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# Chain of Responsibility in C++



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## Chain of Responsibility design pattern

- 1. Put a "next" pointer in the base class
- 2. The "chain" method in the base class always delegates to the next object
- 3. If the derived classes cannot handle, they delegate to the base class

```
#include <iostream>
#include <vector>
#include <ctime>
using namespace std;
class Base
    Base *next; // 1. "next" pointer in the base class
  public:
    Base()
    {
        next = 0;
    void setNext(Base *n)
        next = n;
    void add(Base *n)
        if (next)
          next->add(n);
        else
          next = n;
    }
    // 2. The "chain" method in the base class always delegates to the next obj
    virtual void handle(int i)
        next->handle(i);
    }
};
class Handler1: public Base
  public:
     /*virtual*/void handle(int i)
    {
        if (rand() % 3)
            // 3. Don't handle requests 3 times out of 4
            cout << "H1 passed " << i << " ";
            Base::handle(i); // 3. Delegate to the base class
        }
        else
          cout << "H1 handled " << i << " ";</pre>
    }
};
class Handler2: public Base
```

```
public:
     /*virtual*/void handle(int i)
    {
        if (rand() % 3)
        {
            cout << "H2 passed " << i << " ";
            Base::handle(i);
        }
        else
          cout << "H2 handled " << i << " ";</pre>
    }
};
class Handler3: public Base
{
  public:
     /*virtual*/void handle(int i)
        if (rand() % 3)
            cout << "H3 passed " << i << " ";
            Base::handle(i);
        }
        else
          cout << "H3 handled " << i << " ";</pre>
    }
};
int main()
  srand(time(0));
  Handler1 root;
  Handler2 two;
  Handler3 thr;
  root.add(&two);
  root.add(&thr);
  thr.setNext(&root);
  for (int i = 1; i < 10; i++)
    root.handle(i);
    cout << '\n';
  }
}
```

#### Output

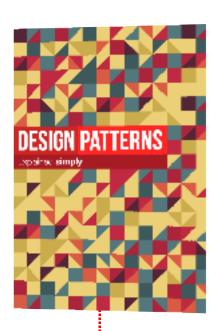
```
H1 passed 1 H2 passed 1 H3 passed 1 H1 passed 1 H2 handled 1
H1 handled 2
H1 handled 3
H1 passed 4 H2 passed 4 H3 handled 4
H1 passed 5 H2 handled 5
H1 passed 6 H2 passed 6 H3 passed 6 H1 handled 6
H1 passed 7 H2 passed 7 H3 passed 7 H1 passed 7 H2 handled 7
H1 handled 8
H1 passed 9 H2 passed 9 H3 handled 9
```

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