Extract Method

You have a code fragment that can be grouped together.
Turn the fragment into a method whose name explains the purpose of the method.

```
void printOwing() {
        printBanner();

        //print details
        System.out.println ("name:     " + _name);
        System.out.println ("amount    " + getOutstanding());
}
```

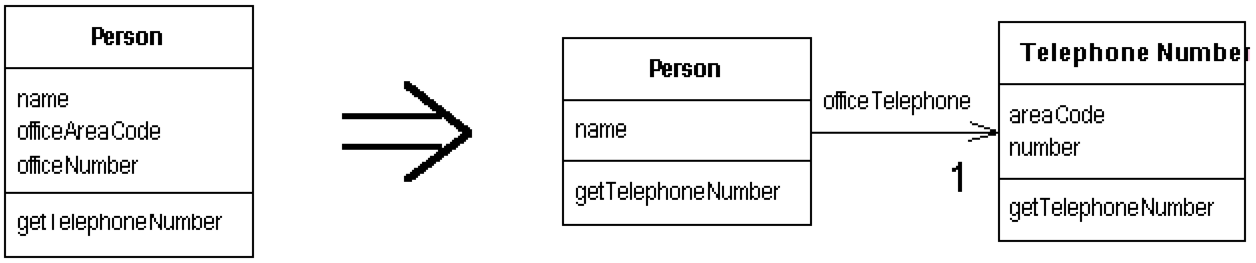
$\Downarrow$

```
void printOwing() {
        printBanner();
        printDetails(getOutstanding());
}

void printDetails (double outstanding) {
        System.out.println ("name:     " + _name);
        System.out.println ("amount    " + outstanding);
}
```

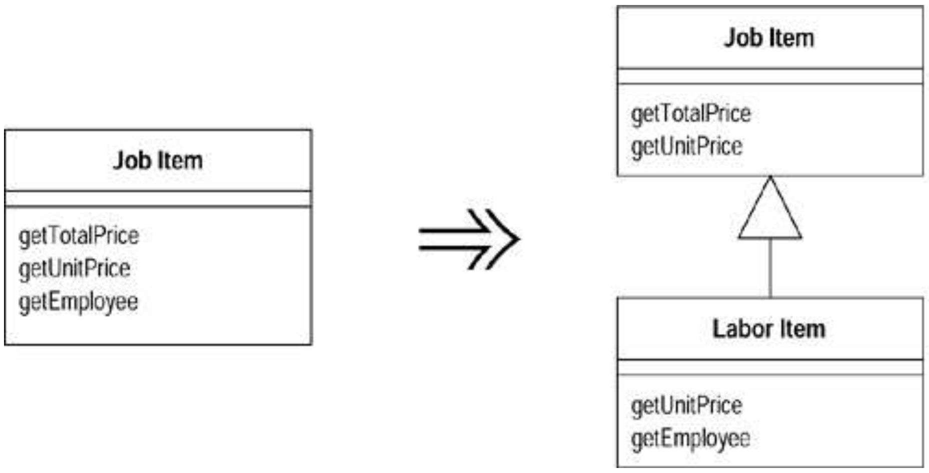
Extract Class

You have one class doing work that should be done by two.
Create a new class and move the relevant fields and methods from the old class into the new class.



Extract Sub Class

A class has features that are used only in some instances.
Create a subclass for that subset of features.



Introduce Explaining Variable

You have a complicated expression.
Put the result of the expression, or parts of the expression, in a temporary variable with a name that explains the purpose.

```
if ((platform.toUpperCase().indexOf("MAC") > -1) &&
   (browser.toUpperCase().indexOf("IE") > -1) &&
    wasInitialized() && resize > 0 ) {
         // do something
}
```

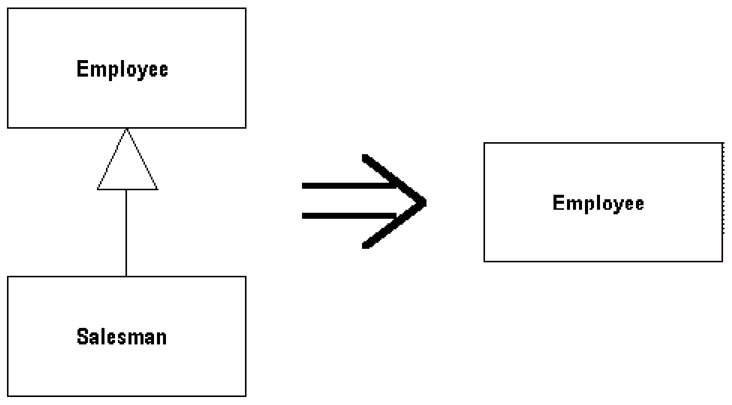
$\Downarrow$

```
final boolean isMacOs     = platform.toUpperCase().indexOf("MAC") > -1;
final boolean isIEBrowser = browser.toUpperCase().indexOf("IE")  > -1;
final boolean wasResized  = resize > 0;

if (isMacOs && isIEBrowser && wasInitialized() && wasResized) {
     // do something
}
```

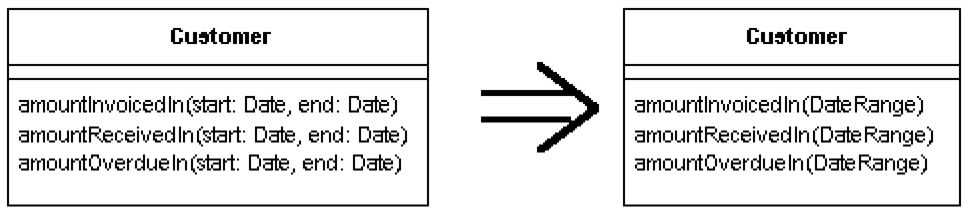
Collapse Hierarchy

A superclass and subclass are not very different.
Merge them together.



Introduce Parameter Object

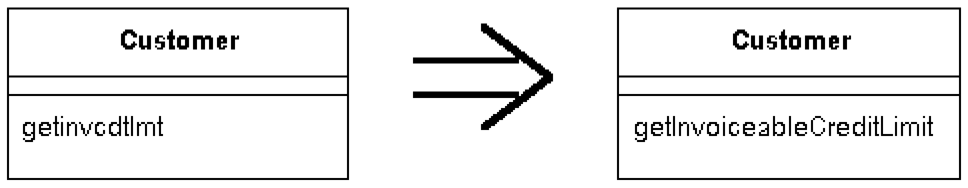
You have a group of parameters that naturally go together.
Replace them with an object.



Customer
amountInvoicedIn(start: Date, end: Date)
amountReceivedIn(start: Date, end: Date)
amountOverdueIn(start: Date, end: Date)
Customer
amountInvoicedIn(DateRange)
amountReceivedIn(DateRange)
amountOverdueIn(DateRange)

Rename

The name of a method does not reveal its purpose.
Change the name of the method.

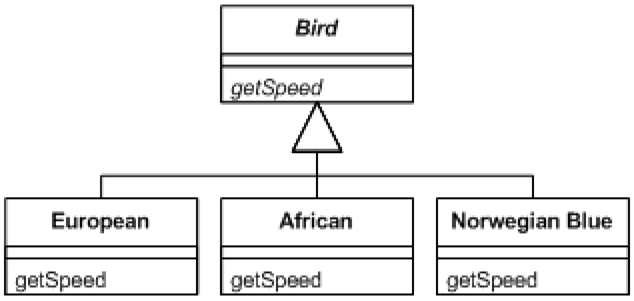


Replace Conditional with Polymorphism

You have a conditional that chooses different behavior depending on the type of an object.
Move each leg of the conditional to an overriding method in a subclass. Make the original method abstract.

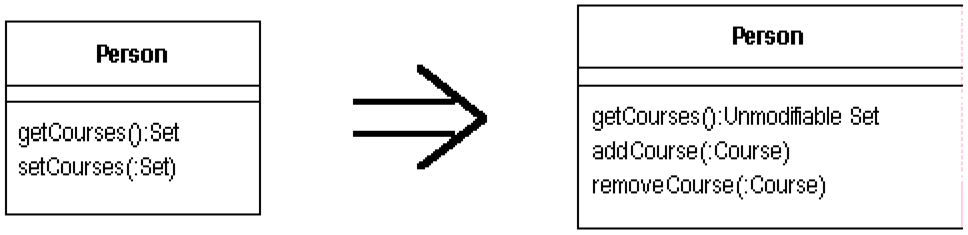
```
double getSpeed() {
  switch (_type) {
    case EUROPEAN:
      return getBaseSpeed();
    case AFRICAN:
      return getBaseSpeed() - getLoadFactor() * _numberOfCoconuts;
    case NORWEGIAN_BLUE:
      return (_isNailed) ? 0 : getBaseSpeed(_voltage);
  }
  throw new RuntimeException ("Should be unreachable");
}
```

$\Downarrow$



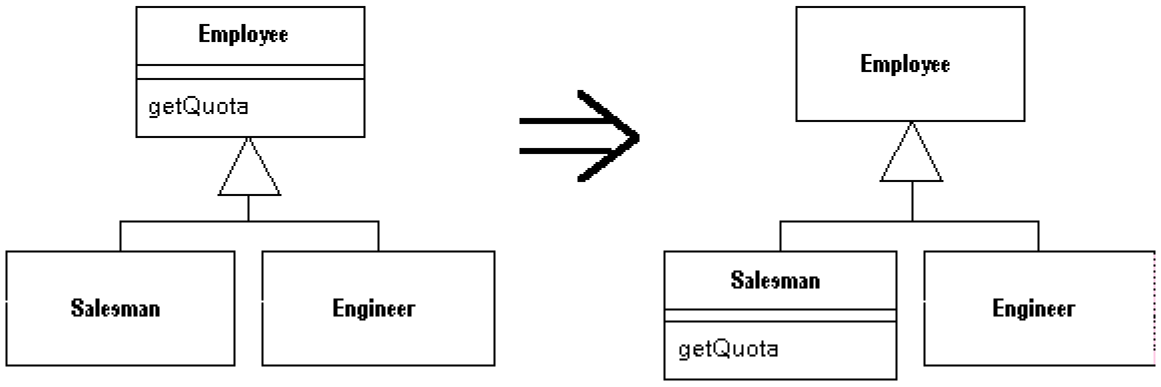
Encapsulate Collection

A method returns a collection.
Make it return a read-only view and provide add/remove methods.



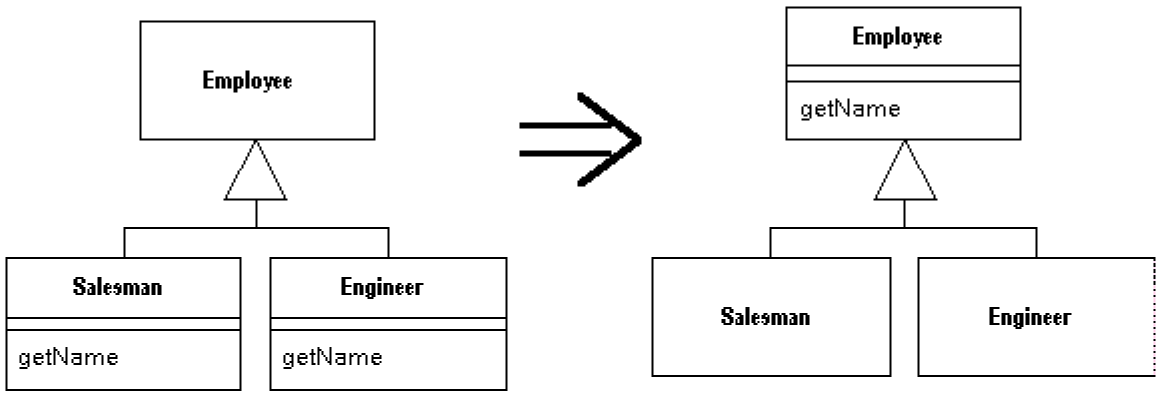
Push Down Field/Method

Behavior on a superclass is relevant only for some of its subclasses.
Move it to those subclasses.



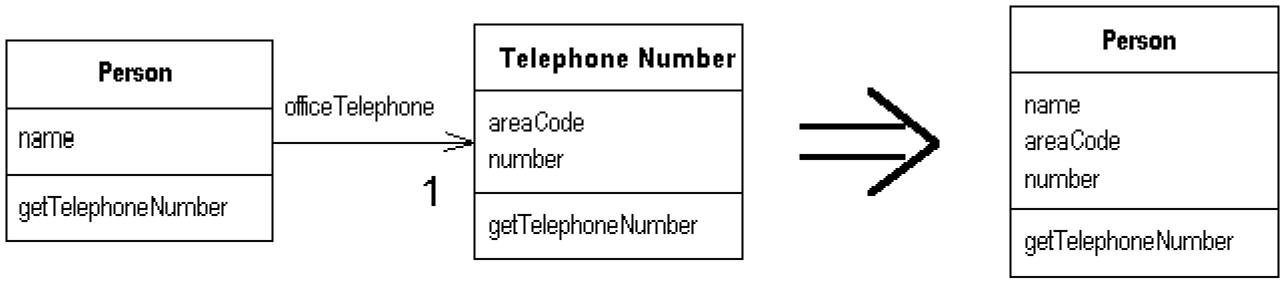
Pull Up Field/Method

You have methods with identical results on subclasses.
Move them to the superclass.



Inline Class

A class isn't doing very much.
Move all its features into another class and delete it.



Inline Method

A method’s body is just as clear as its name.
Put the method’s body into the body of its callers and remove the method.

```
int getRating() {
        return (moreThanFiveLateDeliveries()) ? 2 : 1;
}

boolean moreThanFiveLateDeliveries() {
        return _numberOfLateDeliveries > 5;
}
```

$$\Downarrow$$

```
int getRating() {
        return (_numberOfLateDeliveries > 5) ? 2 : 1;
}
```

Inline Temp

You have a temp that is assigned to once with a simple expression, and the temp is getting in the way of other refactorings.
Replace all references to that temp with the expression.

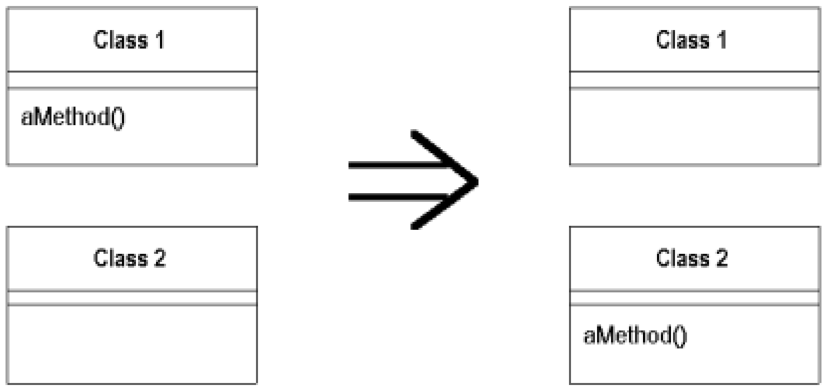
```
double basePrice = anOrder.basePrice();
return (basePrice > 1000)
```

$$\Downarrow$$

```
return (anOrder.basePrice() > 1000)
```

Move Method

A method is, or will be, using or used by more features of another class than the class on which it is defined.
Create a new method with a similar body in the class it uses most. Either turn the old method into a simple delegation, or remove it altogether.


Class 1
aMethod()
Class 2
Class 1
Class 2
aMethod()