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OSvC TECHNICAL SUPPORT WEBINARS:

Demystifying CPMs

our experts are your guides

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OSvC Technical Support

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Safe Harbor Statement

Agenda

1. CPM Overview
2. Code Walkthrough
3. Debugging
4. Advanced Notions
5. Q&A

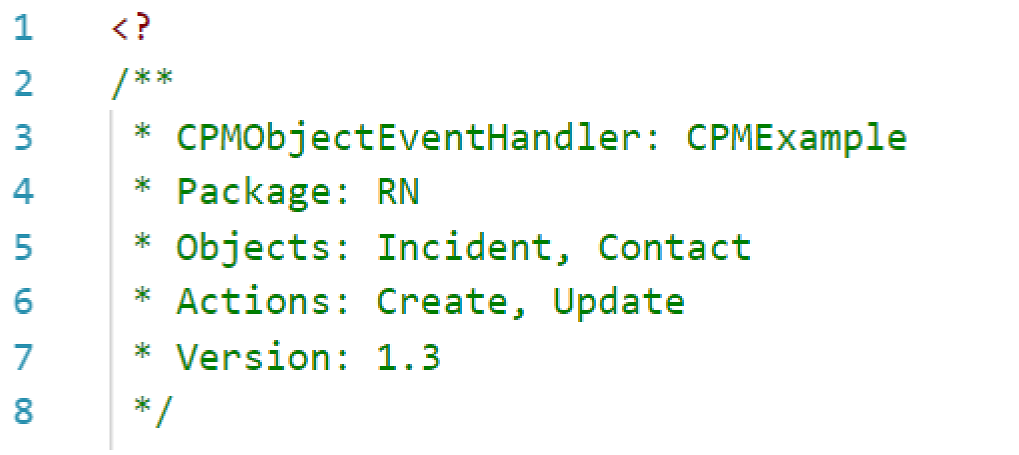
CPM Overview

What are Custom Process Models (CPMs)?

- Server-side business logic (a.k.a. PHP scripts)
- Can be triggered by Create, Update, Delete operations or Business Rules
- Typical uses include:
  - Syncing data between systems (i.e. update contact master records)
  - Calculating and recording detailed metrics
  - Sending notifications

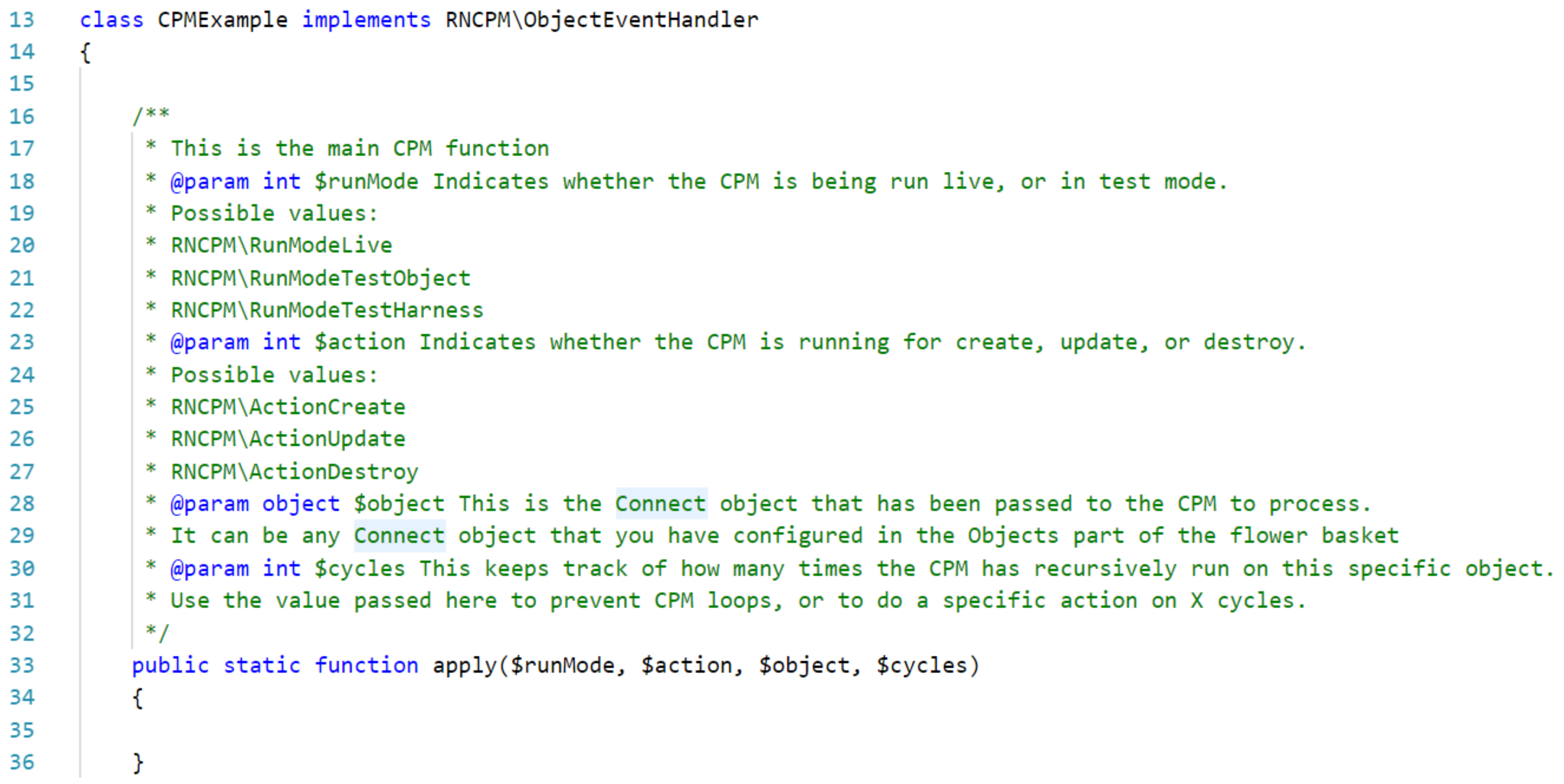
Code Walkthrough

Flower Basket



```
<?
/**
 * CPMObjectEventHandler: CPMExample
 * Package: RN
 * Objects: Incident, Contact
 * Actions: Create, Update
 * Version: 1.3
 */
```

Main Class & Apply Function



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class CPMExample implements RNCPM\ObjectEventHandler
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     * @param int $runMode Indicates whether the CPM is being run live, or in test mode.
     * Possible values:
     * RNCPM\RunModeLive
     * RNCPM\RunModeTestObject
     * RNCPM\RunModeTestHarness
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     * @param object $object This is the Connect object that has been passed to the CPM to process.
     * It can be any Connect object that you have configured in the Objects part of the flower basket
     * @param int $cycles This keeps track of how many times the CPM has recursively run on this specific object.
     * Use the value passed here to prevent CPM loops, or to do a specific action on X cycles.
     */
    public static function apply($runMode, $action, $object, $cycles)
    {

    }
```

Test Harness

```php
class CPMExample_TestHarness implements RNCPM\ObjectEventHandler_TestHarness
{

    public static function setup()
    {

    }


    public static function fetchObject($action, $objectType)
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    }


    public static function validate($action, $object)
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    }


    public static function cleanup()
    {

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```
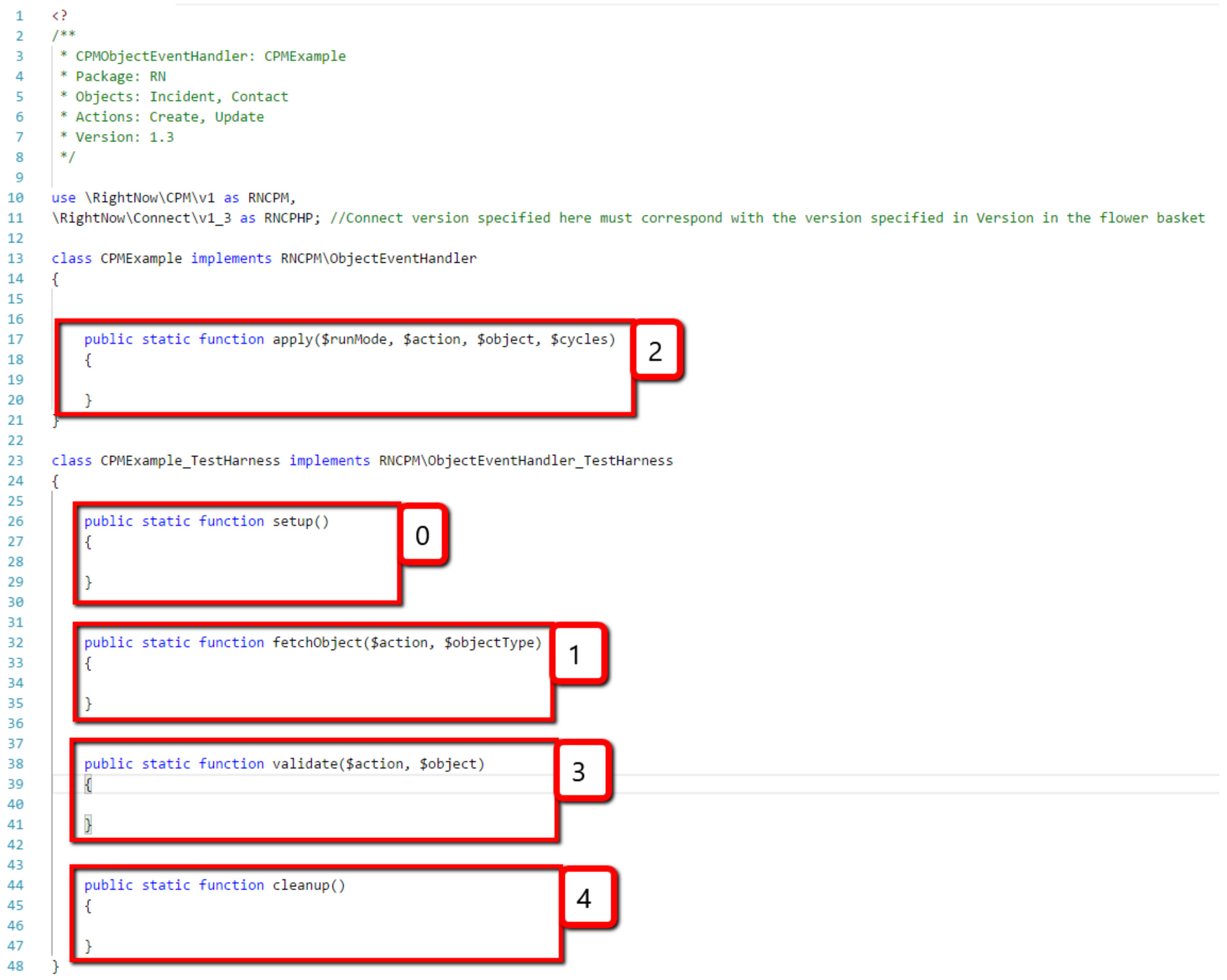

Test Harness Order of Operations



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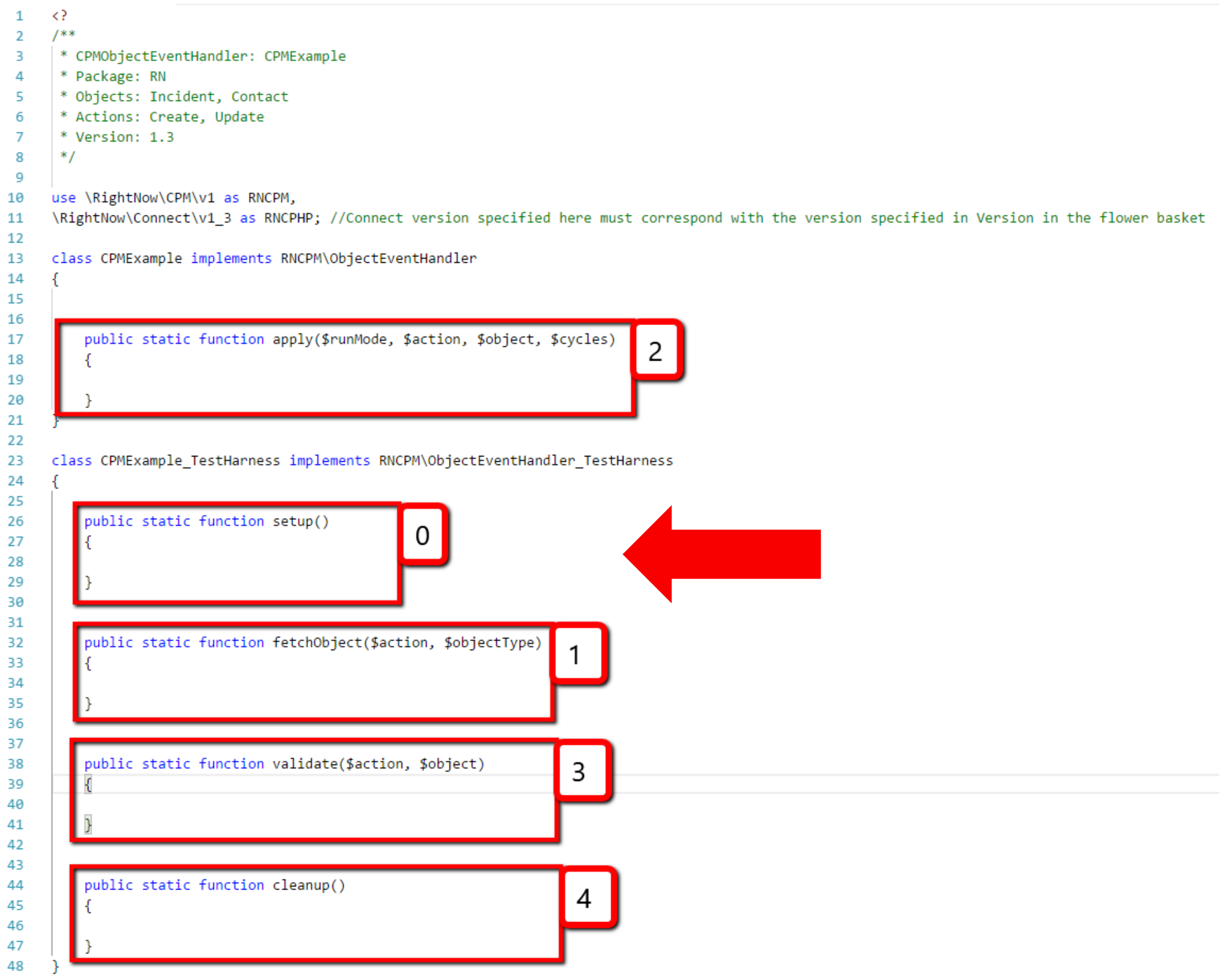
Function: setup()



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Function: setup()

```php
private static $testIncident;
private static $testContact;
/**
 * This function runs once per test, before any of the other functions.
 * It is typically used to create test objects, or any other one-time-only setup.
 */
public static function setup()
{
    $contact = new RNCPHP\Contact();
    $contact->Name = new RNCPHP\PersonName();
    $contact->Name->First = "Malcolm";
    $contact->Name->Last = "Reynolds";
    $contact->save();

    static::$testContact = $contact;

    $incident = new RNCPHP\Incident();
    $incident->PrimaryContact = $contact;
    $incident->Subject = "Test Incident";

    static::$testIncident = $incident;
}
```

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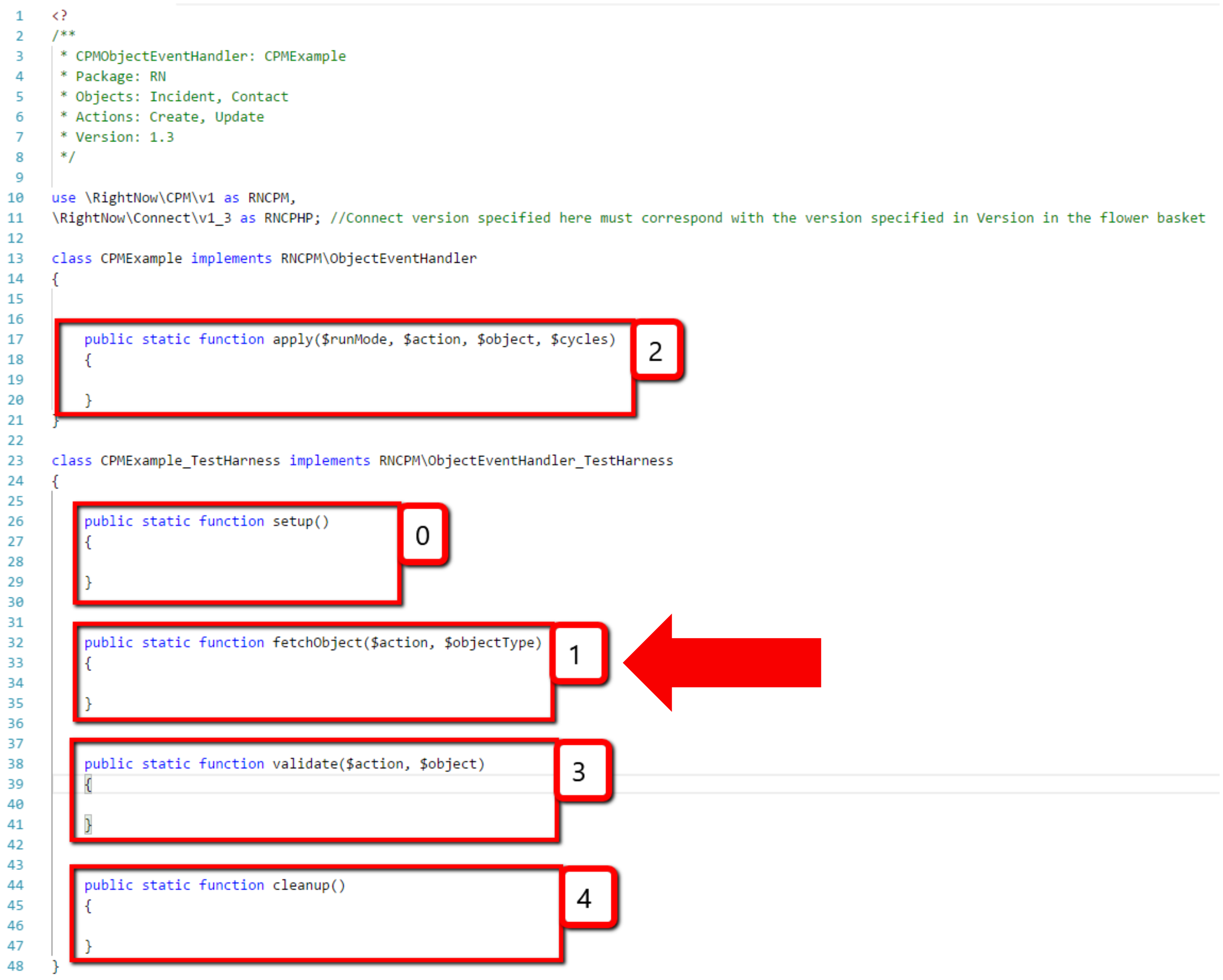
Function: fetchObject()



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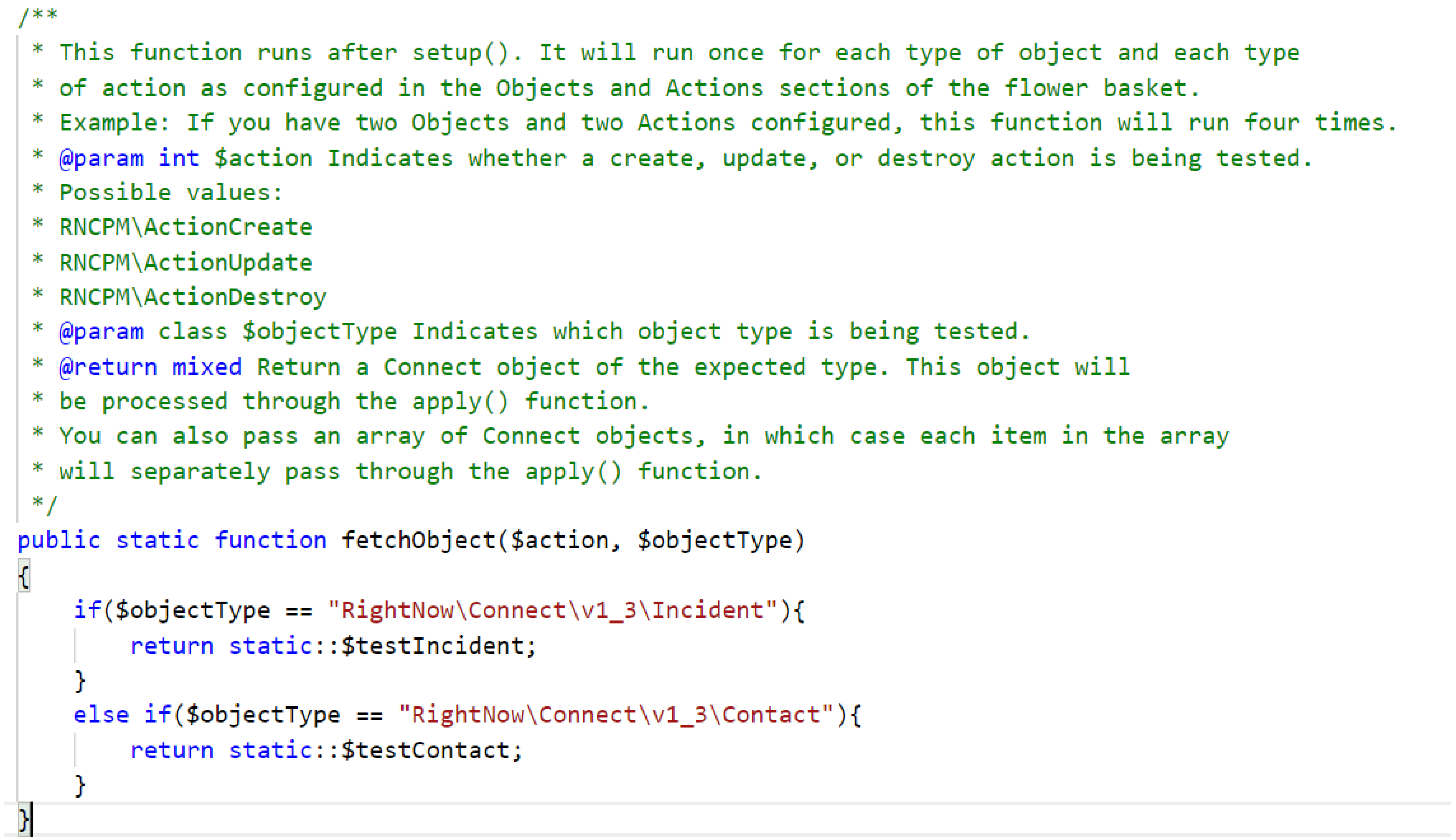
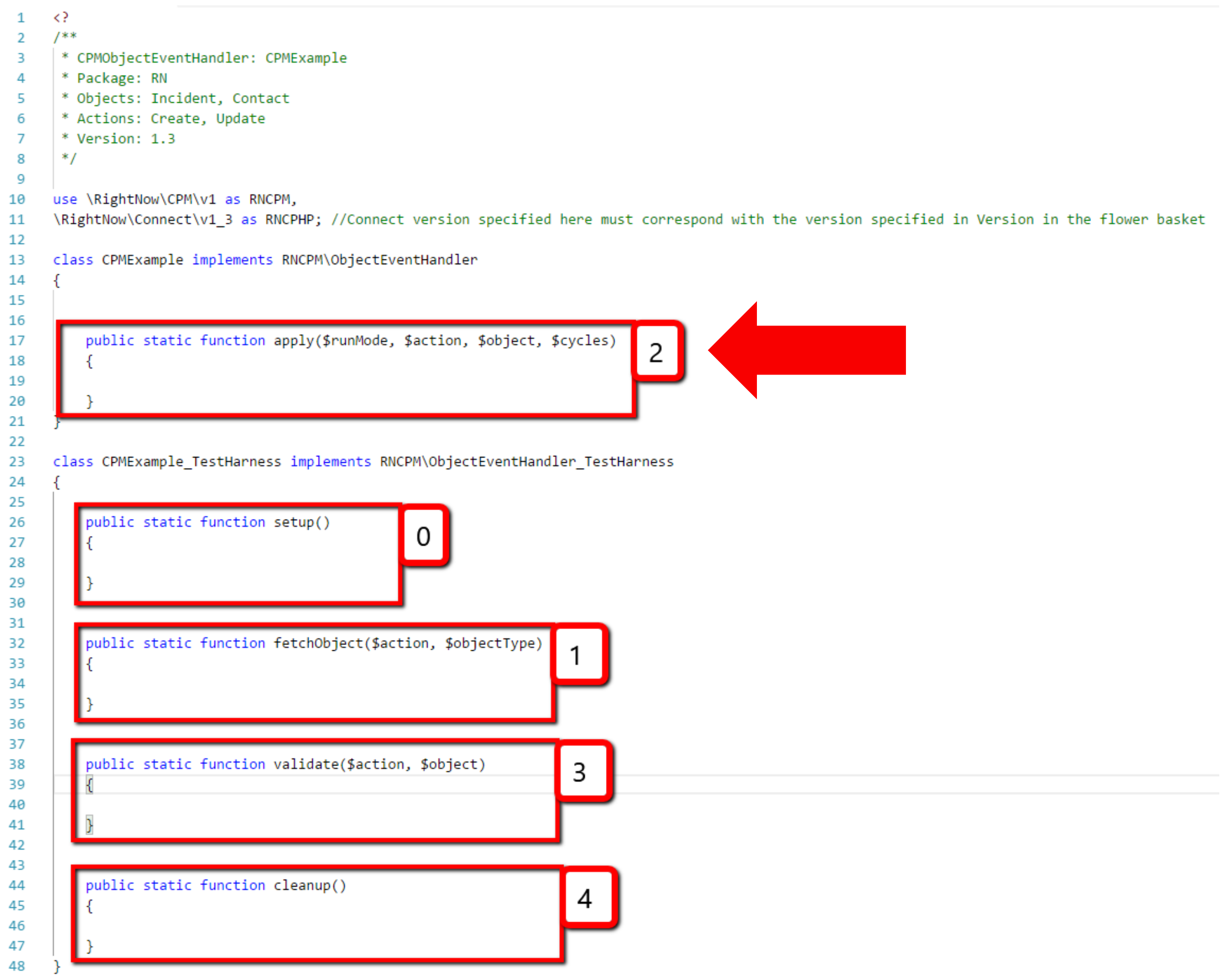
Function: fetchObject()



```php
/**
 * This function runs after setup(). It will run once for each type of object and each type
 * of action as configured in the Objects and Actions sections of the flower basket.
 * Example: If you have two Objects and two Actions configured, this function will run four times.
 * @param int $action Indicates whether a create, update, or destroy action is being tested.
 * Possible values:
 * RNCPM\ActionCreate
 * RNCPM\ActionUpdate
 * RNCPM\ActionDestroy
 * @param class $objectType Indicates which object type is being tested.
 * @return mixed Return a Connect object of the expected type. This object will
 * be processed through the apply() function.
 * You can also pass an array of Connect objects, in which case each item in the array
 * will separately pass through the apply() function.
 */
public static function fetchObject($action, $objectType)
{
    if($objectType == "RightNow\Connect\v1_3\Incident"){
        return static::$testIncident;
    }
    else if($objectType == "RightNow\Connect\v1_3\Contact"){
        return static::$testContact;
    }
}
```

Function: apply()



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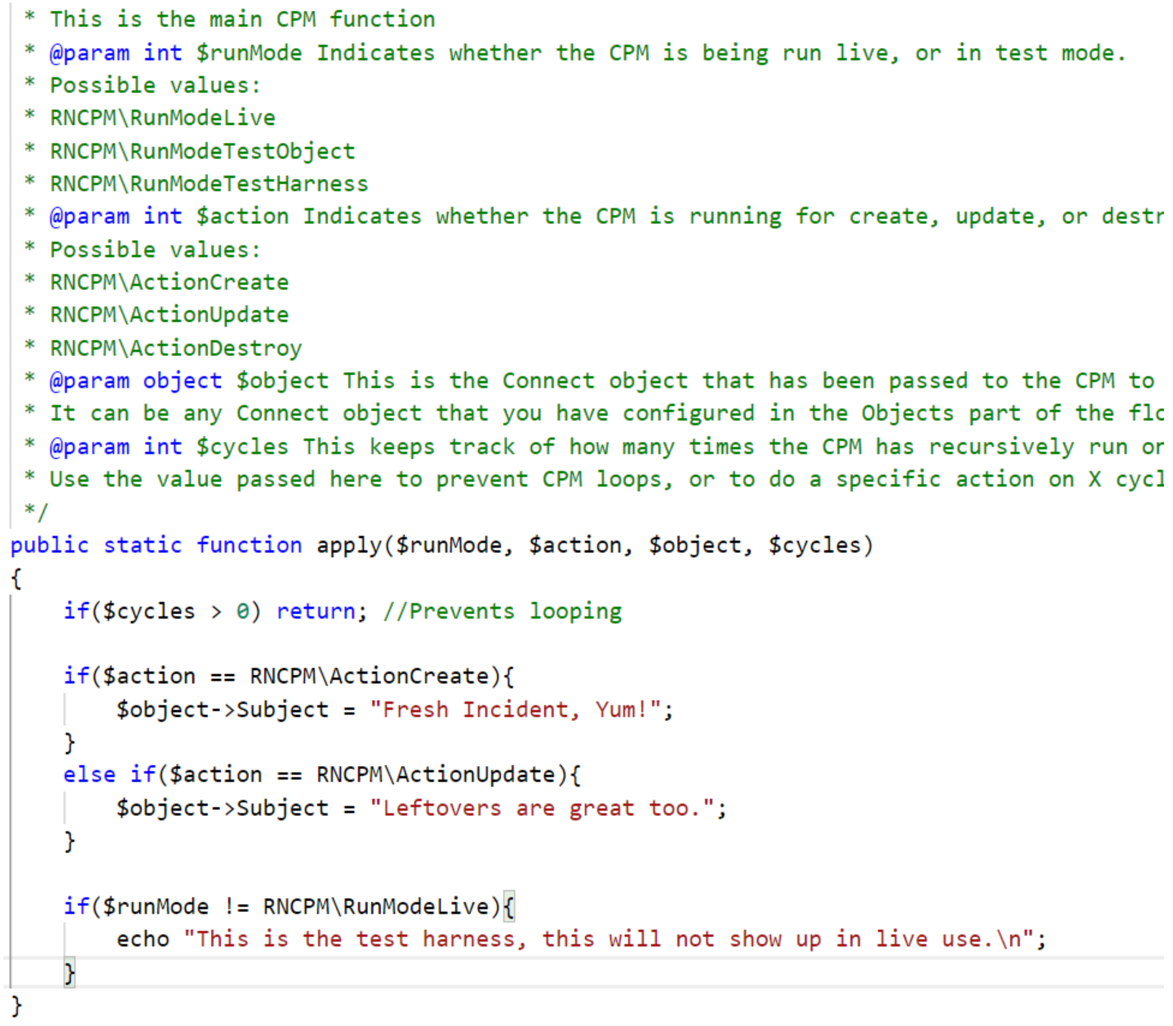

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    if($cycles > 0) return; //Prevents looping

    if($action == RNCPM\ActionCreate){
        $object->Subject = "Fresh Incident, Yum!";
    }
    else if($action == RNCPM\ActionUpdate){
        $object->Subject = "Leftovers are great too.";
    }

    if($runMode != RNCPM\RunModeLive){
        echo "This is the test harness, this will not show up in live use.\n";
    }
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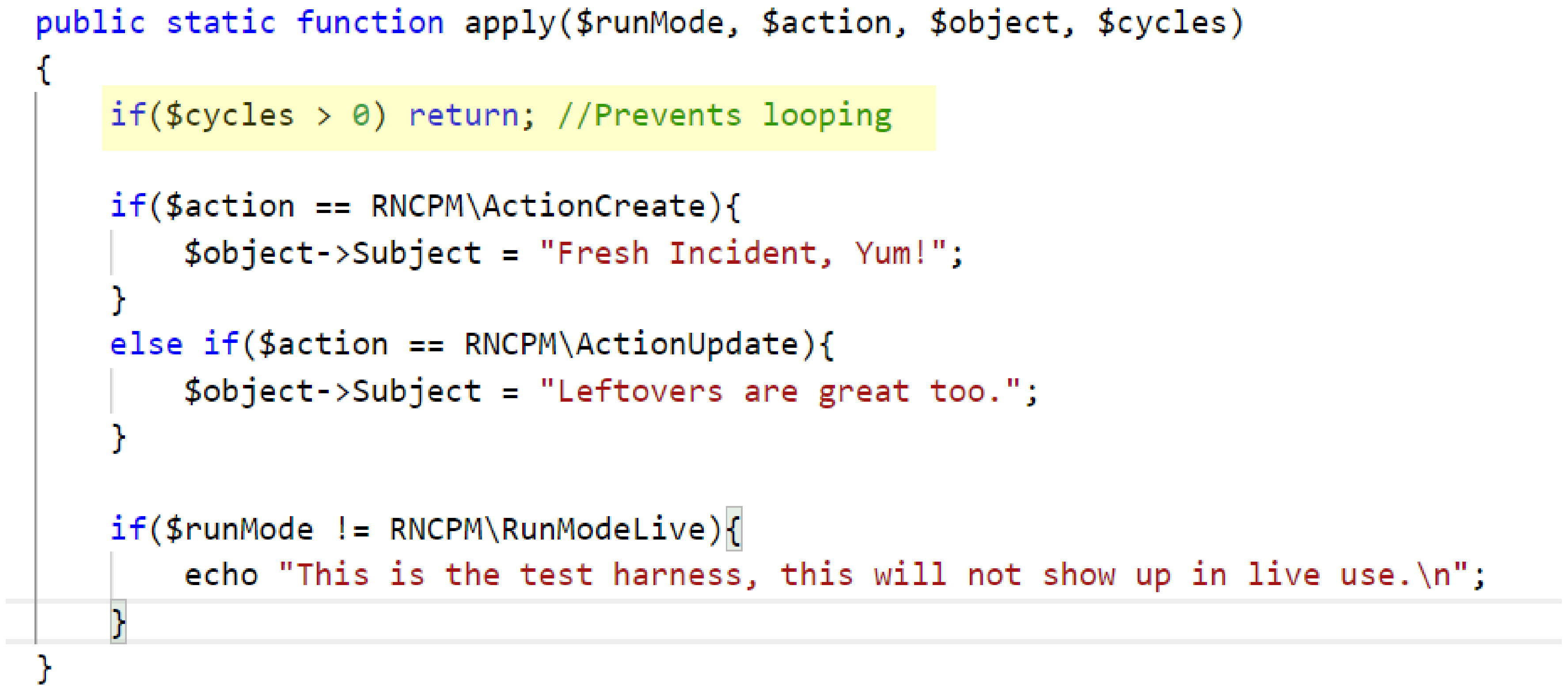
Function: apply()



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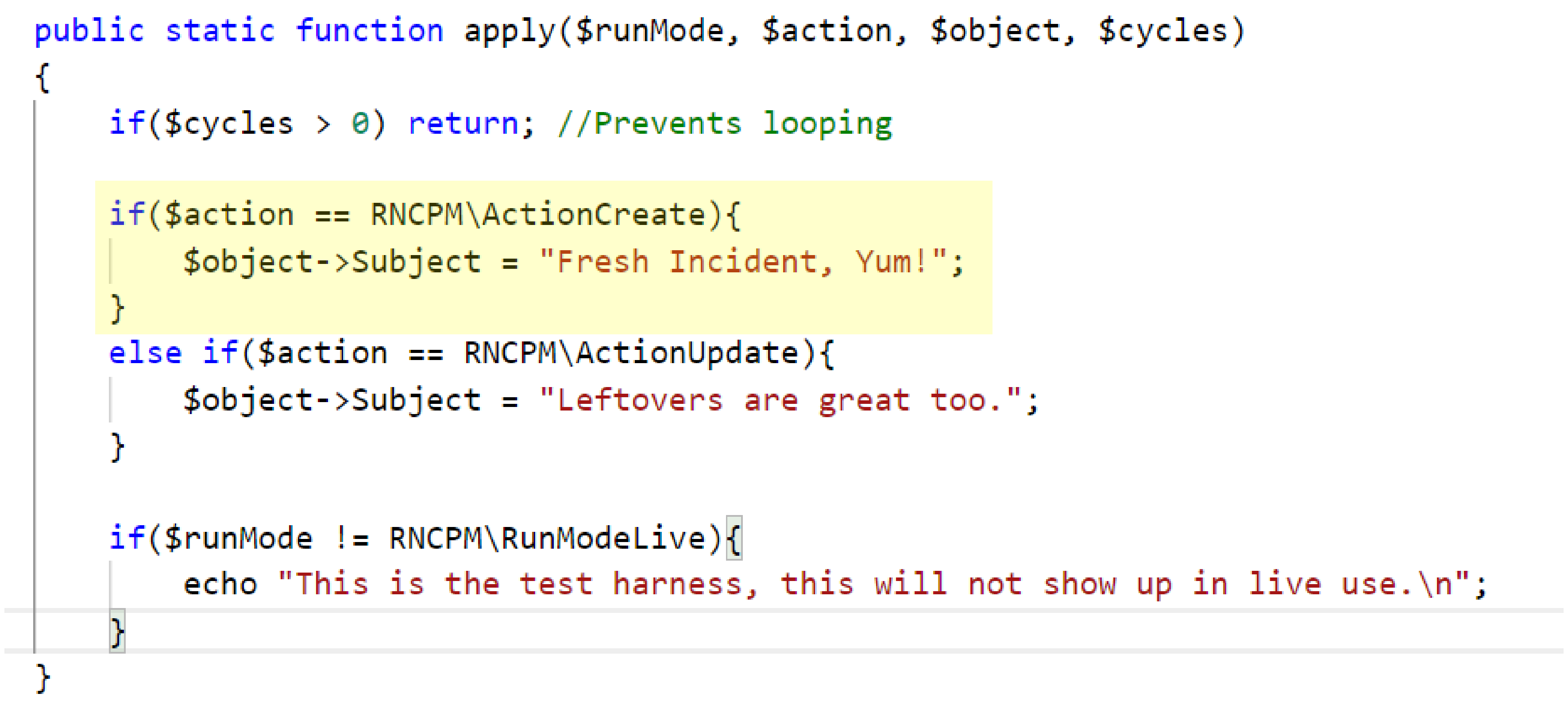

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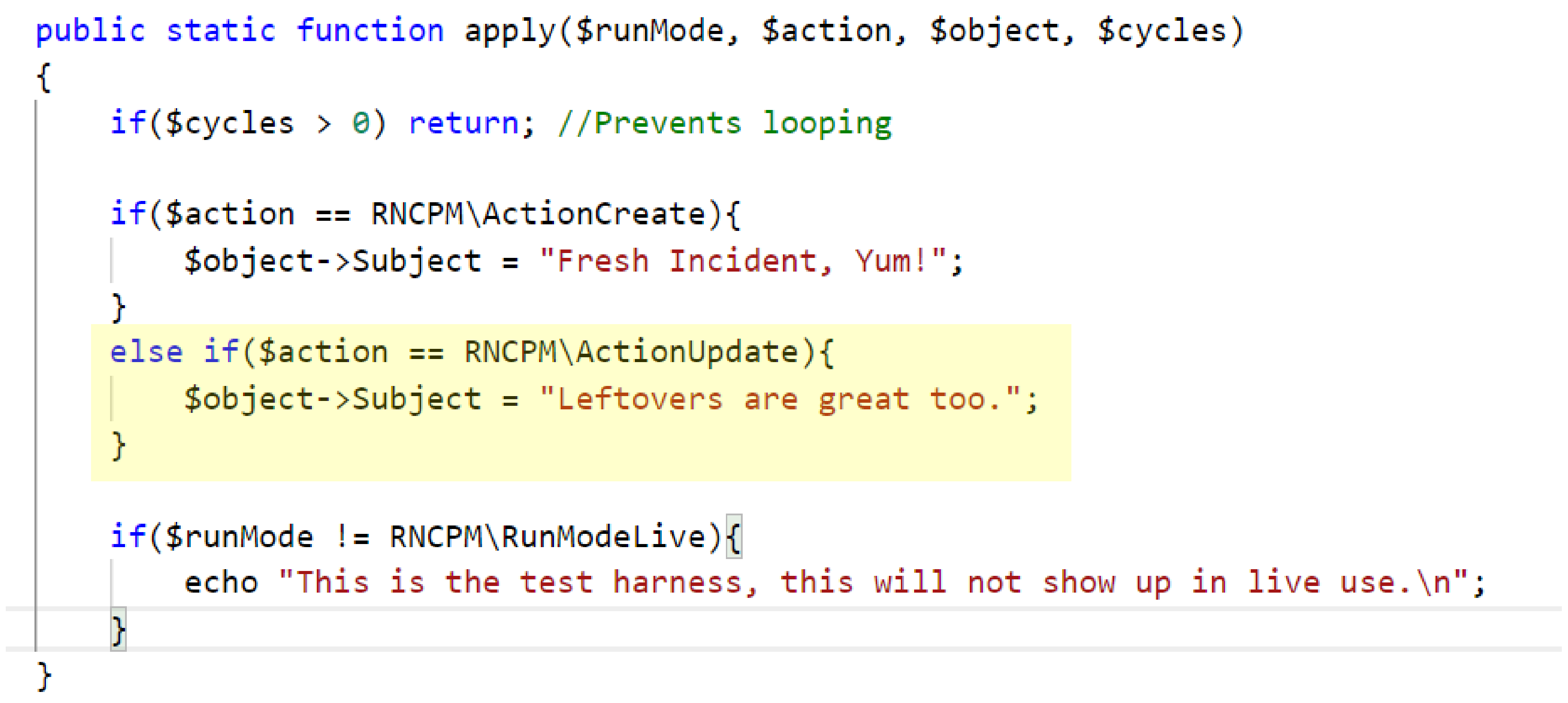

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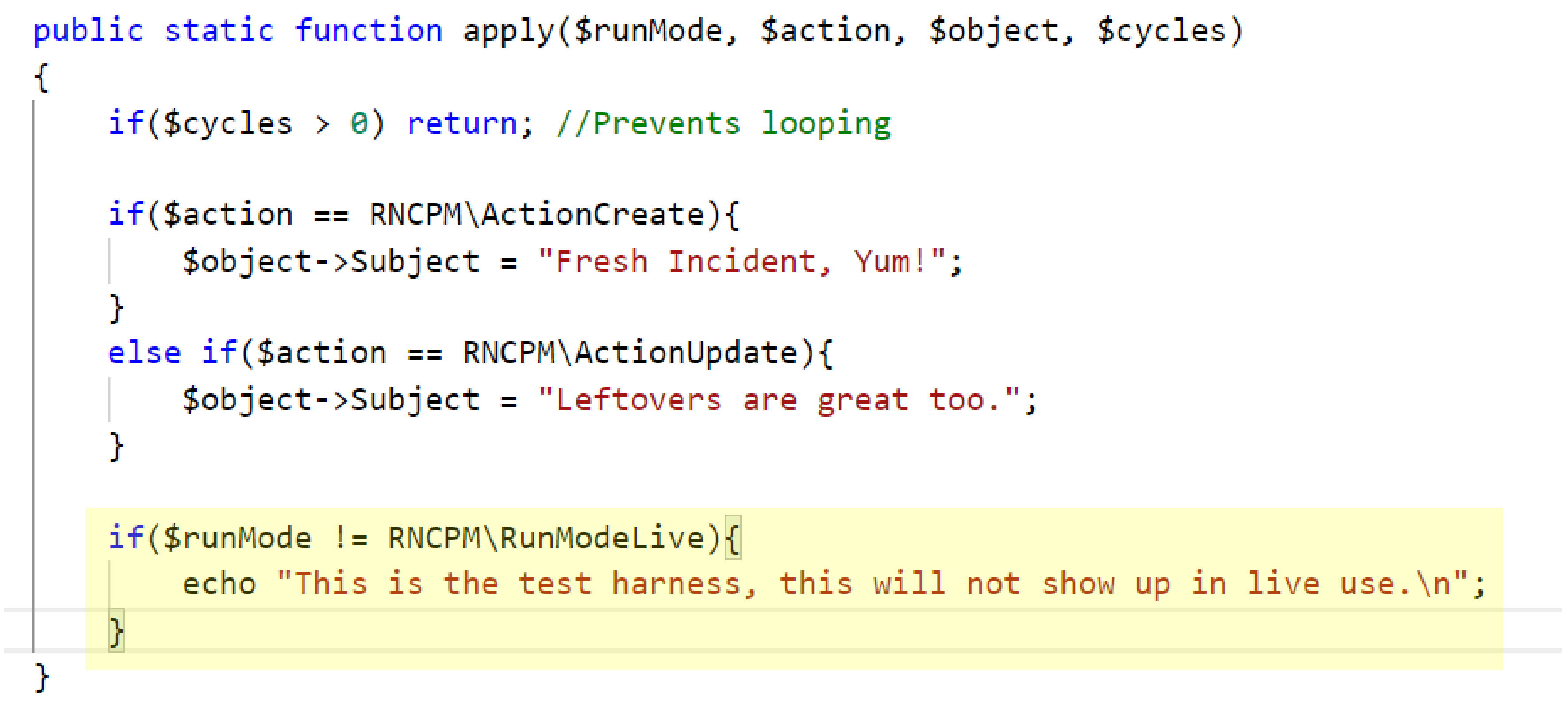

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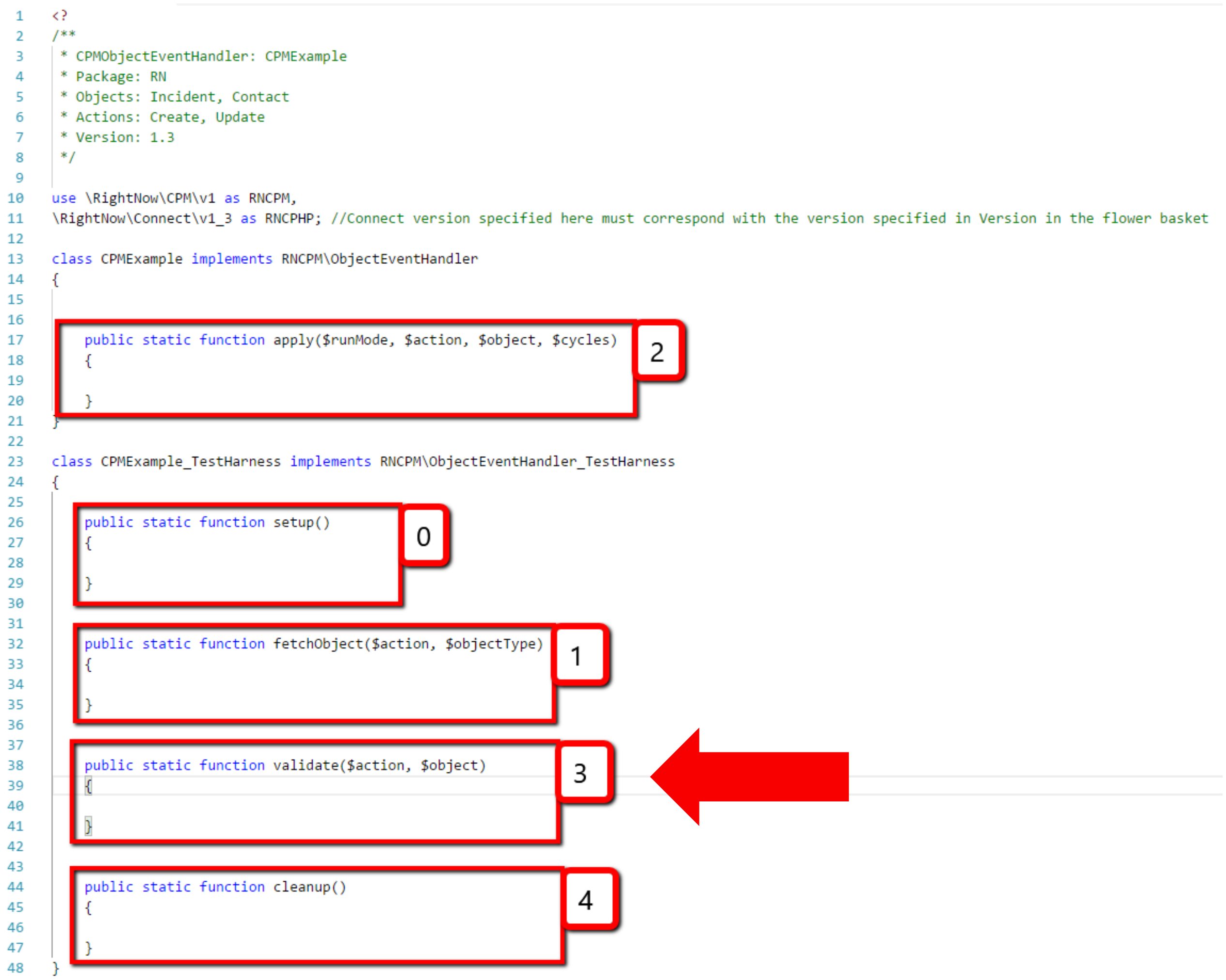
Function: validate()



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    {

    }

    public static function cleanup()
    {

    }
}
```

Function: validate()

```php
public static function validate($action, $object)
{
    $success = true;
    if($action == RNCPM\ActionCreate){
        $success = ($object->Subject == "Fresh Incident, Yum!");
        if($success){
            echo "Passed Create Test\n";
        }
        else {
            echo "Failed Create Test\n Subject was: {$object->Subject}\n";
        }
    }

    else if($action == RNCPM\ActionUpdate){
        $success = (strpos($object->Subject, "Leftovers are great too.") !== false);
        if($success){
            echo "Passed Update Test.\n";
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    return $success;
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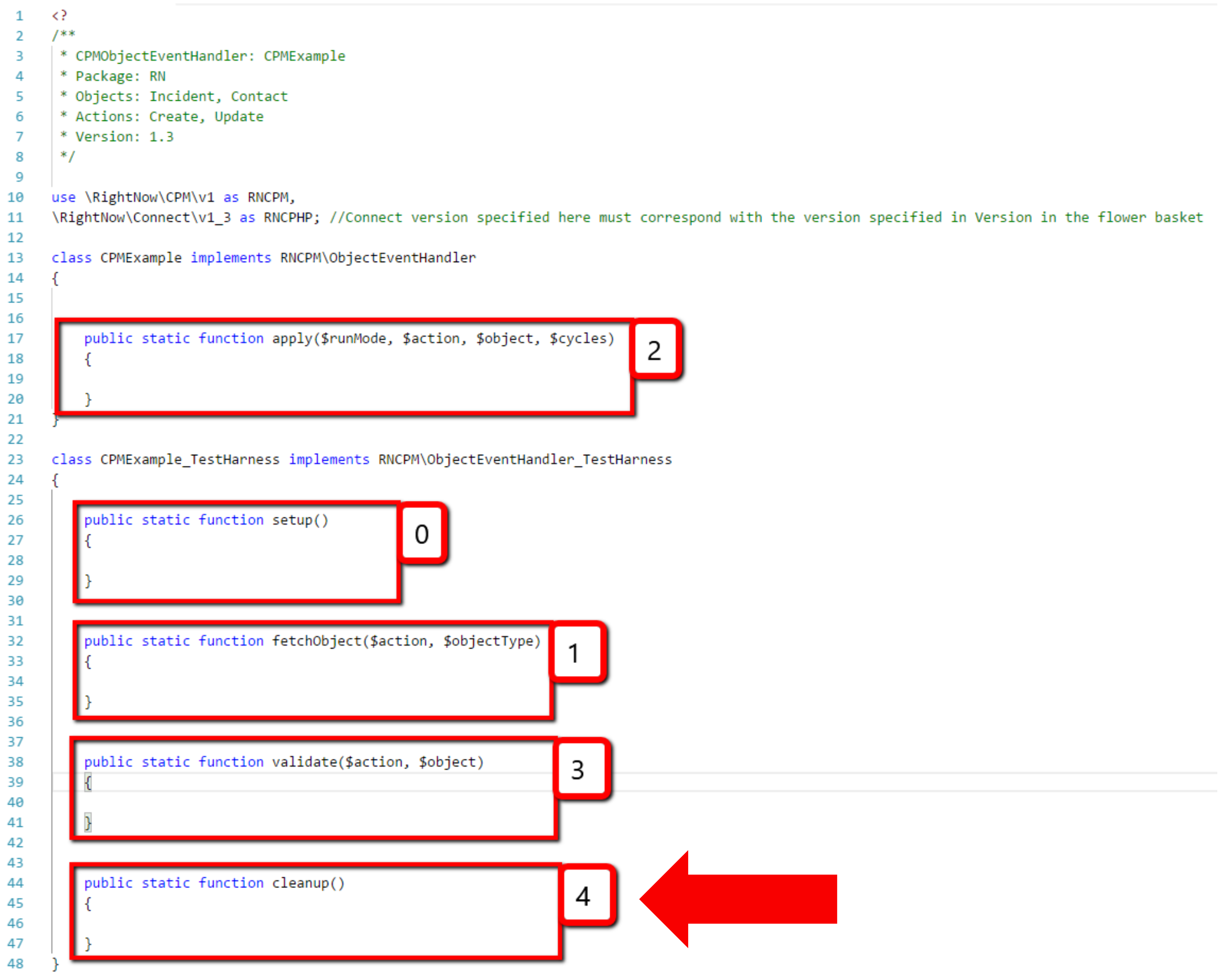

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    }
}
```
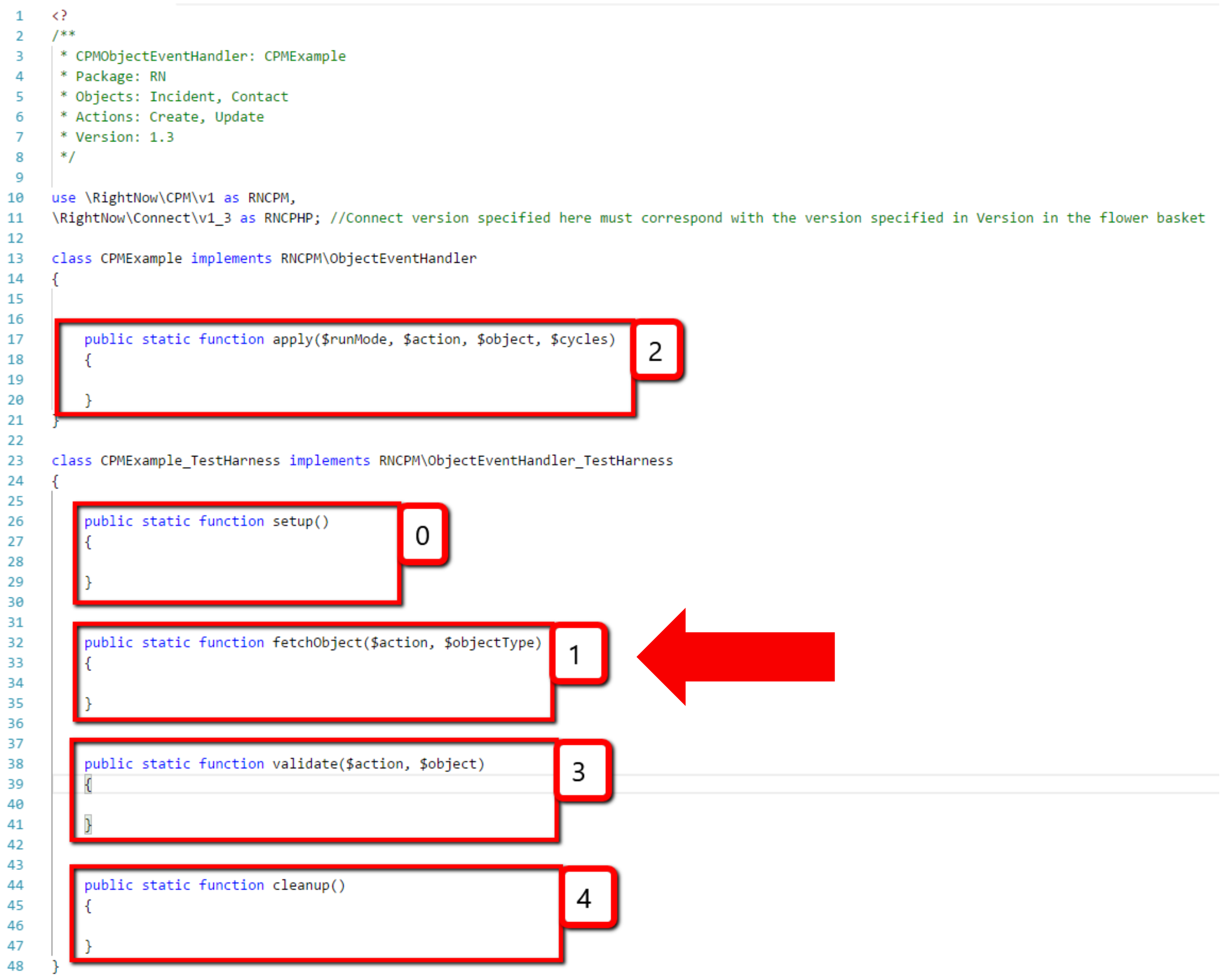

Function: cleanup()

```
/**
 * This function runs once per validate() run.
 * Seldom used, except in cases where external data may have
 * been modified during a test run (via external API calls, etc.)
 */
public static function cleanup()
{

}
```

Back to fetchObject



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Debugging

Development and Live Usage

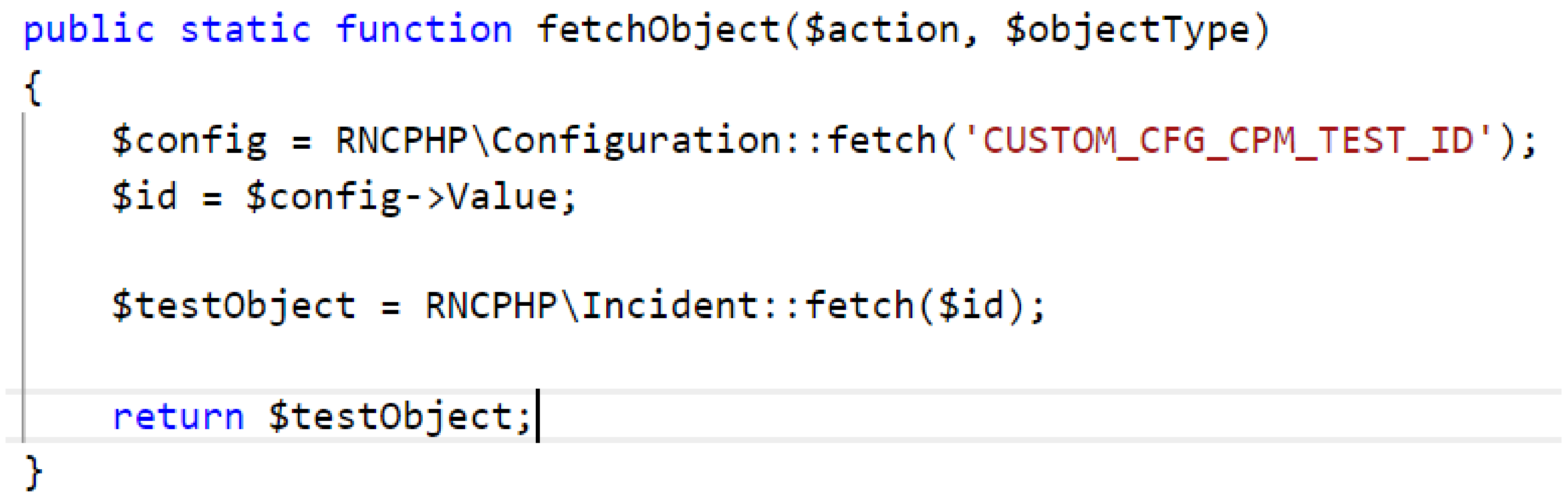
Debugging During Development

- Use echo, var_dump, etc.
  - Use $runMode logic to enable verbose debugging
- In case of silent failure, check PHP syntax
- Check error and info logs
- Remember that changes are not committed during testing
- Public Mail API will send
- PHP debugging functions – debug_backtrace(), etc.

Debugging During Live Use

- Catch exceptions and failures
  - Log to Custom Object
  - Send error notifications with Public Mail API
    - Attach output from debug_backtrace(), see later example
  - Log ID of object that produced failure
- Use a custom config to store a testing ID
  - Allows easy testing when a given object fails to process

Example: Config-Stored Testing ID



```
public static function fetchObject($action, $objectType)
{
    $config = RNCPHP\Configuration::fetch('CUSTOM_CFG_CPM_TEST_ID');
    $id = $config->Value;

    $testObject = RNCPHP\Incident::fetch($id);

    return $testObject;
}
```

Example: Sending Error Data w/Mail API

```php
public static function sendErrorData(){
    $mm = new RNCPHP\MailMessage();
    $mm->To->EmailAddresses = array("some.one@your_site.com");
    $mm->Subject = "CPM Error Report";

    $exceptionData = json_encode(debug_backtrace());
    $fattach = new RNCPHP\FileAttachment();
    $fattach->ContentType = "text/text";
    $fp = $fattach->makeFile();
    fwrite($fp, $exceptionData);
    fclose($fp);
    $fattach->FileName = "ExceptionData.txt";
    $fattach->Name = "ExceptionData.txt";

    $mm->FileAttachments = new RNCPHP\FileAttachmentArray();
    $mm->FileAttachments[] = $fattach;

    $mm->Body->Text = "Exception Data Attached";
    $mm->Body->Html = "Exception Data Attached";

    $mm->send();
}
```

Advanced CPMs

Asynchronous CPMs

- Automatically retries failed runs
  - Retries occur at 90, 450, 3,150, and 34,650 seconds after initial attempt
- Non-blocking, will not prevent save operations from completing while it runs
- Required for CPMs that utilize cURL
- Recommended for long-running scripts

Using the “prev” Object w/Test Harness

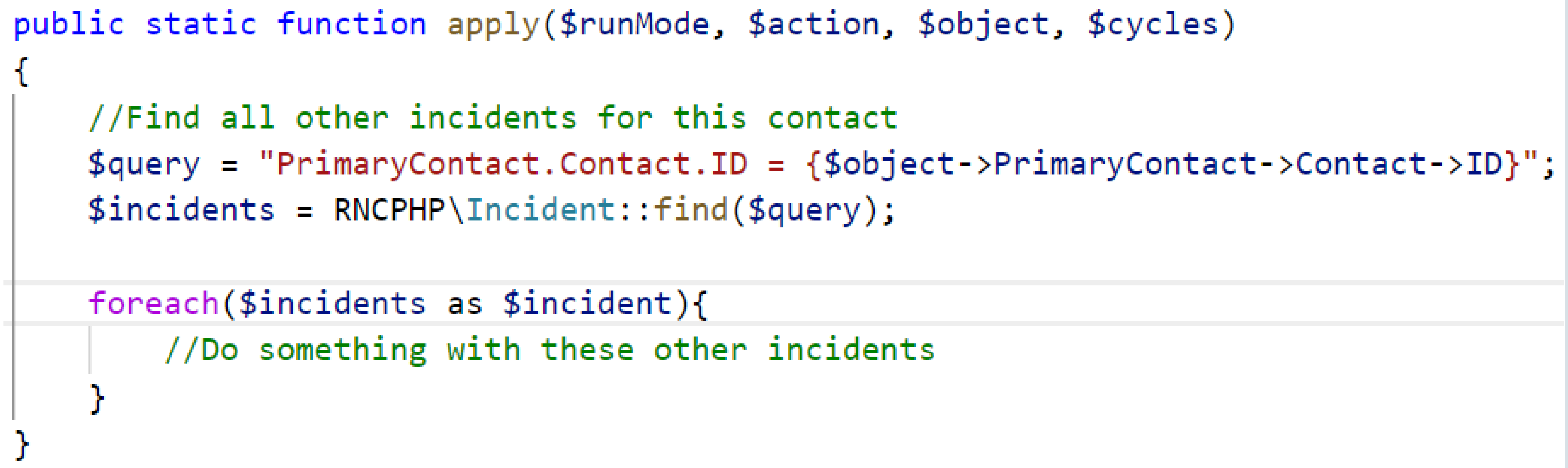
Example:

```php
public static function fetchObject($action, $objectType)
{
    if($action == RNCPM\ActionUpdate){
        $prevIncident = new RNCPHP\Incident();
        $prevIncident->PrimaryContact = static::$testContact;
        //Set whatever prev fields we care about
        $prevIncident->StatusWithType->Status->ID = 3;

        static::$testIncident->prev = $prevIncident; //Now our test incident has a prev object
    }

    return static::$testIncident;
}
```

ROQL / Object Retrieval Testing



```php
public static function apply($runMode, $action, $object, $cycles)
{
    //Find all other incidents for this contact
    $query = "PrimaryContact.Contact.ID = {$object->PrimaryContact->Contact->ID}";
    $incidents = RNCPHP\Incident::find($query);

    foreach($incidents as $incident){
        //Do something with these other incidents
    }
}
```

ROQL / Object Retrieval Testing

```
public static function setup()
{
    $contact = new RNCPHP\Contact();
    $contact->Name = new RNCPHP\PersonName();
    $contact->Name->First = "Malcolm";
    $contact->Name->Last = "Reynolds";
    $contact->save();
    static::$testContact = $contact;

    //Create additional incident(s) to query for:
    $otherContactIncident = new RNCPHP\Incident();
    $otherContactIncident->PrimaryContact = $contact;
    $otherContactIncident->save();

    //Commit incident(s)
    RNCPHP\ConnectAPI::commit();

    $incident = new RNCPHP\Incident();
    $incident->PrimaryContact = $contact;
    $incident->Subject = "Test Incident";

    static::$testIncident = $incident;
}
```

Q&A

Safe Harbor Statement