Step-by-step walkthrough for example on page 53 of the lecture notes: C++ Class

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```


```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```

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      real += x.real; imag += x.imag;
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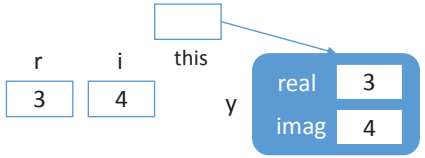
    }
};
```



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  x.add1(y).add1(y).print();
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  p->print();
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  z.print();
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class Complex /* File: complex.h */
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      return this;
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    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```

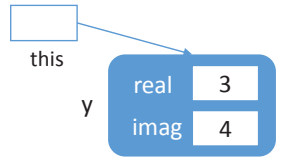

Output

```
( 3 , 4 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
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  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

Output

```
( 3 , 4 )

Return by value
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
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  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
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  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

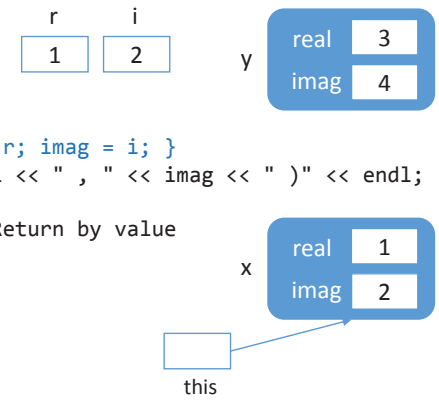
Output

```
( 3 , 4 )

Return by value
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
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  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

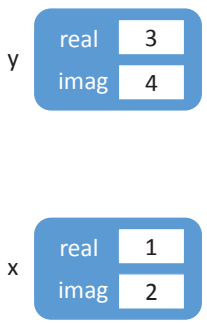

Output

```
( 3 , 4 )

Return by value
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
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    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```
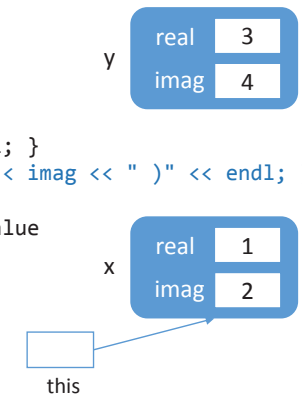
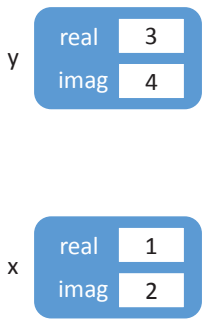



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
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    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
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    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```
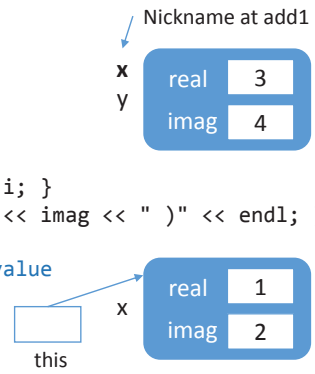
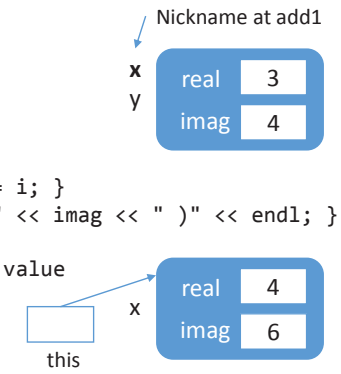



Output
(3 , 4)

Return by value
(1 , 2)

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output
(3 , 4)

Return by value
(1 , 2)

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
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    {
      real += x.real; imag += x.imag;
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    }
};
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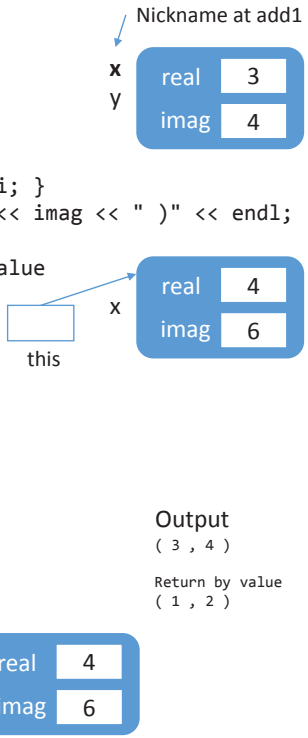

Output
(3 , 4)

Return by value
(1 , 2)

Generated by return (*this)

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
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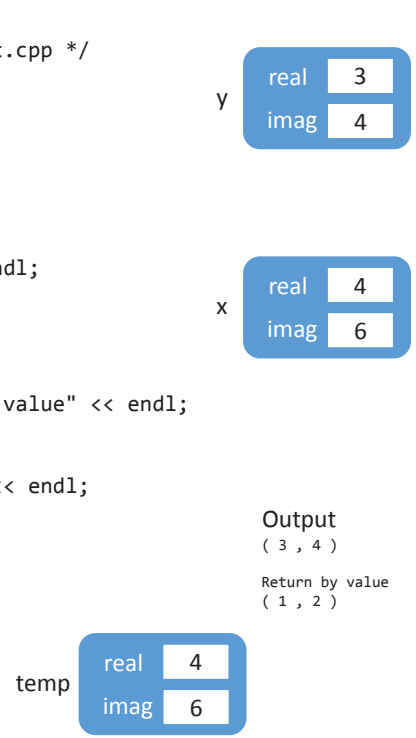
  x.print();
  x.add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output
(3 , 4)

Return by value
(1 , 2)

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
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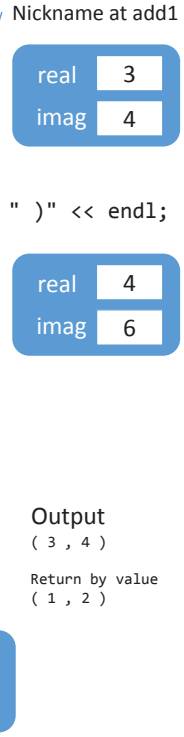


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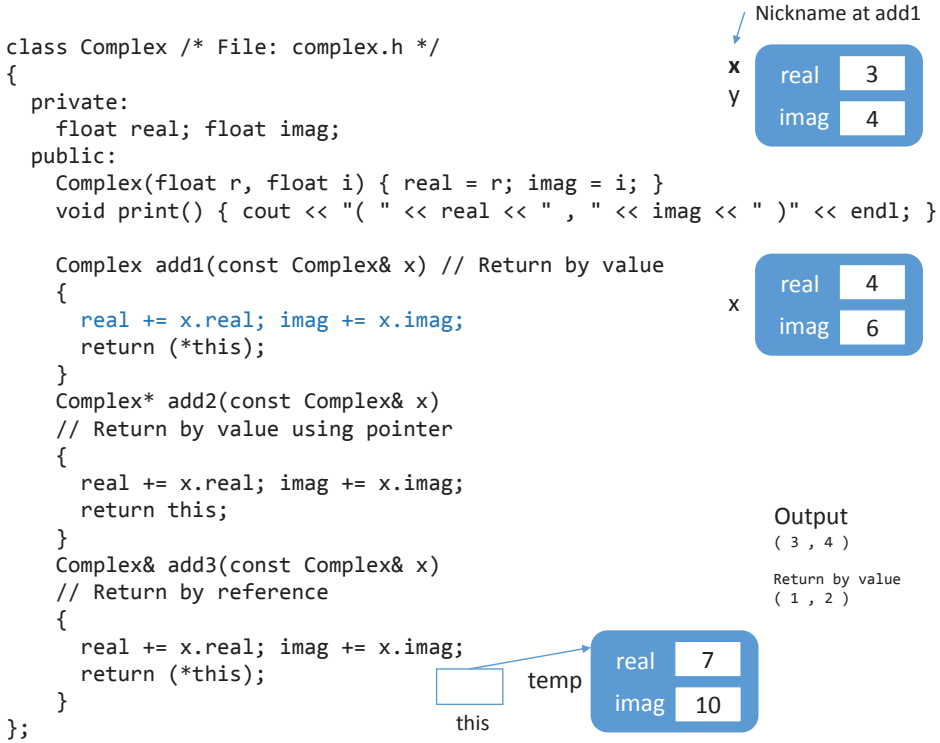


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    }
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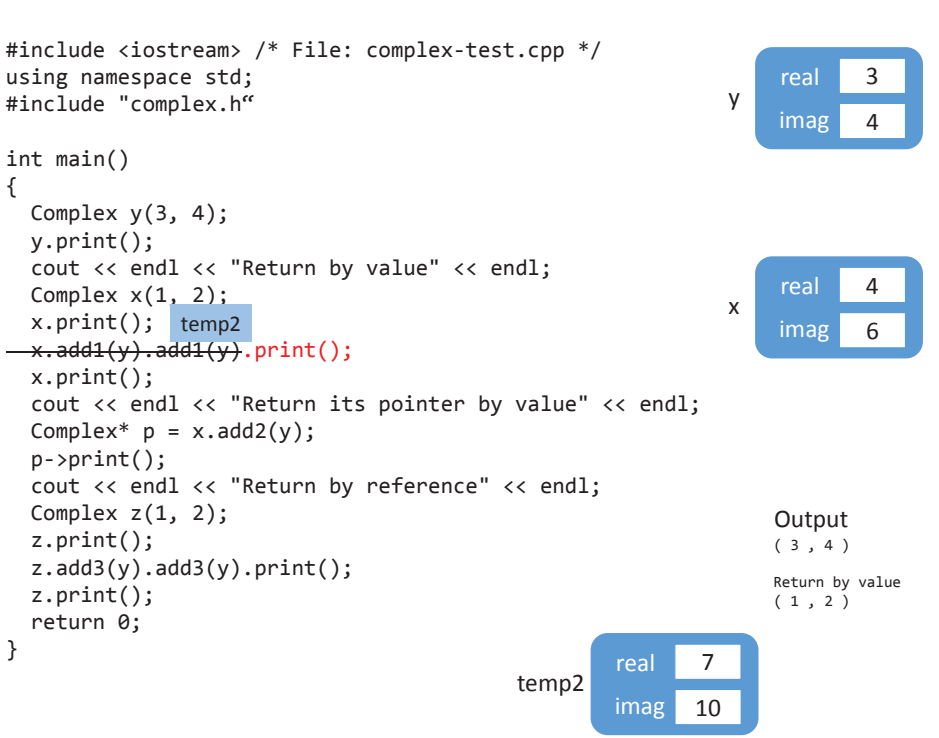
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



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class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

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      return (*this);
    }
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    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```

Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

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    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```
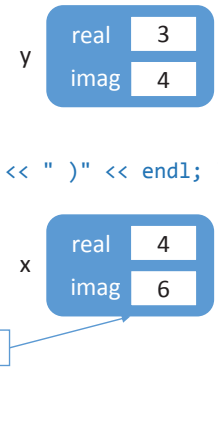



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

Output

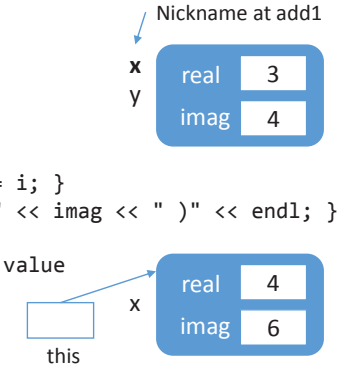
```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```

Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

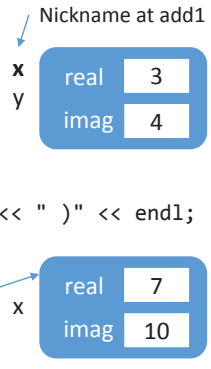
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

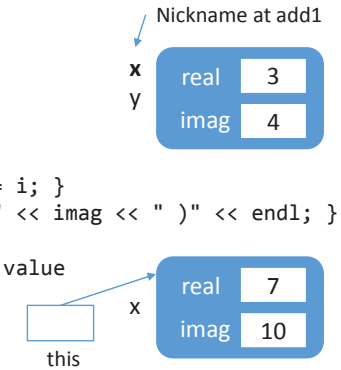
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

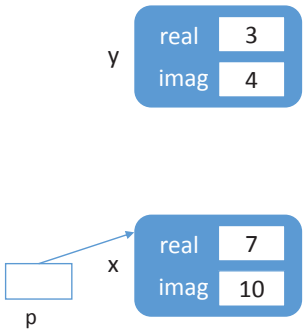
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

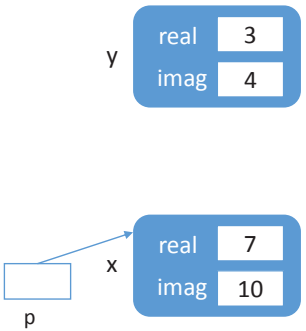
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

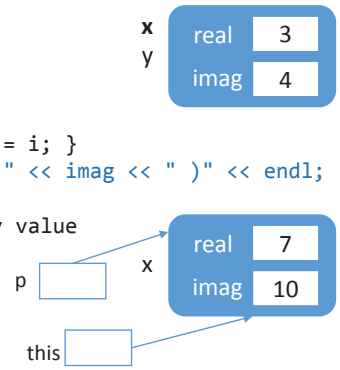
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
```

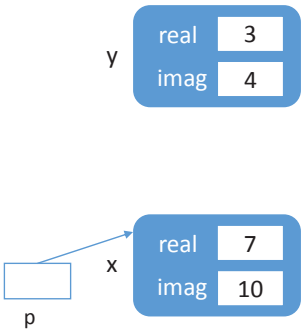
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )
```

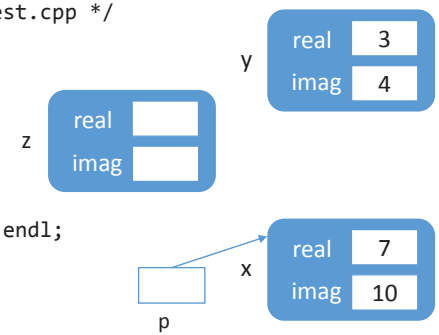
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

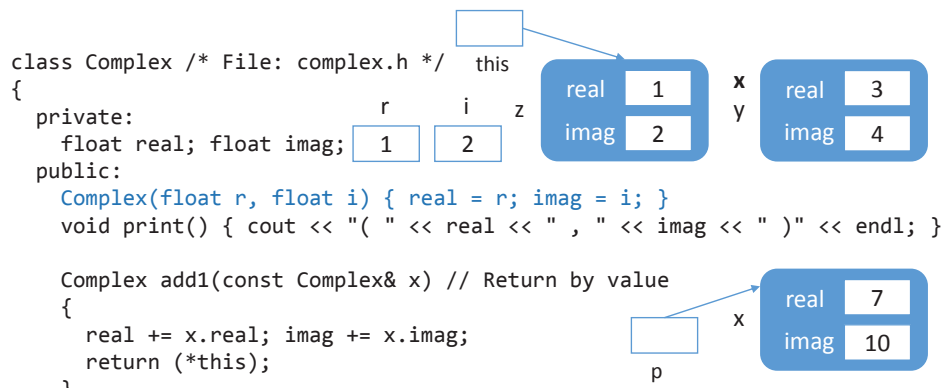
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

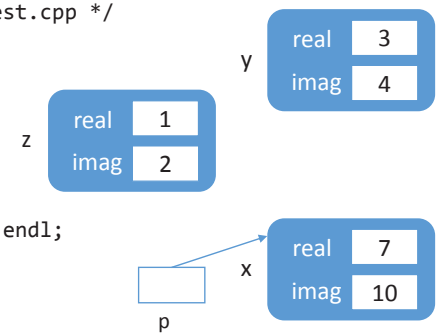
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

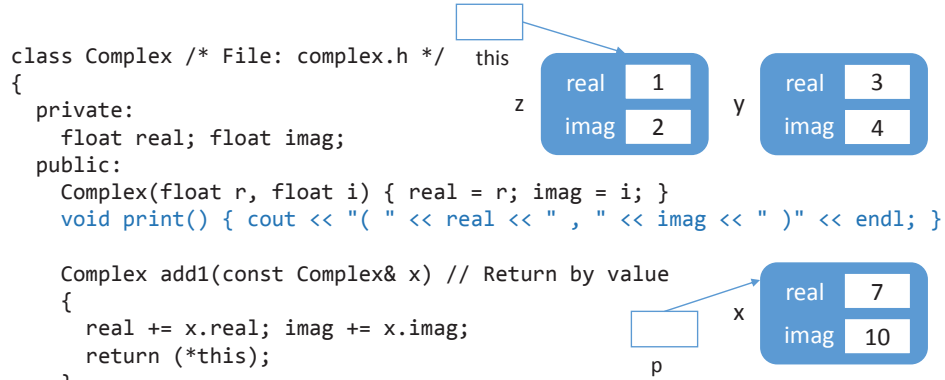
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

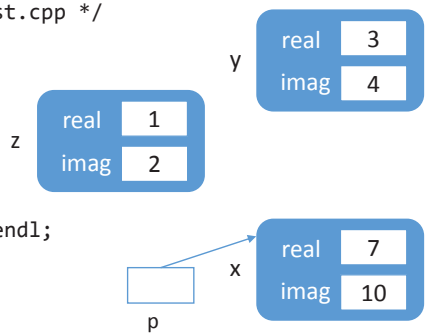
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

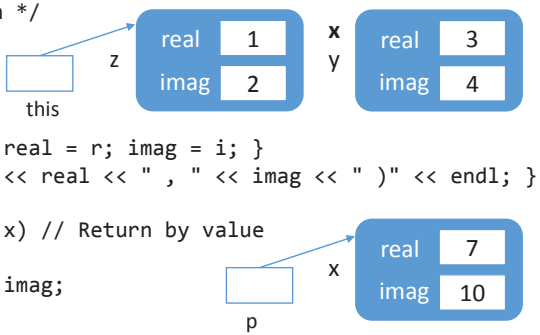
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

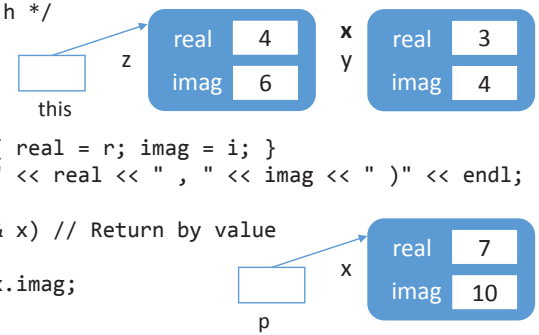
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



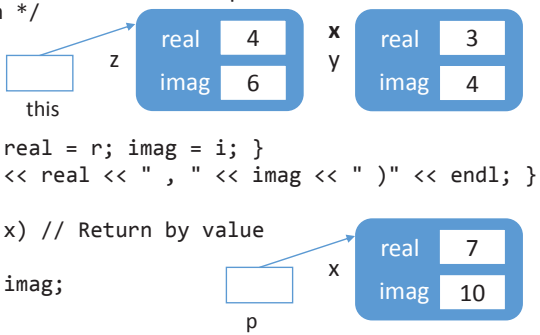
Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

Generated by return (*this)

temp3

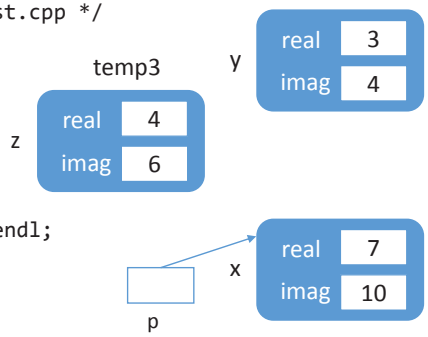
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

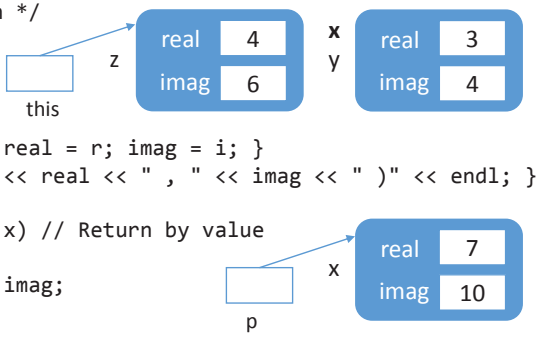
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
temp3 z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
```

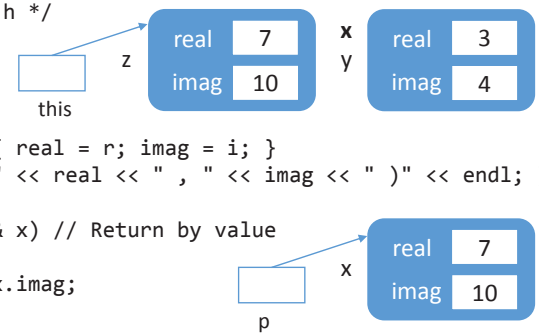
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



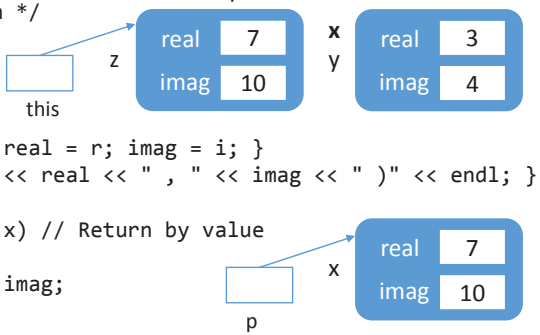
Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

Generated by return (*this)

temp4

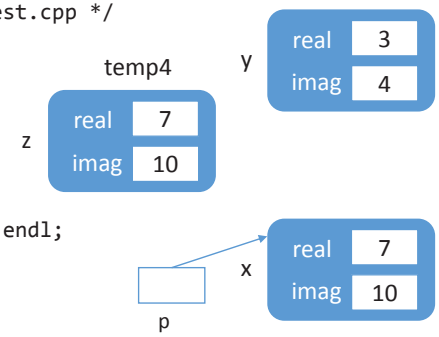
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

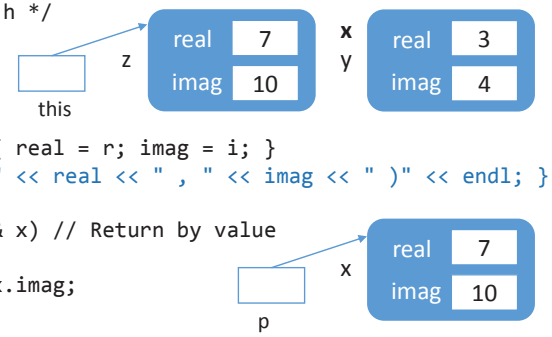
```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
```

```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
( 7, 10 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h"

int main()
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  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```
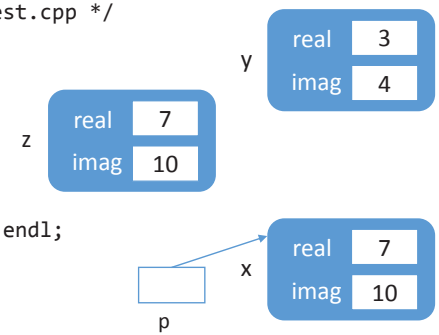
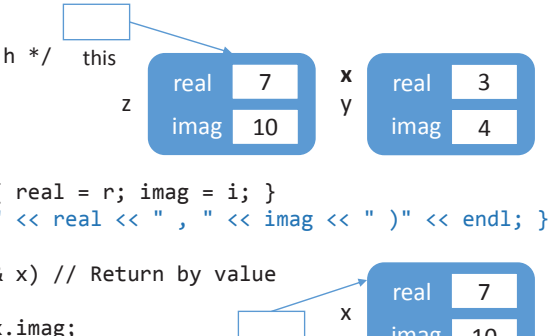



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
( 7, 10 )
```

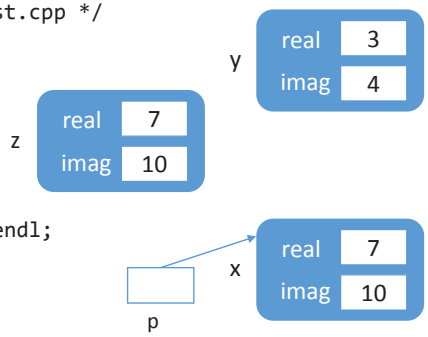
```
class Complex /* File: complex.h */
{
  private:
    float real; float imag;
  public:
    Complex(float r, float i) { real = r; imag = i; }
    void print() { cout << "( " << real << " , " << imag << " )" << endl; }

    Complex add1(const Complex& x) // Return by value
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
    Complex* add2(const Complex& x)
    // Return by value using pointer
    {
      real += x.real; imag += x.imag;
      return this;
    }
    Complex& add3(const Complex& x)
    // Return by reference
    {
      real += x.real; imag += x.imag;
      return (*this);
    }
};
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
( 7, 10 )
( 7, 10 )
```

```
#include <iostream> /* File: complex-test.cpp */
using namespace std;
#include "complex.h“

int main()
{
  Complex y(3, 4);
  y.print();
  cout << endl << "Return by value" << endl;
  Complex x(1, 2);
  x.print();
  x.add1(y).add1(y).print();
  x.print();
  cout << endl << "Return its pointer by value" << endl;
  Complex* p = x.add2(y);
  p->print();
  cout << endl << "Return by reference" << endl;
  Complex z(1, 2);
  z.print();
  z.add3(y).add3(y).print();
  z.print();
  return 0;
}
```



Output

```
( 3 , 4 )

Return by value
( 1 , 2 )
( 7 , 10 )
( 4 , 6 )

Return its pointer by value
( 7 , 10 )

Return by reference
( 1 , 2 )
( 7, 10 )
( 7, 10 )
```