Angular Fundamentals
Module 2 – Databinding

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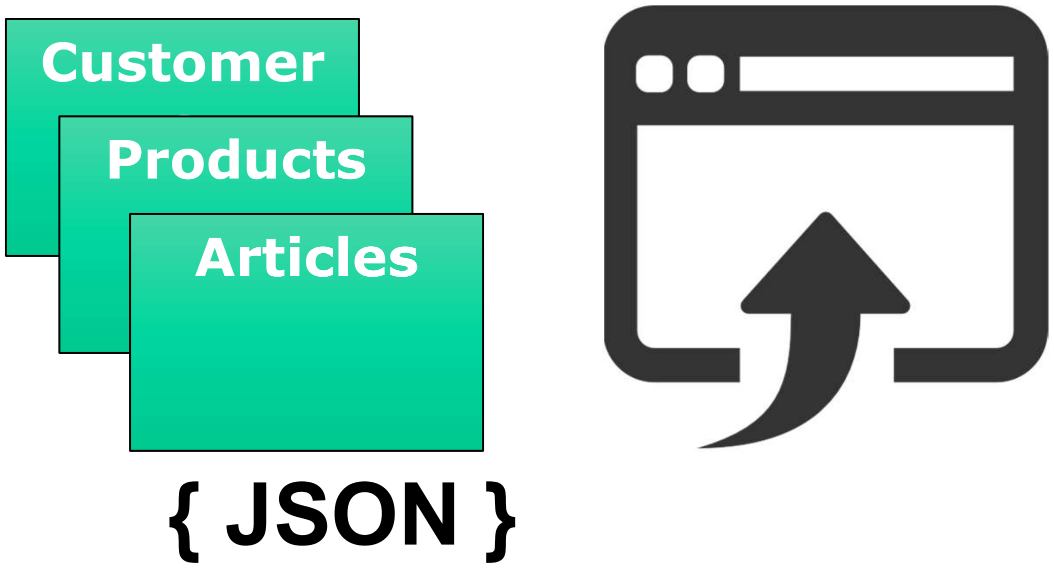
What is databinding

- Show – all kinds of – data in User Interface
- Data can come from:
    - Controller / class
    - Database
    - User input
    - Other systems



Declarative syntax

- Four (4) kinds of databinding
- Angular specific notation in HTML templates
    1. Simple data binding
    2. Event binding
    3. One-way data binding (Attribute binding)
    4. Two-way data binding

1. Simple data binding syntaxis

Unaltered from AngularJS and other frameworks.

Use double curly braces:

```
<div>City: {{ city }}</div>

<div>First Name: {{ person.firstname }}</div>
```

Always: in conjunction with component/class

```
import {Component} from '@angular/core';
@Component({
   selector: 'hello-world',
   template: `<h1>Hello Angular 2</h1>
      <h2>My name is : {{ name }}</h2>
      <h2>My favorite city is : {{ city }}</h2>
   `
})
export class AppComponent {
   name = 'Peter Kassenaar';
   city = ‘Groningen'
}
```

Or: properties via constructor

```
• export class AppComponent {
     name: string;
     city: string;

     constructor() {
        // this.name = '…';
        // this.city = '…';
     }
      ngOnInit() {
        this.name = 'Peter Kassenaar';
        this.city = 'Groningen';
     }
  }
```

BEST PRACTICE:

use `ngOnInit()`

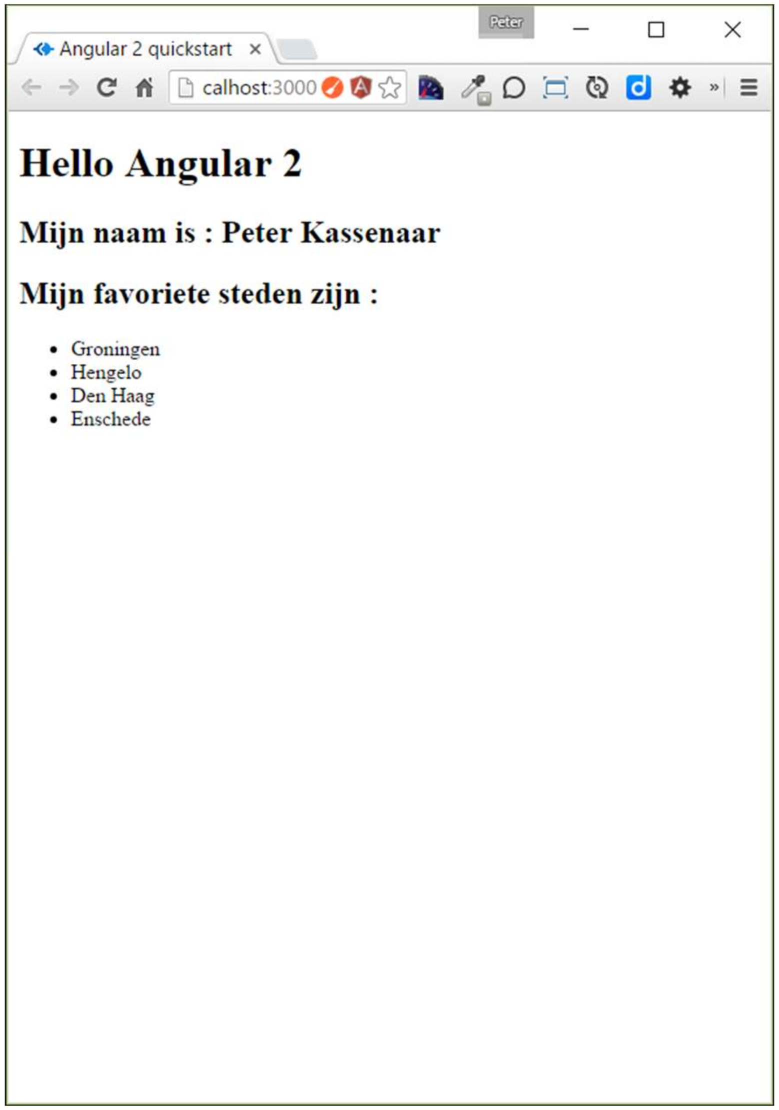
Binding using a loop: `*ngFor`

Template:

```
<h2>My favourite cities are:</h2>
<ul>
   <li *ngFor="let city of cities">{{ city }}</li>
</ul>
```

Class:

```
// Class with properties, array with cities
export class AppComponent {
   name:string;
   cities:string[];

   ngOnInit() {
      this.name   = 'Peter Kassenaar';
      this.cities = ['Groningen', 'Hengelo', 'Den Haag', 'Enschede']
   }
}
```



Hello Angular 2

Mijn naam is : Peter Kassenaar

Mijn favoriete steden zijn :

- Groningen
- Hengelo
- Den Haag
- Enschede

More info:

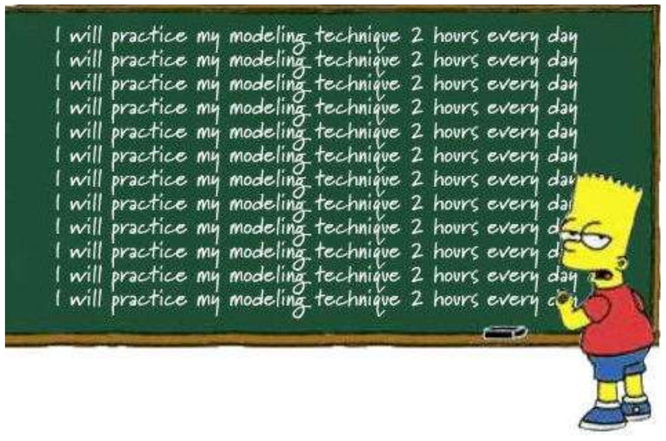
https://angular.io/docs/ts/latest/guide/displaying-data.html

Workshop

- Simple data binding `{{ … }}`
- Properties of the class are bound
- Create some class properties

- Bind them to the template
- Use an array of data to bind to the template
    - Use `*ngFor` for that
- Exercise 2a, 2b.

Exercise....



Creating a Model (as in: MVC)

A Model as a class with exported public properties:

```
export class City{
   constructor(
      public id: number,
      public name: string,
      public province: string,
   ){ }
}
```

Notice shorthand notation `public id : number` :

1. Defines a private/local parameter
2. Defines a public parameter with the same name
3. Initializes parameter at instantiation of the class with `new`

Using the Model

1. Import model class

```
import {City} from './city.model'
```

2. Update component

```
export class AppComponent {
      name   = 'Peter Kassenaar';
      cities =[
         new City(1, 'Groningen', 'Groningen'),
         new City(2, 'Hengelo', 'Overijssel'),
         new City(3, 'Den Haag', 'Zuid-Holland'),
         new City(4, 'Enschede', 'Overijssel'),
      ]
}
```

3. Update View

```
<li *ngFor="let city of cities">{{ city.id}} - {{ city.name }}</li>
```

Andere optie: `interface`

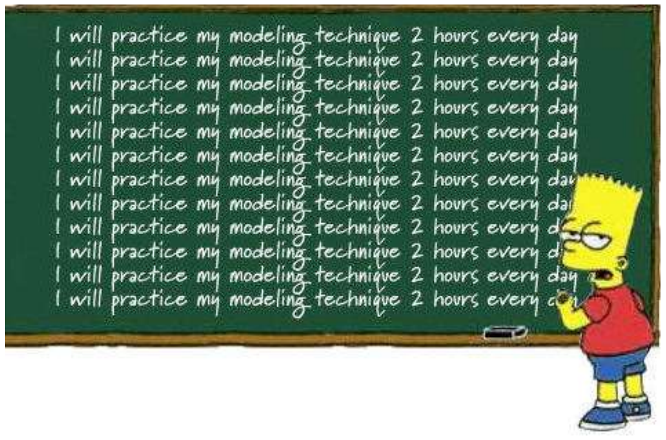
- `Interface` only describes the structure of the data
- No keyword `new`
- No functionality in the ‘instances’
- Mostly – personal preference!

```
interface ICity {
  id: number;
  name: string;
  province: string;
}
```

Checkpoint

- Creating a model: `Class` of `interface`
- Using a model: `import`-statements for your class or interface
- Best practice; put them in the folder `/shared`.
- Excercise `2c)`
- Example: `../examples/101-databinding`

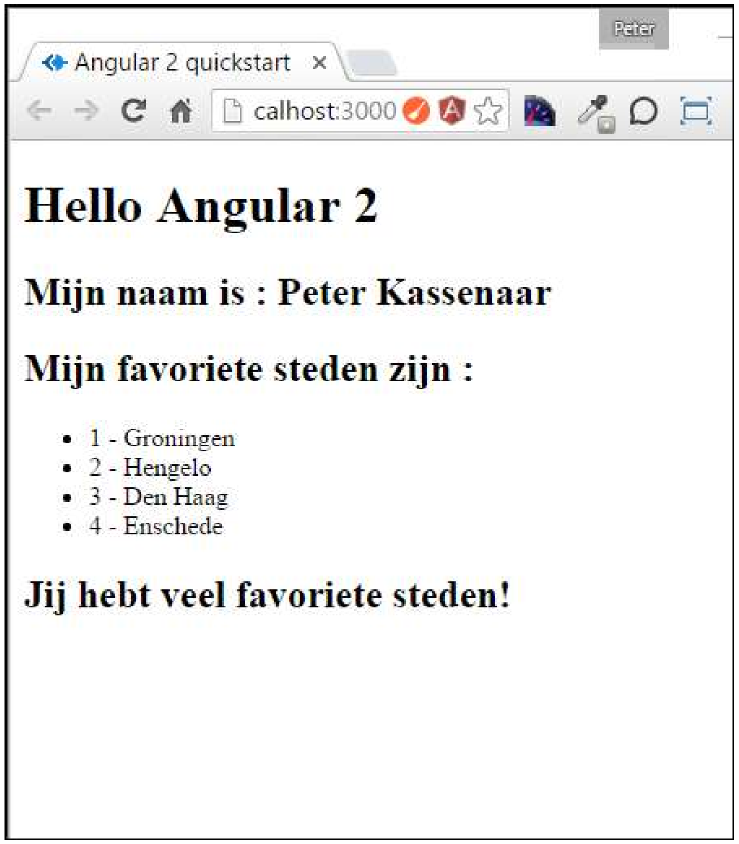
Workshop....



Using `*ngIf` to show conditionally

Use the `*ngIf` directive (pay attention to the asterisk!)

```
<h2 *ngIf="cities.length > 3">There are a lot of favorite cities!</h2>
```



Hello Angular 2

Mijn naam is : Peter Kassenaar

Mijn favoriete steden zijn :

- 1 - Groningen
- 2 - Hengelo
- 3 - Den Haag
- 4 - Enschede

Jij hebt veel favoriete steden!

External templates

If you don’t like inline HTML :

```
@Component({
   selector   : 'hello-world',
   templateUrl: 'app.component.html'
})
```

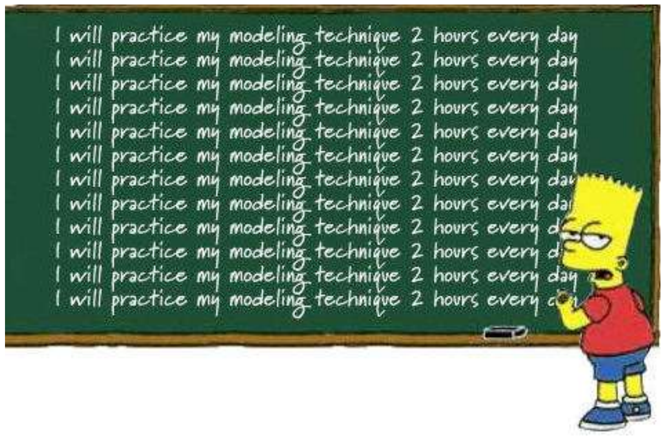
File `app.html`

```
<!-- HTML in external template -->

<h1>Hello Angular</h1>

<p>This is an external template</p>

<h2>My name is : {{ name }}</h2>

<h2>My favorite cities :</h2>

…
```

Checkpoint

- Simple data binding `{{ … }}`
- Properties of the class are bound
- Loops and conditional statements with `*ngFor` and `*ngIf`
- Preferrably – working with a Model
    - class
    - interface
- Optional: external HTML-templates
- Exercise: `2a), 2b), 2c), 2d), 2e)`

Exercise….



User input and event binding

React to mouse, keyboard,

hyperlinks and more

Event binding syntax

Angular: use parentheses for events:

Angular 1:

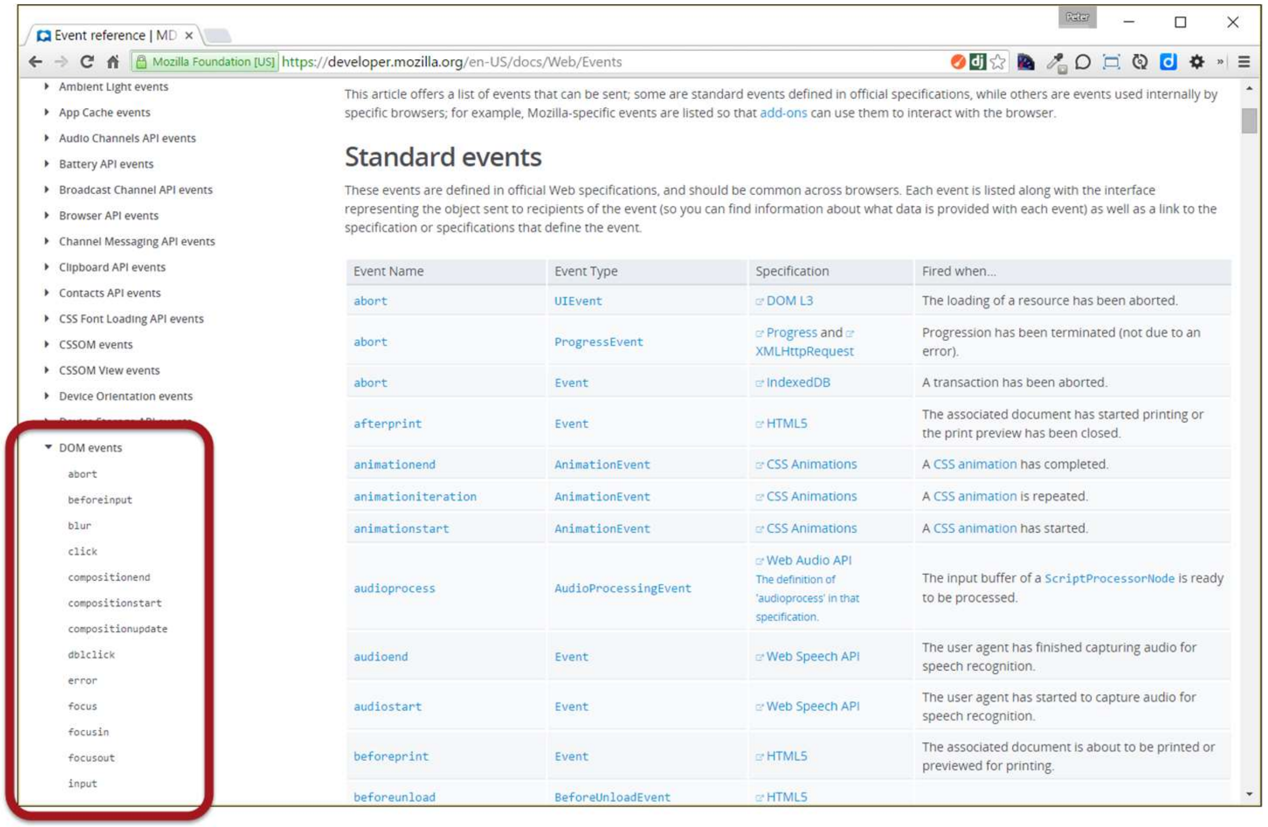
```
<div ng-click="handleClick()">…</div>
```

Angular 2+:

```
<div (click)="handleClick()">…</div>

<input (blur)="onBlur()">…</div>
```

DOM-events

- Angular can listen to *any* DOM-event without needing different directives:



Event reference | MD

Mozilla Foundation [US] https://developer.mozilla.org/en-US/docs/Web/Events

- Ambient Light events
- App Cache events
- Audio Channels API events
- Battery API events
- Broadcast Channel API events
- Browser API events
- Channel Messaging API events
- Clipboard API events
- Contacts API events
- CSS Font Loading API events
- CSSOM events
- CSSOM View events
- Device Orientation events
- DOM events
  - abort
  - beforeinput
  - blur
  - click
  - compositionend
  - compositionstart
  - compositionupdate
  - dblclick
  - error
  - focus
  - focusin
  - focusout
  - input

This article offers a list of events that can be sent; some are standard events defined in official specifications, while others are events used internally by specific browsers; for example, Mozilla-specific events are listed so that add-ons can use them to interact with the browser.

Standard events

These events are defined in official Web specifications, and should be common across browsers. Each event is listed along with the interface representing the object sent to recipients of the event (so you can find information about what data is provided with each event) as well as a link to the specification or specifications that define the event.

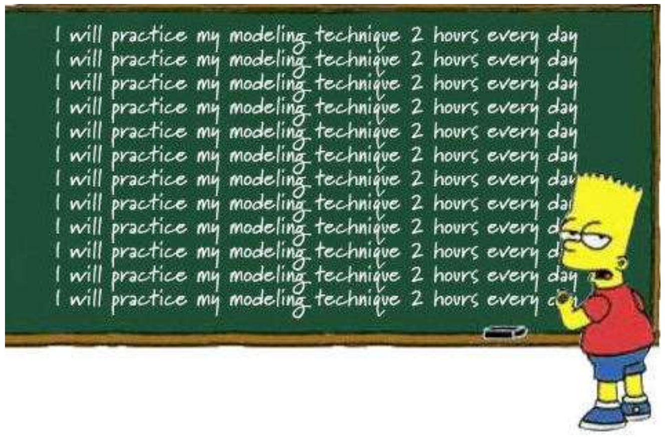
Event Name	Event Type	Specification	Fired when...
abort	UIEvent	DOM L3	The loading of a resource has been aborted.
abort	ProgressEvent	Progress and XMLHttpRequest	Progression has been terminated (not due to an error).
abort	Event	IndexedDB	A transaction has been aborted.
afterprint	Event	HTML5	The associated document has started printing or the print preview has been closed.
animationend	AnimationEvent	CSS Animations	A CSS animation has completed.
animationiteration	AnimationEvent	CSS Animations	A CSS animation is repeated.
animationstart	AnimationEvent	CSS Animations	A CSS animation has started.
audioprocess	AudioProcessingEvent	Web Audio API The definition of 'audioprocess' in that specification.	The input buffer of a ScriptProcessorNode is ready to be processed.
audioend	Event	Web Speech API	The user agent has finished capturing audio for speech recognition.
audiostart	Event	Web Speech API	The user agent has started to capture audio for speech recognition.
beforeprint	Event	HTML5	The associated document is about to be printed or previewed for printing.
beforeunload	BeforeUnloadEvent	HTML5	

https://developer.mozilla.org/en-US/docs/Web/Events

Checkpoint

- Event bindint is done with `(eventname)="…"`
- Events are always notated in lowercase.
- You can bind multiple events to the same element.
- Events are *not* rendered in the browser DOM-tree
- Events are handled by an event handler-function on the component
- Example `../examples/102-event-binding`
- Excercise `3a)`

Workshop….

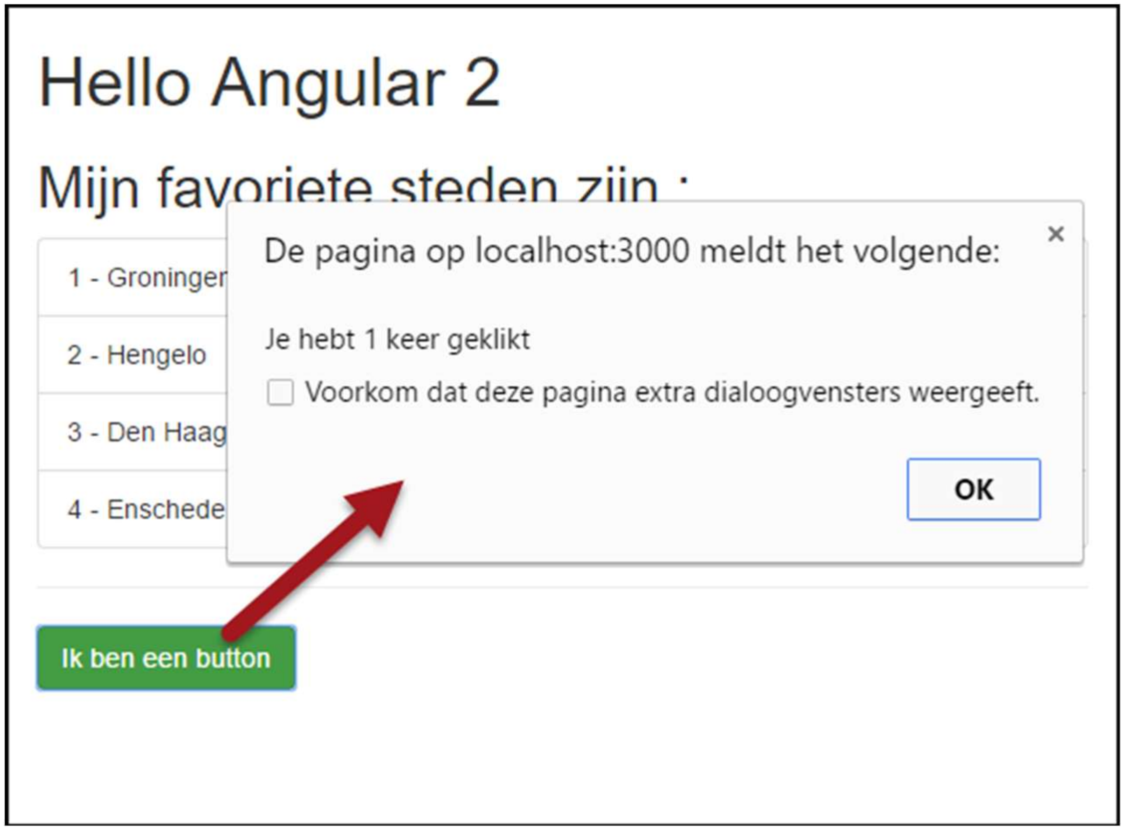


Example event binding

HTML

```
<!-- Event binding on button -->
<button class="btn btn-success"
      (click)="btnClick()">I am a button</button>
```

```
export class AppComponent {
   …
   counter: number =0;

   btnClick(){
      alert(‘You clicked '+ ++this.counter +’ times');
   }
 }
```



Hello Angular 2

Mijn favoriete steden zijn :

1 - Groninger

2 - Hengelo

3 - Den Haag

4 - Enschede

De pagina op localhost:3000 meldt het volgende:

Je hebt 1 keer geklikt

☐ Voorkom dat deze pagina extra dialoogvensters weergeeft.

Reading values from text fields

Creating a variable from your text field

A) Event parameters: $event

HTML

```
<input type="text" class="input-lg" placeholder="City..."
      (keyup.enter)="onKeyUp($event)"><br>
<p>{{ txtKeyUp}}</p>
```

```
// 2. Bind to keyUp-event in the textbox
onKeyUp(event:any){
   this.txtKeyUp = event.target.value + ' - ';
}
```

B) Event parameters local template variable

Declare *local template variable* with # → The complete element is passed to the component

```
<input type="text" class="input-lg" placeholder=”City..."
      #txtCity (keyup)="betterKeyUp(txtCity)">
<h3>{{ txtCity.value }}</h3>
```

Class:

```
 // 3. Bind to keyUp-event via local template variable
betterKeyUp(txtCity){
   //... Handle txtCity as desired
}
```

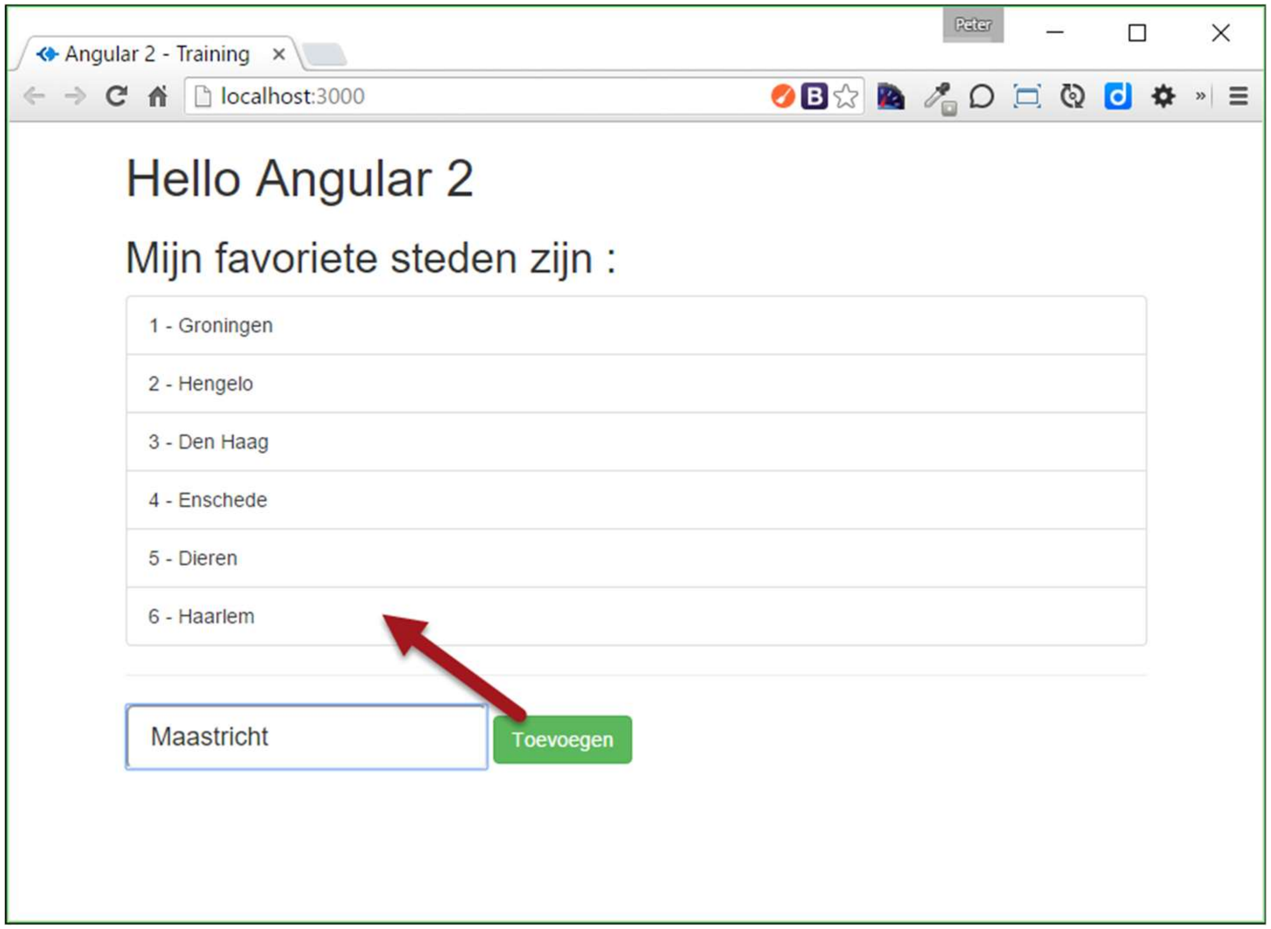
Putting it all together…

HTML

```
<input type="text" class="input-lg" placeholder="City..." #txtCity>
<button class="btn btn-success"
      (click)="addCity(txtCity)">Add city
</button>
```

Class

```
export class AppComponent {
   // Properties on component/class
   …
   addCity(txtCity) {
      let newID   = this.cities.length + 1;
      let newCity = new City(newID, txtCity.value, 'Unknown');
      this.cities.push(newCity);
      txtCity.value = '';
   }
}
```



Hello Angular 2

Mijn favoriete steden zijn :

1 - Groningen
2 - Hengelo
3 - Den Haag
4 - Enschede
5 - Dieren
6 - Haarlem

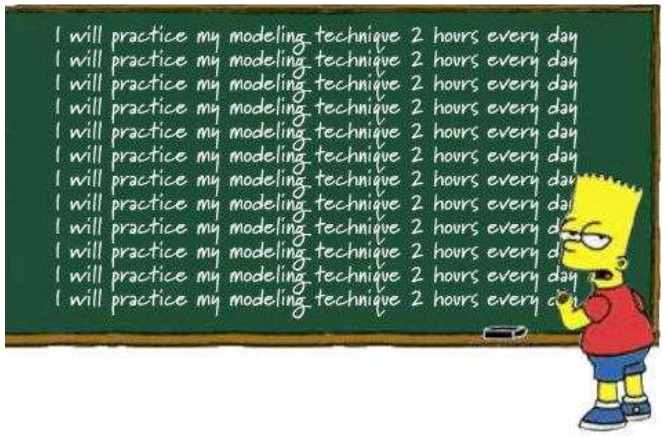
Maastricht

Further reading : https://angular.io/docs/ts/latest/guide/user-input.html

Checkpoint

- Event binding is addressed with `(eventname)`=“…”
- Events are being handled by a function inside the component
- Optional: use `$event` to pass data to the class
- Or: use a local template variable `#` to pass value to the class
- You can create simple, client sided CRUD-operations this way.
- Exercise: `3d)` and `3e)`

Exercise….



Declarative syntax

- Four (4) kinds of databinding
- Angular specific notation in HTML templates

    1. Simple data binding with {{ … }}
    2. Event binding with (…)
    3. One-way data binding (Attribute binding)
    4. Two-way data binding

Attribute & property binding

Bind values dynamically to HTML attributes and DOM-properties

Attribute binding syntax

- Bind directly to properties of HTML-elements.
- Also know as *one-way binding.*
- Use square brackets syntax

Angular 1:

```
<div ng-hide="true|false">…</div>
```

Angular 2+:

```
<div [hidden]="true">…</div>
```

Or :

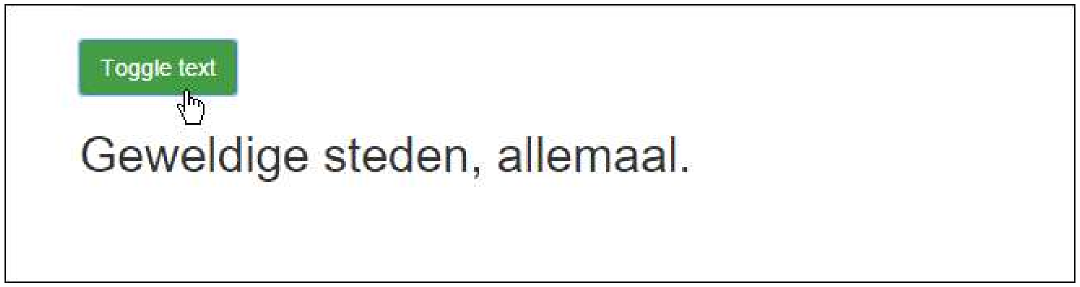
```
<div [hidden]="person.hasEmail">…</div>
<div [style.background-color]="'yellow'">…</div>
```

Example attribute binding

HTML

```html
<!-- Attribute binding -->
<button class="btn btn-success" (click)="toggleText()">Toggle text</button>
<h2 [hidden]="textVisible">I love all these cities!</h2>
```

```typescript
// Toggle attribute: show or hide text.
toggleText(){
   this.textVisible = !this.textVisible;
}
```



Geweldige steden, allemaal.

For instance…

HTML

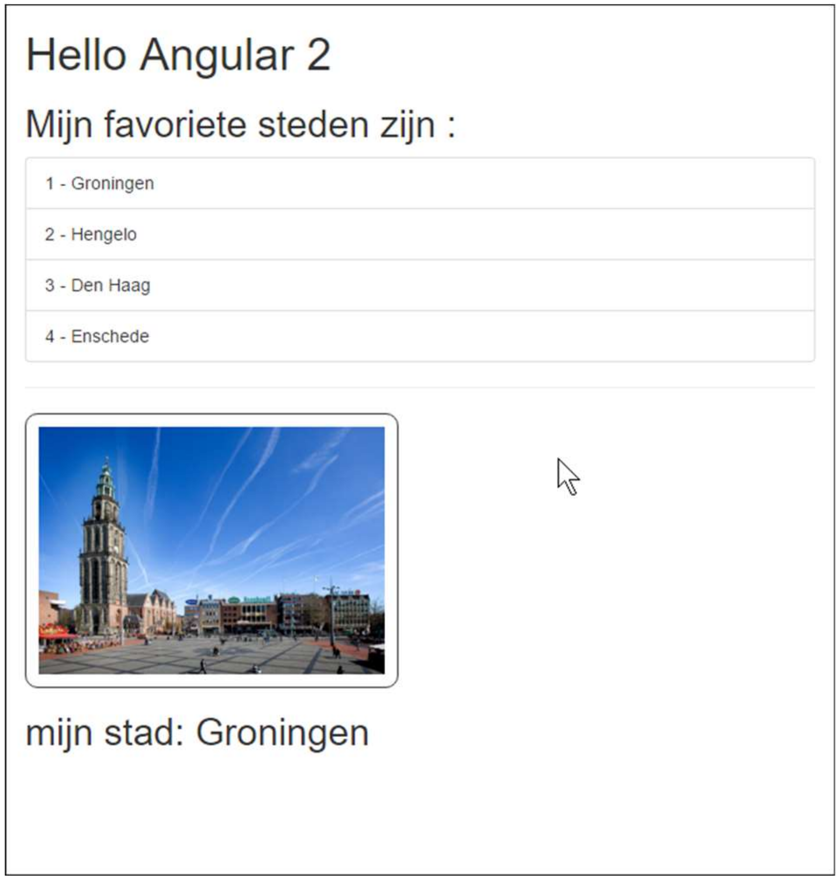
```
<li *ngFor=”let city of cities" class="list-group-item"
   (click)="updateCity(city)">
   {{ city.id}} - {{ city.name }}
</li>
```

Class

```
export class AppComponent {
   // …
   currentCity:City    = null;
   cityPhoto:string    = '';

   // Update selected city in the UI. New: ES6 String interpolation
   updateCity(city:City) {
      this.currentCity = city;
      this.cityPhoto   = `img/${this.currentCity.name}.jpg`;
   }
}
```

Demo:

`..\103-attributebinding\src\app\app.component.ts`



Hello Angular 2

Mijn favoriete steden zijn :

1 - Groningen

2 - Hengelo

3 - Den Haag

4 - Enschede

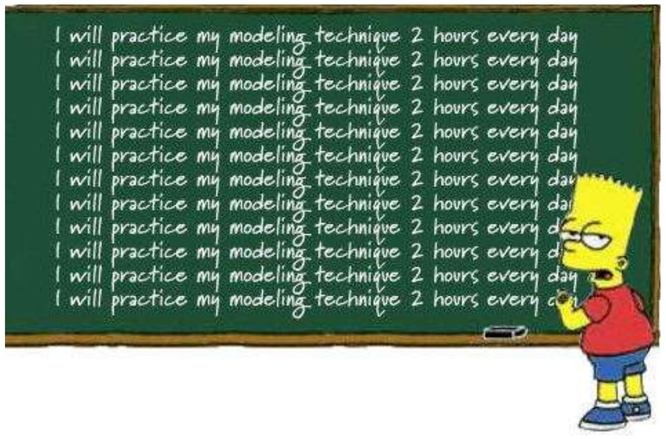
mijn stad: Groningen

More information : https://angular.io/docs/ts/latest/guide/template-syntax.html#!#property-binding

Checkpoint

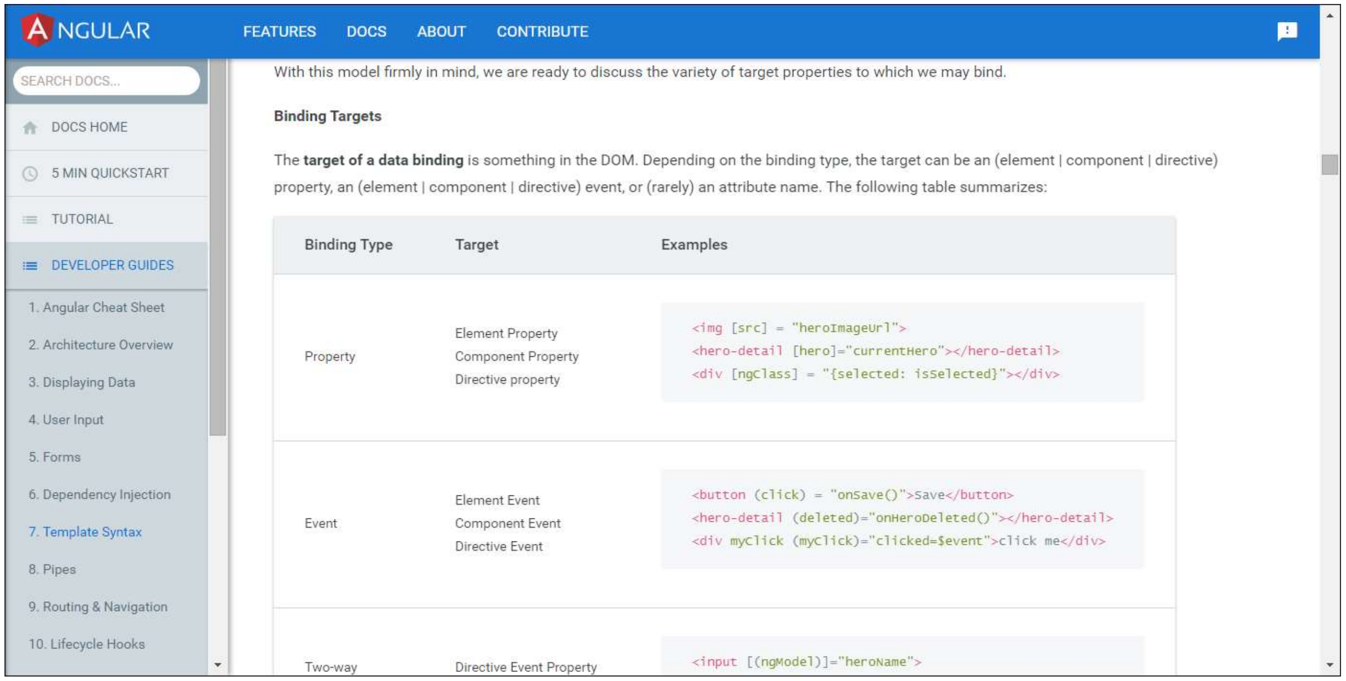
- Attribute binding is addressed with `[attrName]="…"`
- Attributes are bound to a variable on the class.
- You can calculate the variable in the `.ts`-file
- Exercise: `4a)` and `4b)`
- Example code is in `../103-attribute-binding`

Exercise….



More binding-options

- Attribute binding and DOM-property binding: `[…]`
- Class binding : `[ngClass]`
- Style binding : `[ngStyle]`
- https://angular.io/docs/ts/latest/guide/template-syntax.html



With this model firmly in mind, we are ready to discuss the variety of target properties to which we may bind.

Binding Targets

The **target of a data binding** is something in the DOM. Depending on the binding type, the target can be an (element | component | directive) property, an (element | component | directive) event, or (rarely) an attribute name. The following table summarizes:

Binding Type	Target	Examples

Property	Element Property
	Component Property
	Directive property
		`<img [src] = "heroImageUrl">`
		`<hero-detail [hero]="currentHero"></hero-detail>`
		`<div [ngClass] = "{selected: isSelected}"></div>`

Event	Element Event
	Component Event
	Directive Event
		`<button (click) = "onSave()">Save</button>`
		`<hero-detail (deleted)="onHeroDeleted()"></hero-detail>`
		`<div myClick (myClick)="clicked=$event">click me</div>`

Two-way	Directive Event Property	`<input [(ngModel)]="heroName">`

Two-way binding

Updating user interface and class variables at the same time

Two way binding syntaxis

Was removed from Angular 2 for a while, but returned after complaints from the community:

Angular 1:

```
<input ng-model="person.firstName" />
```

Angular 2: similar, but notation is a little bizar:

```
<input [(ngModel)]="person.firstName" />
```

Using [(ngModel)]

```
<input type="text" class="input-lg" [(ngModel)]="newCity" />
<h2>{{ newCity }}</h2>
```

Which is shorthand-notation for:

```
<!-- Two-way binding with extended syntax -->
<input type="text" class="input-lg"
      [value]="newCityExtended"
      (input)="newCityExtended = $event.target.value" />
<h2>{{ newCityExtended }}</h2>
```

Import FormsModule

- Two-way binding used to be in the Angular Core – now in it’s own module
- Import `FormsModule` in `app.module.ts!`

- `import {FormsModule} from "@angular/forms";`
- …
- `imports      : [BrowserModule, FormsModule],`

So: passing data from View to Controller,

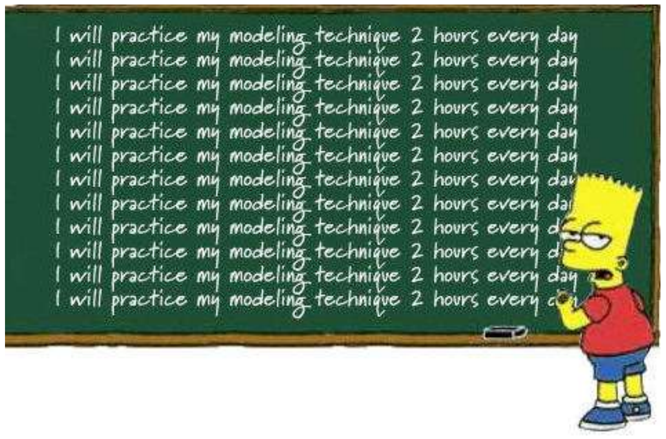
lots of options:

1. Using `$event`
2. Using a Local Template Variabele `#NameVar`
3. Using `[(ngModel)]` (to be used in simple situations, mostly not on complex forms)
4. HostBinding/`@HostListener` (via @-decorators)
5. Use `@ViewChild()` …

Checkpoint

- Two-way binding is addressed with **`[(ngModel)]="…"`**
- The value of `[(ngModel)]` is updated automagically by Angular.
- It is available in the View/Template and in the TypeScript class.
- Exercise: `4d)`

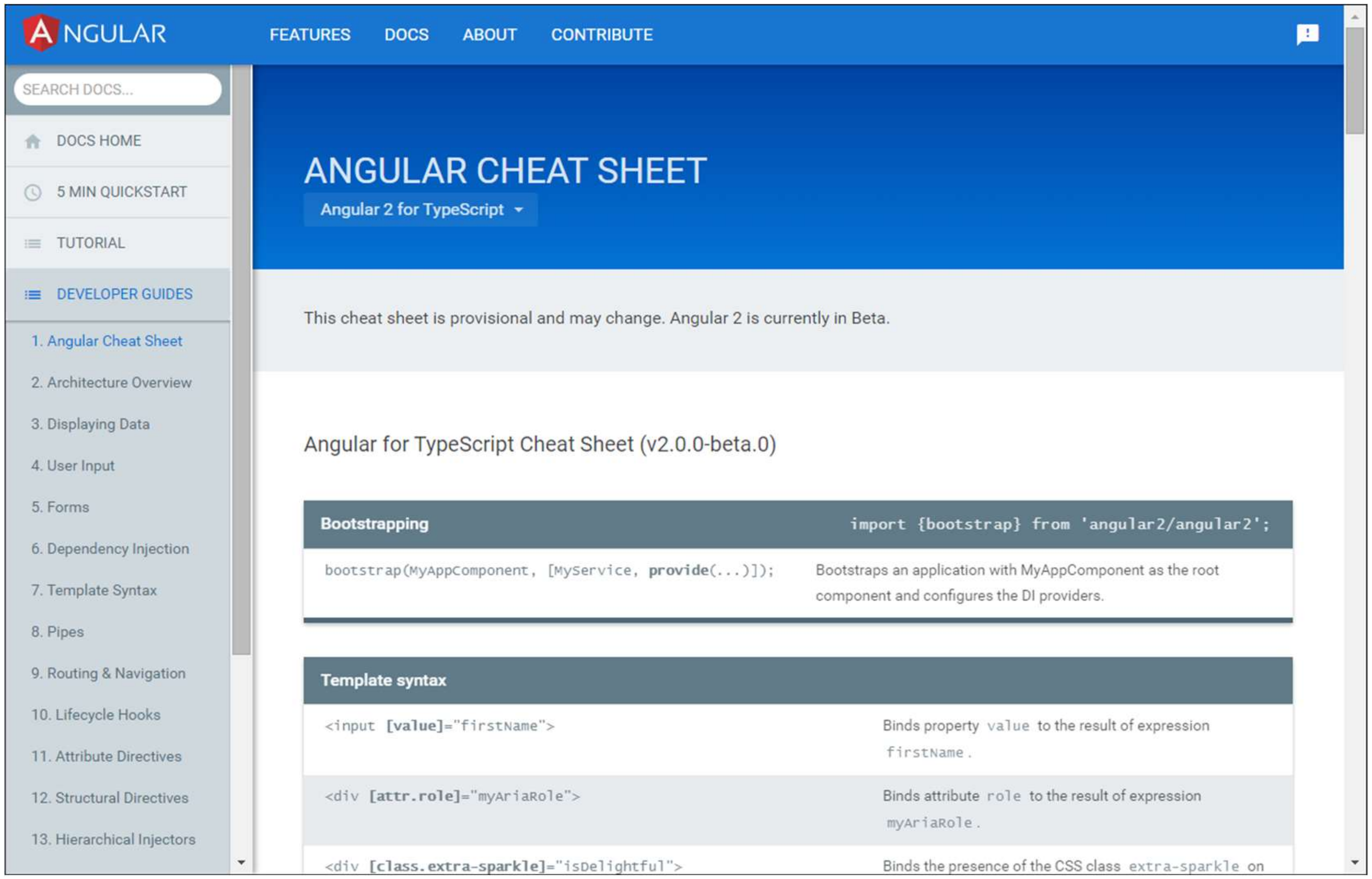
Workshop….



Declarative syntax

- Four (4) kinds of databinding
- Angular specific notation in HTML templates
  1. Simple data binding with {{ … }}
  2. Event binding with (…)
  3. One-way data binding (Attribute binding) with […]
  4. Two-way data binding with [(ngModel)]="…"

Binding cheat sheet



ANGULAR CHEAT SHEET

This cheat sheet is provisional and may change. Angular 2 is currently in Beta.

Angular for TypeScript Cheat Sheet (v2.0.0-beta.0)

Bootstrapping	`import {bootstrap} from 'angular2/angular2';`
`bootstrap(MyAppComponent, [MyService, provide(...)]);`	Bootstraps an application with MyAppComponent as the root component and configures the DI providers.

Template syntax	
`<input [value]="firstName">`	Binds property `value` to the result of expression `firstName`.
`<div [attr.role]="myAriaRole">`	Binds attribute `role` to the result of expression `myAriaRole`.
`<div [class.extra-sparkle]="isDelightful">`	Binds the presence of the CSS class `extra-sparkle` on

https://angular.io/docs/ts/latest/guide/cheatsheet.html

Checkpoint

- Databinding in Angular 2 is new
- Learn the new syntax on DOM- and Attribute binding. Also learn event binding en two-way binding.
- Optional: host binding with `@HostListener()`
- Always edit the class and corresponding View
- A lot of concepts are the same, the way to achieve results are completely new in Angular 2, compared to Angular 1.