



13.8 — Overloading the increment and decrement operators

▲ ALEX

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JULY 31, 2021

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Overloading prefix increment and decrement

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```
#include <iostream>
 1
 2
    class Digit
 3
    private:
 5
        int m_digit;
 6
    public:
        Digit(int digit=0)
 8
             : m_digit{digit}
         {
 9
10
         Digit& operator++();
11
         Digit& operator--();
12
13
         friend std::ostream& operator<< (std::ostream& out, const Digit&</pre>
    d);
14
    };
    Digit& Digit::operator++()
15
16
         // If our number is already at 9, wrap around to 0
         if (m_digit == 9)
             m_digit = 0;
         // otherwise just increment to next number
         else
17
             ++m_digit;
18
         return *this;
19
    }
20
21
    Digit& Digit::operator--()
         // If our number is already at 0, wrap around to 9 \,
         if (m_digit == 0)
            m_digit = 9;
22
         // otherwise just decrement to next number
         else
             --m_digit;
24
         return *this;
    }
25
    std::ostream& operator<< (std::ostream& out, const Digit& d)</pre>
26
27
    {
28
     out << d.m_digit;</pre>
29
     return out;
30
    }
31
     int main()
32
33
         Digit digit(8);
         std::cout << digit;</pre>
         std::cout << ++digit;
34
         std::cout << ++digit;</pre>
         std::cout << --digit;</pre>
         std::cout << --digit;</pre>
35
36
         return 0;
   }
```

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Overloading postfix increment and decrement

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```
1
    class Digit
3
    private:
4
        int m_digit;
    public:
6
        Digit(int digit=0)
            : m_digit{digit}
9
10
        Digit& operator++(); // prefix has no parameter
        Digit& operator--(); // prefix has no parameter
11
        Digit operator++(int); // postfix has an int parameter
        Digit operator--(int); // postfix has an int parameter
12
        friend std::ostream& operator<< (std::ostream& out, const Digit&</pre>
13
    d);
14
    };
    // No parameter means this is prefix operator++
15
    Digit& Digit::operator++()
        // If our number is already at 9, wrap around to 0
16
        if (m_digit == 9)
            m_digit = 0;
        // otherwise just increment to next number
        else
            ++m_digit;
        return *this;
18
19
    // No parameter means this is prefix operator--
    Digit& Digit::operator--()
21
        // If our number is already at 0, wrap around to 9
22
        if (m_digit == 0)
23
            m_digit = 9;
        // otherwise just decrement to next number
        else
24
            --m_digit;
```

```
return *this;
    }
27
    // int parameter means this is postfix operator++
28
    Digit Digit::operator++(int)
29
30
         // Create a temporary variable with our current digit
31
         Digit temp{*this};
32
33
         // Use prefix operator to increment this digit
         ++(*this); // apply operator
34
         // return temporary result
         return temp; // return saved state
35
36
     // int parameter means this is postfix operator--
    Digit Digit::operator--(int)
37
38
         // Create a temporary variable with our current digit
39
         Digit temp{*this};
         \ensuremath{/\!/} Use prefix operator to decrement this digit
40
         --(*this); // apply operator
41
42
         // return temporary result
43
         return temp; // return saved state
44
    }
45
    std::ostream& operator<< (std::ostream& out, const Digit& d)</pre>
     out << d.m_digit;
47
     return out;
48
49
    int main()
         Digit digit(5);
50
         std::cout << digit;</pre>
51
         std::cout << ++digit; // calls Digit::operator++();</pre>
52
         std::cout << digit++; // calls Digit::operator++(int);</pre>
         std::cout << digit;</pre>
         std::cout << --digit; // calls Digit::operator--();</pre>
         std::cout << digit--; // calls Digit::operator--(int);</pre>
53
         std::cout << digit;</pre>
55
         return 0;
    }
```

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```
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```

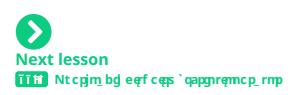
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