

# LAB 6

Name: Sameer Gupta

Roll no: 252010036

## Aim:

- (a) Introduction to AngularJS
- (b) Expressions and Data Binding
- (c) Working with Directives and Controllers
- (d) Filters
- (e) Forms
- (f) Modules and Services

## (a) Introduction to AngularJS

AngularJS is a **JavaScript framework**. It can be added to an HTML page with a `<script>` tag. AngularJS extends HTML attributes with **Directives**, and binds data to HTML with **Expressions**.

## AngularJS is a JavaScript Framework

AngularJS is a JavaScript framework written in JavaScript.

AngularJS is distributed as a JavaScript file, and can be added to a web page with a script tag:

```
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
```

## AngularJS Extends HTML

AngularJS extends HTML with **ng-directives**.

The **ng-app** directive defines an AngularJS application.

The **ng-model** directive binds the value of HTML controls (input, select, textarea) to application data.

The **ng-bind** directive binds application data to the HTML view.

## AngularJS Applications

AngularJS **modules** define AngularJS applications.

AngularJS **controllers** control AngularJS applications.

The **ng-app** directive defines the application, the **ng-controller** directive defines the controller.

```
↳ intro.html ×
  ↳ intro.html > ⚙ html
    1   <!DOCTYPE html>
    2   <html>
    3   <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
    4   <body>
    5
    6   <p>Try to change the names.</p>
    7
    8   <div ng-app="myApp" ng-controller="myCtrl">
    9
   10  First Name: <input type="text" ng-model="firstName"><br>
   11  Last Name: <input type="text" ng-model="lastName"><br>
   12  <br>
   13  Full Name: {{firstName + " " + lastName}}
   14
   15  </div>
   16
   17  <script>
   18  var app = angular.module('myApp', []);
   19  app.controller('myCtrl', function($scope) {
   20    $scope.firstName= "John";
   21    $scope.lastName= "Doe";
   22  });
   23  </script>
   24
   25  </body>
   26  </html>
```

## Output:

Try to change the names.

First Name:

Last Name:

Full Name: Prasad Dhengale

## (b) Expressions and Data Binding

### AngularJS Expressions vs. JavaScript

#### Expressions

Like JavaScript expressions, AngularJS expressions can contain literals, operators, and variables.

Unlike JavaScript expressions, AngularJS expressions can be written inside HTML.

AngularJS expressions do not support conditionals, loops, and exceptions, while JavaScript expressions do.

AngularJS expressions support filters, while JavaScript expressions do not.

AngularJS binds data to HTML using **Expressions**.

#### AngularJS Expressions

AngularJS expressions can be written inside double braces: {{ expression }}.

AngularJS expressions can also be written inside a directive: ng-bind="expression".

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

**AngularJS expressions** are much like **JavaScript expressions**: They can contain literals, operators, and variables.

Example {{ 5 + 5 }} or {{ firstName + " " + lastName }}

```
expressions.html
```

```
expressions.html > html
1  <!DOCTYPE html>
2  <html>
3  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
4  <body>
5
6  <div ng-app>
7  <p>My first expression: {{ 5 + 5 }}</p>
8  </div>
9
10 </body>
11 </html>
```

## Output:

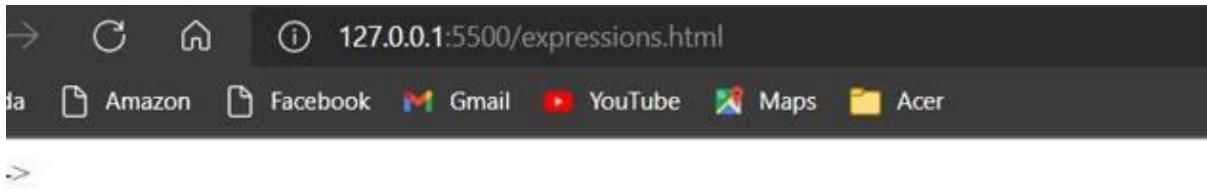


If you remove the `ng-app` directive, HTML will display the expression as it is, without solving it.

```
expressions.html
```

```
expressions.html > html
12  <!DOCTYPE html>
13  <html>
14  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
15  <body>
16
17  <p>Without the ng-app directive, HTML will display the expression as it is, without solving it.</p>
18
19  <div>
20  <p>My first expression: {{ 5 + 5 }}</p>
21  </div>
22
23  </body>
24 </html>
```

## Output:



Without the `ng-app` directive, HTML will display the expression as it is, without solving it.

My first expression: `{{ 5 + 5 }}`

## AngularJS Data Binding

Data binding in AngularJS is the synchronization between the model and the view.

### Data Model

AngularJS applications usually have a data model. The data model is a collection of data available for the application.

### HTML View

The HTML container where the AngularJS application is displayed, is called the view.

The view has access to the model, and there are several ways of displaying model data in the view.

You can use the `ng-bind` directive, which will bind the `innerHTML` of the element to the specified model property:

### Example

```
<p ng-bind="firstname"></p>
```

You can also use double braces `{{ }}` to display content from the model:

### Example

```
<p>First name: {{firstname}}</p>
```

## The `ng-model` Directive

Use the `ng-model` directive to bind data from the model to the view on HTML controls (input, select, textarea)

### Example

```
<input ng-model="firstname">
```

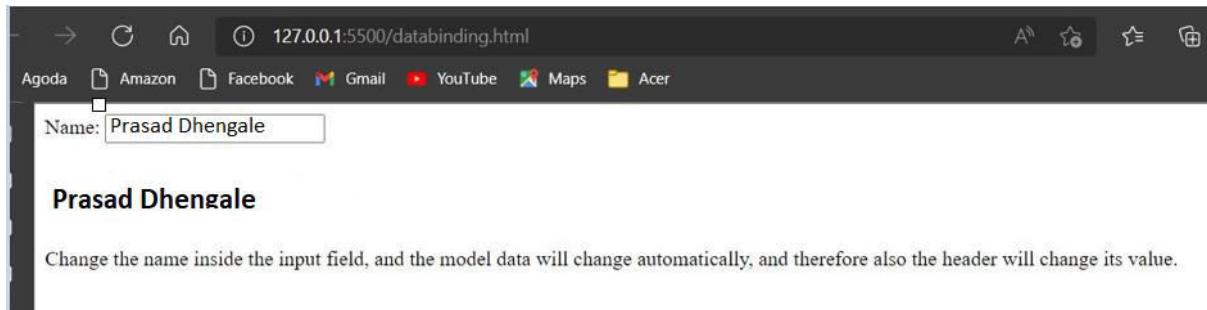
The `ng-model` directive provides a two-way binding between the model and the view.

## Two-way Binding

Data binding in AngularJS is the synchronization between the model and the view. When data in the model changes, the view reflects the change, and when data in the view changes, the model is updated as well. This happens immediately and automatically, which makes sure that the model and the view is updated at all times

```
intro.html      expressions.html 2  Untitled-1  databinding.html X
databinding.html > html
1  <!DOCTYPE html>
2  <html>
3  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
4  <body>
5
6  <div ng-app="myApp" ng-controller="myCtrl">
7      Name: <input ng-model="firstname">
8      <h1>{{firstname}}</h1>
9  </div>
10
11 <script>
12 var app = angular.module('myApp', []);
13 app.controller('myCtrl', function($scope) {
14     $scope.firstname = "John";
15     $scope.lastname = "Doe";
16 });
17 </script>
18
19 <p>Change the name inside the input field, and the model data will change automatically, and therefore also the header will change
20
21 </body>
22 </html>
```

Output:



## Working with Directives and Controllers

### AngularJS Directives

---

AngularJS lets you extend HTML with new attributes called **Directives**.

AngularJS has a set of built-in directives which offers functionality to your applications. AngularJS also lets you define your own directives.

AngularJS directives are extended HTML attributes with the prefix `ng-`. The `ng-app` directive initializes an AngularJS application.

The `ng-init` directive initializes application data.

The `ng-model` directive binds the value of HTML controls (input, select, textarea) to application data.

# The ng-app Directive

The `ng-app` directive defines the **root element** of an AngularJS application.

The `ng-app` directive will **auto-bootstrap** (automatically initialize) the application when a web page is loaded.

---

# The ng-init Directive

The `ng-init` directive defines **initial values** for an AngularJS application. Normally, you will not use `ng-init`. You will use a controller or module instead. You will learn more about controllers and modules later.

---

# The ng-model Directive

The `ng-model` directive binds the value of HTML controls (input, select, textarea) to application data.

The `ng-model` directive can also:

- Provide type validation for application data (number, email, required).
- Provide status for application data (invalid, dirty, touched, error).
- Provide CSS classes for HTML elements.
- Bind HTML elements to HTML forms.

Read more about the `ng-model` directive in the next chapter.

---

# Create New Directives

In addition to all the built-in AngularJS directives, you can create your own directives. New directives are created by using the `.directive` function.

To invoke the new directive, make an HTML element with the same tag name as the new directive.

When naming a directive, you must use a camel case name, `w3TestDirective`, but when invoking it, you must use `-` separated name, `w3-test-directive`:

## Example

The screenshot shows a code editor with several tabs at the top: intro.html, expressions.html 2, databinding.html, directives.html (which is the active tab), and another unnamed tab. The code in the directives.html tab is as follows:

```
<!DOCTYPE html>
<html>
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
<body ng-app="myApp">
<w3-test-directive></w3-test-directive>
<script>
var app = angular.module("myApp", []);
app.directive("w3TestDirective", function() {
  return {
    template : "<h1>HELLO THERE!!.....THIS IS MAYURI HERE...Made by a directive!</h1>"
  };
});
</script>
</body>
</html>
```

OUTPUT:



**HELLO THERE!!.....THIS IS MAYURI HERE...Made by a directive!**

You can invoke a directive by using:

- Element name
- Attribute
- Class
- Comment

The examples below will all produce the same result:

Element name

<w3-test-directive></w3-test-directive>

Attribute

<div w3-test-directive></div>

Class

<div class="w3-test-directive"></div>

Comment

```
<!-- directive: w3-test-directive -->
```

## Restrictions

You can restrict your directives to only be invoked by some of the methods.

## Example

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer (Left):** Shows the project structure:
  - OPEN EDITORS: directives.html
  - ANGULAR.JS: databinding.html, directives.html, expressions.html, intro.html
- Code Editor (Center):** The file "directives.html" is open, displaying the following code:

```
17 </body>
18 </html>-->
19
20 <!DOCTYPE html>
21 <html>
22 <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
23 <body ng-app="myApp">
24
25 <w3-test-directive></w3-test-directive>
26
27 <div w3-test-directive></div>
28
29 <script>
30 var app = angular.module("myApp", []);
31 app.directive("w3TestDirective", function() {
32     return {
33         restrict : "A",
34         template : "<h1>Heyy Mayuri Here....Made by a directive!</h1>"
35     };
36 });
37 </script>
38
39 <p><strong>Note:</strong> By setting the <strong>restrict</strong> property to "A", only the HTML element with the "w3-test-directi
40
41 </body>
42 </html>[
```
- Status Bar (Bottom):** Shows "Ln 42 Col 8 Spaces: 4 UTF-8 CRLF HTML ⚡ Port: 5500"

## **OUTPUT:**



**The legal restrict values are:**

- E for Element name
  - A for Attribute
  - C for Class
  - M for Comment

By default the value is EA, meaning that both Element names and attribute names can invoke the directive.

AngularJS controllers **control the data** of AngularJS applications.

AngularJS controllers are regular **JavaScript Objects**.

---

## AngularJS Controllers

AngularJS applications are controlled by controllers.

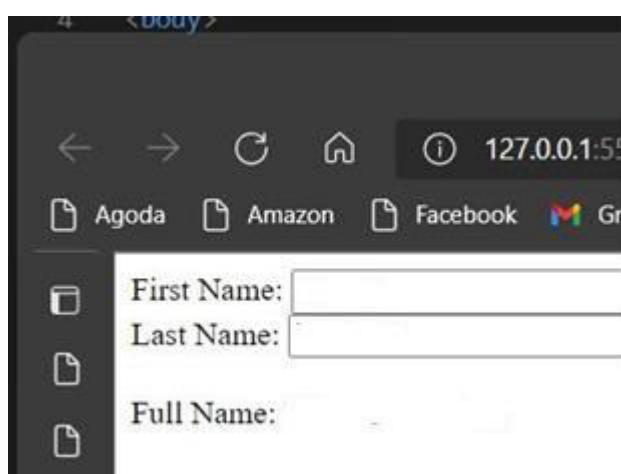
The **ng-controller** directive defines the application controller.

A controller is a **JavaScript Object**, created by a standard JavaScript **object constructor**.

### AngularJS Example

```
directives.html controllers.html
controllers.html > html
1
2   <div ng-app="myApp" ng-controller="myCtrl">
3
4     First Name: <input type="text" ng-model="firstName"><br>
5     Last Name: <input type="text" ng-model="lastName"><br>
6     <br>
7     Full Name: {{firstName + " " + lastName}}
8
9   </div>
10
11   <script>
12     var app = angular.module('myApp', []);
13     app.controller('myCtrl', function($scope) {
14       $scope.firstName = "John";
15       $scope.lastName = "Doe";
16     });
17   </script>
18
19   </body>
20 </html>
```

#### OUTPUT:



## Application explained:

The AngularJS application is defined by `ng-app="myApp"`. The application runs inside the `<div>`.

The `ng-controller="myCtrl"` attribute is an AngularJS directive. It defines a controller. The `myCtrl` function is a JavaScript function.

AngularJS will invoke the controller with a `$scope` object.

In AngularJS, `$scope` is the application object (the owner of application variables and functions).

The controller creates two properties (variables) in the scope (`firstName` and `lastName`).

The `ng-model` directives bind the input fields to the controller properties (`firstName` and `lastName`).

## Controller Methods

The example above demonstrated a controller object with two properties: `lastName` and `firstName`.

A controller can also have methods (variables as functions):

## Controllers In External Files

In larger applications, it is common to store controllers in external files.

Just copy the code between the `<script>` tags into an external file named [`personController.js`](#):

Save the file as [`namesController.js`](#):

And then use the controller file in an application: MY

JAVASCRIPT FILE:

```
namescontroller.js > ...
1 angular.module('myApp', []).controller('namesCtrl', function($scope) {
2   $scope.names = [
3     {name:'Jani',country:'Norway'},
4     {name:'Hege',country:'Sweden'},
5     {name:'Kai',country:'Denmark'}
6   ];
7 });
8
```

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows files like directives.html, controllers.html, and namescontroller.js.
- Editors:** Two tabs are open: "controllers.html" (HTML file) and "namescontroller.js".
- Content of controllers.html:**

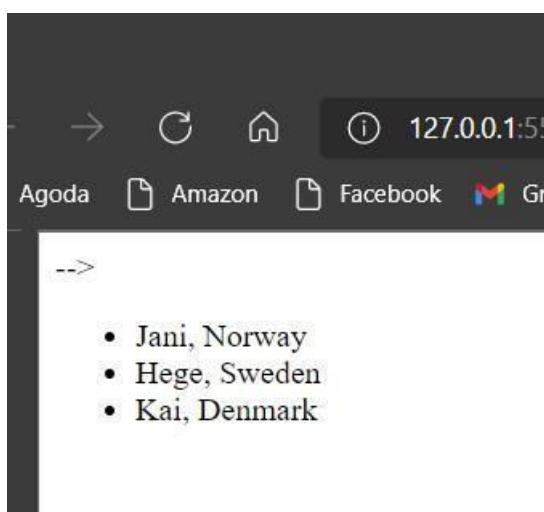
```
<!DOCTYPE html>
<html>
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
<body>
<div ng-app="myApp" ng-controller="namesCtrl">
<ul>
<li ng-repeat="x in names">
{{ x.name + ', ' + x.country }}
</li>
</ul>
</div>
<script src="namescontroller.js"></script>
</body>
</html>
```

- Content of namescontroller.js:**

```
var myApp = angular.module('myApp', []);
myApp.controller('namesCtrl', ['$scope', function($scope) {
  $scope.names = [
    {name: 'Jani', country: 'Norway'},
    {name: 'Hege', country: 'Sweden'},
    {name: 'Kai', country: 'Denmark'}
  ];
}]);
```

- Live Server Extension:** A tooltip indicates the server is started at port 5500. Another tooltip shows the server is now offline.
- Status Bar:** Shows Ln 24, Col 11, Spaces:4, UTF-8, CRLF, HTML, Port: 5500.

OUTPUT:



## Filters

Filters can be added in AngularJS to format data.

# AngularJS Filters

AngularJS provides filters to transform data:

- **currency** Format a number to a currency format.
  - **date** Format a date to a specified format.
  - **filter** Select a subset of items from an array.
  - **json** Format an object to a JSON string.
  - **limitTo** Limits an array/string, into a specified number of elements/characters.
  - **lowercase** Format a string to lower case.
  - **number** Format a number to a string.
  - **orderBy** Orders an array by an expression.
  - **uppercase** Format a string to upper case.
- 

## Adding Filters to Expressions

Filters can be added to expressions by using the pipe character `|`, followed by a filter. The **uppercase** filter format strings to upper case:

### Example

```
<div ng-app="myApp" ng-controller="personCtrl">
<p>The name is {{ lastName | uppercase }}</p>
</div>
```

The **lowercase** filter format strings to lower case:

### Example

```
<div ng-app="myApp" ng-controller="personCtrl">
<p>The name is {{ lastName | lowercase }}</p>
</div>
```

## Adding Filters to Directives

Filters are added to directives, like **ng-repeat**, by using the pipe character `|`, followed by a filter:

### Example

The **orderBy** filter sorts an array:

```
<div ng-app="myApp" ng-controller="namesCtrl">  
  <ul>  
    <li ng-repeat="x in names | orderBy:'country'">  
      {{ x.name + ', ' + x.country }}  
    </li>  
  </ul>  
</div>
```

---

## The currency Filter

The **currency** filter formats a number as currency:

### Example

```
<div ng-app="myApp" ng-controller="costCtrl">  
  <h1>Price: {{ price | currency }}</h1>  
</div>
```

---

## The filter Filter

The **filter** filter selects a subset of an array.

The **filter** filter can only be used on arrays, and it returns an array containing only the matching items.

### Example

Return the names that contains the letter "i":

```
<div ng-app="myApp" ng-controller="namesCtrl">  
  <ul>  
    <li ng-repeat="x in names | filter : 'i'">  
      {{ x }}  
    </li>  
  </ul>  
</div>
```

## Filter an Array Based on User Input

By setting the **ng-model** directive on an input field, we can use the value of the input field as an expression in a filter.

Type a letter in the input field, and the list will shrink/grow depending on the match:

- Jani
- Carl
- Margareth
- Hege
- Joe
- Gustav
- Birgit
- Mary
- Kai

## Example

```
<div ng-app="myApp" ng-controller="namesCtrl">  
  <p><input type="text" ng-model="test"></p>  
  <ul>  
    <li ng-repeat="x in names | filter : test">  
      {{ x }}  
    </li>  
  </ul>  
</div>
```

## Sort an Array Based on User Input

Click the table headers to change the sort order::

Name

Country

Jani

Norwa

Margareth

Englan

Jo

Denmar

Gustav

Sweden

Birgit

Denmar

Marv

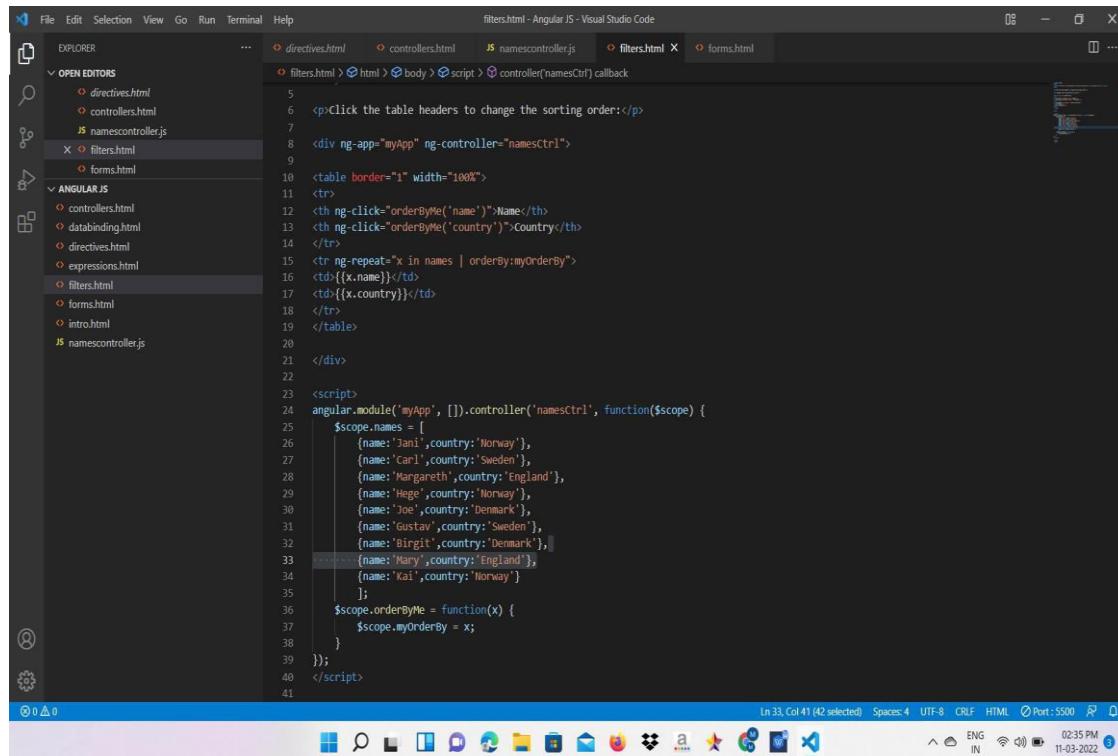
England

Kai

Norwa

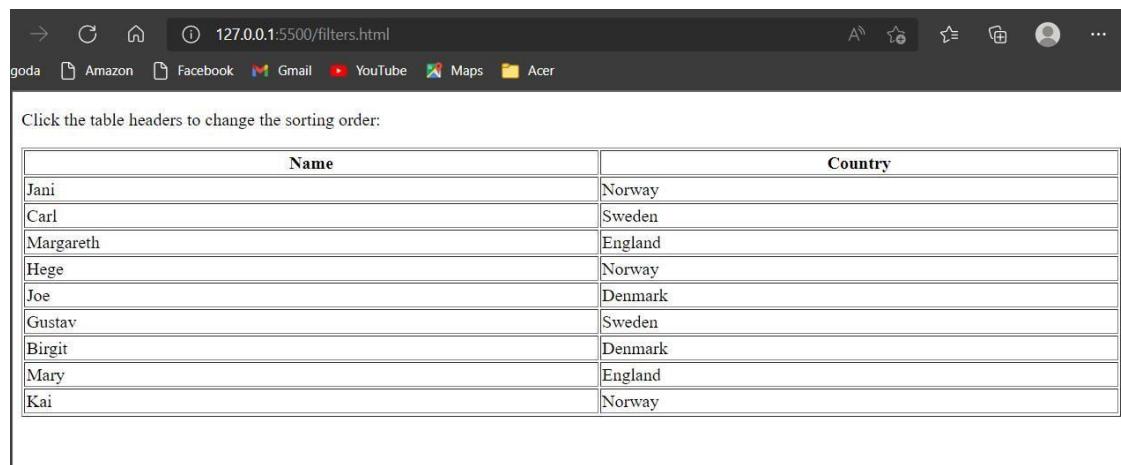
By adding the `ng-click` directive on the table headers, we can run a function that changes the sorting order of the array:

## Example



```
filters.html - Angular JS - Visual Studio Code
File Edit Selection View Go Run Terminal Help
OPEN EDITORS
  directives.html controllers.html JS namescontroller.js filters.html forms.html
ANGULAR.JS
  controllers.html databinding.html directives.html expressions.html filters.html forms.html intro.html JS namescontroller.js
filters.html
Click the table headers to change the sorting order:<p>
<div ng-app="myApp" ng-controller="namesCtrl">
  <table border="1" width="100%">
    <tr>
      <th ng-click="orderByMe('name')">Name</th>
      <th ng-click="orderByMe('country')">Country</th>
    </tr>
    <tr ng-repeat="x in names | orderBy:myOrderBy">
      <td>{{x.name}}</td>
      <td>{{x.country}}</td>
    </tr>
  </table>
</div>
<script>
angular.module('myApp', []).controller('namesCtrl', function($scope) {
  $scope.names = [
    {name:'Jani',country:'Norway'},
    {name:'Carl',country:'Sweden'},
    {name:'Margareth',country:'England'},
    {name:'Hege',country:'Norway'},
    {name:'Joe',country:'Denmark'},
    {name:'Gustav',country:'Sweden'},
    {name:'Birgit',country:'Denmark'},
    {name:'Mary',country:'England'},
    {name:'Kai',country:'Norway'}
  ];
  $scope.orderByMe = function(x) {
    $scope.myOrderBy = x;
  }
});
</script>
Ln 33, Col 41 (42 selected) Spaces: 4 UTF-8 CRLF HTML Port: 5500 0 02:35 PM ENG IN 11-03-2022
```

## OUTPUT:



Name	Country
Jani	Norway
Carl	Sweden
Margareth	England
Hege	Norway
Joe	Denmark
Gustav	Sweden
Birgit	Denmark
Mary	England
Kai	Norway

## Custom Filters

You can make your own filters by registering a new filter factory function with your module:

## Example

Make a custom filter called "myFormat":

```
<ul ng-app="myApp" ng-controller="namesCtrl">
  <li ng-repeat="x in names">
    {{x | myFormat}}
  </li>
</ul>

<script>

var app = angular.module('myApp', []);
app.filter('myFormat', function() {
  return function(x) { var
    i, c, txt = "";
    for (i = 0; i < x.length; i++) { c
      = x[i];
      if (i % 2 == 0) {
        c = c.toUpperCase();
      }
      txt += c;
    }
    return txt;
  };
});
app.controller('namesCtrl', function($scope) {
  $scope.names =
  ["Jani", "Carl", "Margareth", "Hege", "Joe", "Gustav", "Birgit", "Mary", "Kai"];
});

</script>
```

The `myFormat` filter will format every other character to uppercase.

## Forms

# AngularJS Forms

---

Forms in AngularJS provides data-binding and validation of input controls.

## Input Controls

Input controls are the HTML input elements:

- input elements
  - select elements
  - button elements
  - textarea elements
-

# Data-Binding

Input controls provides data-binding by using the `ng-model` directive.

```
<input type="text" ng-model="firstname">
```

The application does now have a property named `firstname`.

The `ng-model` directive binds the input controller to the rest of your application. The property

`firstname`, can be referred to in a controller:

## Example

```
<script>
var app = angular.module("myApp", []);
app.controller("formCtrl", function($scope) {
  $scope.firstname = "John";
});
</script>
```

It can also be referred to elsewhere in the application:

## Example

```
<form>
  First Name: <input type="text" ng-model="firstname">
</form>

<h1>You entered: {{firstname}}</h1>
```

# Checkbox

A checkbox has the value `true` or `false`. Apply the `ng-model` directive to a checkbox, and use its value in your application.

## Example

Show the header if the checkbox is checked:

```
<form>
  Check to show a header:
  <input type="checkbox" ng-model="myVar">
</form>

<h1 ng-show="myVar">My Header</h1>
```

---

# Radiobuttons

Bind radio buttons to your application with the `ng-model` directive.

Radio buttons with the same `ng-model` can have different values, but only the selected one will be used.

## Example

Display some text, based on the value of the selected radio button:

```
<form>
  Pick a topic:
  <input type="radio" ng-model="myVar" value="dogs">Dogs
  <input type="radio" ng-model="myVar" value="tuts">Tutorials
  <input type="radio" ng-model="myVar" value="cars">Cars
</form>
```

The value of myVar will be either `dogs`, `tuts`, or `cars`.

---

## Selectbox

Bind select boxes to your application with the `ng-model` directive.

The property defined in the `ng-model` attribute will have the value of the selected option in the selectbox.

## Example

Display some text, based on the value of the selected option:

```
<form>
  Select a topic:
  <select ng-model="myVar">
    <option value="">
    <option value="dogs">Dogs
    <option value="tuts">Tutorials
    <option value="cars">Cars
  </select>
</form>
```

The value of myVar will be either `dogs`, `tuts`, or `cars`.

---

## An AngularJS Form Example

First Name:

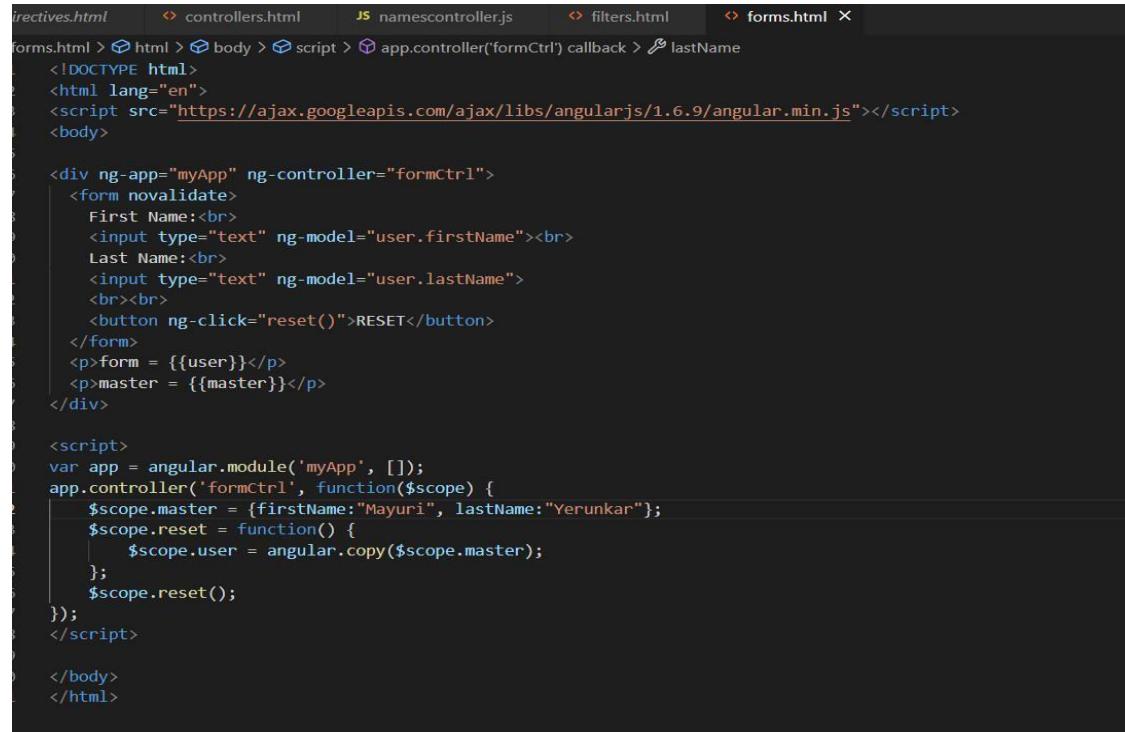
Last Name:

RESET

```
form = {"firstName": "John", "lastName": "Doe"} master =  
{"firstName": "John", "lastName": "Doe"}
```

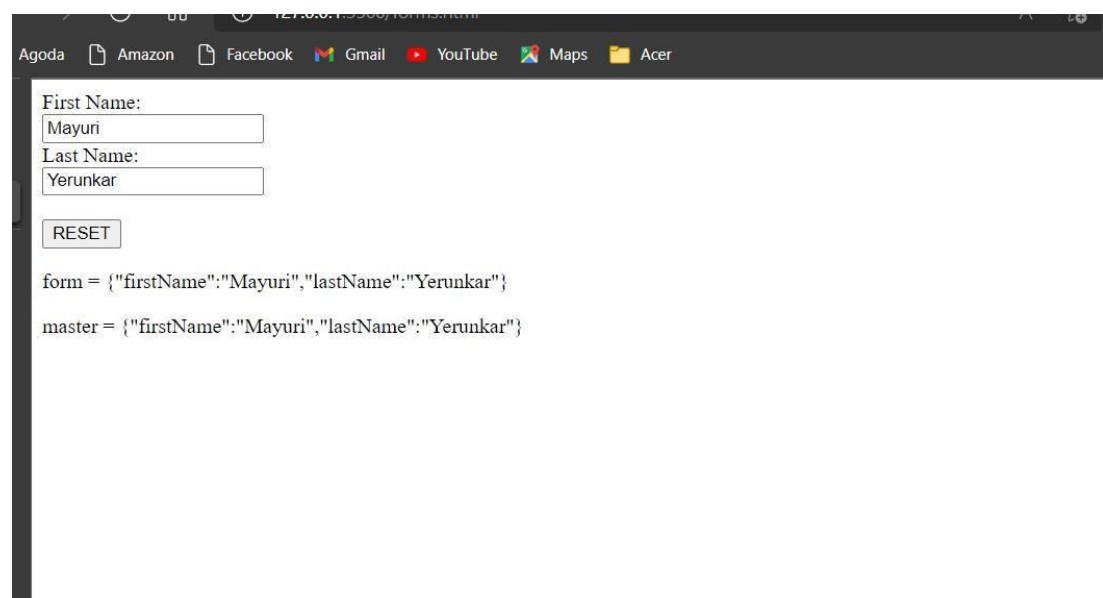
---

## Application Code



```
directives.html controllers.html JS namescontroller.js filters.html forms.html  
forms.html > html > body > script > app.controller('formCtrl') callback > lastName  
  !DOCTYPE html  
  <html lang="en">  
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>  
    <body>  
  
      <div ng-app="myApp" ng-controller="formCtrl">  
        <form novalidate>  
          First Name:<br>  
          <input type="text" ng-model="user.firstName"><br>  
          Last Name:<br>  
          <input type="text" ng-model="user.lastName">  
          <br><br>  
          <button ng-click="reset()">RESET</button>  
        </form>  
        <p>form = {{user}}</p>  
        <p>master = {{master}}</p>  
      </div>  
  
      <script>  
        var app = angular.module('myApp', []);  
        app.controller('formCtrl', function($scope) {  
          $scope.master = {firstName: "Mayuri", lastName: "Yerunkar"};  
          $scope.reset = function() {  
            $scope.user = angular.copy($scope.master);  
          };  
          $scope.reset();  
        });  
      </script>  
    </body>  
  </html>
```

## OUTPUT:



The **novalidate** attribute is new in HTML5. It disables any default browser validation.

---

## Example Explained

The **ng-app** directive defines the AngularJS application.

The **ng-controller** directive defines the application controller.

The **ng-model** directive binds two input elements to the **user** object in the model.

The **formCtrl** controller sets initial values to the **master** object, and defines the **reset()** method.

The **reset()** method sets the **user** object equal to the **master** object.

The **ng-click** directive invokes the **reset()** method, only if the button is clicked.

The novalidate attribute is not needed for this application, but normally you will use it in AngularJS forms, to override standard HTML5 validation.

## Modules and Services

## AngularJS Modules

---

An AngularJS module defines an application.

The module is a container for the different parts of an application. The module is a container for the application controllers.

Controllers always belong to a module.

---

## Creating a Module

A module is created by using the AngularJS function **angular.module**

```
<div ng-app="myApp">...</div>  
<script>  
var app = angular.module("myApp", []);  
</script>
```

The "myApp" parameter refers to an HTML element in which the application will run. Now you can add controllers, directives, filters, and more, to your AngularJSapplication.

---

## Adding a Controller

Add a controller to your application, and refer to the controller with the **ng-controller** directive:

### Example

```
controllers.html      JS namescontroller.js      filters.html      forms.html      modules.html X      databinding.html
> modules.html > html > body > script > app.controller("myCtrl") callback
1   <!DOCTYPE html>
2   <html>
3   <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
4   <body>
5
6   <div ng-app="myApp" ng-controller="myCtrl">
7   {{ firstName + " " + lastName }}
8   </div>
9
10  <script>
11  var app = angular.module("myApp", []);
12  app.controller("myCtrl", function($scope) {
13    $scope.firstName = "Mayuri";
14    $scope.lastName = "Yerunkar";
15  });
16  </script>
17
18  </body>
19  </html>
```

OUTPUT:

## Adding a Directive

AngularJS has a set of built-in directives which you can use to add functionality to your application.

In addition you can use the module to add your own directives to your applications:

## Example

```
<div ng-app="myApp" w3-test-directive></div>

<script>
var app = angular.module("myApp", []);

app.directive("w3TestDirective", function() {
  return {
    template : "I was made in a directive constructor!"
  };
});
</script>
```

---

## Modules and Controllers in Files

It is common in AngularJS applications to put the module and the controllers in JavaScript files.

In this example, "myApp.js" contains an application module definition, while "myCtrl.js" contains the controller:

## Example

```
<!DOCTYPE html>
<html>
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
<body>

<div ng-app="myApp" ng-controller="myCtrl">
{{ firstName + " " + lastName }}
</div>

<script src="myApp.js"></script>
<script src="myCtrl.js"></script>

</body>
</html>
```

### myApp.js

```
var app = angular.module("myApp", []);
```

The [] parameter in the module definition can be used to define dependent modules.

Without the [] parameter, you are not creating a new module, but retrieving an existing one.

### myCtrl.js

```
app.controller("myCtrl", function($scope) {
  $scope.firstName = "John";
  $scope.lastName = "Doe";
});
```

---

## Functions can Pollute the Global Namespace

Global functions should be avoided in JavaScript. They can easily be overwritten or destroyed by other scripts.

AngularJS modules reduces this problem, by keeping all functions local to the module.

---

## When to Load the Library

While it is common in HTML applications to place scripts at the end of the `<body>` element, it is recommended that you load the AngularJS library either in the `<head>` or at the start of the `<body>`.

This is because calls to `angular.module` can only be compiled after the library has been loaded.

### Example

```
<!DOCTYPE html>
<html>
<body>
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>

<div ng-app="myApp" ng-controller="myCtrl">
{{ firstName + " " + lastName }}
</div>

<script>
var app = angular.module("myApp", []);
app.controller("myCtrl", function($scope) {
  $scope.firstName = "John";
  $scope.lastName = "Doe";
});
</script>

</body>
</html>
```

## AngularJS Services

---

In AngularJS you can make your own service, or use one of the many built-in services.

---

## What is a Service?

In AngularJS, a service is a function, or object, that is available for, and limited to, your AngularJS application.

AngularJS has about 30 built-in services. One of them is the **\$location** service.

The **\$location** service has methods which return information about the location of the current web page:

### Example

Use the **\$location** service in a controller:

```
var app = angular.module('myApp', []);
app.controller('customersCtrl', function($scope, $location) {
  $scope.myUrl = $location.absUrl();
});
```

---

## Why use Services?

For many services, like the **\$location** service, it seems like you could use objects that are already in the DOM, like the **window.location** object, and you could, but it would have some limitations, at least for your AngularJS application.

AngularJS constantly supervises your application, and for it to handle changes and events properly, AngularJS prefers that you use the **\$location** service instead of the **window.location** object.

---

## The **\$http** Service

The **\$http** service is one of the most common used services in AngularJS applications. The service makes a request to the server, and lets your application handle the response.

### Example

Use the **\$http** service to request data from the server:

```
var app = angular.module('myApp', []);
app.controller('myCtrl', function($scope, $http) {
  $http.get("welcome.htm").then(function (response) {
    $scope.myWelcome = response.data;
  });
});
```

This example demonstrates a very simple use of the `$http` service. Learn more about the `$http` service in the [AngularJS Http Tutorial](#).

---

## The `$timeout` Service

The `$timeout` service is AngularJS' version of the `window.setTimeout` function.

### Example

Display a new message after two seconds:

```
var app = angular.module('myApp', []);
app.controller('myCtrl', [
  '$scope', '$timeout',
  function($scope, $timeout) {
    $scope.myHeader = "Hello World!";
    $timeout(function () {
      $scope.myHeader = "How are you today?";
    }, 2000);
}]);
```

---

## The `$interval` Service

The `$interval` service is AngularJS' version of the `window.setInterval` function.

### Example

Display the time every second:

```
var app = angular.module('myApp', []);
app.controller('myCtrl', [
  '$scope', '$interval',
  function($scope, $interval) {
    $scope.theTime = new Date().toLocaleTimeString();
    $interval(function () {
      $scope.theTime = new Date().toLocaleTimeString();
    }, 1000);
}]);
```

---

## Create Your Own Service

To create your own service, connect your service to the module:

Create a service named `hexify`:

```
app.service("hexafy", function() {
  this.myFunc = function(x) {
    return x.toString(16);
  }
});
```

To use your custom made service, add it as a dependency when defining the controller:

## Example

Use the custom made service named `hexafy` to convert a number into a hexadecimal number:

```
app.controller("myCtrl", function($scope, hexafy) {
  $scope.hex = hexafy.myFunc(255);
});
```

## Use a Custom Service Inside a Filter

Once you have created a service, and connected it to your application, you can use the service in any controller, directive, filter, or even inside other services.

To use the service inside a filter, add it as a dependency when defining the filter:

The service `hexafy` used in the filter `myFormat`:

```
app.filter("myFormat", ["hexafy", function(hexafy) {
  return function(x) {
    return hexafy.myFunc(x);
  };
}]);
```

You can use the filter when displaying values from an object, or an array:

```
controllers.html      filters.html      forms.html      modules.html      databinding.html
> services.html > html
1   <!DOCTYPE html>
2   <html>
3   <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.6.9/angular.min.js"></script>
4   <body>
5
6   <div ng-app="myApp" ng-controller="myCtrl">
7   <p>Use a filter when displaying the array [255, 251, 200]:</p>
8
9   <ul>
10  | <li ng-repeat="x in counts">{{x | myFormat}}</li>
11  </ul>
12
13 <p>This filter uses a service that converts numbers into hexadecimal values.</p>
14 </div>
15
16 <script>
17 var app = angular.module('myApp', []);
18 app.service('hexafy', function() {
19     this.myFunc = function (x) {
20         return x.toString(16);
21     }
22 });
23 app.filter('myFormat',['hexafy', function(hexafy) {
24     return function(x) {
25         return hexafy.myFunc(x);
26     };
27 }]);
28 app.controller('myCtrl', function($scope) {
29     $scope.counts = [255, 251, 200];
30 });
31 </script>
32
33 </body>
34 </html>
```

OUTPUT:

---

Use a filter when displaying the array [255, 251, 200]:

- ff
- fb
- c8

This filter uses a service that converts numbers into hexadecimal values.