# AngularJS

**Beginner's guide - part 1**

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## AngularJS:

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- **Superheroic JavaScript MVW Framework**

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- **Superheroic JavaScript MVW Framework**
- Javascript framework for writing frontend web apps

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- **Superheroic JavaScript MVW Framework**
- Javascript framework for writing frontend web apps
- It aims at **simplifying** both the **development** and the **testing** of **web application**

## Example 1

```html
<!DOCTYPE html>
<html lang="en" ng-app>
<head>
  <meta charset="UTF-8">
  <title>What's your name?</title>
  <script src="./angular.min.js"></script>
</head>
<body>

  <div>
    <label>Name</label>
    <input type="text" ng-model="name" placeholder="Enter
your name">
    <h1>Hello <span ng-bind="name"></span>!</h1>
  </div>
</body>
</html>
```

script loads and runs when the browser signals that the context is ready.

## Example 1

```
<!DOCTYPE html>
<html lang="en" ng-app>
<head>
  <meta charset="UTF-8">
  <title>What's your name?</title>
  <script src="./angular.min.js"></script>
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<body>


  <div>
    <label>Name</label>
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your name">
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  </div>
</body>
</html>
```

Angular scans the HTML looking for the ng-app attribute. It creates a scope.

## Example 1

```
<!DOCTYPE html>
<html lang="en" ng-app>
<head>
  <meta charset="UTF-8">
  <title>What's your name?</title>
  <script src="./angular.min.js"></script>
</head>
<body>

  <div>
    <label>Name</label>
    <input type="text" ng-model="name" placeholder="Enter
your name">
    <h1>Hello <span ng-bind="name"></span>!</h1>
  </div>
</body>
</html>
```

The compiler scans the DOM for templating markups. Then, it fills them with info from the scope.

## Example 1

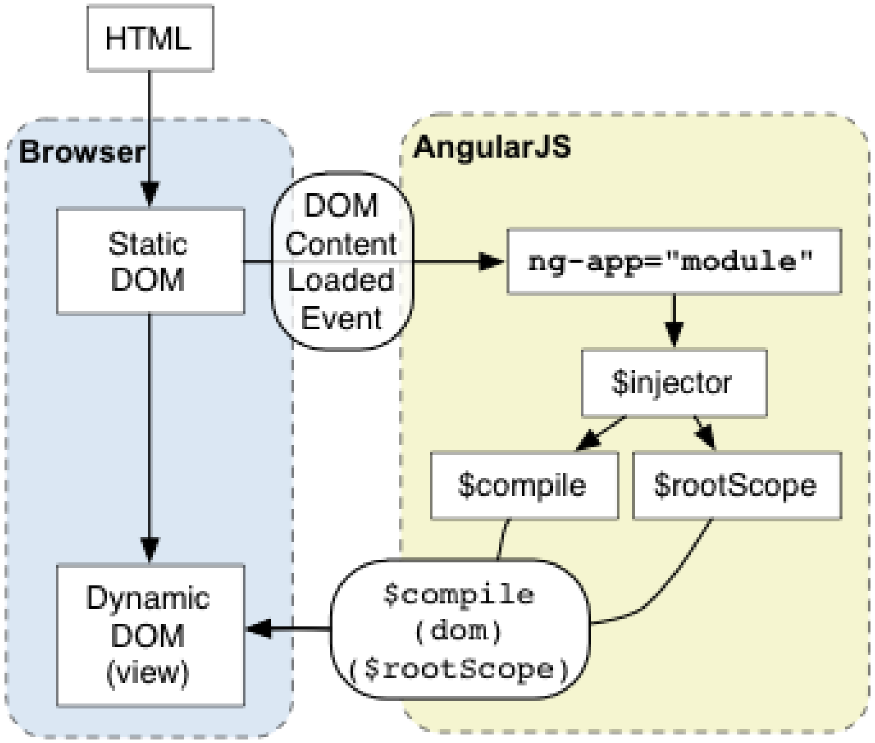
**Two-way data binding by ng-bind**

```
<!DOCTYPE html>
<html lang="en" ng-app>
<head>
  <meta charset="UTF-8">
  <title>What's your name?</title>
  <script src="./angular.min.js"></script>
</head>
<body>

  <div>
    <label>Name</label>
    <input type="text" ng-model="name" placeholder="Enter
your name">
    <h1>Hello <span ng-bind="name"></span>!</h1>
  </div>
</body>
</html>
```

name is replaced with the value inserted in the <input>

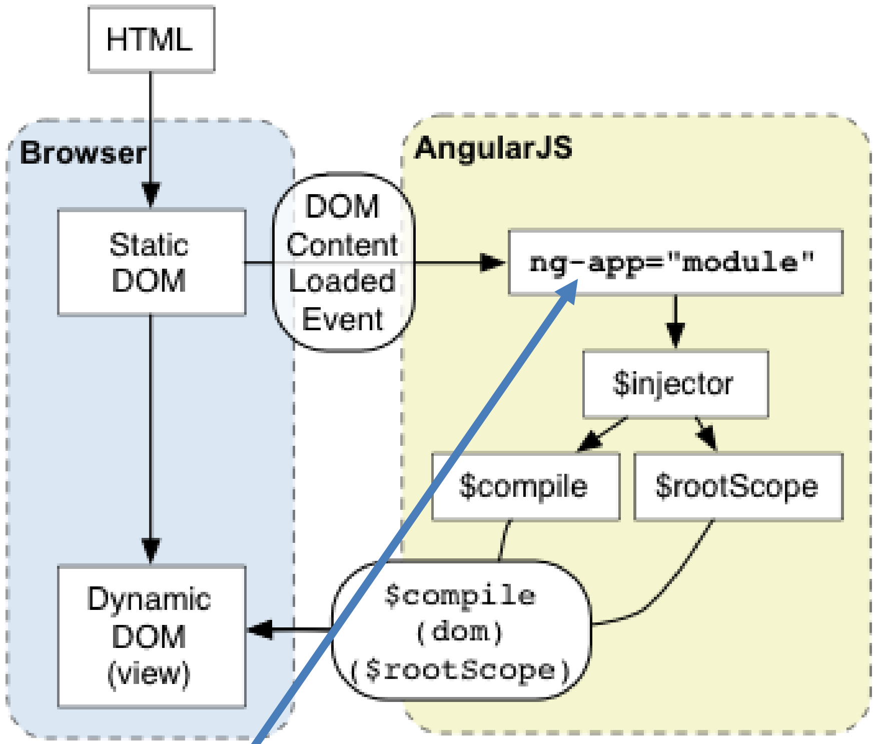
# AngularJS Initialization



https://docs.angularjs.org/guide/bootstrap

1. AngularJS initializes automatically upon DOMContentLoaded event
2. AngularJS looks in the **template** for the ngApp **directive** which designates our application root.
3. Loads the **module** associated with the directive.
4. Creates the application injector
5. Compiles the DOM treating the ngApp directive as the root of the compilation

# AngularJS Initialization



https://docs.angularjs.org/guide/bootstrap

1. AngularJS initializes automatically upon DOMContentLoaded event
2. AngularJS looks in the **template** for the ngApp **directive** which designates our application root.
3. Loads the **module** associated with the directive.
4. Creates the application injector
5. Compiles the DOM treating the ngApp directive as the root of the compilation

**Tip**: The ng-app attribute represents an AngularJS directive, named ngApp (AngularJS uses kebab-case for its custom attributes and camelCase for the corresponding directives which implement them)

# Concepts and Terminology

| | |
|---|---|
| **Template** | HTML with additional markup used to describe what should be displayed |
| **Directive** | Allows a developer to extend HTML with her own elements and attributes |
| **Module** | A container for parts of an application |
| **Scope** | Context where the model data is stored so that templates and controllers can access it |
| **Compiler** | Processes the template to generate HTML for the browser |
| **Dependency Injection** | Fetching and setting up all the functionality needed by a component |
| **Data Binding** | Syncing of data between the Scope and the HTML (two-way) |
| **Service** | Reusable functionality available for any view |

## Directives

- They are markers on a DOM element that tell Angular's HTML compiler to attach a specific behavior to that element
  - The **ng-app** directive defines an AngularJS application

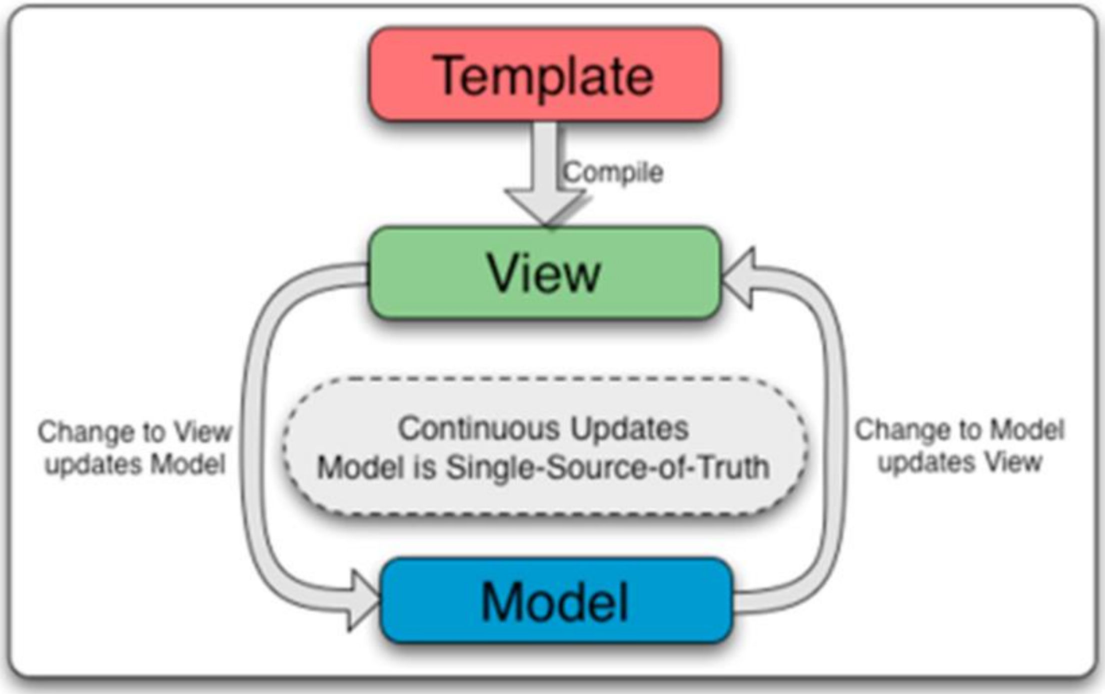
    `<html lang="en" `**`ng-app`**`>`
  - The **ng-model** directive binds the value of HTML controls (input, select, textarea) to application data.

    `<input type="text" `**`ng-model="name"`**` …>`
  - The **ng-bind** directive binds application data to the HTML view.

    `<span `**`ng-bind="name"`**`></span>`

## Two-Way Data Binding

- It is the automatic synchronization of data between the model and the view components


Template
Compile
View
Change to View updates Model
Continuous Updates Model is Single-Source-of-Truth
Change to Model updates View
Model

# Two-Way Data Binding

- It is the automatic synchronization of data between the model and the view components

**How can we do it?**

- AngularJS binds data to HTML using **Expressions:**
  - **ng-bind** directive

    ```
    <h1>Hello <span ng-bind=" expression "></span>!<\h1>
    ```

  - **Double braces**

    ```
    <h1>Hello {{ expression }}!<\h1>
    ```

- AngularJS will resolve the expression, and return the result exactly where the expression is written

## Example 2: double braces

Two-way data binding with double braces

```
<!DOCTYPE html>
<html lang="en" ng-app>
<head>
  <meta charset="UTF-8">
  <title>What's your name?</title>
  <script src="./angular.min.js"></script>
</head>
<body>

  <div>
    <label>Name</label>
    <input type="text" ng-model="name" placeholder="Enter
your name">
    <h1>Hello {{ name }}! Math says 5 + 4 is {{ 5+4 }}
</h1>
  </div>
</body>
</html>
```

name is replaced with the value inserted in the <input> and 5+4 is replace with 9

## Other Built-in Directives

- ng-init
  - Evaluates the given expression(s) to, for example, create a variable when initiating the application
- ng-src | ng-href
  - Add an image or a link, where the src is evaluated by AngularJS
- ng-repeat
  - instantiate a template once per item from a collection

```
<div ng-init="names = ['Laura', 'Teo', 'Gabriella']">
    <h3>Loop through names with ng-repeat</h3>
    <ul>
        <li ng-repeat="name in names">{{ name }}</li>
    </ul>
</div>
```

→ Example 3

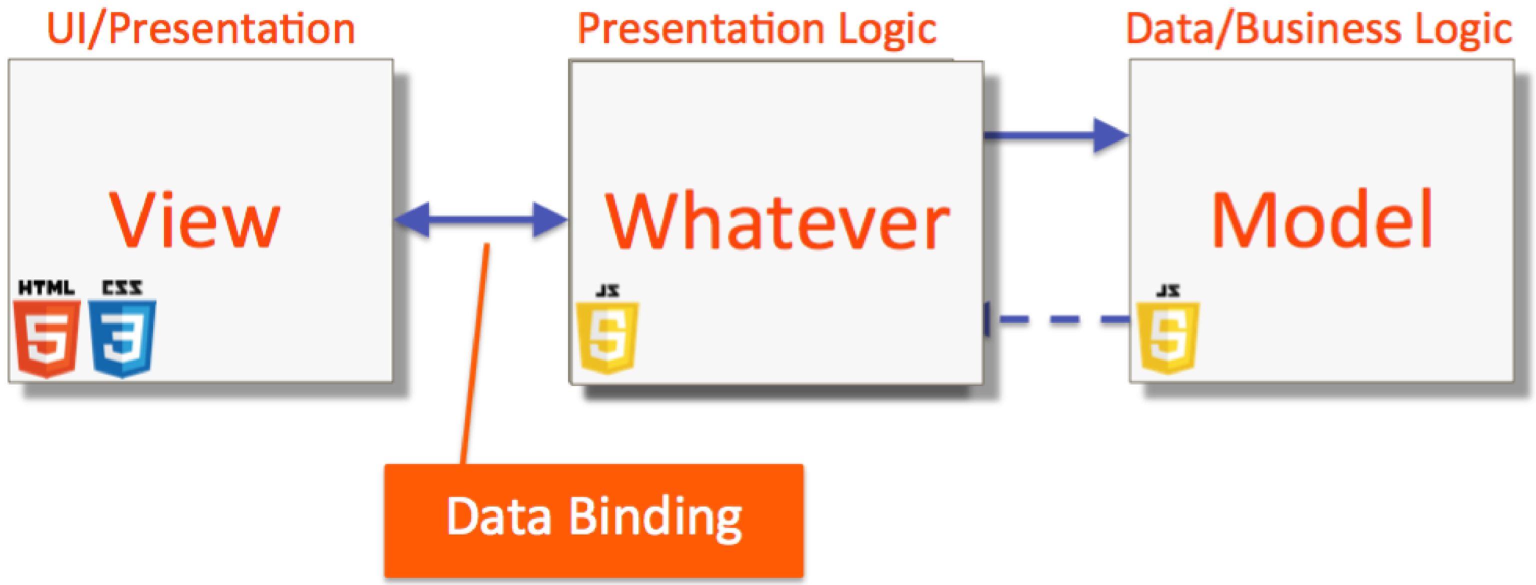
## Other Built-in Directives

- ng-show/ng-hide
  - show/hide DOM elements according to a given expression
- ng-if
  - include an element in the DOM if the subsequent expression is true
- ng-click
  - Angular version of HTML’s onclick
  - execute a given operation when the element is clicked

## Filters

- Formats the value of an expression for display to the user
  - `{{ name | uppercase }}`
- Keeps formatting into the presentation
- Syntax
  - `{{ expression | filter }}`
  - `{{ expression | filter1 | filter2 }}`
  - `{{ expression | filter:argument }}`

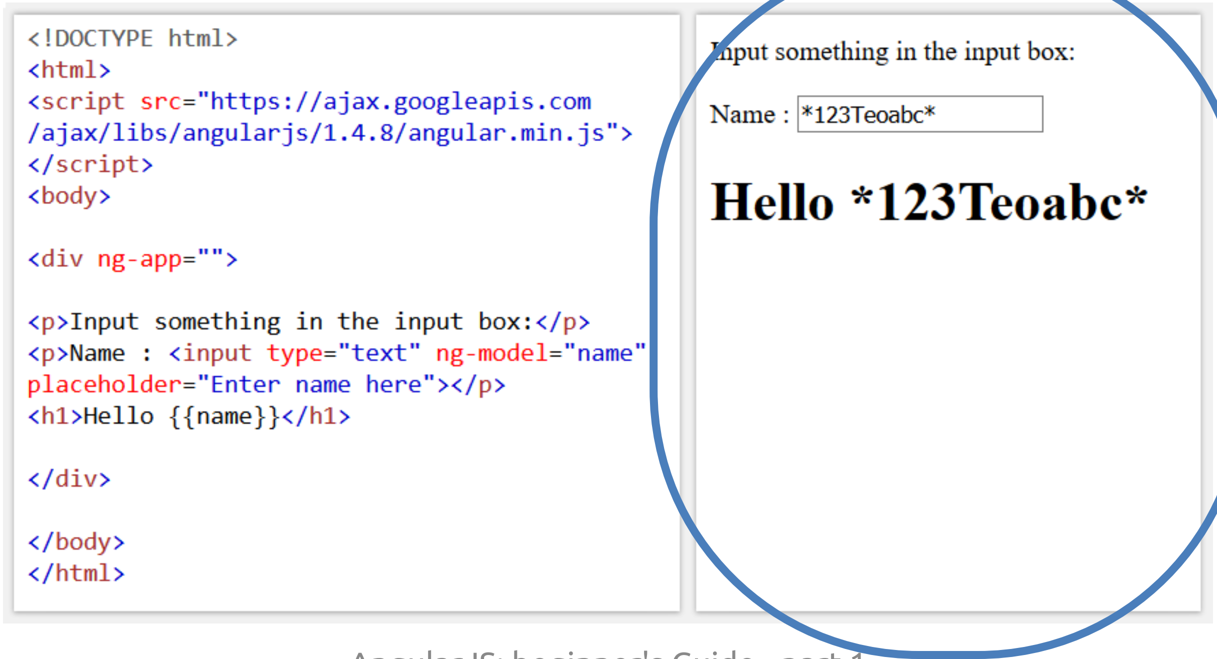
# AngularJS: MVW or MV*



# AngularJS: MVW or MV*

- View
  - It is the visible result generated by AngularJS by applying some directives to the HTML template

Example:



```
<!DOCTYPE html>
<html>
<script src="https://ajax.googleapis.com
/ajax/libs/angularjs/1.4.8/angular.min.js">
</script>
<body>

<div ng-app="">

<p>Input something in the input box:</p>
<p>Name : <input type="text" ng-model="name"
placeholder="Enter name here"></p>
<h1>Hello {{name}}</h1>

</div>

</body>
</html>
```

Input something in the input box:

Name : *123Teoabc*

**Hello *123Teoabc***

# AngularJS: MVW or MV*

- Whatever: the AngularJS **Controller**
  - A JavaScript function
  - It defines a new `$scope` that may
    - contain data (properties)
    - specify some behaviors (methods)
  - It should contain only the logic needed for a single view
    - i.e., each view should have one controller (and viceversa)

## AngularJS: MVW or MV*

- Whatever: the AngularJS **Controller**
  - It should be concerned – only! - with
    - consuming data,
    - preparing it for the view, and
    - transmitting it to service for processing
  - Best practices
    - services are responsible to hold the model and communicate with a server
    - declarations should manipulate the DOM
    - views do not have to know about their controller
    - a controller definitely does not want to know about its view

HTML

```
<!DOCTYPE html>
<html lang="en" ng-app="sonetExample" >
<head>
  <meta charset="UTF-8">
  <title>Introducing... Controllers!</title>
  <script src="./angular.min.js"></script>
</head>
<body ng-controller="MyCtrl">
  <div>
    <label>Name</label>
    <input type="text" ng-model="name" ...>
      <h1>{{ greeting }} {{name}}!</h1>
  </div>
[...]
```

module

controller

JS

```
angular.module("sonetExample", [])
 .controller('MyCtrl', function ($scope) {
    $scope.name = "";
    $scope.greeting = "Hello";
})
```

→ Example 4

# Modules

- Container to collect and organize components
  - in a *modular* way
- Multiple modules can exist in an application
  - “main” module (ng-app)
  - service modules, controller modules, etc.
- Best practices
  - a module for each feature
  - a module for each reusable component (especially directives and filters)
  - an application level module which depends on the above modules and contains any initialization code

## The Scope (`$scope`)

- The "glue" between a controller and a template
- The scope is shared among the controller and the view (the template): the framework passes it as a parameter to the controller

```
angular.module("sonetExample", [])
 .controller('MyCtrl', function ($scope) {
     ...
})
```

- It aims at defining the **data model** and exposing it to the view

# The Scope (`$scope`)

- Every property and/or function defined within the scope will be available in the view

HTML

```
[...]<body ng-controller="MyCtrl">
  <div>
    <label>Name</label>
    <input type="text" ng-model="name" ...>
      <h1>{{ greeting }} {{name}}!</h1>
      <h1>{{ Bye() }}!</h1>
  </div>
[...]
```

JS

```
angular.module("sonetExample", [])
 .controller('MyCtrl', function ($scope) {
    $scope.name = "";
    $scope.greeting = "Hello";
    $scope.Bye = function() {
            return "Bye" + " " + "!"
        };
})
```

⟶ Example 5

## The Scope (`$scope`)

- Thus, it can be seen as an execution context for expressions like
  `{{ pizza.name }}`
- Scopes can watch expressions and propagate events
- Scopes are arranged in a hierarchical structure that mimic the DOM structure of the application:
  - every application has ONE root scope: `$rootScope`
  - every controller has its own scope
  - all the scopes are descendant of the `$rootScope`
  -

continue

## The Scope (`$scope`)

– if we define nested controllers, the most internal scope inherits methods and properties of all the others

HTML

```
[...]
<div ng-controller="userController">
   <p>Name: <input type="text" ng-model="user.name"></p>
   <p>Surname: <input type="text" ng-model="user.surname"></p>
   <p ng-controller="greetingController">{{greeting()}}</p>
</div> [...]
```

JS

```
angular.module("myApp", [])
    .controller("userController",
        function($scope) {
            $scope.user = {name: "Mario", surname: "Rossi"};
        })
    .controller("greetingController",
        function($scope) {
            $scope.greeting = function() {
                return "Hello "+$scope.user.name+" "+$scope.user.surname+"!"
            };
        });
```

⟶ Example 6

## The Scope (`$scope`)

- More info about the Scope
  - ENG
    - https://docs.angularjs.org/guide/scope
  - ITA
    - http://www.html.it/pag/52713/scope-e-two-way-data-binding/
    - http://www.html.it/pag/52795/gerarchia-di-scope/

TO BE
CONTINUED...

## References

- AngularJS official guide
  - https://docs.angularjs.org/guide
- AngularJS API documentation
  - https://docs.angularjs.org/api
- AngularJS in 60 minutes [video]
  - https://www.youtube.com/watch?v=i9MHigUZKEM
- Learn Angular in your browser
  - http://angular.codeschool.com/

## 01QYAPD Social Networking: technologies and applications

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Thanks to **Luigi De Russis** (luigi.derussis@polito.it), the creator the slides I used as basis!

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