAnotherValue = 3

if
ooo
if else
oo●
Intro to loops
For loop
oo
While loop
oo
while or for
o

When if is false

Source Code

```
int main()
{
    int aValue=3;
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    if(aValue!=aAnotherValue) {
        cout<<"3 and 3 are
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same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

data

aValue = 3

aAnotherValue = 3

if
○○○

if else
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Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is false

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    cout<<"done with
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}
```

Output

3 and 3 are the same

data

aValue = 3
aAnotherValue = 3

if
○○○

if else
○○●

Intro to loops

For loop
○○

While loop
○○

while or for
○

When if is false

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        cout<<"3 and 3 are
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    }
    else {
        cout<<"3 and 3 are the
same"<<endl;
    }
    cout<<"done with
if"<<endl;
cin.get();
}
```

Output

3 and 3 are the same
done with if

data

aValue = 3
aAnotherValue = 3

if
000

if else
000

Intro to loops

For loop
00

While loop
00

while or for
0

Table of Contents

Why Loop

- Easy way to run a lot of repetitive code
- Make sure that each iteration does exactly the same
- Less copy
  paste code (and less copy
  paste bugs)

if
○○○

if else
○○○

Intro to loops

For loop
○○

While loop
○○

while or for
○

Without Loop

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int i=1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

data

i = 1

if
○○○

if else
○○○

Intro to loops

For loop
○○

While loop
○○

while or for
○

Without Loop

Source Code

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#include <iostream>
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    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1

data

i = 1

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
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    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1

data

i = 2

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
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    int i=1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1
i is: 2

data

i = 2

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int i=1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1
i is: 2

data

i = 3

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

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#include <iostream>
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    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1
i is: 2
i is: 3

data

i = 3

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

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#include <iostream>
using namespace std;
int main()
{
    int i=1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1
i is: 2
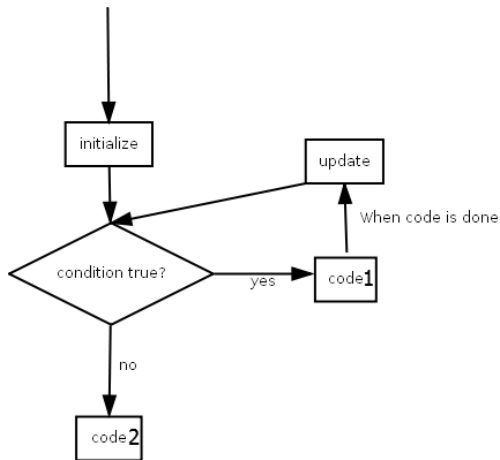i is: 3

data

$i = 4$

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Without Loop

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int i=1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    i=i+1;
    cout<<"i is: "<<i<<endl;
    cin.get();
}
```

Output

i is: 1
i is: 2
i is: 3
i is: 4

data

i = 4

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ooo

Intro to loops

For loop
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While loop
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while or for
o

Graphical Representation

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

data

i = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

data

i = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

data

i = 1

if
ooo

if else
ooo

Intro to loops

For loop
o●

While loop
oo

while or for
o

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1

data

i = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1

data

i = 2

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1

data

i = 2

if
ooo

if else
ooo

Intro to loops

For loop
o●

While loop
oo

while or for
o

Example

Source Code

```cpp
#include <iostream>
using namespace std;
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i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1

data

i = 2

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
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    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2

data

i = 2

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2

data

i = 3

Example

Source Code
```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output
i is: 1
i is: 2

data
i = 3

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2

data

i = 3

if
ooo

if else
ooo

Intro to loops

For loop
oo

While loop
oo

while or for
o

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
    cin.get();
}
```

Output

i is: 1

i is: 2

i is: 3

data

i = 3

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1

i is: 2

i is: 3

data

i = 4

Example

Source Code

```cpp
#include <iostream>
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int main()
{
    for (int i=1; i<=4; i=i+1)
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Output

i is: 1
i is: 2
i is: 3

data

i = 4

Example

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i<<endl;
    }
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for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2
i is: 3

data

i = 4

Example

Source Code

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}
```

Output

i is: 1

i is: 2

i is: 3

i is: 4

data

i = 4

Example

Source Code

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{
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    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2
i is: 3
i is: 4

data

i = 5

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
    {
        cout<<"i is: "<<
i<<endl;
    }
    cout<<"Done with
for"<<endl;
     cin.get();
}
```

Output

i is: 1
i is: 2
i is: 3
i is: 4

data

i = 5

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i=1; i<=4; i=i+1)
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        cout<<"i is: "<<
i<<endl;
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    cout<<"Done with
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Output

i is: 1

i is: 2

i is: 3
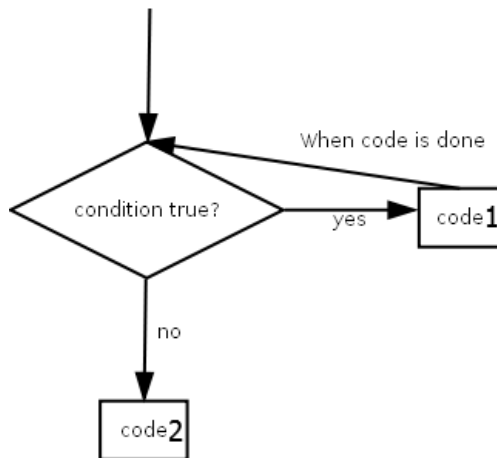
i is: 4

Done with wile

data

i = 5

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Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int count = 1;
    while (count < 5 )
    {
        cout<<"Count is: "<<
count<<endl;
        count=count+1;
    }
    cout<<"Done with
wile"<<endl;
cin.get();
}
```

Output

data

Count = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int count = 1;
    while (count < 5 )
    {
        cout<<"Count is: "<<
count<<endl;
        count=count+1;
    }
    cout<<"Done with
wile"<<endl;
cin.get();
}
```

Output

data

Count = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
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    int count = 1;
    while (count < 5 )
    {
        cout<<"Count is: "<<
count<<endl;
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Output

data

Count = 1

Example

Source Code

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    }
    cout<<"Done with
wile"<<endl;
cin.get();
}
```

Output

data

Count = 1

if
○○○

if else
○○○

Intro to loops

For loop
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While loop
○●

while or for
○

Example

Source Code

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```

Output

Count is: 1

data

Count = 1

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int count = 1;
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count<<endl;
        count=count+1;
    }
    cout<<"Done with
wile"<<endl;
cin.get();
}
```

Output

Count is: 1

data

Count = 2

if
ooo

if else
ooo

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Example

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```

Output

Count is: 1

data

Count = 2

Example

Source Code

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#include <iostream>
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    cout<<"Done with
wile"<<endl;
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```

Output

Count is: 1

data

Count = 2

if
ooo

if else
ooo

Intro to loops

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Source Code

```cpp
#include <iostream>
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wile"<<endl;
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```

Output

Count is: 1
Count is: 2

data

Count = 2

if
000
if else
000
Intro to loops
For loop
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While loop
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while or for
0

Example

Source Code
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using namespace std;
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    int count = 1;
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```

Output

Count is: 1
Count is: 2

data

Count = 3

Example

Source Code

```cpp
#include <iostream>
using namespace std;
int main()
{
    int count = 1;
    while (count < 5 )
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        cout<<"Count is: "<<
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Output

Count is: 1
Count is: 2

data

Count = 3

Example

Source Code

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Output

Count is: 1
Count is: 2

data

Count = 3

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Output

Count is: 1
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Count is: 3

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Count = 3

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Output

Count is: 1
Count is: 2
Count is: 3

data

Count = 4

if
000

if else
000

Intro to loops

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while or for
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Count is: 2
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Output

Count is: 1
Count is: 2
Count is: 3
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data

Count = 4

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Count is: 2
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Count = 5

if
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if else
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Output

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Count is: 2
Count is: 3
Count is: 4
Done with wile

data

Count = 5

when to use the different loops

For loop

- When you know exactly how many times you need to run some code
- Running through each element in a list

While loop

- When you need to run onto a condition a met
- Running onto you reach the end of a file
- Running onto the user gives a specific input