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# 10 Golden Rules of Thumb

## OSIDays 2011

Tobias Schlitt (@tobySen)

November 20, 2011

# About me

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- ▶ Degree in computer science



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- ▶ Prof. PHP since 1999



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**Helping teams to create  
high quality PHP software.**

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high quality PHP software.**

<http://qafoo.com>

**Separate object  
construction from  
application logic.**

# Problem

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     public function getWeather()
6     {
7         $weatherService = new GoogleWeatherService();
8         $rawWeather = $weatherService->getWeather();
9         $weather = $this->parseWeather( $rawWeather );
10        return $weather;
11    }
12    /* ... */
13 }
```

# Problem

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```
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3 class WeatherLoader
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# Problem

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# Problem

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# Problem

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10        return $weather;
11    }
12    /* ... */
13 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service;
6     public function __construct( WeatherService $service )
7     {
8         $this->service = $service;
9     }
10    public function getWeather()
11    {
12        $rawWeather = $this->service->getWeather();
13        $weather = $this->parseWeather( $rawWeather );
14        return $weather;
15    }
16    /* ... */
17 }
```

# Solution

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service;
6     public function __construct( WeatherService $service )
7     {
8         $this->service = $service;
9     }
10    public function getWeather()
11    {
12        $rawWeather = $this->service->getWeather();
13        $weather = $this->parseWeather( $rawWeather );
14        return $weather;
15    }
16    /* ... */
17 }
```

**Never perform real work  
in a constructor.**

# Problem

---

```
1 <?php
2
3 class GoogleWeatherParser
4 {
5     protected $condition; protected $temperature;
6     public function __construct( $xmlString )
7     {
8         $dom = new DOMDocument();
9         $dom->loadXml( $xmlString );
10        $xpath = new DOMXPath( $this->dom );
11
12        $this->condition = $this->parseCondition( $dom, $xpath );
13        $this->temperature = $this->parseTemperature( $dom, $xpath );
14    }
15
16    public function getCondition()
17    { return $this->condition; }
18    public function getTemperature()
19    { return $this->temperature; }
20
21    /* ... */
22 }
```

# Problem

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```
1 <?php
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3 class GoogleWeatherParser
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5     protected $condition; protected $temperature;
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8         $dom = new DOMDocument();
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11
12        $this->condition = $this->parseCondition( $dom, $xpath );
13        $this->temperature = $this->parseTemperature( $dom, $xpath );
14    }
15
16    public function getCondition()
17    { return $this->condition; }
18    public function getTemperature()
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```

# Problem

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```
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2
3 class GoogleWeatherParser
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6     public function __construct( $xmlString )
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8         $dom = new DOMDocument();
9         $dom->loadXml( $xmlString );
10        $xpath = new DOMXPath( $this->dom );
11
12        $this->condition = $this->parseCondition( $dom, $xpath );
13        $this->temperature = $this->parseTemperature( $dom, $xpath );
14    }
15
16    public function getCondition()
17    { return $this->condition; }
18    public function getTemperature()
19    { return $this->temperature; }
20
21    /* ... */
22 }
```

# Problem

---

```
1 <?php
2
3 class GoogleWeatherParser
4 {
5     protected $condition; protected $temperature;
6     public function __construct( $xmlString )
7     {
8         $dom = new DOMDocument();
9         $dom->loadXml( $xmlString );
10        $xpath = new DOMXPath( $this->dom );
11
12        $this->condition = $this->parseCondition( $dom, $xpath );
13        $this->temperature = $this->parseTemperature( $dom, $xpath );
14    }
15
16    public function getCondition()
17    { return $this->condition; }
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19    { return $this->temperature; }
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21    /* ... */
22 }
```

# Problem

---

```
1 <?php
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3 class GoogleWeatherParser
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5     protected $condition; protected $temperature;
6     public function __construct( $xmlString )
7     {
8         $dom = new DOMDocument();
9         $dom->loadXml( $xmlString );
10        $xpath = new DOMXPath( $this->dom );
11
12        $this->condition = $this->parseCondition( $dom, $xpath );
13        $this->temperature = $this->parseTemperature( $dom, $xpath );
14    }
15
16    public function getCondition()
17    { return $this->condition; }
18    public function getTemperature()
19    { return $this->temperature; }
20
21    /* ... */
22 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class GoogleWeatherParser
4 {
5     protected $dom; protected $xpath;
6
7     public function __construct( $xmlString )
8     {
9         $dom = new DOMDocument();
10        $dom->loadXml( $xmlString );
11        $xpath = new DOMXPath( $this->dom );
12    }
13
14    public function getCondition()
15    {
16        return $this->parseCondition();
17    }
18    public function getTemperature()
19    {
20        return $this->parseTemperature();
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# Solution

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```
1 <?php
2
3 class GoogleWeatherParser
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5     protected $dom; protected $xpath;
6
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9         $dom = new DOMDocument();
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14    public function getCondition()
15    {
16        return $this->parseCondition();
17    }
18    public function getTemperature()
19    {
20        return $this->parseTemperature();
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# Solution

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1 <?php
2
3 class GoogleWeatherParser
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5     protected $dom; protected $xpath;
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7     public function __construct( $xmlString )
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9         $dom = new DOMDocument();
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16        return $this->parseCondition();
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```
1 <?php
2
3 class GoogleWeatherParser
4 {
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6     protected $condition; protected $temperature;
7
8     public function __construct( $xmlString )
9     {
10         $dom = new DOMDocument();
11         $dom->loadXml( $xmlString );
12         $xpath = new DOMXPath( $this->dom );
13     }
14
15     public function getCondition()
16     {
17         if ( !isset( $this->condition ) )
18         {
19             $this->condition = $this->parseCondition();
20         }
21         return $this->condition;
22     }
23     /* ... */
24 }
```

# Solution

```
1 <?php
2
3 class GoogleWeatherParser
4 {
5     protected $dom; protected $xpath;
6     protected $condition; protected $temperature;
7
8     public function __construct( $xmlString )
9     {
10         $dom = new DOMDocument();
11         $dom->loadXml( $xmlString );
12         $xpath = new DOMXPath( $this->dom );
13     }
14
15     public function getCondition()
16     {
17         if ( !isset( $this->condition ) )
18         {
19             $this->condition = $this->parseCondition();
20         }
21         return $this->condition;
22     }
23     /* ... */
24 }
```

**Never use static access.**

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     public function storeWeather( $temperature, $condition )
6     {
7         Database::query(
8             'INSERT INTO weather VALUES (.....)'
9         );
10    }
11 }
```

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     public function storeWeather( $temperature, $condition )
6     {
7         Database::query(
8             'INSERT INTO weather VALUES(.....)'
9         );
10    }
11 }
```

# Problem

---

```
1 <?php
2
3 class WeatherGateway
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5     public function storeWeather( $temperature, $condition )
6     {
7         Database::query(
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# Problem

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3 class WeatherGateway
4 {
5     public function storeWeather( $temperature, $condition )
6     {
7         Database::query(
8             'INSERT INTO weather VALUES (.....)'
9         );
10    }
11 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     protected $db;
6     public function __construct( Database $db )
7     {
8         $this->db = $db;
9     }
10    public function storeWeather( $temperature, $condition )
11    {
12        $this->db->query(
13            'INSERT INTO weather VALUES (.....)'
14        );
15    }
16 }
```

# Solution

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     protected $db;
6     public function __construct( Database $db )
7     {
8         $this->db = $db;
9     }
10    public function storeWeather( $temperature, $condition )
11    {
12        $this->db->query(
13            'INSERT INTO weather VALUES (.....)'
14        );
15    }
16 }
```

# Solution

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     protected $db;
6     public function __construct( Database $db )
7     {
8         $this->db = $db;
9     }
10    public function storeWeather( $temperature, $condition )
11    {
12        $this->db->query(
13            'INSERT INTO weather VALUES (.....)'
14        );
15    }
16 }
```

**Don't pull dependencies,  
push them!**

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     public function __construct( AppRegistry $reg )
6     {
7         // ...
8     }
9 }
```

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     public function __construct( AppRegistry $reg )
6     {
7         // ...
8     }
9 }
```

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     public function __construct( AppRegistry $reg )
6     {
7         // ...
8     }
9 }
```

# Problem

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     // ...
6     public function __construct( AppRegistry $reg )
7     {
8         $this->db = $reg->getDatabase();
9         $this->logger = $reg->getLogger();
10    }
11 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     // ...
6     public function __construct( Database $db, Logger $logger )
7     {
8         $this->db = $db;
9         $this->logger = $logger;
10    }
11 }
```

# Solution

---

```
1 <?php
2
3 class WeatherGateway
4 {
5     // ...
6     public function __construct( Database $db, Logger $logger )
7     {
8         $this->db = $db;
9         $this->logger = $logger;
10    }
11 }
```

**Don't reach through  
objects.**

# Problem

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $gateway;
6     public function __construct( WeatherGateway $gateway )
7     {
8         $this->gateway = $gateway;
9     }
10
11     public function fixWeather( $id )
12     {
13         $this->gateway->getDatabase()->query(
14             'UPDATE_weather_SET_...'
15         );
16     }
17 }
```

# Problem

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $gateway;
6     public function __construct( WeatherGateway $gateway )
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make it better?

# Solution

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2
3 class WeatherLoader
4 {
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11    public function fixWeather( $id )
12    {
13        $this->gateway->fixWeather( $id );
14    }
15 }
```

# Solution

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9     }
10
11     public function fixWeather( $id )
12     {
13         $this->gateway->fixWeather( $id );
14     }
15 }
```

**Never change expected  
behavior in sub-classes.**

# Basis

---

```
1 <?php
2
3 class DistanceConverter
4 {
5     const FACTOR = 0.6214;
6
7     public function milesToKilometers( $miles )
8     {
9         return $miles / self::FACTOR;
10    }
11
12    public function kilometersToMiles( $kilometers )
13    {
14        return $kilometers * self::FACTOR;
15    }
16 }
```

# Basis

---

```
1 <?php
2
3 class DistanceConverter
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# Basis

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3 class DistanceConverter
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7     public function milesToKilometers( $miles )
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9         return $miles / self::FACTOR;
10    }
11
12    public function kilometersToMiles( $kilometers )
13    {
14        return $kilometers * self::FACTOR;
15    }
16 }
```

## Sub-classes . . .

---

may not change what is expected!

# Problem

---

```
1 <?php
2
3 class ValidatingDistanceConverter extends DistanceConverter
4 {
5     public function milesToKilometers( $miles )
6     {
7         if ( $miles < 0 )
8         {
9             throw new \InvalidArgumentException( 'Distance_negative.' );
10        }
11        return parent::milesToKilometers( $miles );
12    }
13
14    public function kilometersToMiles( $kilometers )
15    {
16        if ( $kilometers < 0 )
17        {
18            throw new \InvalidArgumentException( 'Distance_negative.' );
19        }
20        return parent::kilometersToMiles( $kilometers );
21    }
22 }
```

# Problem

---

```
1 <?php
2
3 class ValidatingDistanceConverter extends DistanceConverter
4 {
5     public function milesToKilometers( $miles )
6     {
7         if ( $miles < 0 )
8         {
9             throw new \InvalidArgumentException( 'Distance_negative.' );
10        }
11        return parent::milesToKilometers( $miles );
12    }
13
14    public function kilometersToMiles( $kilometers )
15    {
16        if ( $kilometers < 0 )
17        {
18            throw new \InvalidArgumentException( 'Distance_negative.' );
19        }
20        return parent::kilometersToMiles( $kilometers );
21    }
22 }
```

# Problem

---

```
1 <?php
2
3 class ValidatingDistanceConverter extends DistanceConverter
4 {
5     public function milesToKilometers( $miles )
6     {
7         if ( $miles < 0 )
8         {
9             throw new \InvalidArgumentException( 'Distance_negative.' );
10        }
11        return parent::milesToKilometers( $miles );
12    }
13
14    public function kilometersToMiles( $kilometers )
15    {
16        if ( $kilometers < 0 )
17        {
18            throw new \InvalidArgumentException( 'Distance_negative.' );
19        }
20        return parent::kilometersToMiles( $kilometers );
21    }
22 }
```

**Use composition for  
code-reuse, not  
inheritance.**

# Problem

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService extends HttpClient
12 {
13     const URL = '...';
14
15     public function getWeather()
16     {
17         return $this->get( self::URL );
18     }
19 }
```

# Problem

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService extends HttpClient
12 {
13     const URL = '...';
14
15     public function getWeather()
16     {
17         return $this->get( self::URL );
18     }
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```

# Problem

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1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
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12 {
13     const URL = '...';
14
15     public function getWeather()
16     {
17         return $this->get( self::URL );
18     }
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```

# Problem

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1 <?php
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13     const URL = '...';
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# Problem

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1 <?php
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6     {
7         // ...
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9 }
10
11 class GoogleWeatherService extends HttpClient
12 {
13     const URL = '...';
14
15     public function getWeather()
16     {
17         return $this->get( self::URL );
18     }
19 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService
12 {
13     const URL = '...';
14
15     protected $httpClient;
16
17     public function __construct( HttpClient $httpClient )
18     {
19         $this->httpClient = $httpClient;
20     }
21
22     public function getWeather()
23     {
24         return $this->httpClient->get( self::URL );
25     }
26 }
```

# Solution

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService
12 {
13     const URL = '...';
14
15     protected $httpClient;
16
17     public function __construct( HttpClient $httpClient )
18     {
19         $this->httpClient = $httpClient;
20     }
21
22     public function getWeather()
23     {
24         return $this->httpClient->get( self::URL );
25     }
26 }
```

# Solution

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService
12 {
13     const URL = '...';
14
15     protected $httpClient;
16
17     public function __construct( HttpClient $httpClient )
18     {
19         $this->httpClient = $httpClient;
20     }
21
22     public function getWeather()
23     {
24         return $this->httpClient->get( self::URL );
25     }
26 }
```

# Solution

---

```
1 <?php
2
3 class HttpClient
4 {
5     public function get( $url )
6     {
7         // ...
8     }
9 }
10
11 class GoogleWeatherService
12 {
13     const URL = '...';
14
15     protected $httpClient;
16
17     public function __construct( HttpClient $httpClient )
18     {
19         $this->httpClient = $httpClient;
20     }
21
22     public function getWeather()
23     {
24         return $this->httpClient->get( self::URL );
25     }
26 }
```

**Code against  
abstractions, not details!**

# Problem

---

```
1 <?php
2
3 class GoogleWeatherService
4 {
5     public function getWeather()
6     {
7         // ...
8     }
9 }
10
11 class WeatherLoader
12 {
13     public function __construct( GoogleWeatherService $service )
14     {
15         // ...
16     }
17 }
```

# Problem

---

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1 <?php
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3 class GoogleWeatherService
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5     public function getWeather()
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# Problem

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3 class GoogleWeatherService
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# Problem

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1 <?php
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3 class GoogleWeatherService
4 {
5     public function getWeather()
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14     {
15         // ...
16     }
17 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 abstract class WeatherService
4 {
5     abstract public function getWeather();
6 }
7
8 class GoogleWeatherService extends WeatherService
9 {
10     public function getWeather()
11     {
12         // ...
13     }
14 }
15
16 class WeatherLoader
17 {
18     public function __construct( WeatherService $service )
19     {
20         // ...
21     }
22 }
```

# Solution

---

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3 abstract class WeatherService
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# Solution

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12         // ...
13     }
14 }
15
16 class WeatherLoader
17 {
18     public function __construct( WeatherService $service )
19     {
20         // ...
21     }
22 }
```

**If you use “and” in  
documentation, it’s time  
for refactoring!**

# Problem

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     /**
6      * Retrieves , parses and filters weather for $date
7      *
8      * @param DateTime $date
9      * @return Weather
10     */
11     public function getWeatherForDay( DateTime $date )
12     {
13         $xml = $this->getHttpUrl( self::URL );
14         $weatherData = $this->parseWeatherData( $xml );
15         $weatherForDay = $this->filterWeather( $weatherData , $date );
16         return $weatherForDay;
17     }
18     // ...
19 }
```

# Problem

---

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3 class WeatherLoader
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16         return $weatherForDay;
17     }
18     // ...
19 }
```

# Problem

---

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3 class WeatherLoader
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5     /**
6      * Retrieves , parses and filters weather for $date
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13         $xml = $this->getHttpUrl( self::URL );
14         $weatherData = $this->parseWeatherData( $xml );
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# Problem

---

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2
3 class WeatherLoader
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# Problem

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15        $weatherForDay = $this->filterWeather( $weatherData , $date );
16        return $weatherForDay;
17    }
18    // ...
19 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service;
6     public function __construct( WeatherService $service )
7     {
8         $this->service = $service;
9     }
10
11     /**
12     * Retrieves and filters weather
13     *
14     * @param DateTime $date
15     * @return Weather
16     */
17     public function getWeatherForDay( DateTime $date )
18     {
19         $weatherData = $this->service->getWeather();
20         $weatherForDay = $this->filterWeather( $weatherData, $date );
21         return $weatherForDay;
22     }
23     // ...
24 }
```

# Solution

---

```
1 <?php
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3 class WeatherLoader
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```

# Solution

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service;
6     public function __construct( WeatherService $service )
7     {
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9     }
10
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12      * Retrieves and filters weather
13      *
14      * @param DateTime $date
15      * @return Weather
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18     {
19         $weatherData = $this->service->getWeather();
20         $weatherForDay = $this->filterWeather( $weatherData, $date );
21         return $weatherForDay;
22     }
23     // ...
24 }
```

# How to ...

---

make it better?

# Solution

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service; protected $filter;
6     public function __construct( WeatherService $service , Filter $filter )
7     {
8         $this->service = $service;
9         $this->filter  = $filter;
10    }
11
12    /**
13     * Filters the retrieved weather
14     *
15     * @return Weather
16     */
17    public function getFilteredWeather()
18    {
19        $weatherData = $this->service->getWeather();
20        $filteredData = $this->filter->filterWeather( $weatherData );
21        return $filteredData;
22    }
23    // ...
24 }
```

# Solution

---

```
1 <?php
2
3 class WeatherLoader
4 {
5     protected $service; protected $filter;
6     public function __construct( WeatherService $service , Filter $filter )
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8         $this->service = $service;
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19        $weatherData = $this->service->getWeather();
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24 }
```

# Solution

---

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2
3 class WeatherLoader
4 {
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19        $weatherData = $this->service->getWeather();
20        $filteredData = $this->filter->filterWeather( $weatherData );
21        return $filteredData;
22    }
23    // ...
24 }
```

**Always leave code in a  
better state than you  
found it.**

# Thanks for listening

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Slides will be online at  
<http://talks.qafoo.com>

# Thanks for listening

---

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<http://talks.qafoo.com>

## Stay in touch

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<http://qafoo.com>