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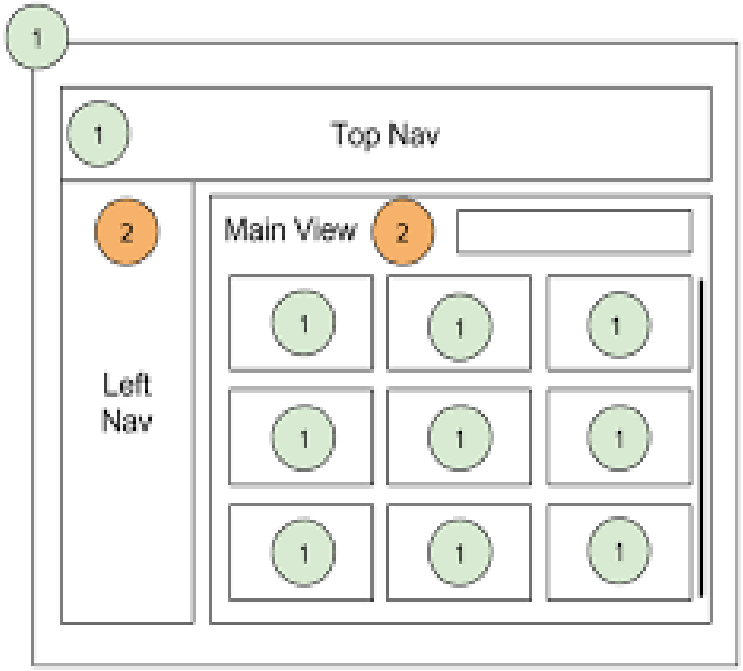
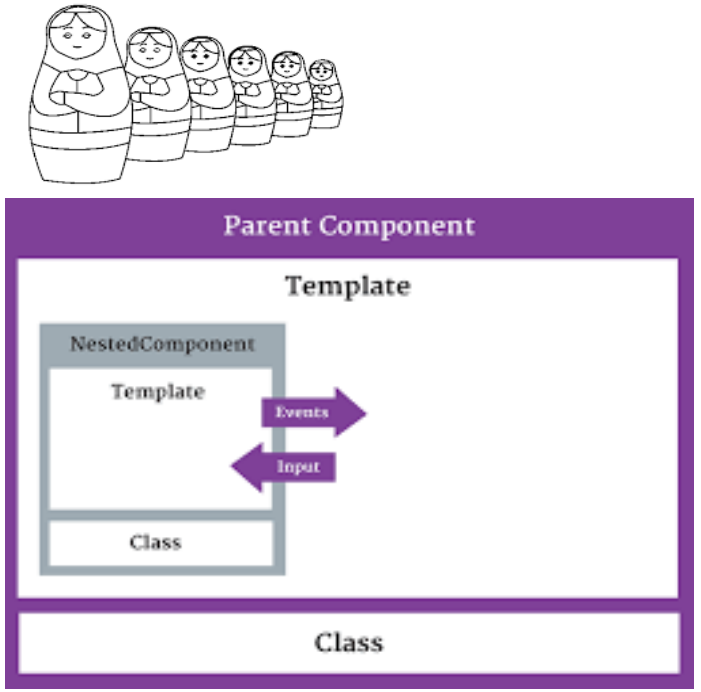
Angular 14 - 08

Nested Components and inter-component communication

Structure and operation

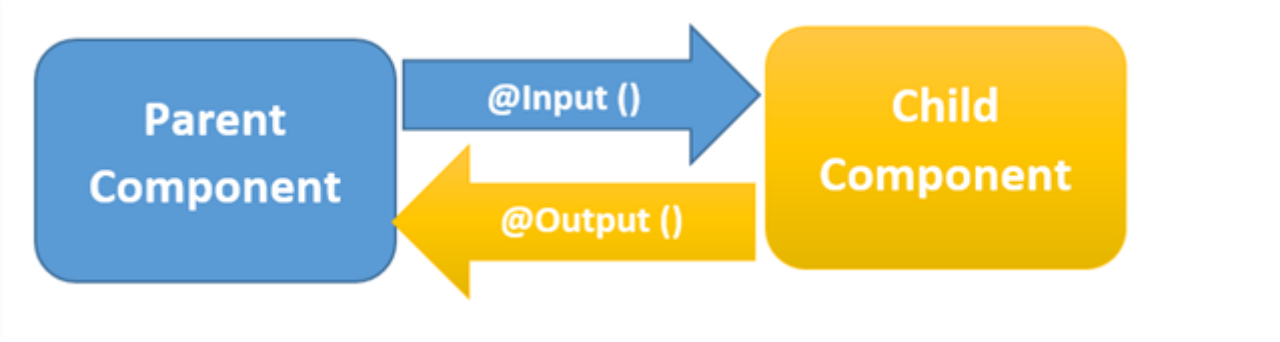




In Angular, components work like matryoshkas (Russian dolls): they use the container/content model.

Recommended situations

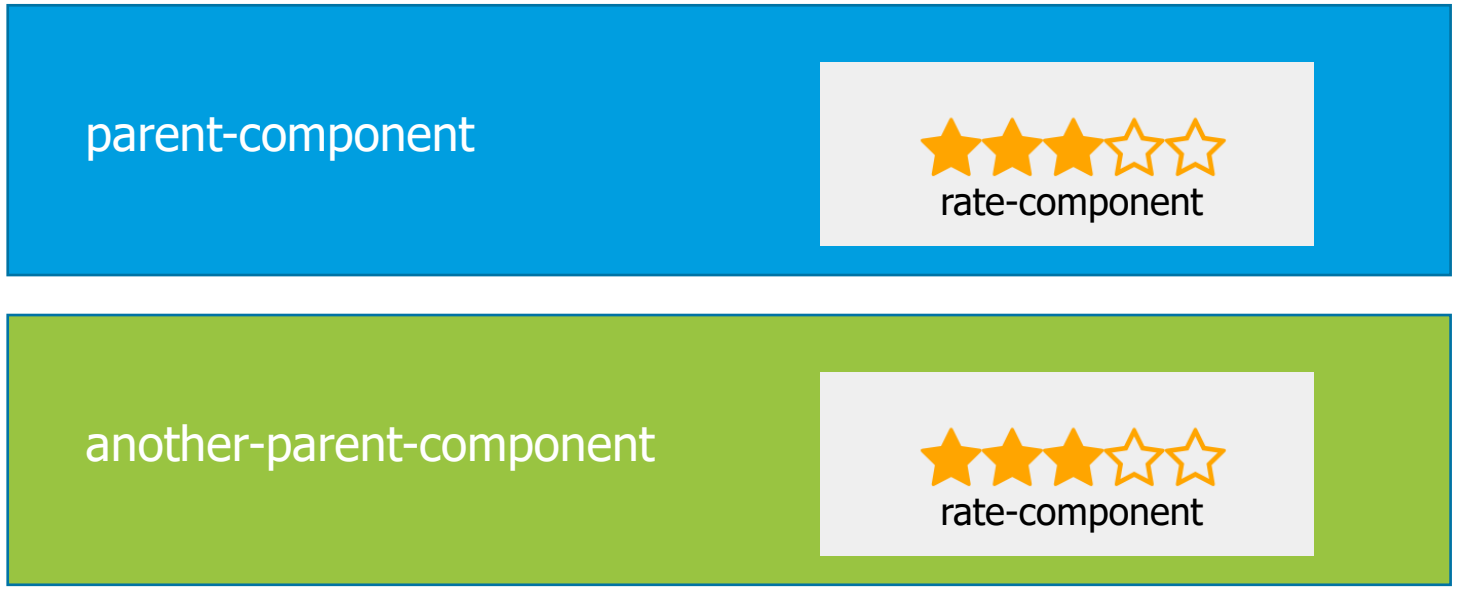
- It is recommended to declare a component as nested (nestable) in the following cases:
  - Your template only handles a fragment of a larger view.
  - It has a selector, so it can be used as a directive.
  - Optionally, it communicates with its container.
  - Nested components communicate with the outside using the **@input** and **@output** decorators.



Structure and operations

- For example, if we want to build a component to rate products with stars:
  - The rating component will have to receive an input parameter (the number) and transform that number into the corresponding stars.
  - In turn, we want that when the user clicks on the component, an event is emitted that notifies the possible changes.

- If we do it as another nested component, the component can be reused in various parts of the application.



The child component

- The HTML template would look something like this:

```
<div class="stars" [title]="rating">
    <div>
        <span [class]="rating>=1?'fill':''" (click)="starC1ick(1)"><i class="bi bi-star"></i></span>
        <span [class]="rating>=2?'fill':''" (click)="starC1ick(2)"><i class="bi bi-star"></i></span>
        <span [class]="rating>=3?'fill':''" (click)="starC1ick(3)"><i class="bi bi-star"></i></span>
        <span [class]="rating>=4?'fill':''" (click)="starC1ick(4)"><i class="bi bi-star"></i></span>
        <span [class]="rating>=5?'fill':''" (click)="starC1ick(5)"><i class="bi bi-star"></i></span>
    </div>

</div>
```

- Note that here we use bootstrap and boostrap icons

🔗 **Install bootstrap**

```
npm i bootstrap
npm i bootstrap-icons
```

🔗 **add to scss**

```
@import "~bootstrap/scss/bootstrap";
@import "~bootstrap-icons/font/bootstrap-icons";
...
```

The child component

- The content of the nested component will be similar to the previous ones, with the references to the UI files, plus their definitions.
- The component additionally needs to reference the **OnChanges** event mechanism , to respond to component changes.
    - We have to **import OnChanges** (for detection of changes in values input)
    - **Implement the ngOnChanges** method that takes care of the value.numeric => width.visual conversion .

```
import { Component, OnChanges} from '@angular/core';

@Component({
  selector: 'app-stars',
  templateUrl: './stars.component.html',
  styleUrls: ['./stars.component.scss'],
})
export class StarsComponent implements OnChanges {

  rating: number = 3;
  startC1ick = (rate:number) => {
    console.log('star clicked...',rate);
  };
  ngOnChanges(): void {
    console.log('ngOnChanges:');

  }
}
```

The parent component

- In turn, the outer template should use the nested component's selector:

```
<tr *ngFor="let product of products">
    <td>{{product.name}}</td>
    <td>{{product.code | lowercase}}</td>
    <td>
        <img *ngIf="show_imgs" [src]="'./assets/imgs/'+product.image"
                [title]="product.name | uppercase" [style.maxWidth.px]="img_width"
            [style.maxHeight.px]="img_height" />
    </td>
    <td>{{product.date}}</td>
    <td>{{product.price | currency:'USD':true:'1.2-2'}}</td>
    <td>
        <app-stars [rating]="product.stars"></app-stars>
    </td>
</tr>
```

- With this, we should see the rating converted to stars, but the component does not receive data or emit to the outside.
    - In order for the component to talk to the outside, we need to mark the properties (or events) of the component with **Communication Decorators**.

Communication decorator: @Input

- Communication Decorators allow us to mark properties with metadata that allow exposing their content to the outside and/or define which properties are considered input values for the component.
- To do this we decorate the elements whose value is received from the outside using the **@Input** decorator

```
@Component()
export class StarsComponent implements OnChanges {

  @Input() rating: number = 3;
  ...
}
```

- Once this is done, we can pass data to that element using "property binding" in the container template.

```
...
                    <app-stars [rating]="product.stars"></app-stars>
...
```

- That way the value of the rating is received by the nested component in its "rating" property.

Communication decorator: @Output

- If we want the nested component to communicate information to the outside, we must use the **@Output** decorator.
  - The way to declare this situation in the component is by defining an event, represented by the **EventEmitter** class.
  - EventEmitter allows the use of generics, so we can define it using that syntax and indicate the type of data we want to pass to the container.
  - In this case, it is enough for us to communicate it to the outside through a chain that informs the UI which element has been selected (clicked), so that it responds as appropriate.
  - In the code we will add the definition of the event in this way:

```
...
@Output() star_clicked: EventEmitter<number> = new EventEmitter<number>();
...
```

Communication decorators (@Input, @Output)

- Additionally, we will need to import the Output and EventEmitter definitions into the nested component.
- Finally, we will add the onClick event to indicate the behavior we want at runtime.

```
import {
  ...
  EventEmitter,
  Output
} from '@angular/core';
...
@Output() star_clicked: EventEmitter<number> = new EventEmitter<number>();

  starC1ick = (rate: number) => {
    console.log('star clicked...', rate);
    this.star_clicked.emit(rate);
  };

...
```

Reception of events in the parent

- In the outer user interface (the listing), we will refer to this (inner) event, by:

```
<app-stars [rating]="product.stars" (star_clicked)="onRatingClicked($event,product.code)"></app-stars>
```

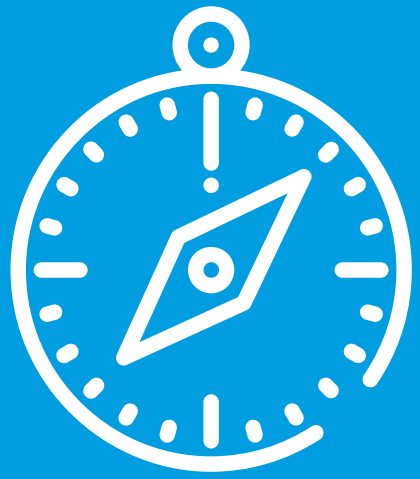
- And in its content, onRatingClicked will also be defined:

```
  ...
  onRatingClicked=(new_rating:number,code:string)=>{
    console.log('onRatingClicked:',new_rating, code);
    // process the input
  }
...
```

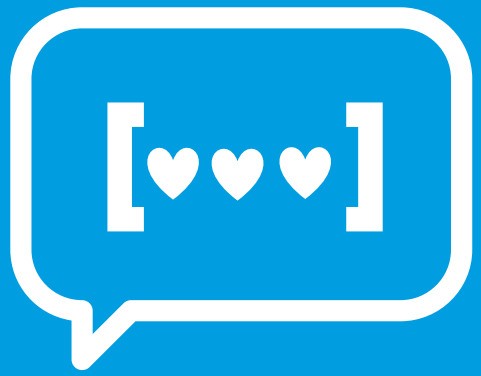
Let's put it into practice: Tasks/Projects App

Add a nested component to each row of the task list (a button).

This component should display a button. When clicked it will delete the corresponding task.



Next steps



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