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H&R BLOCK

AngularJS: Services and DI

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Topics

- What is and why service?
- Built-in (Angular provided) services
  - $log, $location, $timeout, $interval
- Dependency injection (DI)
- Creating a custom service

What is and Why Service?

What is and Why Service?

- Angular services are reusable objects
  - You can use services to organize and share code across your app
- A service can be injected into controller, another service, filter, directive that depends on that service
  - Angular's dependency injection subsystem ($injector) handles dependency injection
- Angular services are:
  - Lazily instantiated – Angular only instantiates a service when an application component depends on it
  - Singletons – Each component dependent on a service gets a reference to the single instance generated by the service factory

Angular has many built-in services

- Angular offers several useful services (like $http), but for most applications you'll also want to create your own
  - Like other core Angular identifiers, built-in services always start with $ (e.g. $http)

- https://docs.angularjs.org/api/ng/service
  - $animate, $controller, $document, $exceptionHandler
  - $filter, $http, $interval, $locale, $location
  - $log, $parse, $q, $rootElement, $rootScope
  - $timeout, $window

Built-in Services:
$log service,
$location service,
$Timeout service,
$Interval service

$log service

- Simple service for logging
- Default implementation writes the message into the browser's console

```
angular.module('logExample', [])
.controller('LogController', ['$scope', '$log', function($scope, $log) {
  $scope.$log = $log;
  $scope.message = 'Hello World!';
}]);
```

$location service (getter & setter)

- Is used to both get location data and set location data
  - Getter: The $location service parses the URL in the browser address bar (based on the window.location) and makes the URL available to your application
  - Setter: Changes to the URL in the address bar are reflected into $location service and changes to $location are reflected into the browser address bar

```
myApp.controller('MyController', ['$scope', '$location', function ($scope, $location) {
   // given url http://example.com/#/some/path?foo=bar&baz=xoxo
   $scope.absUrl = $location.absUrl();  // getter example
   // => "http://example.com/#/some/path?foo=bar&baz=xoxo"

   $scope.setpath = function (path) {
       $location.path(path);                    // setter example
   }
}]);
```

$timeout service

- $timeout service is Angular's wrapper for window.setTimeout

```
myApp.controller('MyController', ['$scope', '$timeout', function ($scope, $timeout) {
        $scope.timeout = function (duration) {
            $scope.duration = duration;
            $timeout(callTimeout, duration);
        }

        function callTimeout() {
            $scope.message = "Timeout occurred in " + $scope.duration / 1000 + "
seconds";
        }
}]);
```

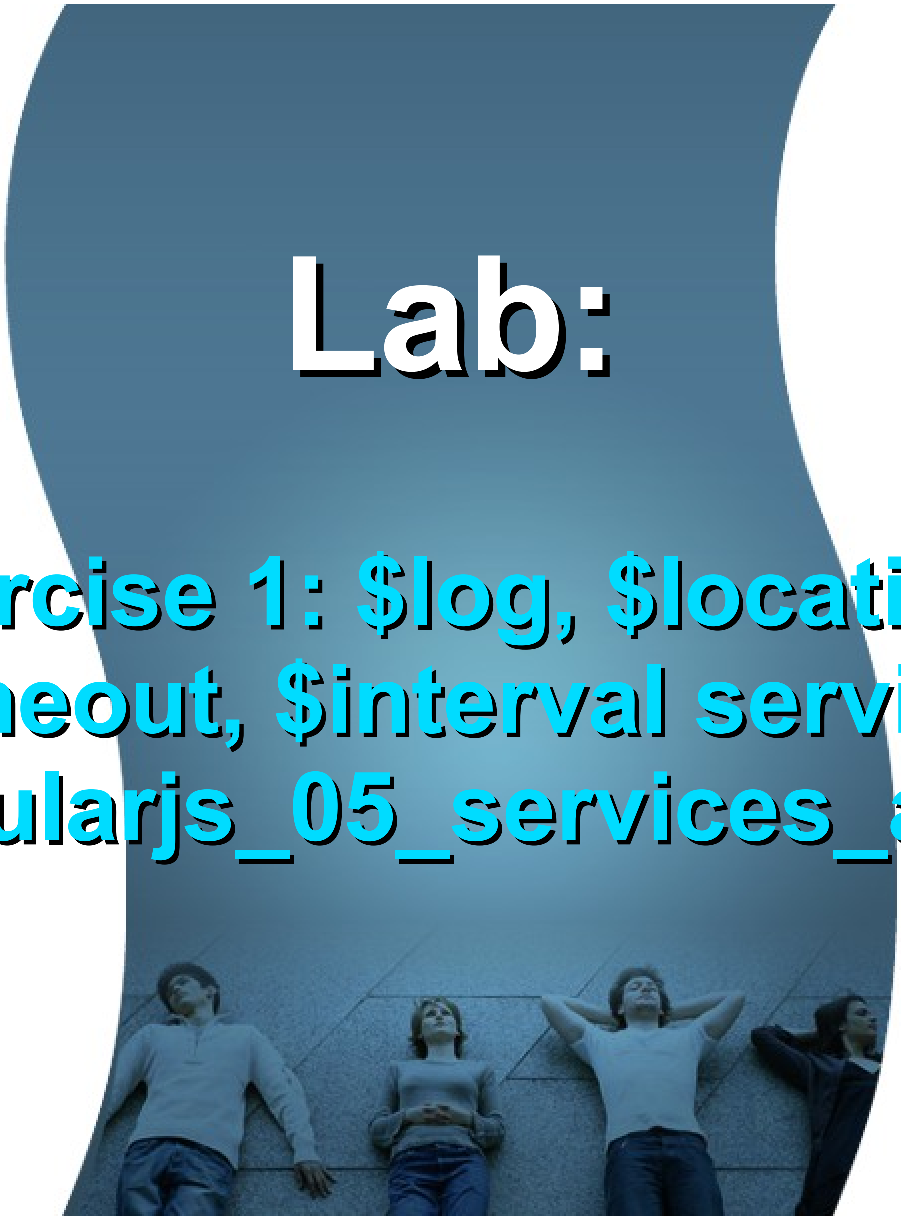
$interval service

- Used to rigger any functions scheduled to run in that time.

```
myApp.controller('MyController', ['$scope', '$interval', function ($scope, $interval) {
        …

        $scope.callAtInterval = function (duration) {
            $interval(callTimeout, duration);
            $scope.duration = duration;
        }

        function callTimeout() {
            $scope.totalDurationInSeconds += $scope.duration / 1000;
            $scope.messages.push("Timeout occurred in " +
$scope.totalDurationInSeconds + " seconds");
        }
}]);
```



Lab:

Exercise 1: $log, $location, $timeout, $interval services

3305_angularjs_05_services_and_di.zip

Dependency Injection

What is and Why DI?

- Dependency Injection (DI) is a software design pattern that deals with how components get hold of their dependencies
  - The component can have the dependency passed to it where it is needed - it removes the responsibility of locating the dependency from the component. The dependency is simply handed to the component
  - Simpler to code and test
- Dependency injection helps to make your web applications both well-structured (e.g. separate entities for presentation, data, and control) and loosely coupled
  - Dependencies between entities are not resolved by the entities themselves, but by the DI subsystem

Injection Syntax

- Implicit annotation
  - > The simplest way to get hold of the dependencies is to assume that the function parameter names are the names of the dependencies
  - > Downside of this approach - If you plan to minify your code, your service names will get renamed and break your app

```
myModule.controller('MyController', function($scope, greeter) {
  // ...
});
```

- Inline array annotation (preferred)
  - > In order to avoid the minification problem of implicit annotation scheme, you can specify the dependencies explicitly

```
someModule.controller('MyController', ['$scope', 'greeter', function($scope, greeter) {
  // ...
}]);
```

Using Strict Dependency Injection

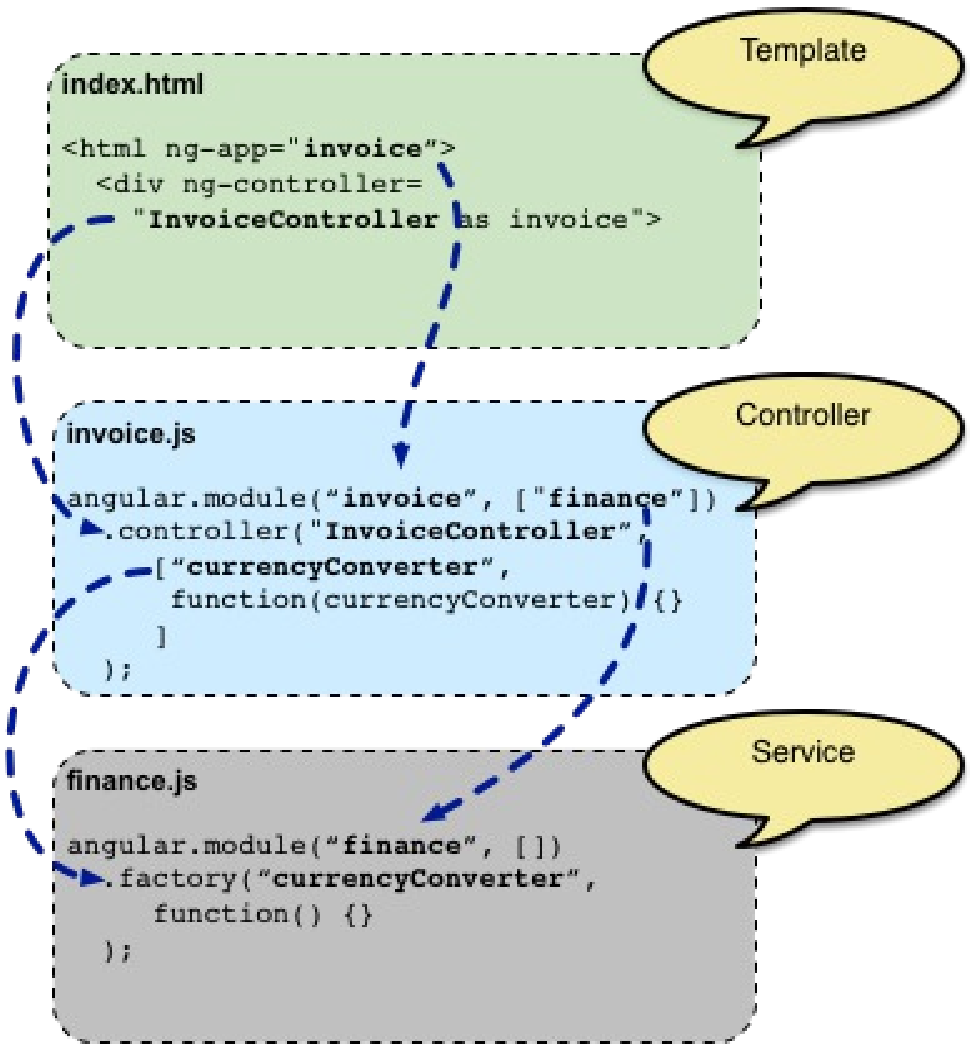
- Add an *ng-strict-di* directive on the same element as ng-app to opt into strict DI mode - Strict mode throws an error whenever a service tries to use implicit annotations

```
<body ng-app="MyApp" ng-strict-di>
    <div ng-controller="MyController">
      <p>absUrl: {{absUrl}} </p>
      <p>protocol: {{protocol}}</p>
    </div>

    <script>
    var myApp = angular.module('MyApp', []);

     myApp.controller('MyController', ['$scope', '$location', function ($scope, $location) {
        $scope.absUrl = $location.absUrl();
        $scope.protocol = $location.protocol();
     }]);
    </script>
</body>
```

Service Injection Example



```
<html ng-app="invoice">
  <div ng-controller=
    "InvoiceController as invoice">
```

```
angular.module("invoice", ["finance"])
 .controller("InvoiceController",
   ["currencyConverter",
     function(currencyConverter) {}
   ]
 );
```

```
angular.module("finance", [])
 .factory("currencyConverter",
   function() {}
 );
```

"currencyConverter" custom service is injected into "InvoiceController"

"currencyConverter" custom service is created

Lab:

Exercise 2: Dependency Injection
3305_angularjs_05_services_and_di.zip

Creating a Custom Service

Why Create a Custom Service?

- If you have business logic that could be used in multiple places, you should create a service
  - > Increases encapsulation
  - > Increases reusability
- If you need to manipulate data, you should create a service
  - > Controller should not directly manipulate data

How to Create a Custom Service

- By registering the service's name and service factory function by using *module.factory(..)* method
- The service factory function generates either a JavaScript object or a function object that represents the service to the rest of the application
  - In other words, a service can be a JavaScript object or a function object (well.. technically a function object is also a JavaScript object)

```
myModule.factory('myService1', function() {
    // return JavaScript object or function object
});
```

- The service can then be injected into any component (controller, service, filter or directive) that specifies a dependency on the service

Register Service Name & Factory

- Note that you are not registering a service instance, but rather a factory function that will create the instance when called - this enables lazy instantiation of service object - if it is not needed, it will not be created

```
var myModule = angular.module('myModule', []);

// The returned service object is JavaScript object
myModule.factory('myService1', function() {
    var shinyNewServiceInstance;
    // factory function body that constructs shinyNewServiceInstance
    return shinyNewServiceInstance;
});

// The returned service object is a function object
myModule.factory('myService1', function() {
    return function () {
    };
});
```

Usage of a Service

- A service is then injected into Controller, another Service, etc and then used

```
// Define “MyCompute” service
app.factory("MyCompute", function () {
    return {
       add: function (x, y) {
                  return x + y;
               }
    }
});

// "MyCompute" service is injected into "MyController"
app.controller("MyController", function ($scope, MyCompute) {
    $scope.addResult = MyCompute.add(50, 30);
});
```

Lab:

Exercise 3: Create custom services
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