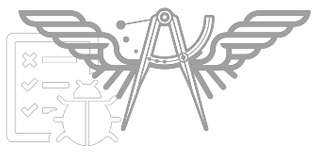
สยามชำนาญกิจ
SIAM CHAMNAN KIT

Getting start with Angular 7



Somkiat Puisungnoen

Somkiat | Home

Somkiat Puisungnoen

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When did you work at Opendream?

22 Pending Items

Intro

Software Craftsmanship

Software Practitioner at สยามชำนาญกิจ พ.ศ. 2556

Agile Practitioner and Technical at SPRINT3r

Post | Photo/Video | Live Video | Life Event

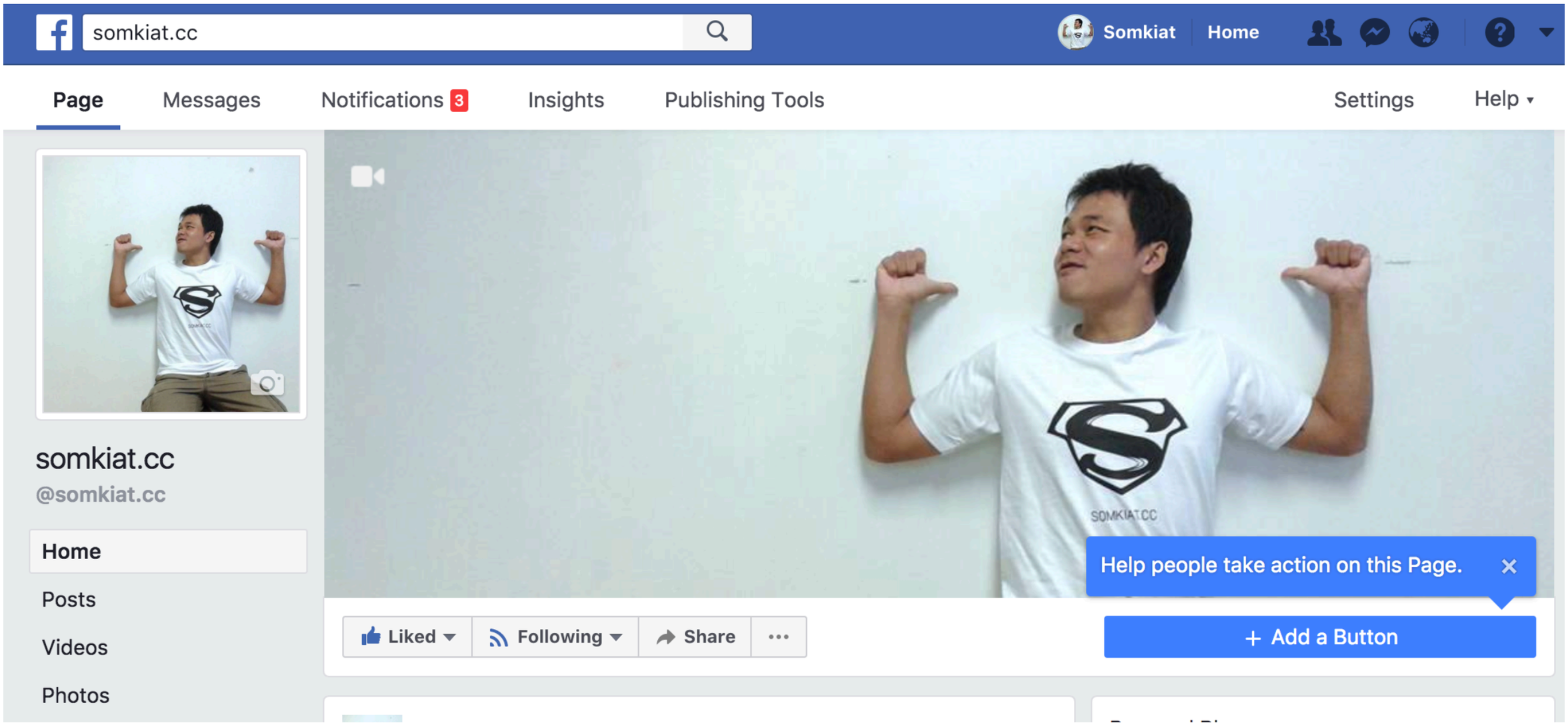
What's on your mind?

Public | Post

Somkiat Puisungnoen

15 mins · Bangkok ·

Java and Bigdata



Agenda

- Introduction to Angular 7
- Installation and configuration
- Structure of Angular project
- Introduction to TypeScript
- Design and develop component/service
- Routing management
- Working with RESTful APIs

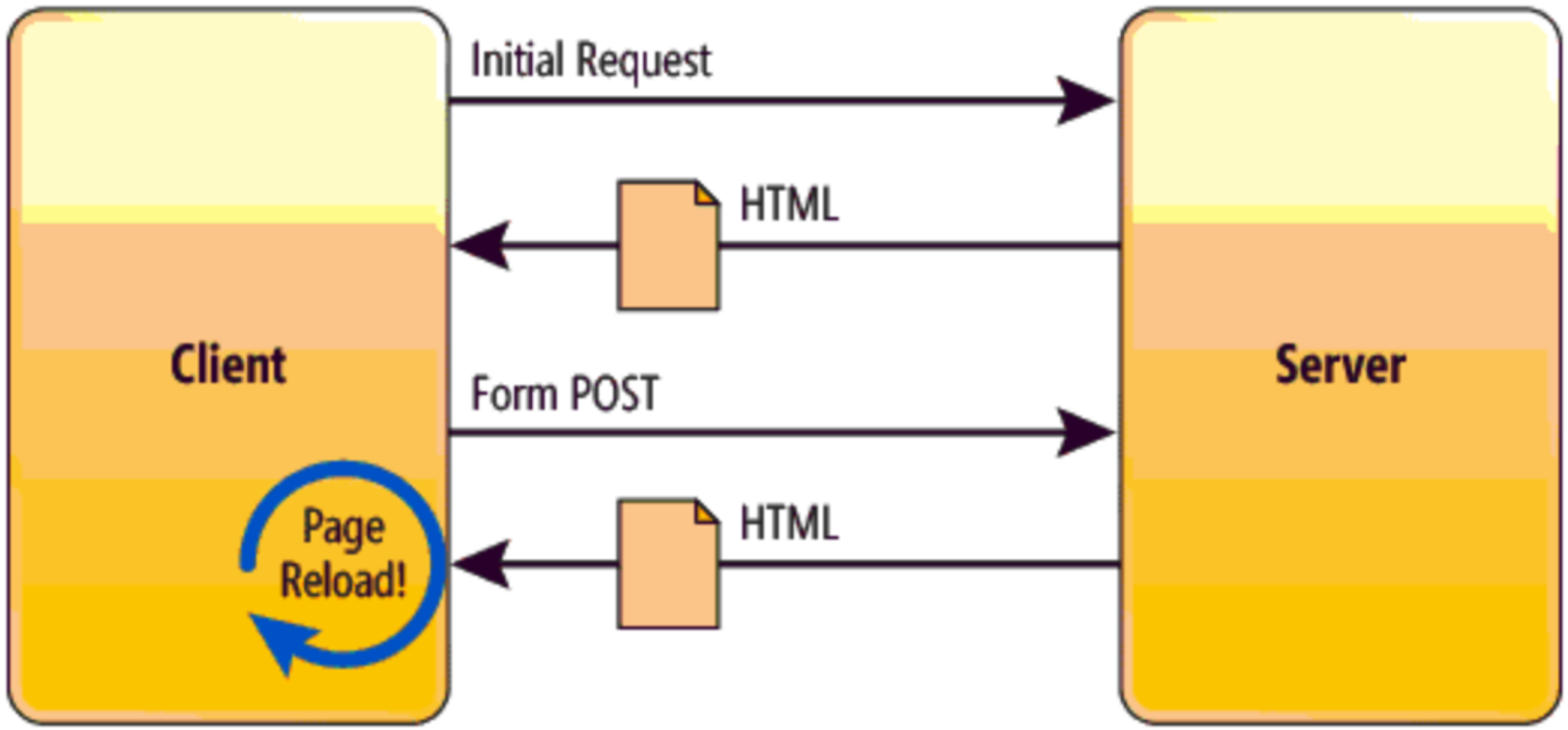
Angular 7

What is Angular ?

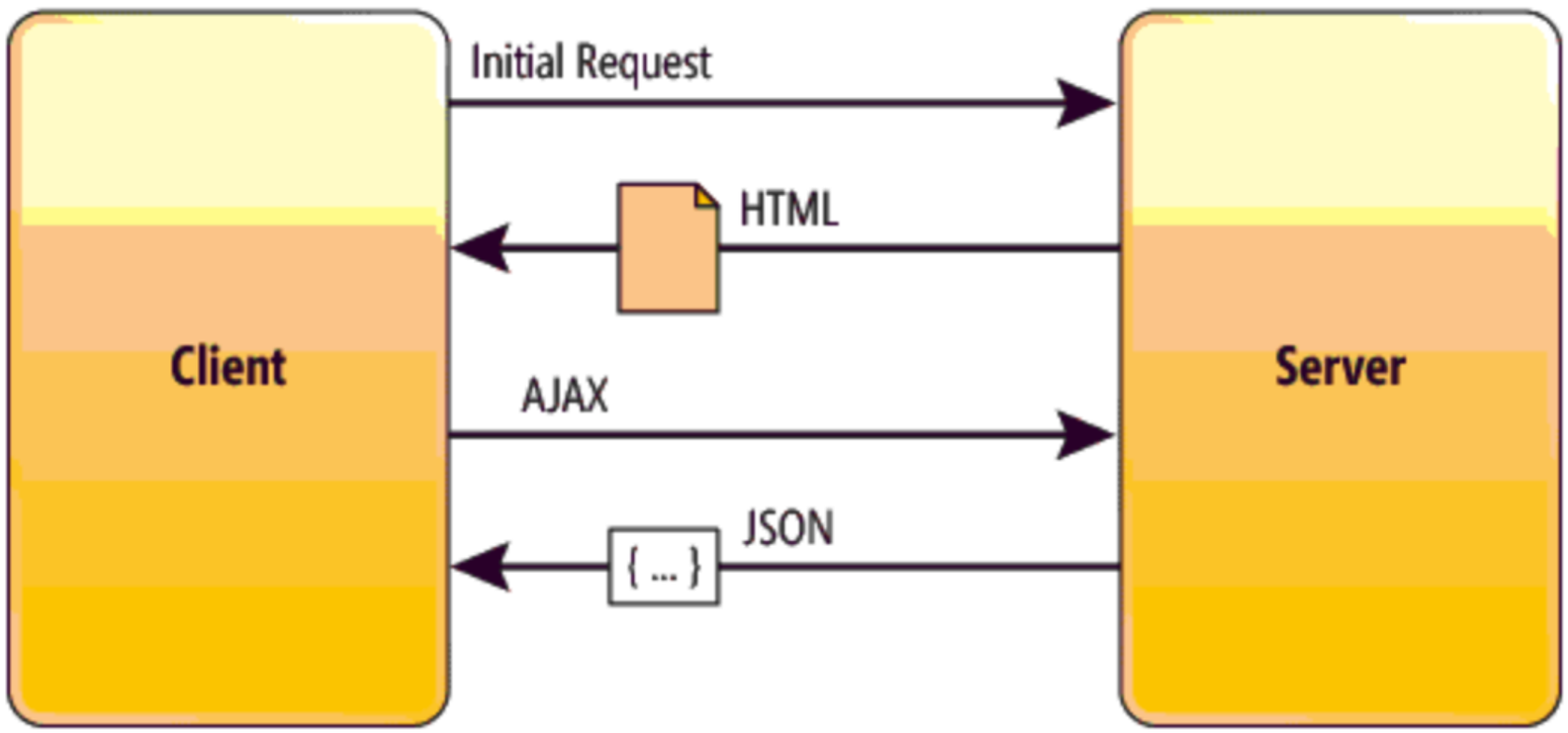
JavaScript framework with allows us to create reactive **Single Page Application** (SPA)

https://angular.io/

Traditional

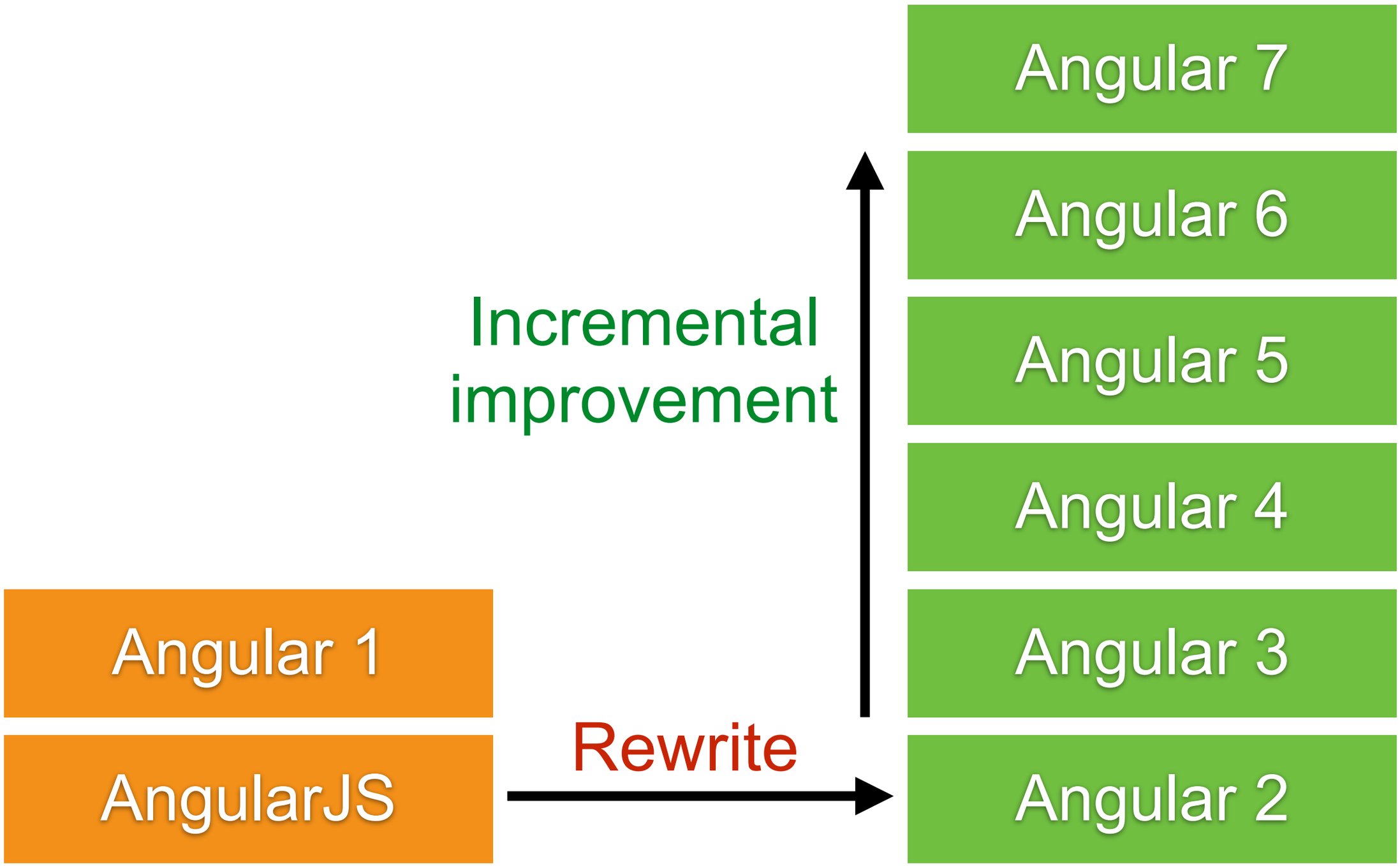


Single Page Application



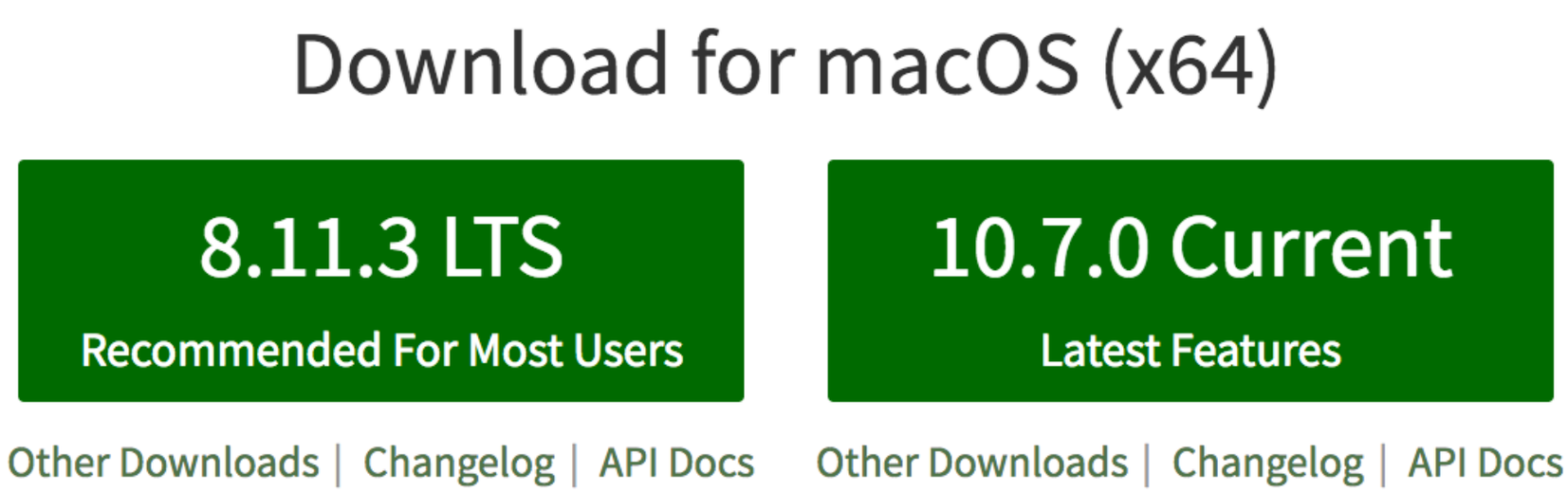
Angular 7

Angular 7



Software requirement

Install NodeJS



https://nodejs.org/en/

Angular CLI

A tool to initialise, develop, scaffold and maintain Angular application

```
>  npm install -g @angular/cli
>  ng new my-dream-app
>  cd my-dream-app
>  ng serve
```

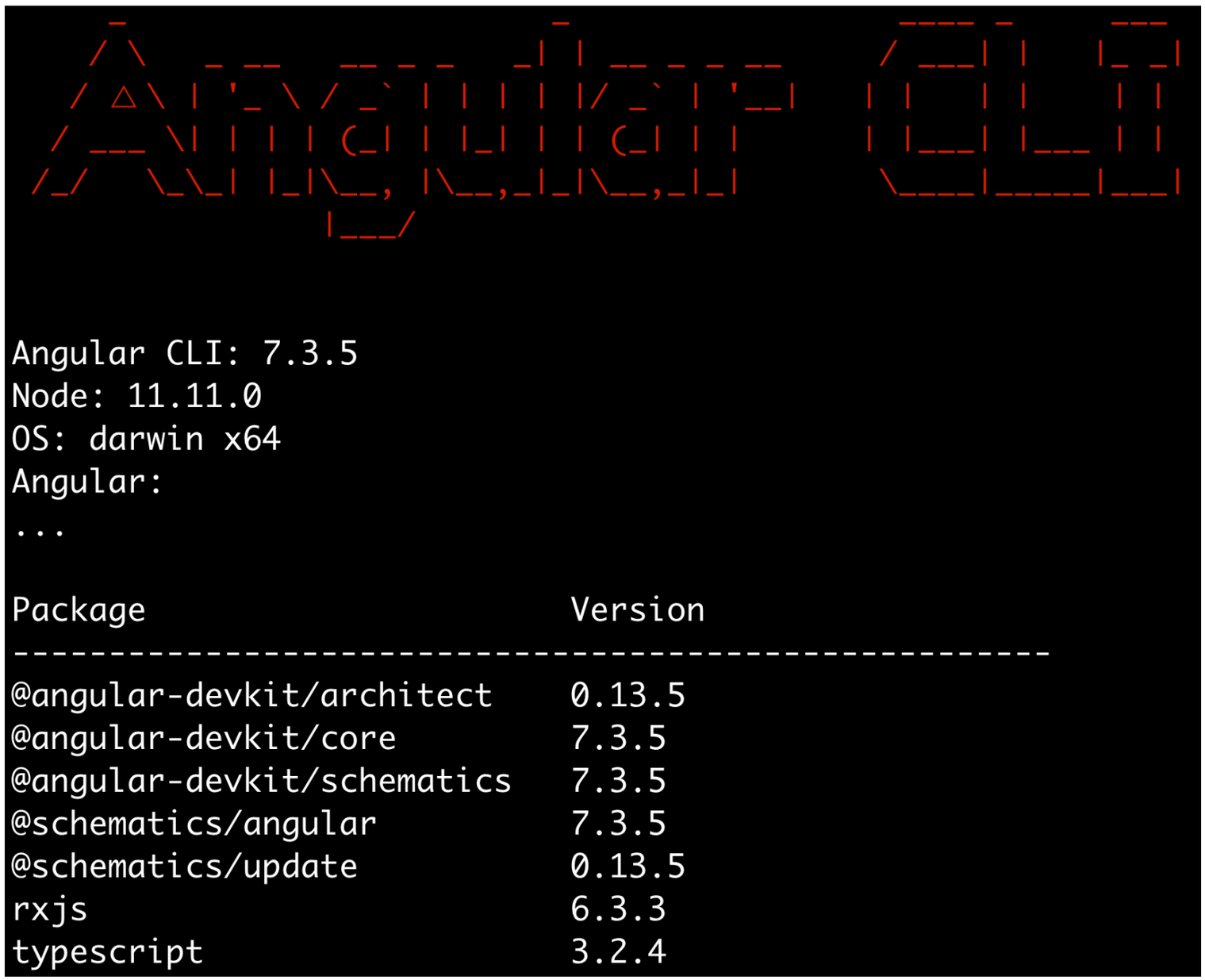
https://cli.angular.io/

Install Angular CLI

$npm install -g @angular/cli@latest

Try after installed

$ng version



Try to create first project

$ng new hello-app

```
CREATE hello-app/README.md (1025 bytes)
CREATE hello-app/angular.json (3575 bytes)
CREATE hello-app/package.json (1313 bytes)
CREATE hello-app/tsconfig.json (384 bytes)
CREATE hello-app/tslint.json (2805 bytes)
CREATE hello-app/.editorconfig (245 bytes)
CREATE hello-app/.gitignore (503 bytes)
CREATE hello-app/src/environments/environment.prod.ts (51 bytes)
CREATE hello-app/src/environments/environment.ts (631 bytes)
CREATE hello-app/src/favicon.ico (5430 bytes)
CREATE hello-app/src/index.html (295 bytes)
```

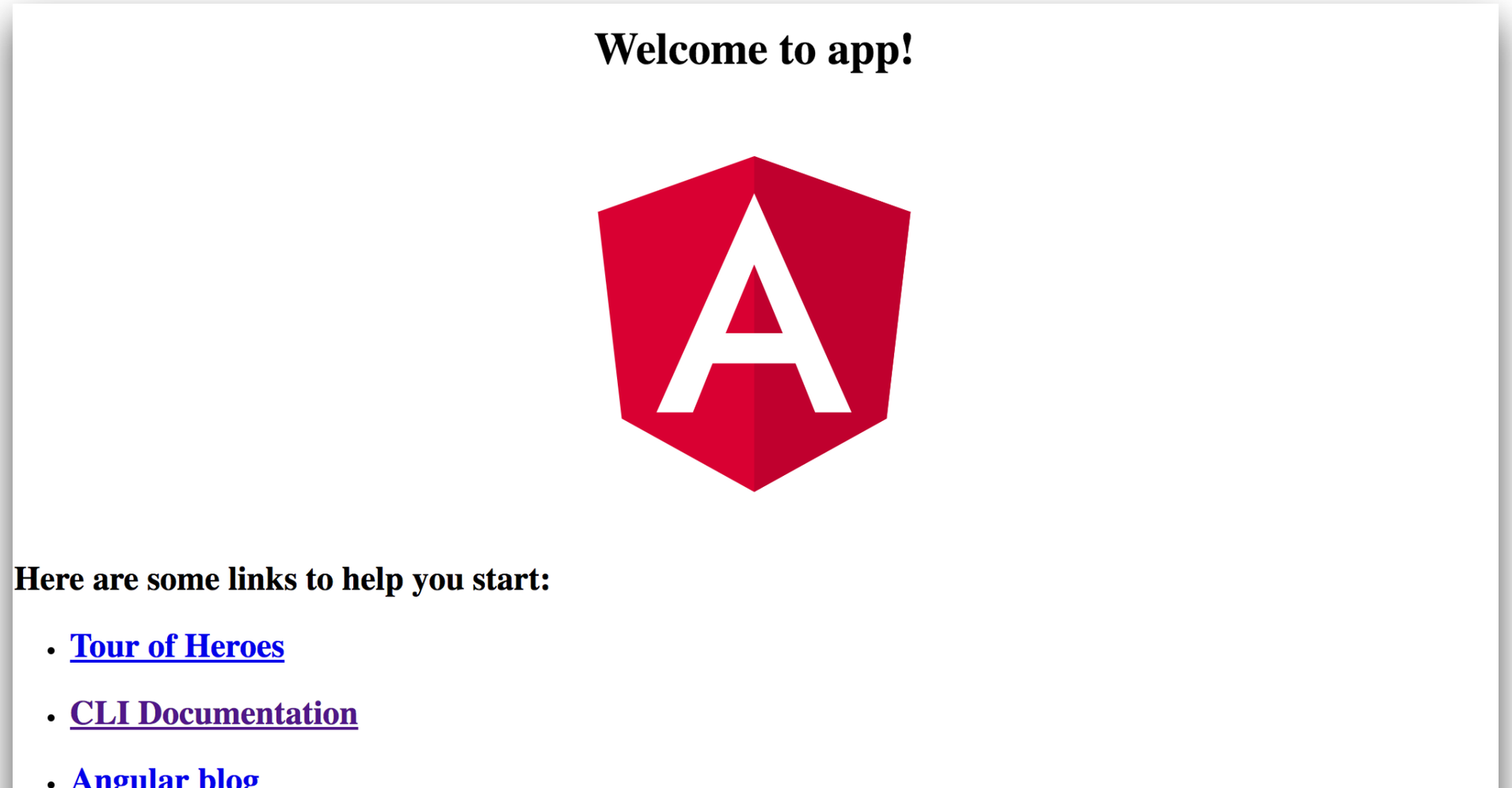
Run your app

$cd hello-app
$ng serve

```
** Angular Live Development Server is listening on localhost:4200, open your bro

Date: 2018-07-19T17:42:59.617Z
Hash: cf107798cf25722bc556
Time: 22285ms
chunk {main} main.js, main.js.map (main) 10.7 kB [initial] [rendered]
chunk {polyfills} polyfills.js, polyfills.js.map (polyfills) 227 kB [initial] [r
chunk {runtime} runtime.js, runtime.js.map (runtime) 5.22 kB [entry] [rendered]
chunk {styles} styles.js, styles.js.map (styles) 15.6 kB [initial] [rendered]
chunk {vendor} vendor.js, vendor.js.map (vendor) 3.06 MB [initial] [rendered]
i ｢wdm｣: Compiled successfully.
```

Open in browser

http://localhost:4200/



Install Text Editor

What’s new in Angular 7 ?

New in Angular 7

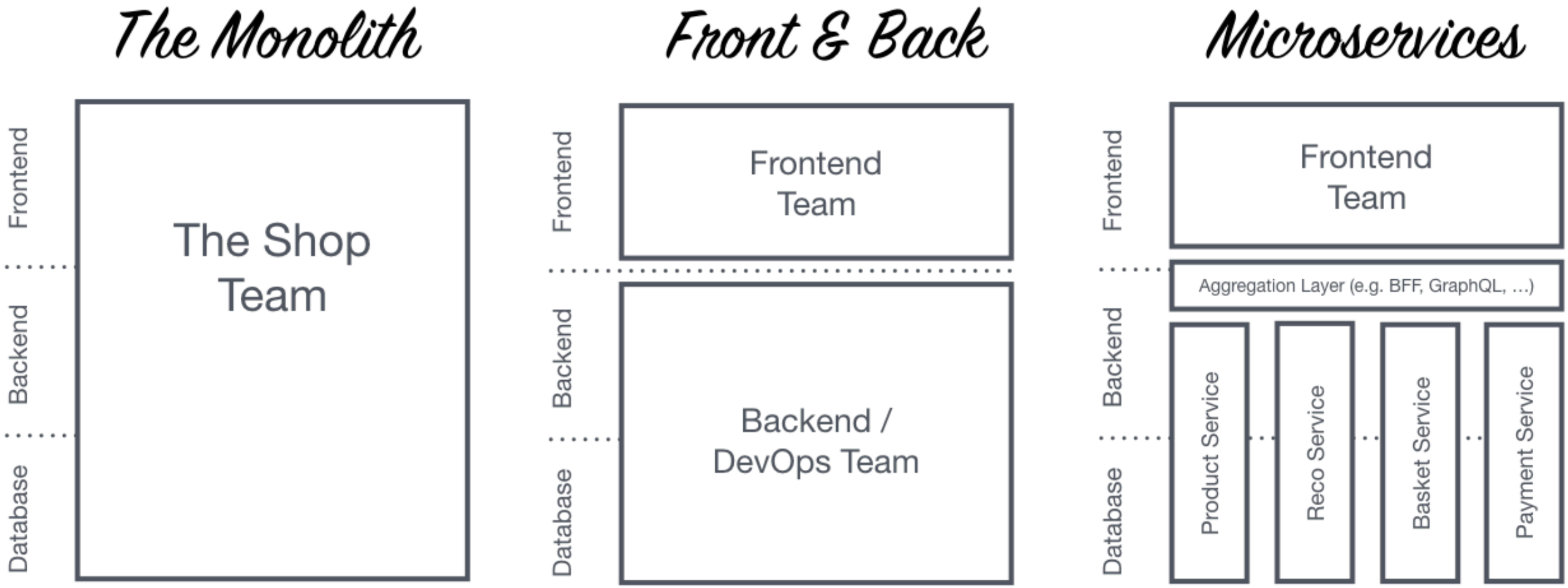
Step in Angular CLI
Bundle Budget features (limit size of app bundle)
Component Dev Kit (CDK)
Support TypeScript 3, RxJs 6.3

Bundle Budget features

Default value of budgets in **angular.json**

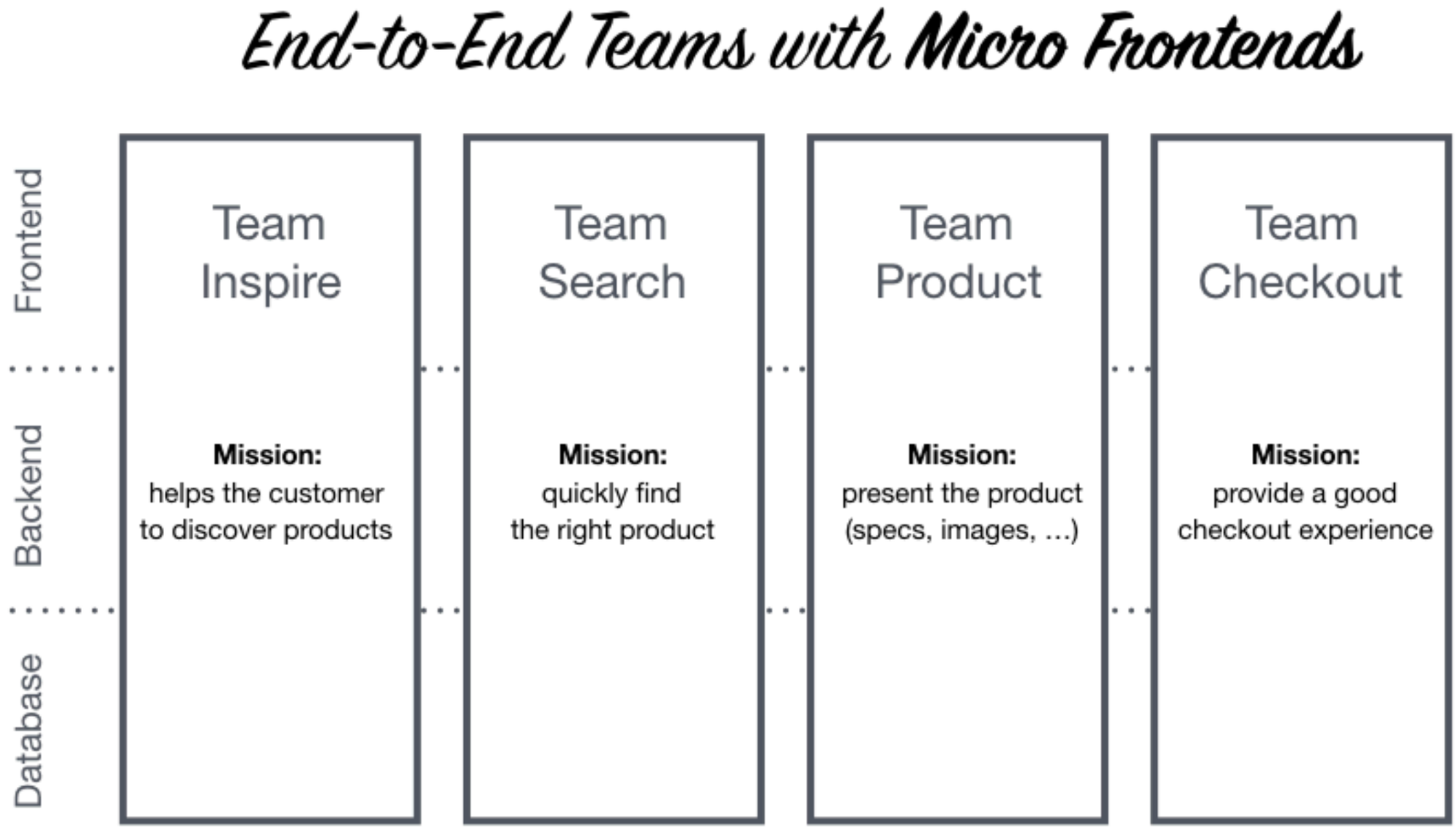
```
"budgets": [
  {
    "type": "initial",
    "maximumWarning": "2mb",
    "maximumError": "5mb"
  }
]
```

Micro Frontend



https://micro-frontends.org/

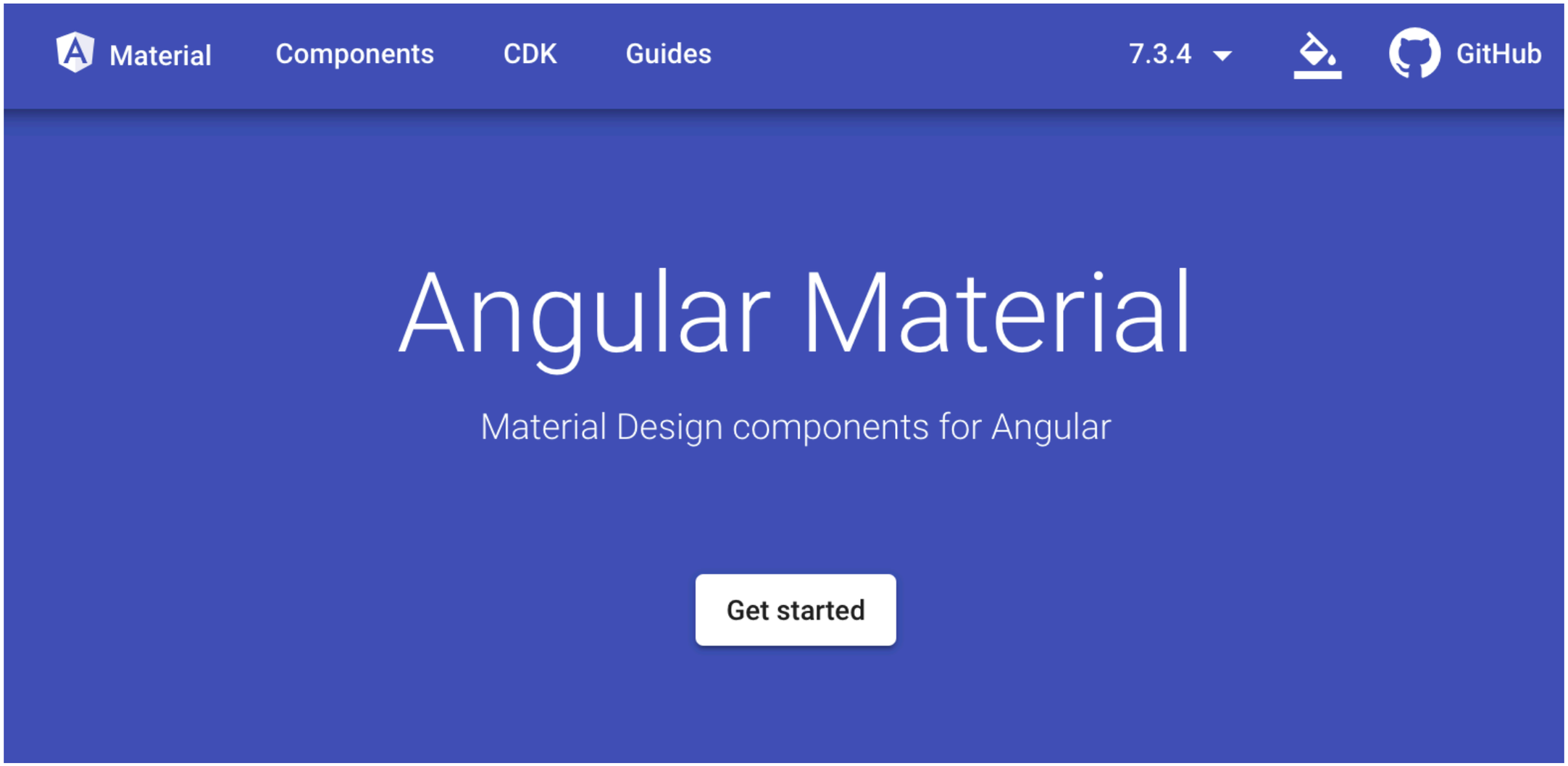
Micro Frontend



https://micro-frontends.org/

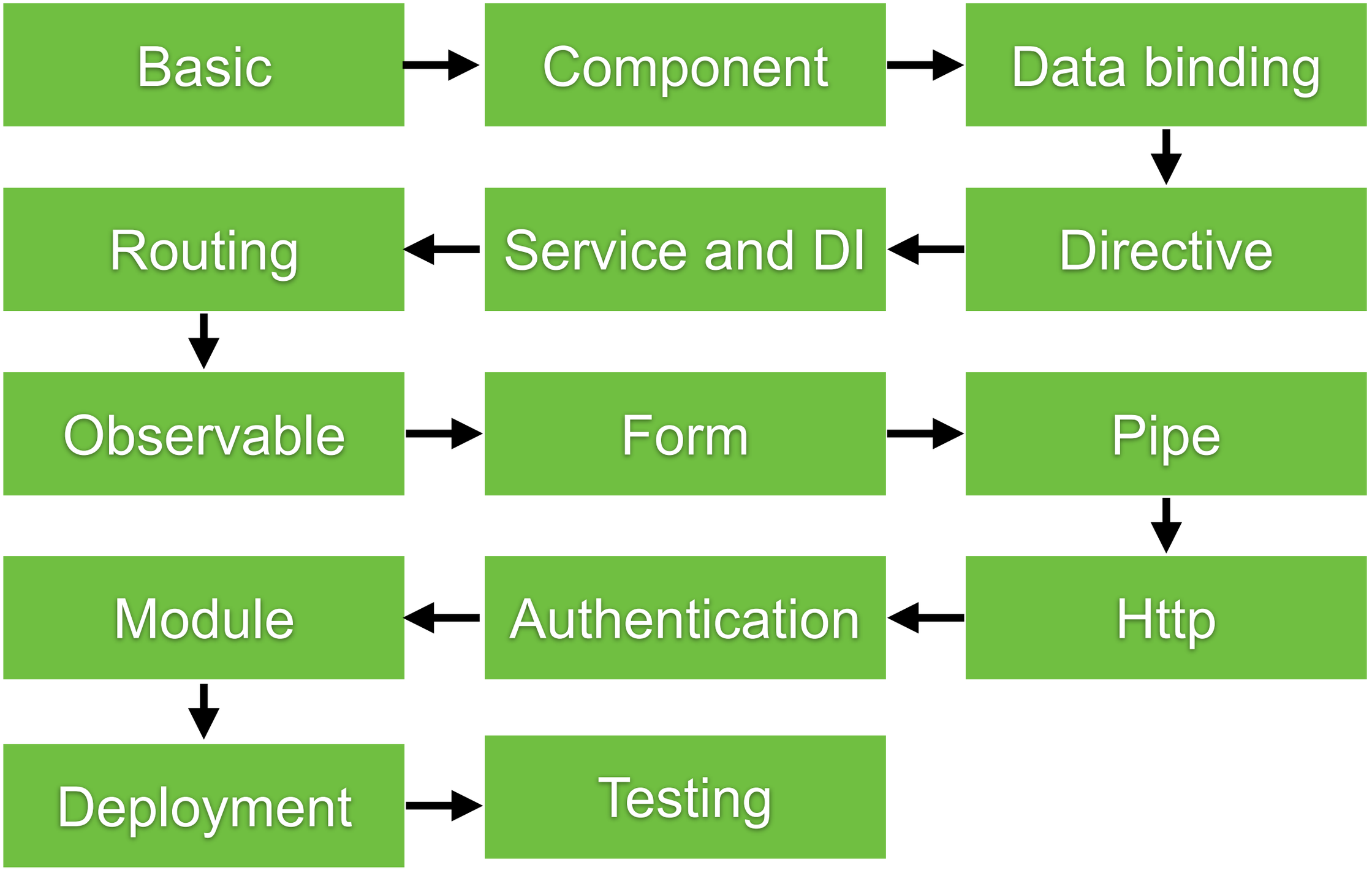
Angular Material Design

https://material.angular.io/



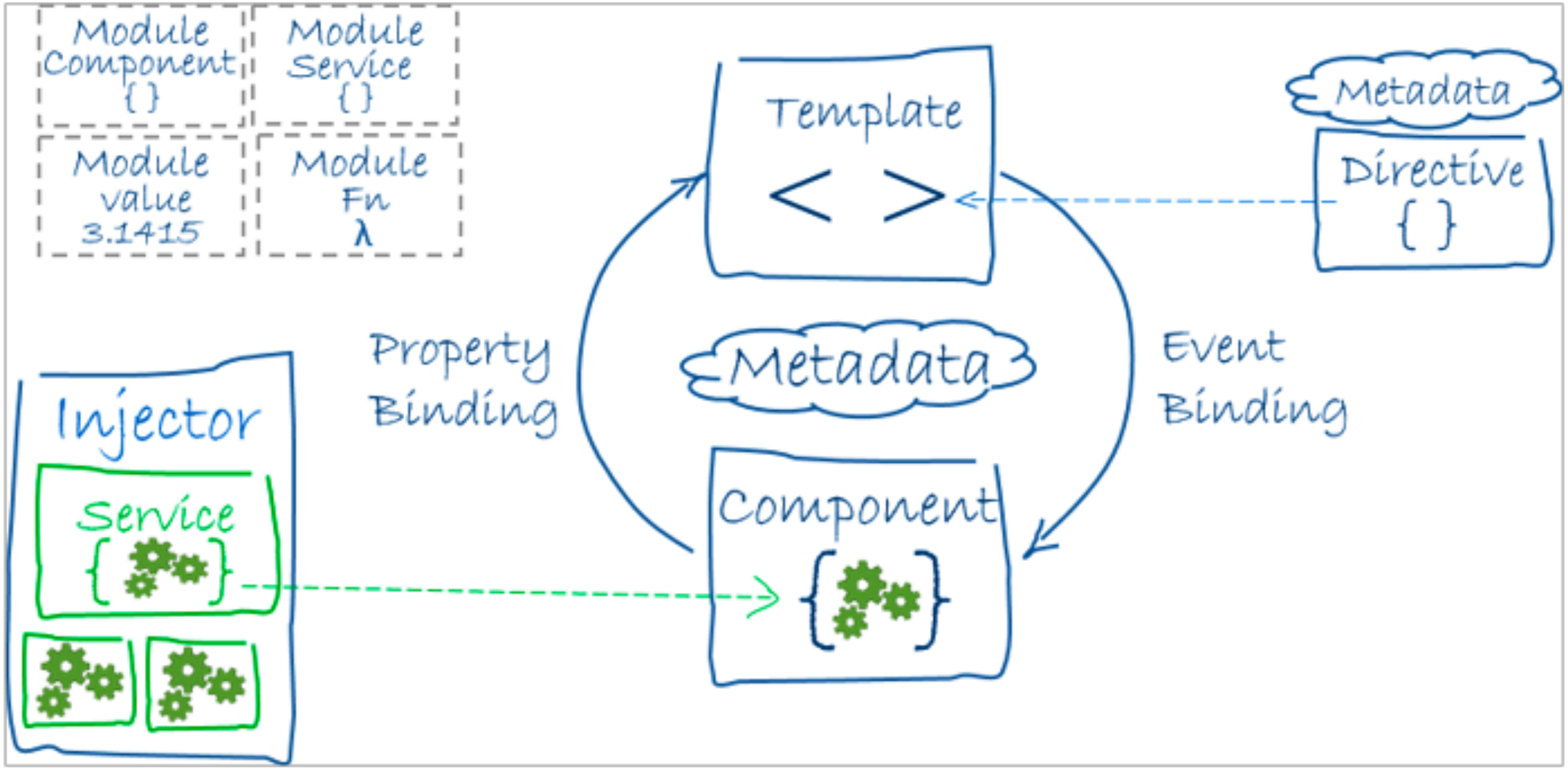
Learning path

Learning path



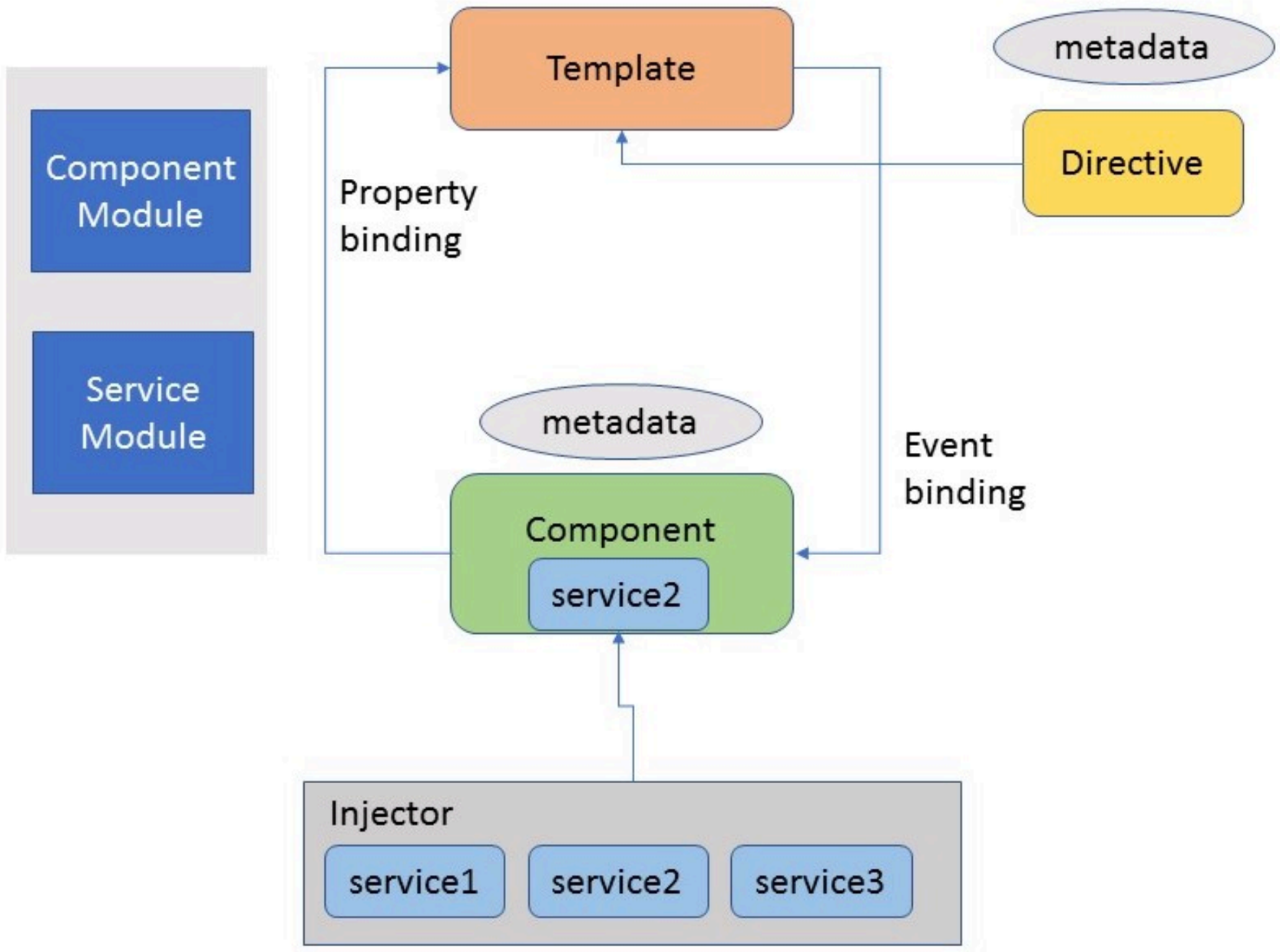
Basic of Angular

Angular Architecture

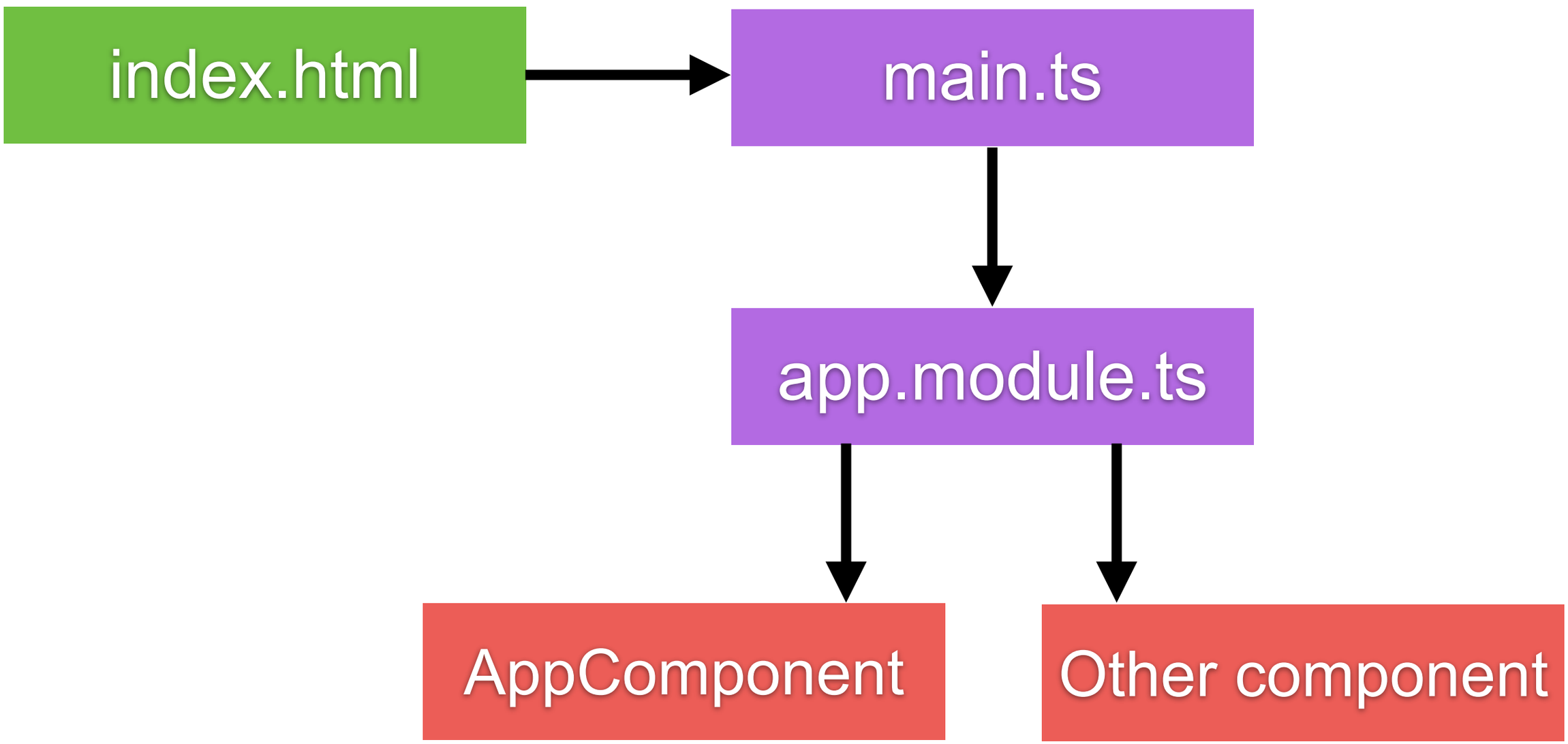


https://angular.io/guide/architecture

Angular Architecture

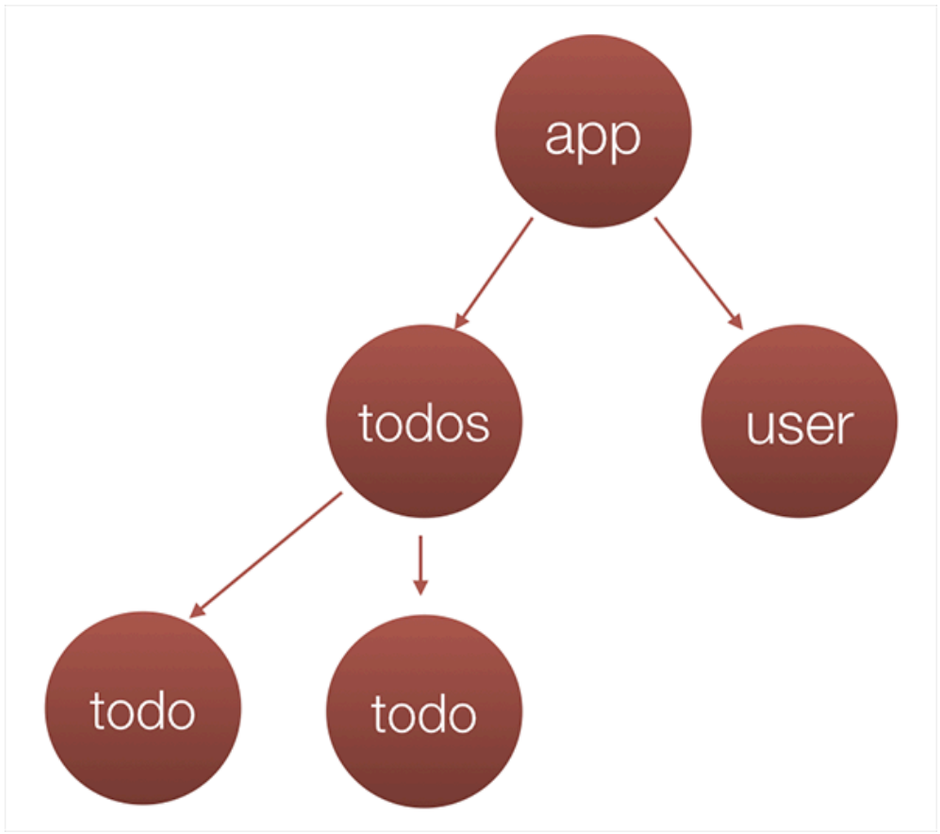


How Angular working ?



Components

Angular application is a tree of **Components**
Top level component is the application itself
Component is rendered by the browser



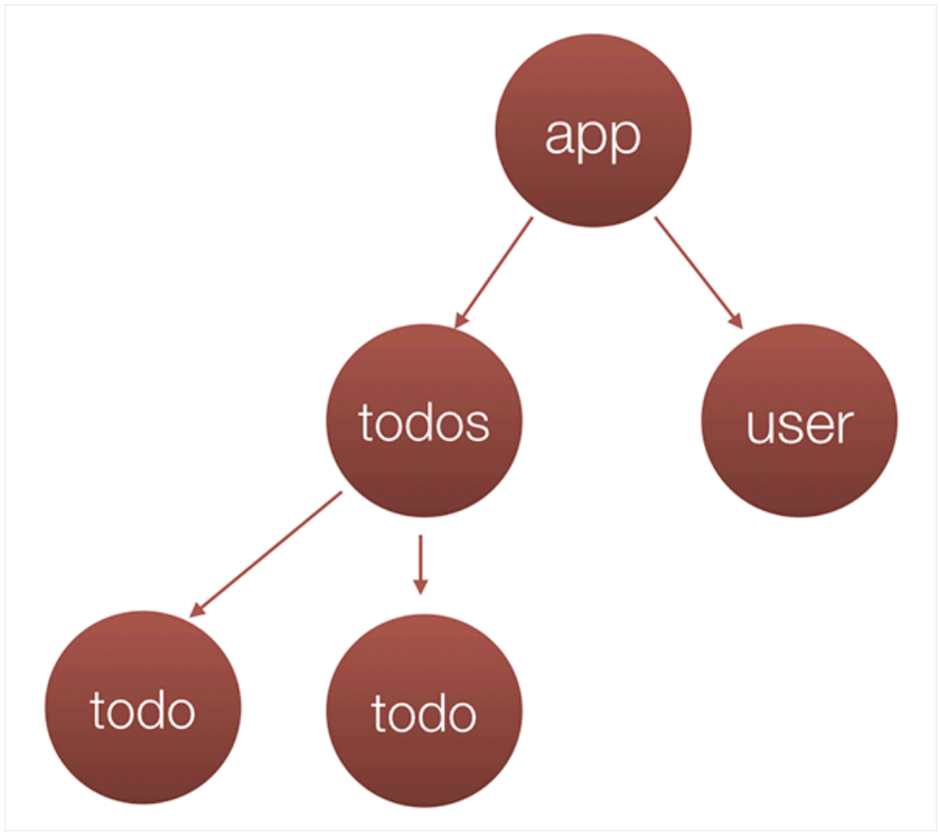
Components

Own template
Own style
Own business logic

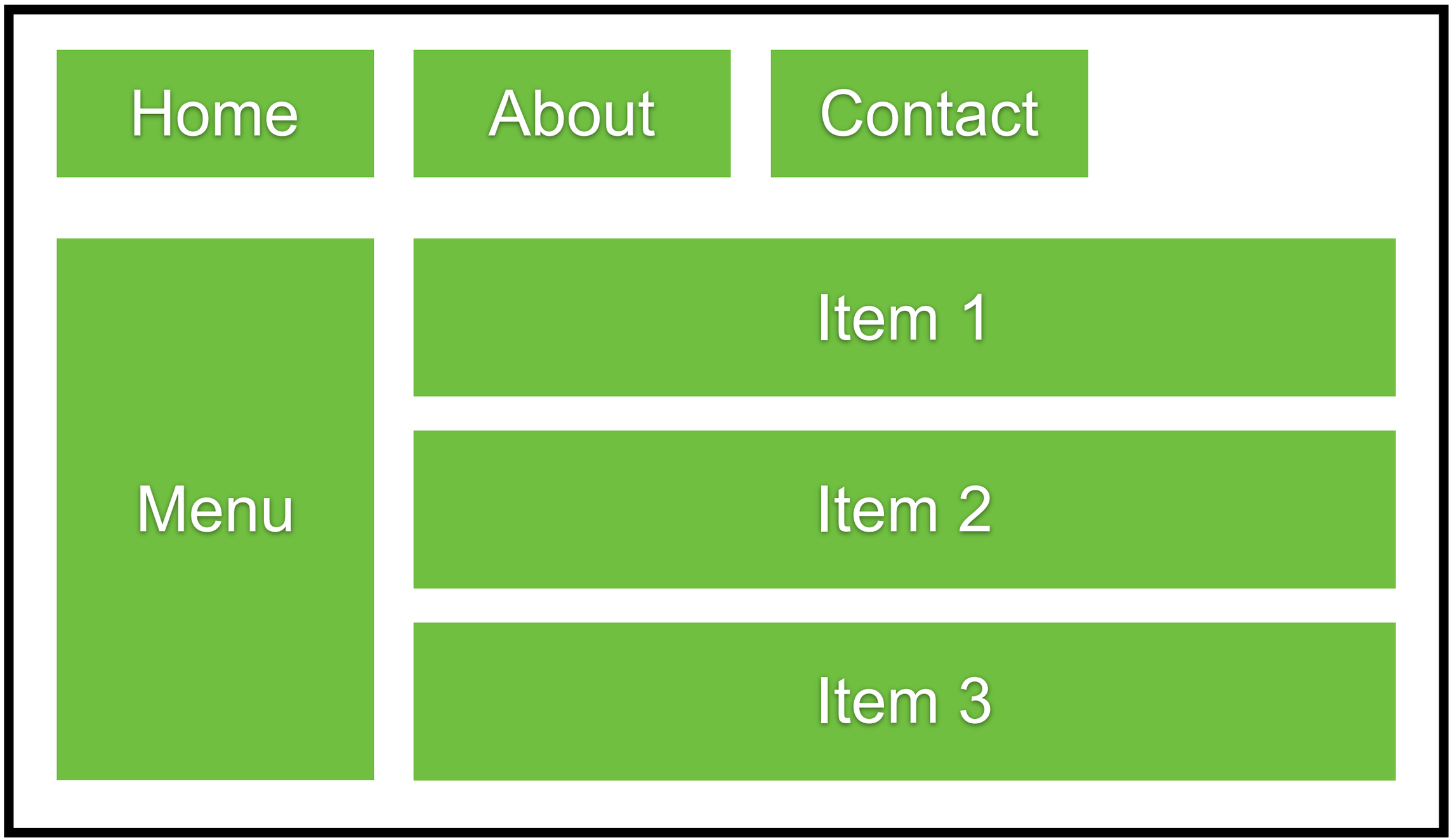
Split complex app to small component !!

Components

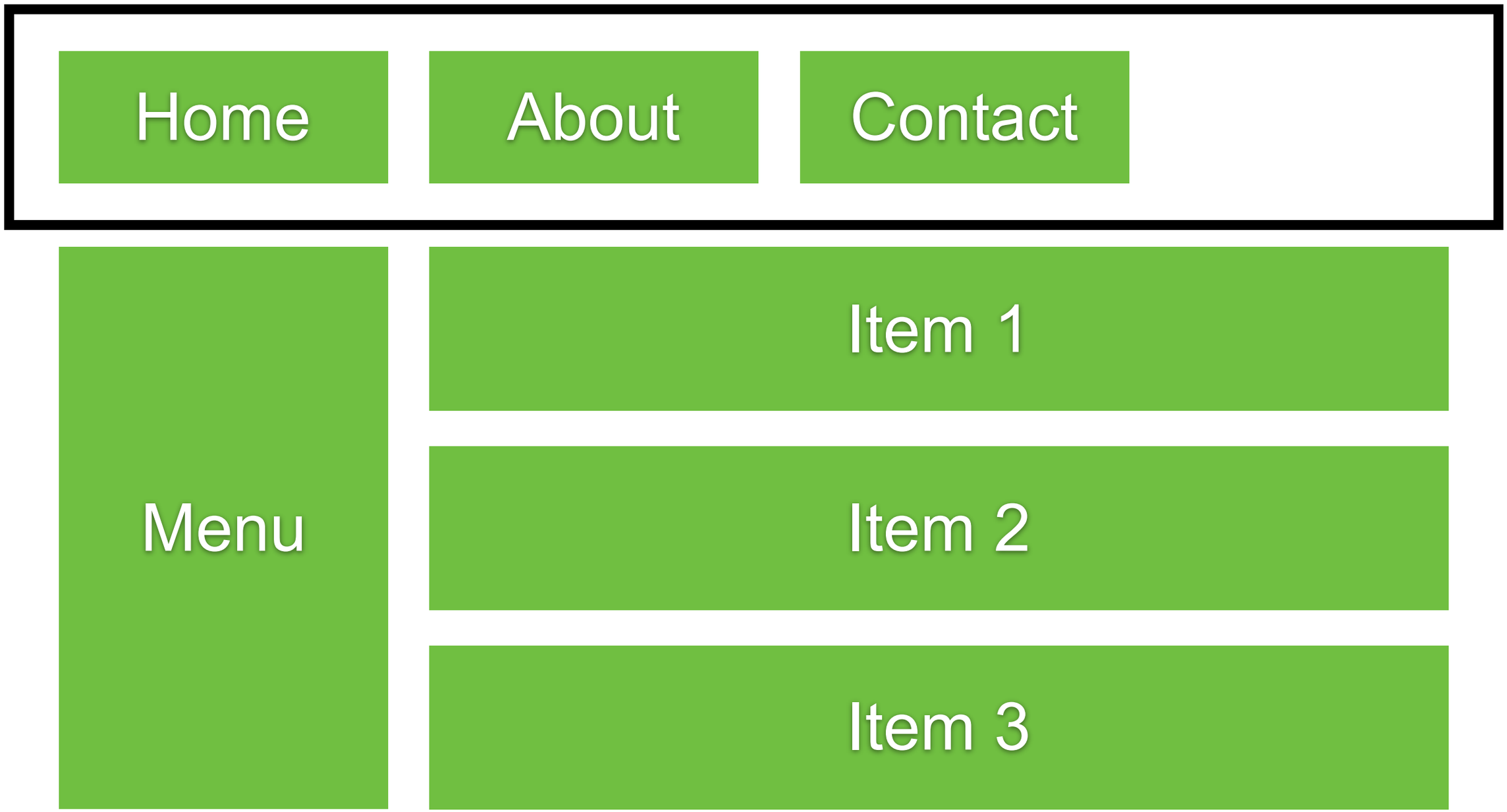
Composable
Reusable
Hierarchical



Design components



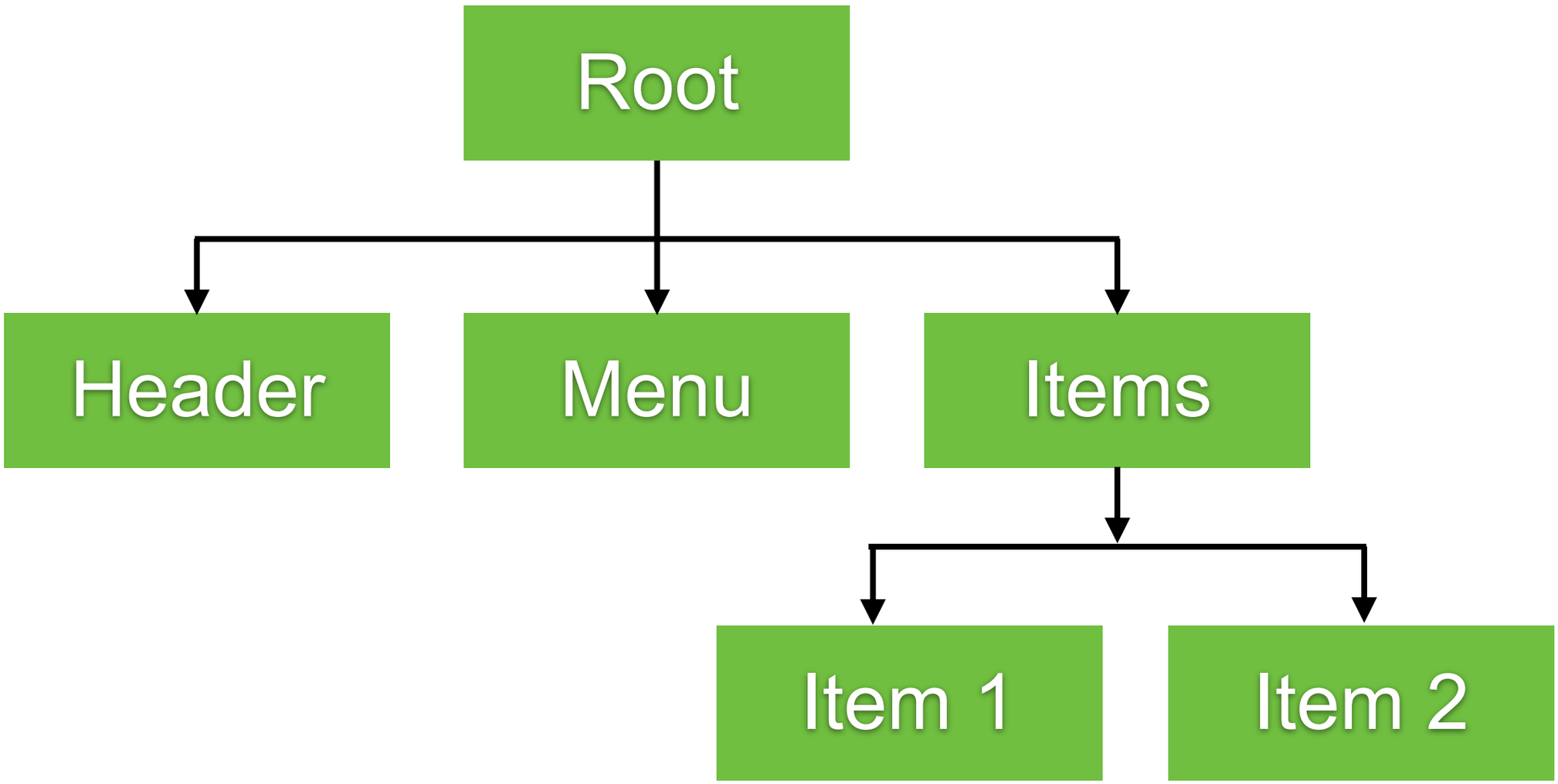
Header component



Sidebar/Menu component

Item component

Design components



Component

Template	Class	Metadata
View layout Create with HTML Binding and directives	Code support view Create with TypeScript Data and logic	Extra data Define decorator @Component

Component

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})

export class AppComponent {
  title = 'demo01';
}
```

Metadata

Template

Template

Building template
Using component as a **directive**
Binding with **Interpolation**
Add logic with directive

Define template in component

Inline template
Link template

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

@Component({
  selector: 'app-root',
  template: `<h1>Welcome to {{ title }}!</h1>`,
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'hello';
}
```

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'hello';
}
```

Metadata

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})

export class AppComponent {
  title = 'demo01';
}
```

Component decorator

Directive name used in HTML

Metadata

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'demo01';
}
```

Component decorator

Directive name used in HTML

View layout , template and style

Component

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
```

```
export class AppComponent {
  title = 'demo01';
}
```

Class

Component

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

Import module/library

```
@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})

export class AppComponent {
  title = 'demo01';
}
```

Import ?

3-party libraries
ES modules
Angular modules

Angular is Modular

@angular/
core

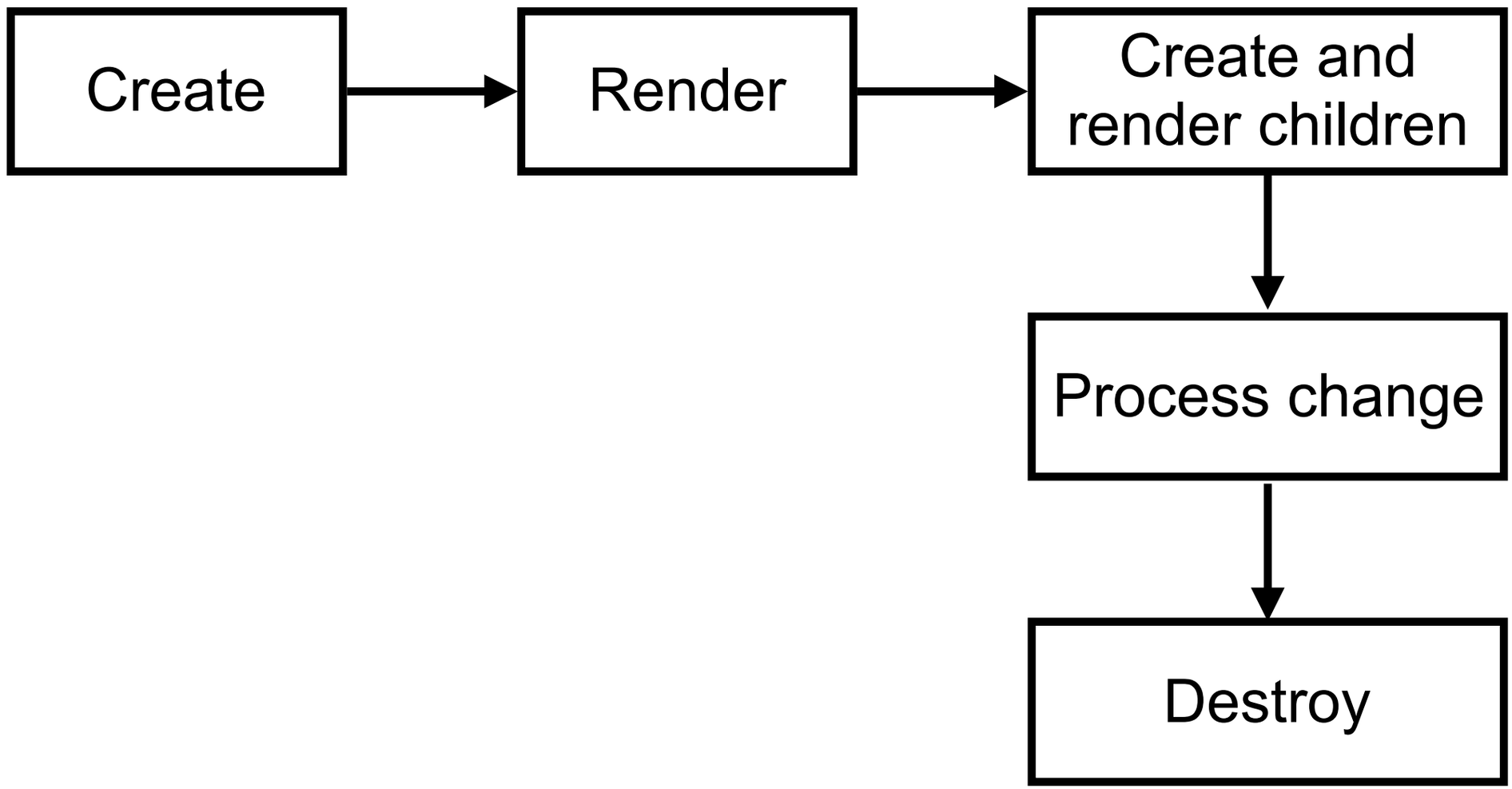
@angular/
http

@angular/
router

Create new component with CLI

$ng generate component <name>

Component life cycle



Component life cycle hooks

Method	Description
OnInit()	Perform component initialization Retrive data
OnChanges()	Perform action after properties are changed
OnDestroy()	Perform cleanup

https://angular.io/guide/lifecycle-hooks

Using life cycle hook

1. Import hook from @angular core

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

export class ProductListComponent implements OnInit {

  constructor() {
    console.log(this.products);
  }

  ngOnInit(): void {
    console.log('Called ngOnInit');
  }

}
```

2. Implement Hooks interface

3. Implement methods from hook

Workshop

https://github.com/up1/workshop-angular-note

1. Create project

$ng new note

Using global style

Edit file style.css

http://bit.ly/2CjEHnc

2. Create Note component

$ng generate component note

```
CREATE src/app/note/note.component.css (0 bytes)
CREATE src/app/note/note.component.html (23 bytes)
CREATE src/app/note/note.component.spec.ts (614 bytes)
CREATE src/app/note/note.component.ts (261 bytes)
UPDATE src/app/app.module.ts (388 bytes)
```

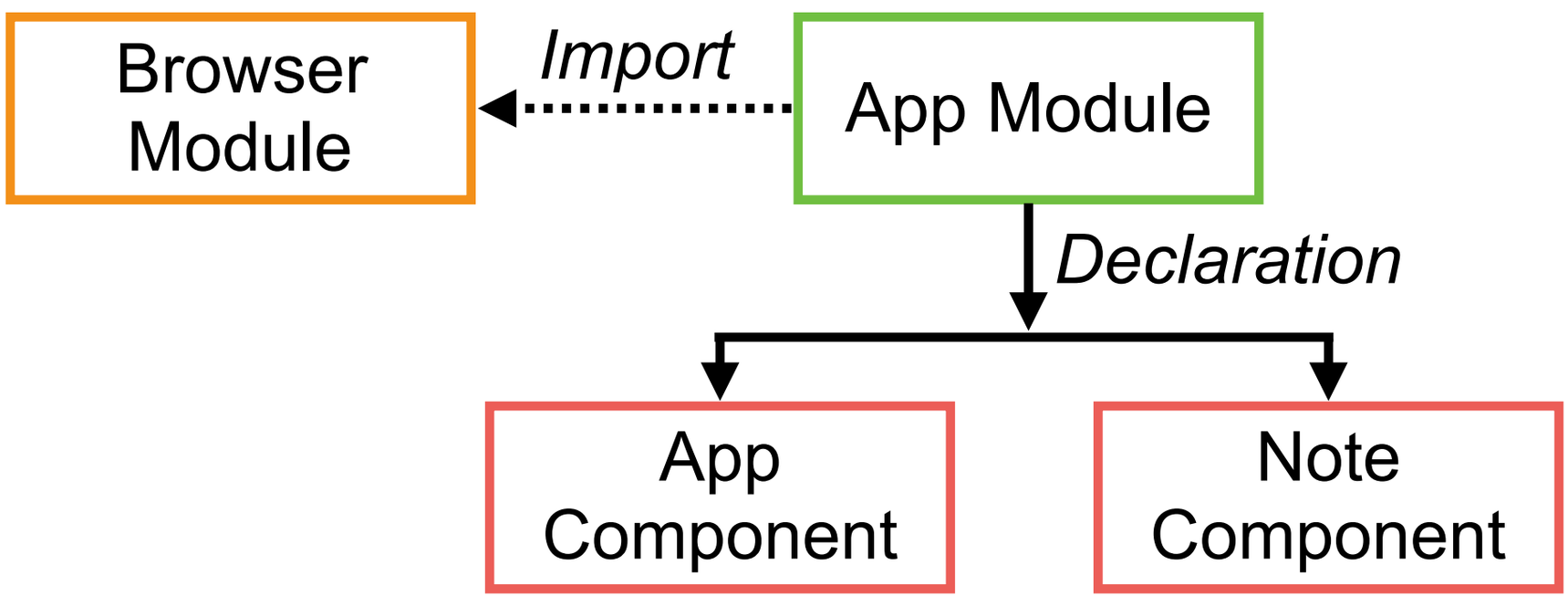
Create Note component in main

$ng generate component note --flat

```
CREATE src/app/note.component.css (0 bytes)
CREATE src/app/note.component.html (23 bytes)
CREATE src/app/note.component.spec.ts (614 bytes)
CREATE src/app/note.component.ts (261 bytes)
UPDATE src/app/app.module.ts (457 bytes)
```

Add Note component

Edit file /app/app.module.ts



Note component

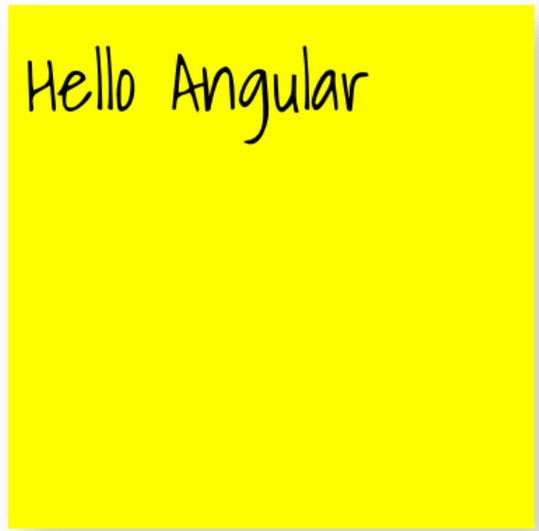
/app/note/note.component.ts

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

@Component({
  selector: 'app-note',
  templateUrl: './note.component.html',
  styleUrls: ['./note.component.css']
})
export class NoteComponent implements OnInit {

  constructor() { }

  ngOnInit() {
  }

}
```

Note component template

/app/note/note.component.html

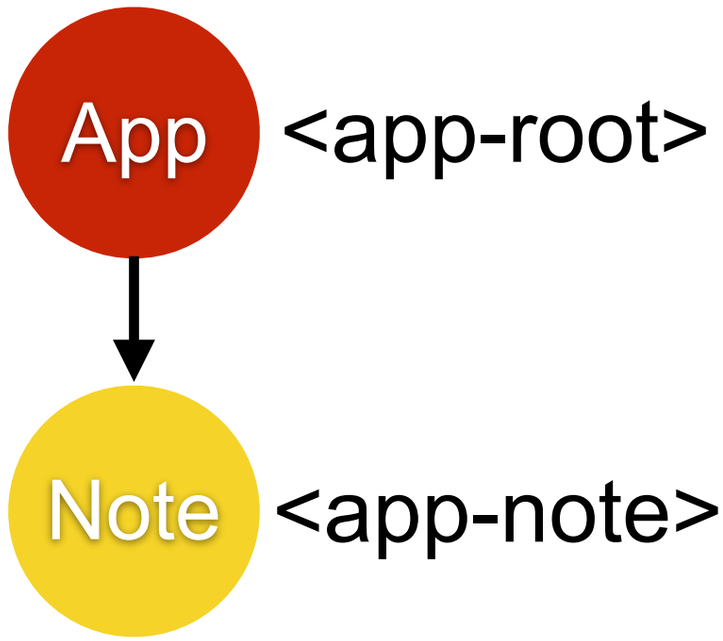
```
<div class="note">
  <p>Hello Angular</p>
  <span>
      <button id="edit">Edit</button>
      <button id="remove">Remove</button>
  </span>
</div>
```



Use note component in App

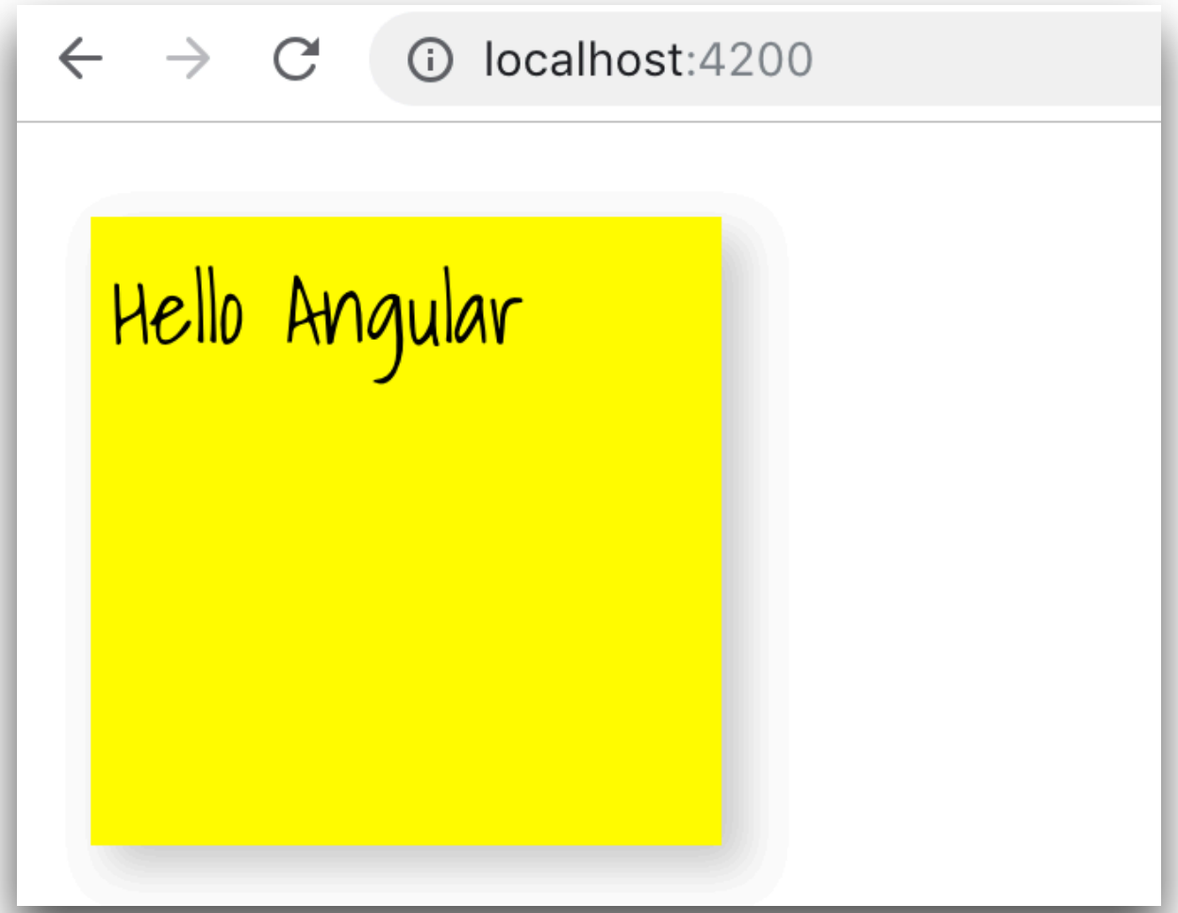
/app/app.component.html

```
<div>
  <app-note></app-note>
</div>
```

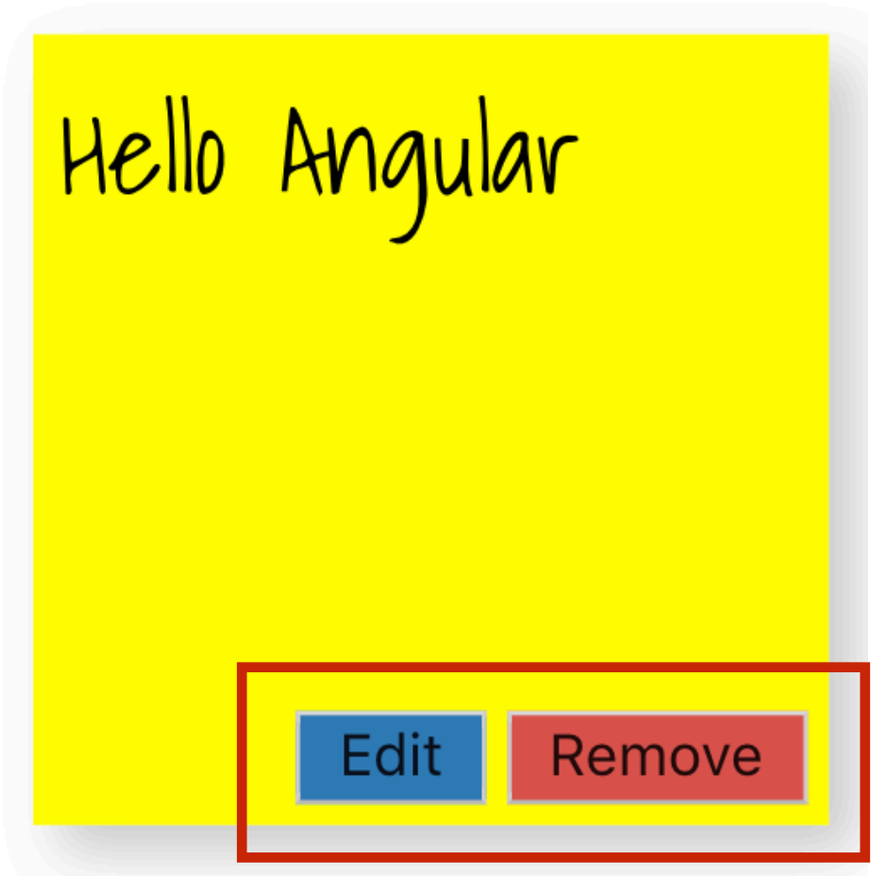


3. Run project

$ng serve



4. Handling events



4. Handling events (Event binding)

Click on Edit and Remove button

```
<div class="note">
  <p>Hello Angular</p>
  <span>
      <button id="edit" (click)="edit()">
          Edit
      </button>
      <button id="remove" (click)="remove()">
          Remove
      </button>
  </span>
</div>
```

https://angular.io/guide/user-input

4. Handling events (Event binding)

Call function in NoteComponent

```
export class NoteComponent implements OnInit {

  constructor() { }

  ngOnInit() {
  }

  edit() {
  }

  remove() {
  }
}
```

https://angular.io/guide/user-input

Show message when click button

Call function in NoteComponent

Add property into NoteComponent

Property name = userEvent : string

```
export class NoteComponent implements OnInit {

  userEvent: string;

  edit() {
    this.userEvent = 'Edit';
  }

  remove() {
    this.userEvent = 'Remove';
  }
}
```

Show data in template

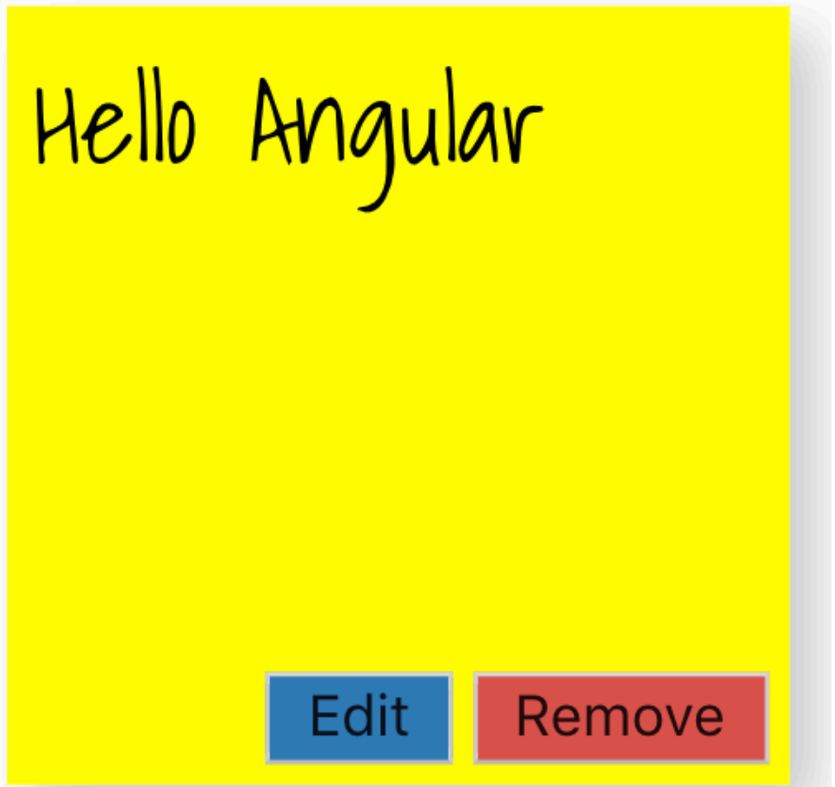
Edit file note.component.html

```
<div class="note">
  <p>Hello Angular</p>

  <p>{{userEvent}}</p>

  <span>
      <button id="edit" (click)="edit()">Edit</button>
      <button id="remove" (click)="remove()">Remove</button>
  </span>
</div>
```

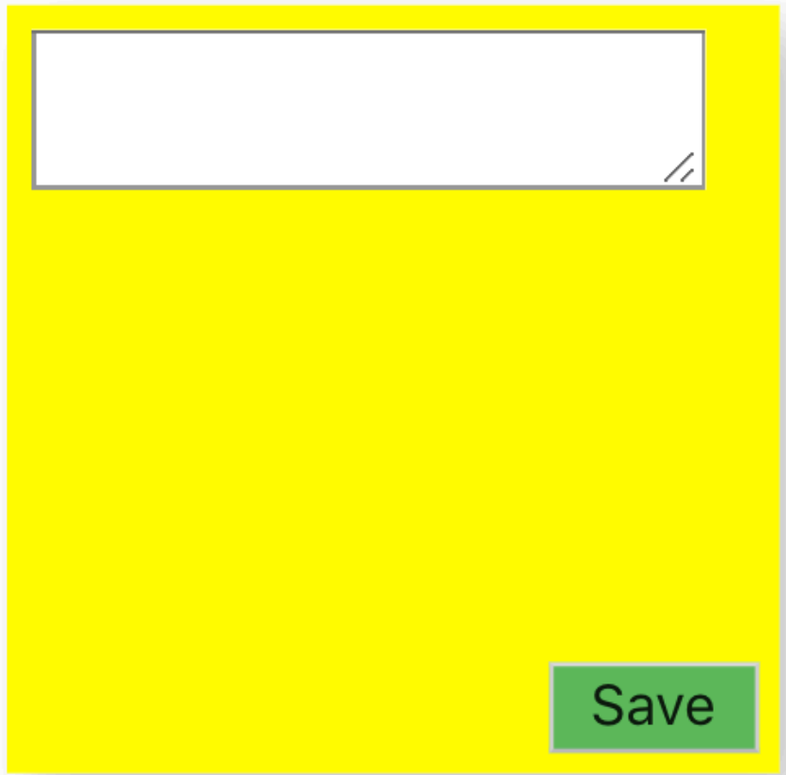
5. Add state to component

isEdit = true | false

isEdit = false



isEdit = true



Add state to component

Create state in class

```
export class NoteComponent implements OnInit {

    isEdit = false;

}
```

State change when click Edit

Implement in edit()

```
export class NoteComponent implements OnInit {

  isEdit = false;

  edit() {
    this.isEdit = true;
  }

}
```

Display UI in each state

Edit file note.component.html by using ***ngIf**

```
<div class="note" *ngIf="!isEdit">
    <p>Hello Angular</p>
    <span>
        <button id="edit" (click)="edit()">Edit</button>
        <button id="remove" (click)="remove()">Remove</button>
    </span>
</div>
```

isEdit = false

```
<div class="note" *ngIf="isEdit">
    <p><textarea></textarea></p>
    <span>
        <button id="save" (click)="save()">Save</button>
    </span>
</div>
```

isEdit = true

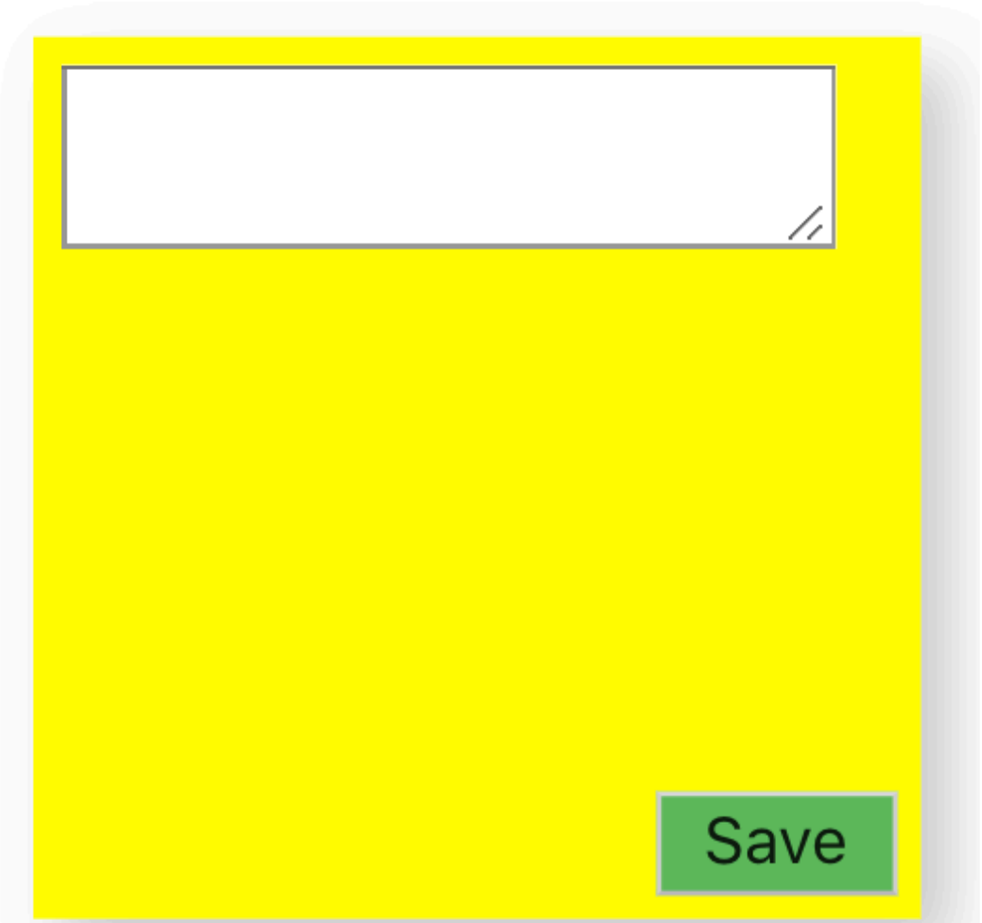
https://angular.io/api/common/NgIf

State change when click Save

Implement in save()

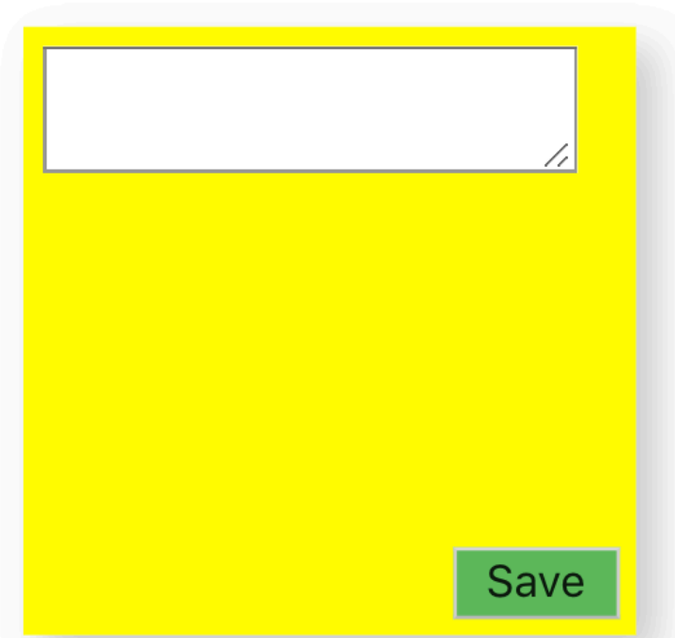
```
export class NoteComponent implements OnInit {

  isEdit = false;

  save() {
     this.isEdit = false;
  }

}
```

6. Save data from textarea



6. Save data from textarea

Working with Angular Forms



https://angular.io/guide/forms

Binding data from textarea

Edit file note.component.html by using **template variables (#)**

```
<div class="note" *ngIf="isEdit">
  <p><textarea #newTitle></textarea></p>
  <span>
      <button id="save" (click)="save(newTitle.value)">
          Save
      </button>
  </span>
</div>
```

Template variable

Get value from variable

Create property and function

Edit in save() and keep data of new title

```
export class NoteComponent implements OnInit {

  isEdit = false;
  title = 'Hello Angular';

  save(newTitle) {
    this.title = newTitle;
    this.isEdit = false;
  }
}
```

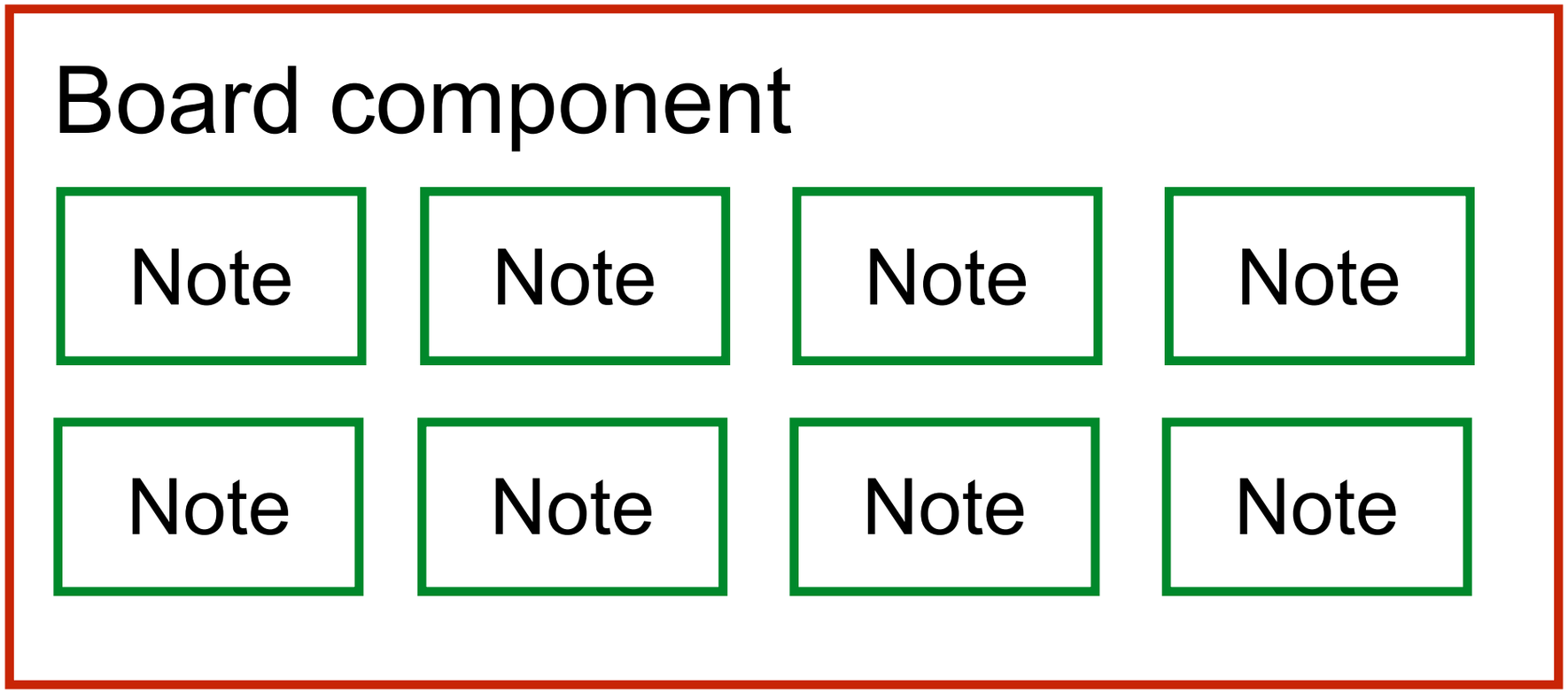
Display new title

Edit file note.component.html

```
<div class="note" *ngIf=“!isEdit">
  <p>{{title}}</p>
    <span>
        <button id="edit" (click)="edit()">Edit</button>
        <button id="remove" (click)="remove()">Remove</button>
    </span>
</div>
```

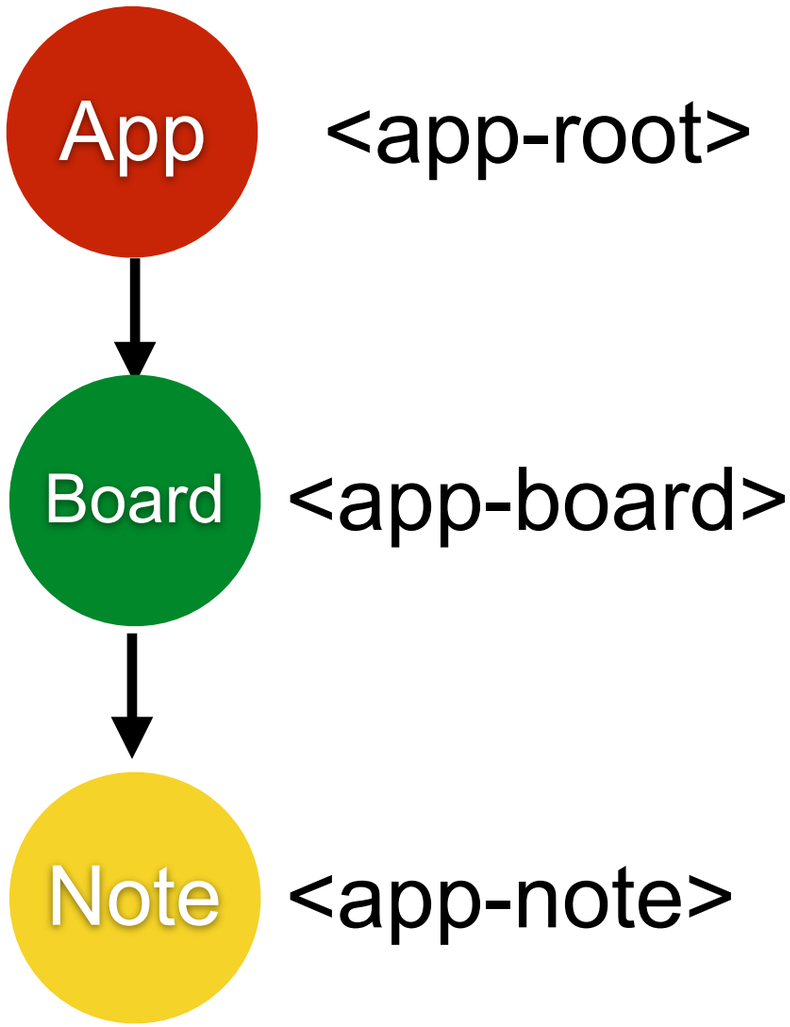
7. Parent and child component

Parent = Board
Child = Note



7. Parent and child component

Parent = Board
Child = Note



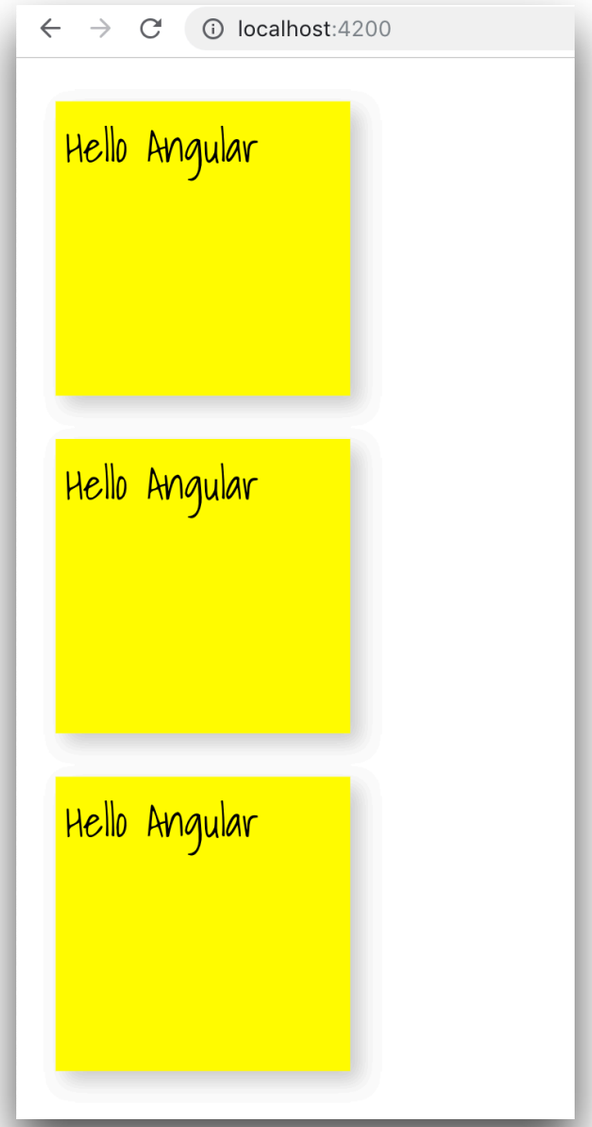
Create Board component

$ng generate component board

Add note to board component

Edit file board.component.html

```
<div>
   <app-note></app-note>
   <app-note></app-note>
   <app-note></app-note>
</div>
```

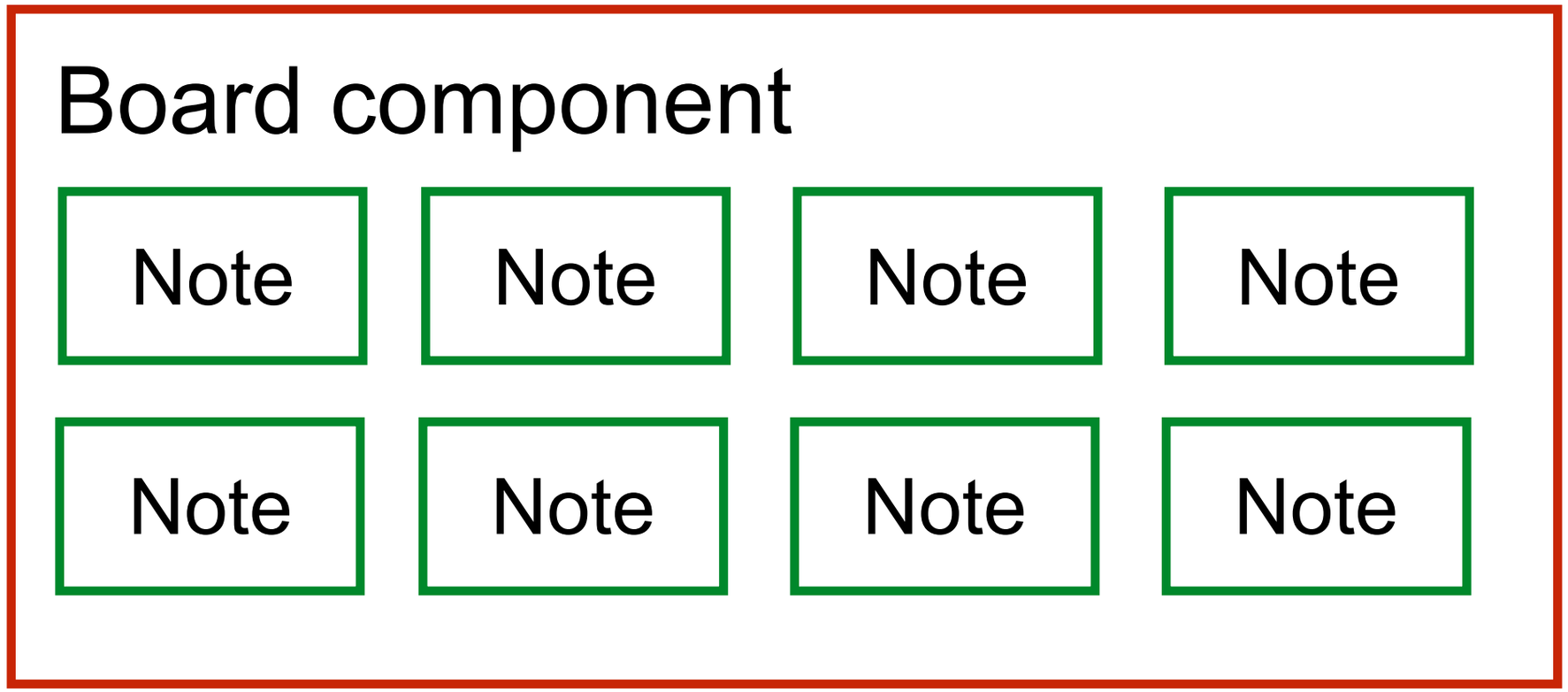


8. Send data from parent to child

Board Component

Stateful component

Hold data of all notes



8. Send data from parent to child

Passing data using @Input

Passing data to component

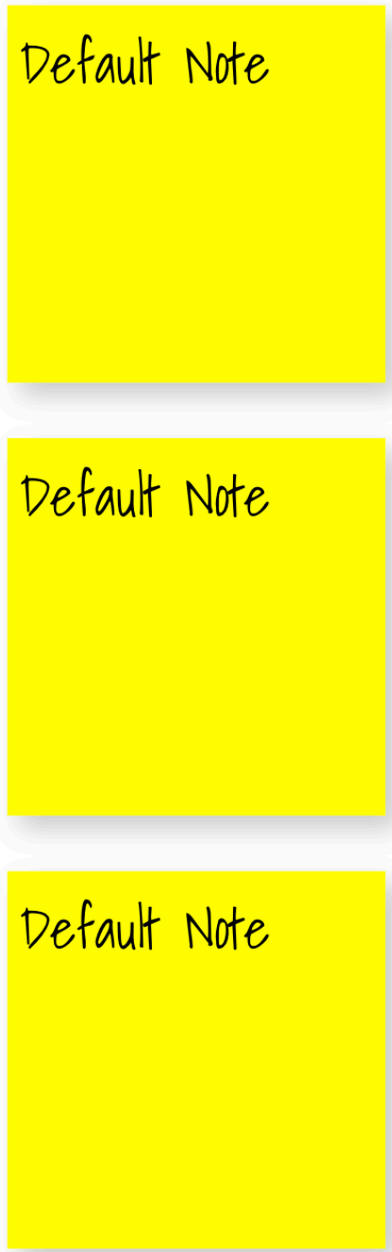
board.component.html

```
<app-note [title]="title"></app-note>
<app-note [title]="title"></app-note>
<app-note [title]="title"></app-note>
```

note.component.ts

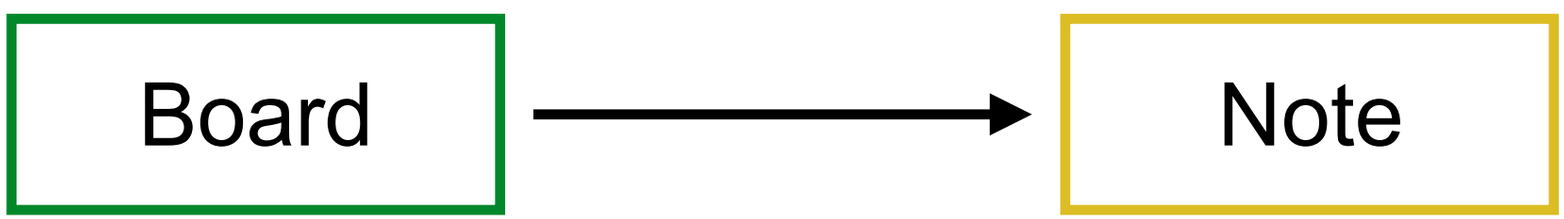
```
export class NoteComponent implements OnInit {
  @Input() title: string;
}
```

Result



Send more data

Passing data using @Input

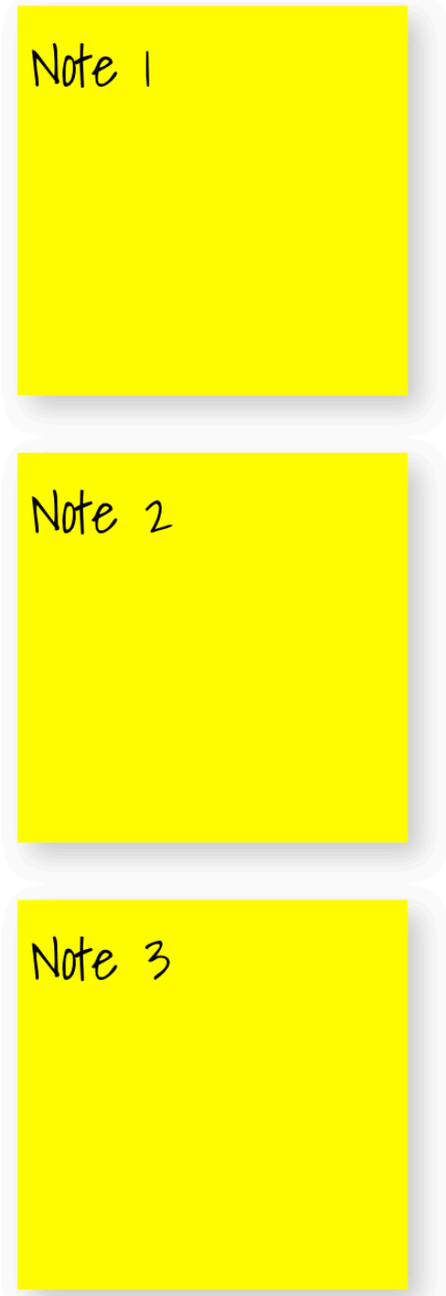



```
notes = [
    {
      id: 1,
      title: 'Note 1'
    },
    {
      id: 2,
      title: 'Note 2'
    },
    {
      id: 3,
      title: 'Note 3'
    }
];
```

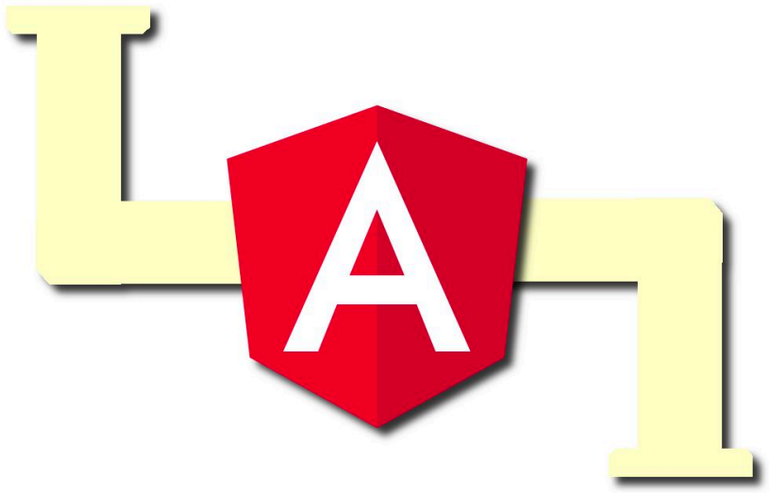
Send more data

board.component.html

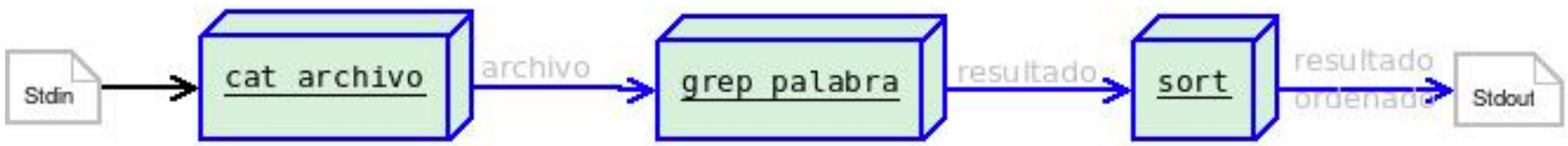
```
<div *ngFor="let note of notes">
   <app-note  [title]="note.title"></app-note>
</div>
```

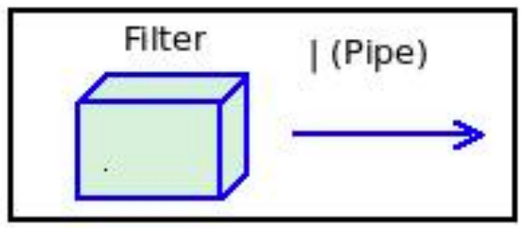


Transform data with Pipe



```
$cat Arquivo | grep palabra | sort
```





Angular Pipe

Pipes allow us to change the way to show data and transform data in our template

Angular Pipe

Build-in pipe

Parameterize pipe

Chaining pipe

Custom pipe

Filter

Build-in pipes

Date
Lowercase
Uppercase
Currency
Percent

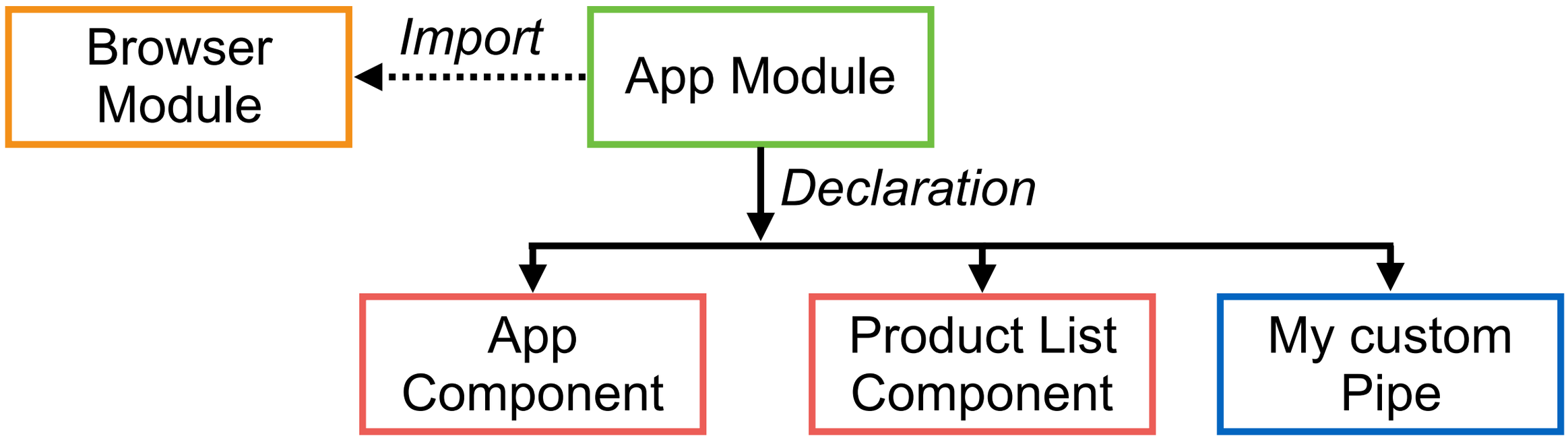
https://angular.io/api?type=pipe

Build-in pipes

```
<th>{{product.code}}</th>
<th>{{product.name | uppercase}}</th>
<th>{{product.price | currency: 'THB ' : 'symbol': '1.2'}}</th>
<th>Yes</th>
<th>****</th>
```

Custom pipes

$ng **g**enerate **p**ipe <pipe name>



Create custom pipes

$ng **g**enerate **p**ipe ReplaceWithDash

replace-with-dash.pipe.ts

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({
  name: 'replaceWithDash'
})
export class ReplaceWithDashPipe implements PipeTransform {

  transform(value: string, character: string): any {
     return value.replace(character, '-');
  }

}
```

Add pipe in app module

$ng **g**enerate **p**ipe ReplacewithDash

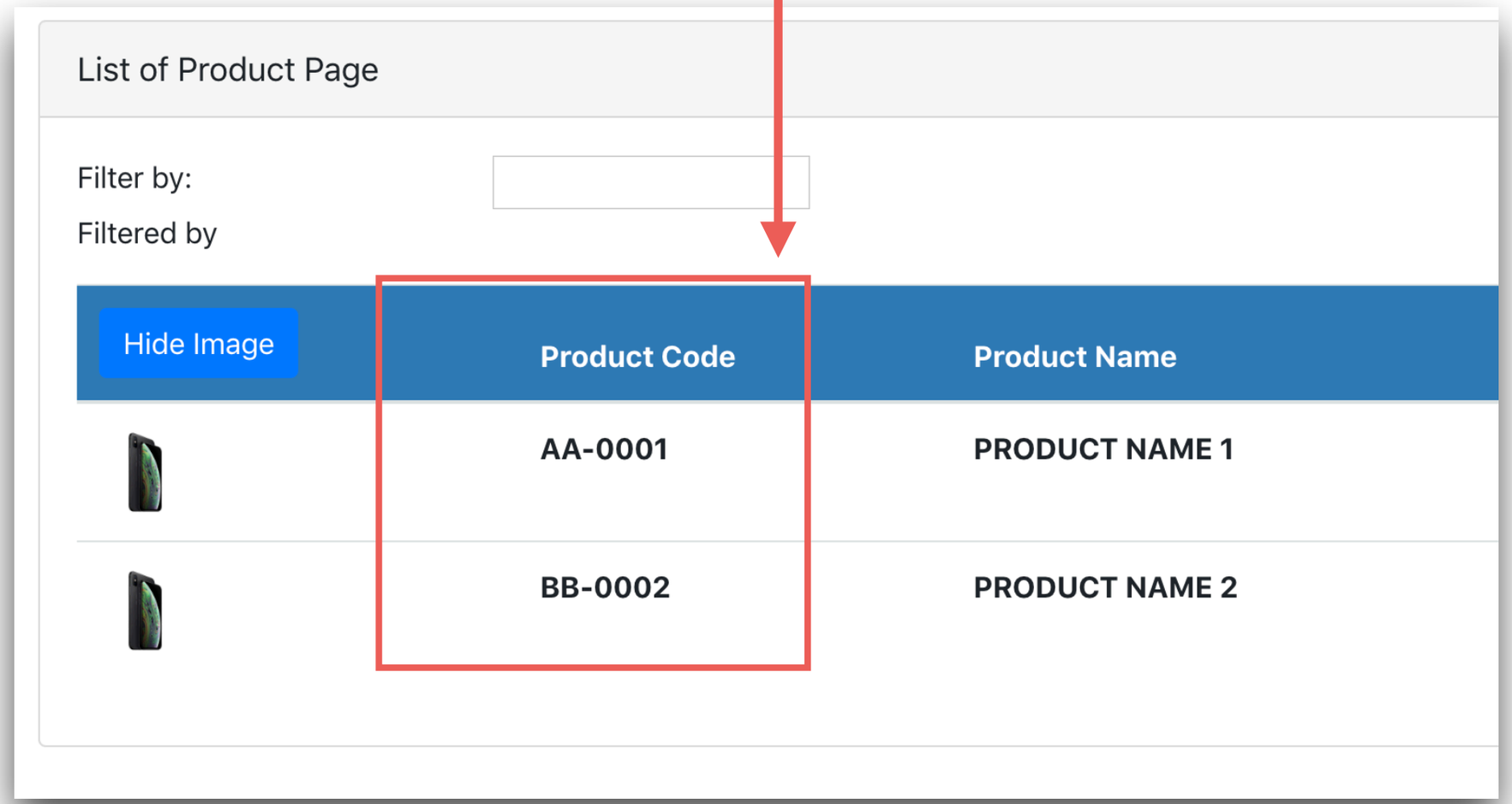
app.module.ts

```
import { ReplaceWithDashPipe } from './replace-with-dash.pipe';

@NgModule({
  declarations: [
    AppComponent,
    ProductListComponent,
    ReplaceWithDashPipe,
  ]})
```

Using pipe in template

product-list.component.html

```
<th>{{product.code | replaceWithDash: ' '}}</th>
```



Edit/Update Note

Edit Note

Edit Note

Board component

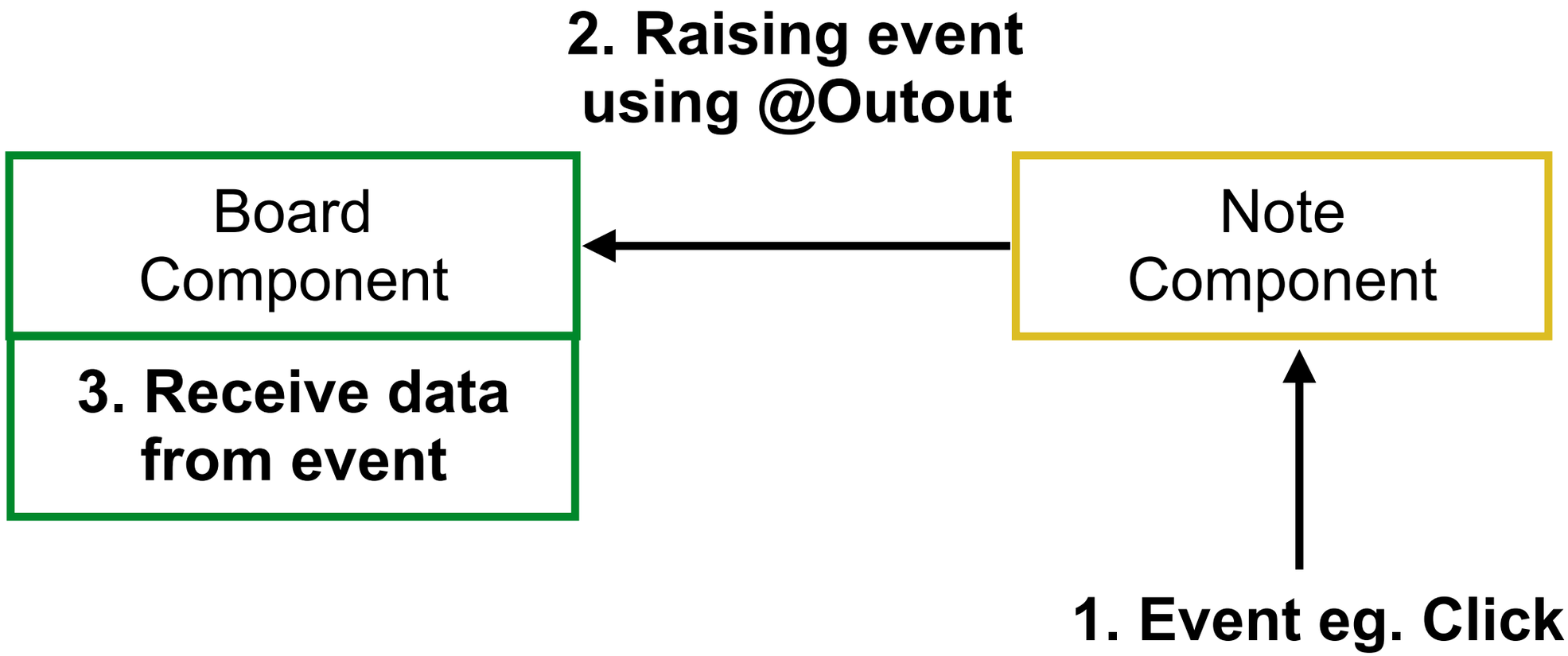
Logic to edit note

@Input

Note component

Handling when data changed

Raising event from component



1. Event handling on rating

note.component.html

```
<button id="save" (click)="save(newTitle.value)">Save</button>
```

note.component.ts

```
export class NoteComponent implements OnInit {

 @Input() note: Note;


 save(newTitle: string) {

 }
}
```

2. Raising event with @Output

note.component.ts

```
export class NoteComponent implements OnInit {

 @Input() note: Note;
 @Output() savedNote: EventEmitter<Note> = new
                                        EventEmitter<Note>();

 save(newTitle: string) {
   const newNote = new Note(this.note.id, newTitle);
   this.savedNote.emit(newNote);
 }
}
```

board.component.html

```
<div *ngFor="let note of notes">
  <app-note
    [note]="note"
    (savedNote)="onSavedNote($event)"
  ></app-note>
</div>
```

3. Receive data from event

board.component.html

```
<div *ngFor="let note of notes">
  <app-note
    [note]="note"
    (savedNote)="onSavedNote($event)"
  ></app-note>
</div>
```

board.component.ts

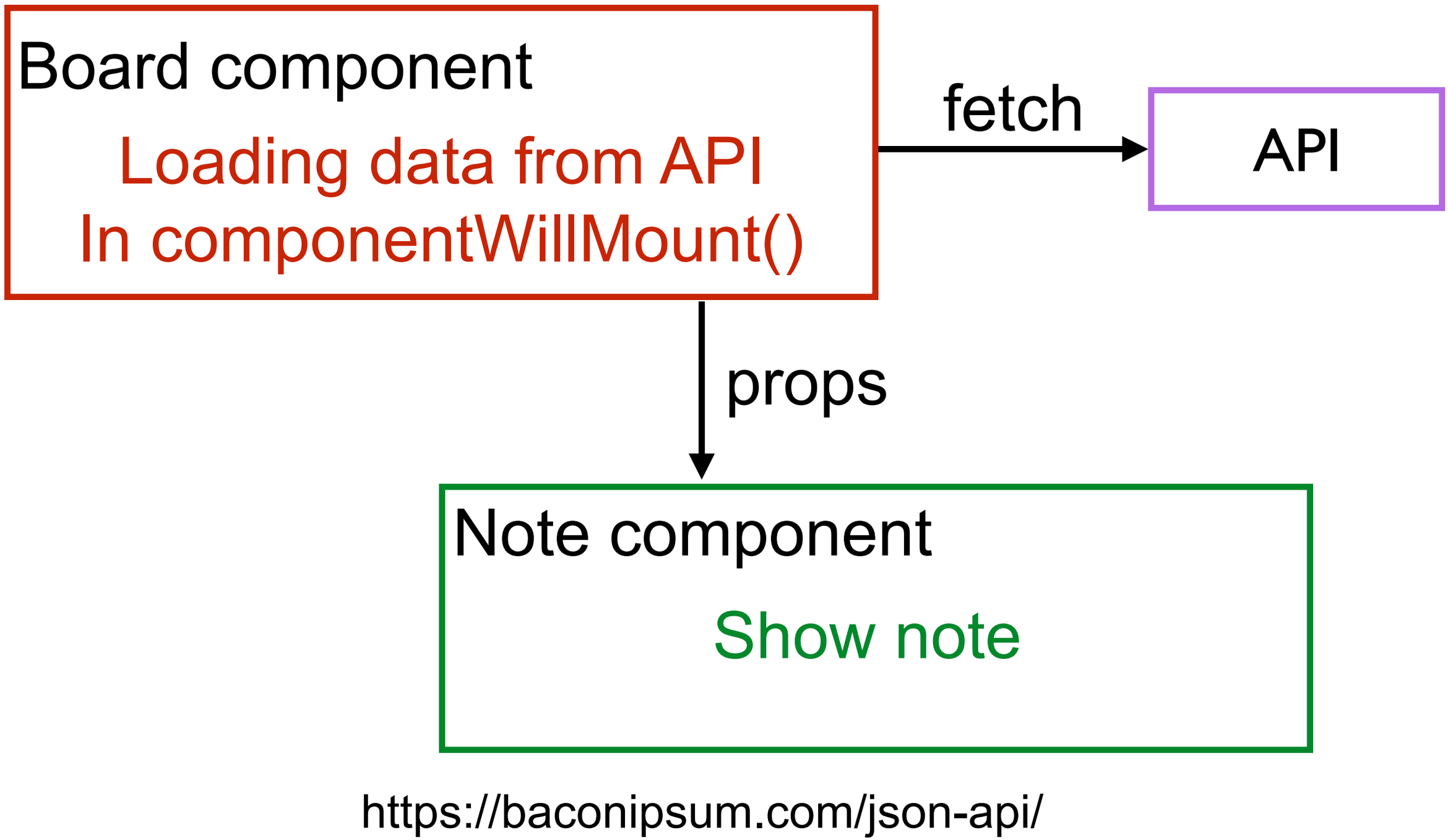
```
export class BoardComponent {
 notes = []

  onSavedNote(savednote: Note) {
    this.notes = this.notes.map( note =>
                  note.id === savednote.id ? savednote : note );
  }
}
```

Delete Note

Add new Note

Loading data from API

Loading data from API



https://baconipsum.com/json-api/

Services

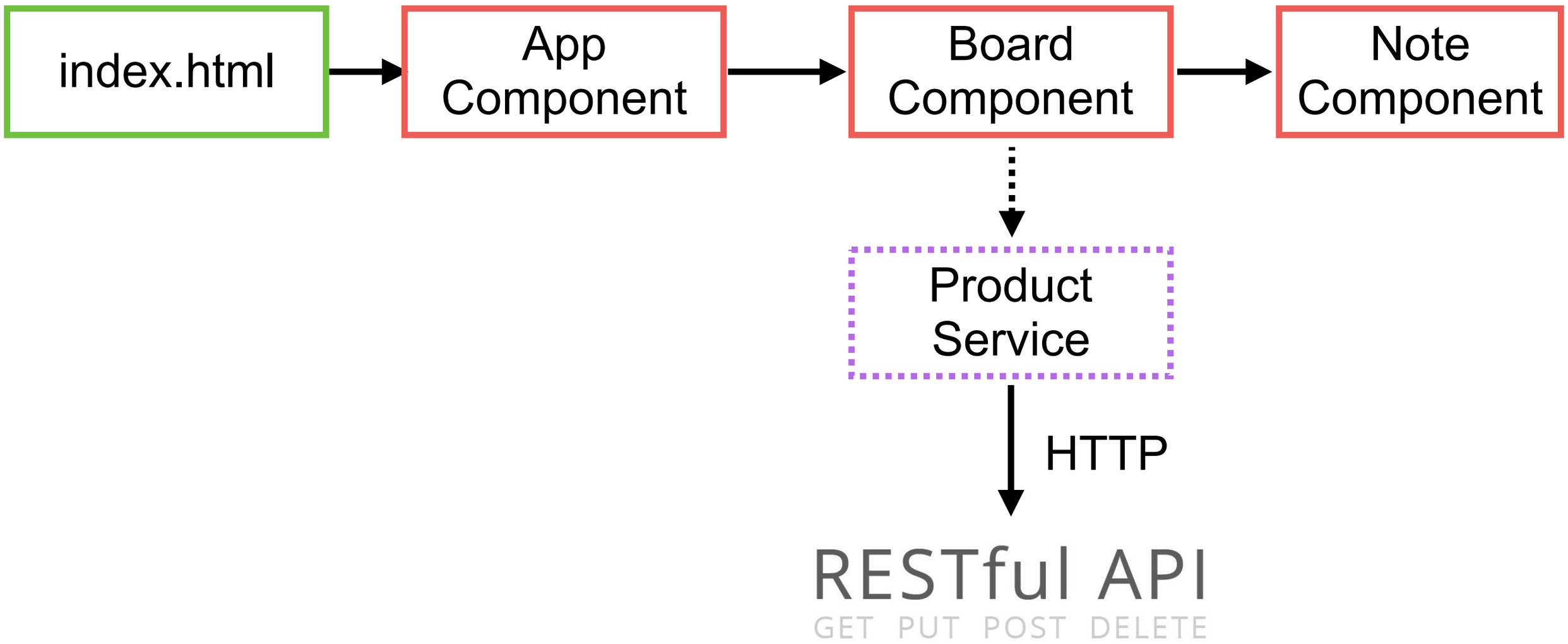
Service

Class with specified purpose
Independent from any component
Provide shared data and logic across components
Encapsulate external interactions

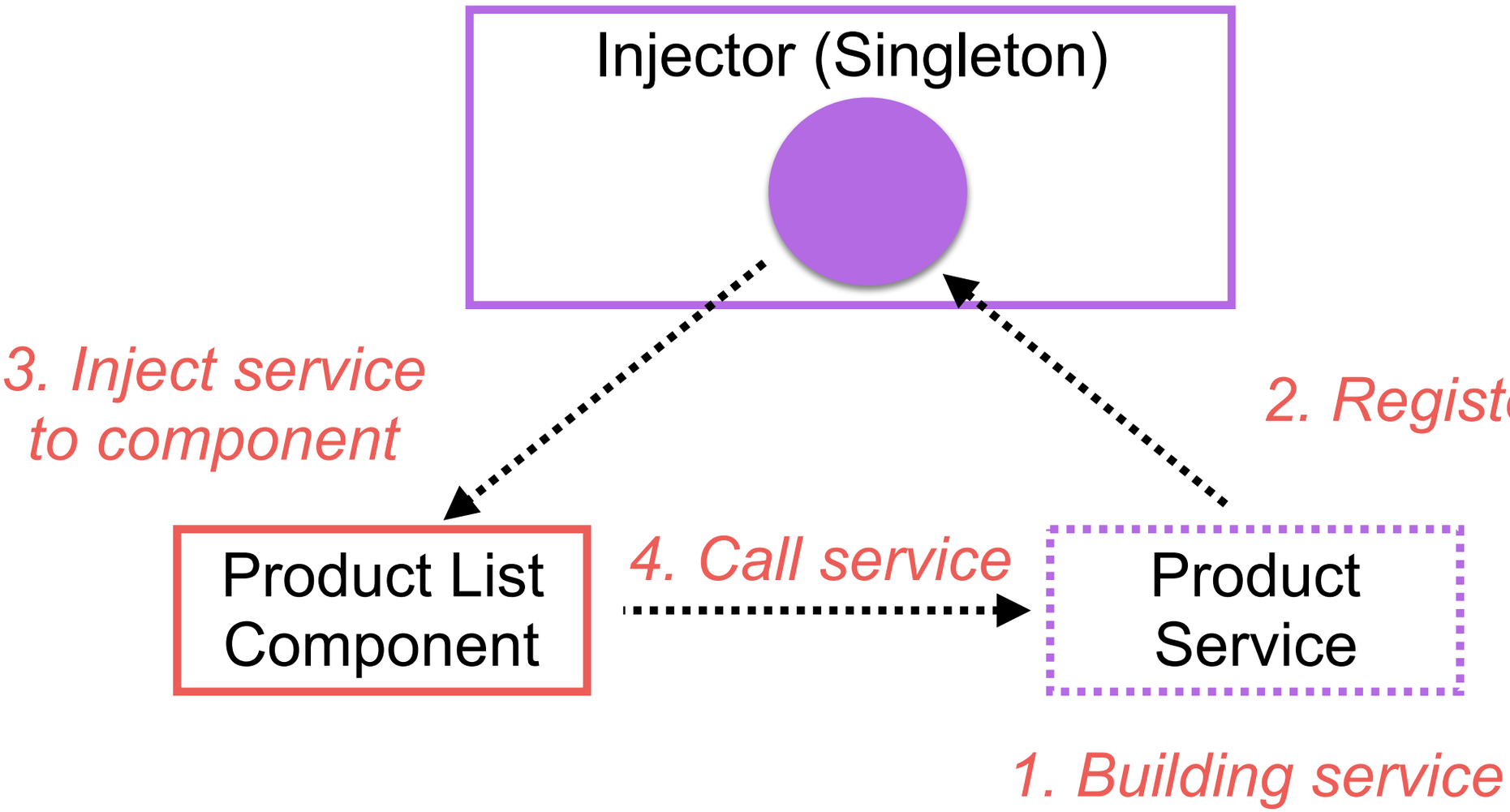
Service

How service working ?
Building service
Register service
Inject service

Application Architecture



How service working ?



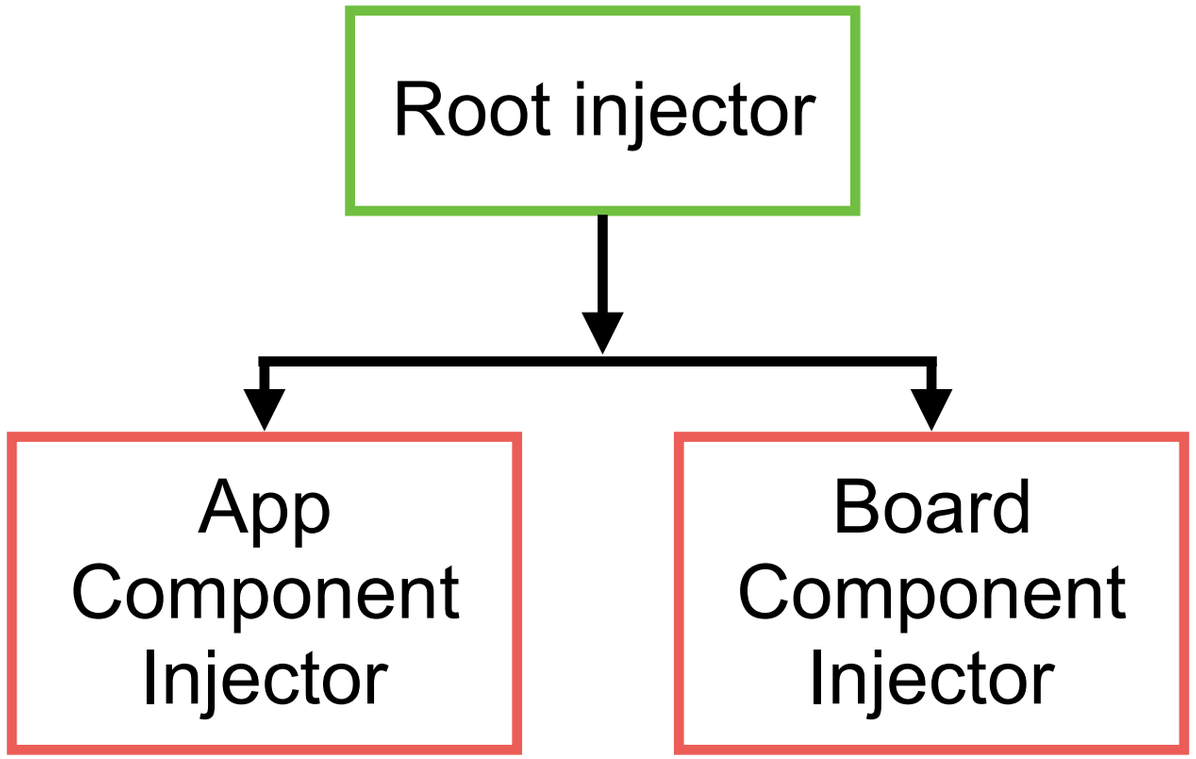
Building service

$ng generate service api/my

my.service.ts

```
import { Injectable } from '@angular/core';

@Injectable({
  providedIn: 'root'
})
export class MyService {

  constructor() { }

}
```

Register service



Register service

Root injector
Component injector

product.service.ts

```
import { Injectable } from '@angular/core';

@Injectable({
  providedIn: 'root'
})
export class ProductService {

  constructor() { }

}
```

Root injector

Add service in component

board.component.ts

```
import {MyService} from './my.service';

@Component({
  selector: 'app-board',
  providers: [MyService],
})
export class BoardComponent implements OnInit {
```

Add service providers

Inject service to component

Using constructor

board.component.ts

```
export class BoardComponent implements OnInit {
```

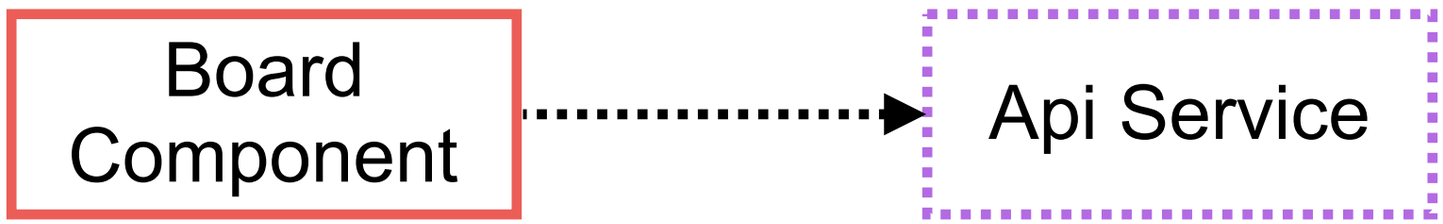
Constructor injection

```
  constructor(private mySerivce: MyService) {

  }

  ngOnInit(): void {
    this.datas = this.mySerivce.getDatas();
  }
```

Working with HTTP

https://angular.io/tutorial/toh-pt6

Create new service



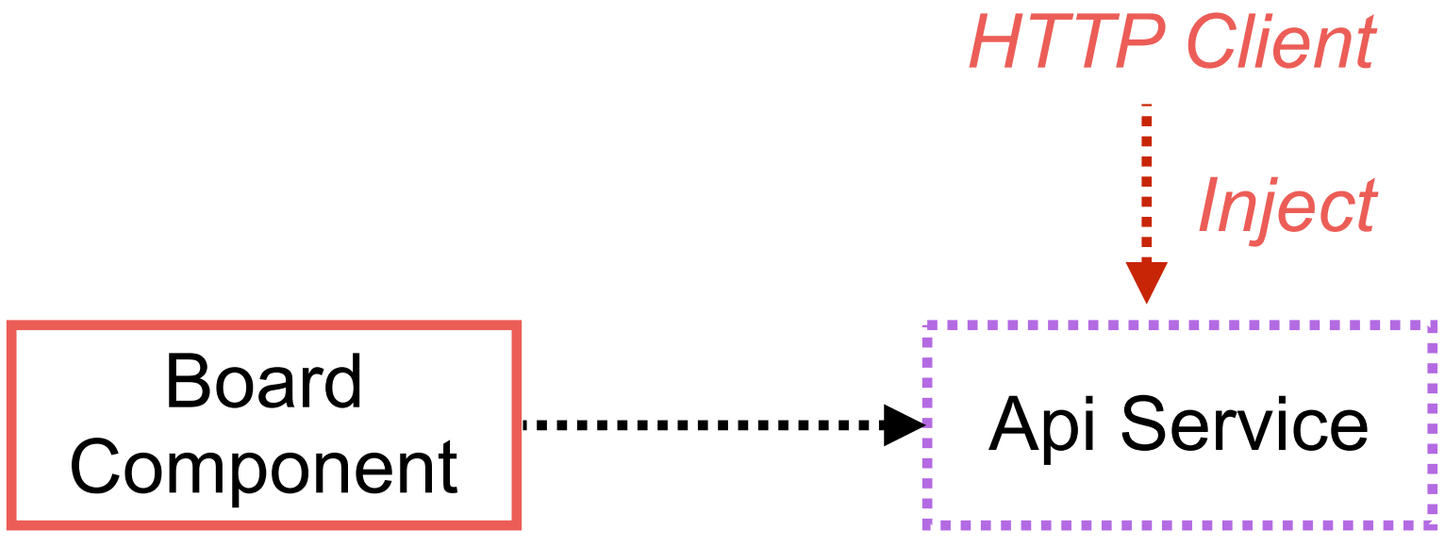
Create new service

$ng generate service services/api

```
CREATE src/app/services/api.service.spec.ts (318 bytes)
CREATE src/app/services/api.service.ts (132 bytes)
```

```ts
import { Injectable } from '@angular/core';

@Injectable({
  providedIn: 'root'
})
export class ApiService {

  constructor() { }
}
```

Inject HttpClient to Service



Add function to service

Get data from API

```
import { Injectable } from '@angular/core';
import {Observable, of} from 'rxjs';
import {HttpClient} from '@angular/common/http';

@Injectable({
  providedIn: 'root'
})
export class ApiService {
  private url = '<url of api>';

  constructor(
    private http: HttpClient) { }

  getDatas(): Observable<string> {
    return this.http.get<string>(this.url);
  }
}
```

Constructor injection

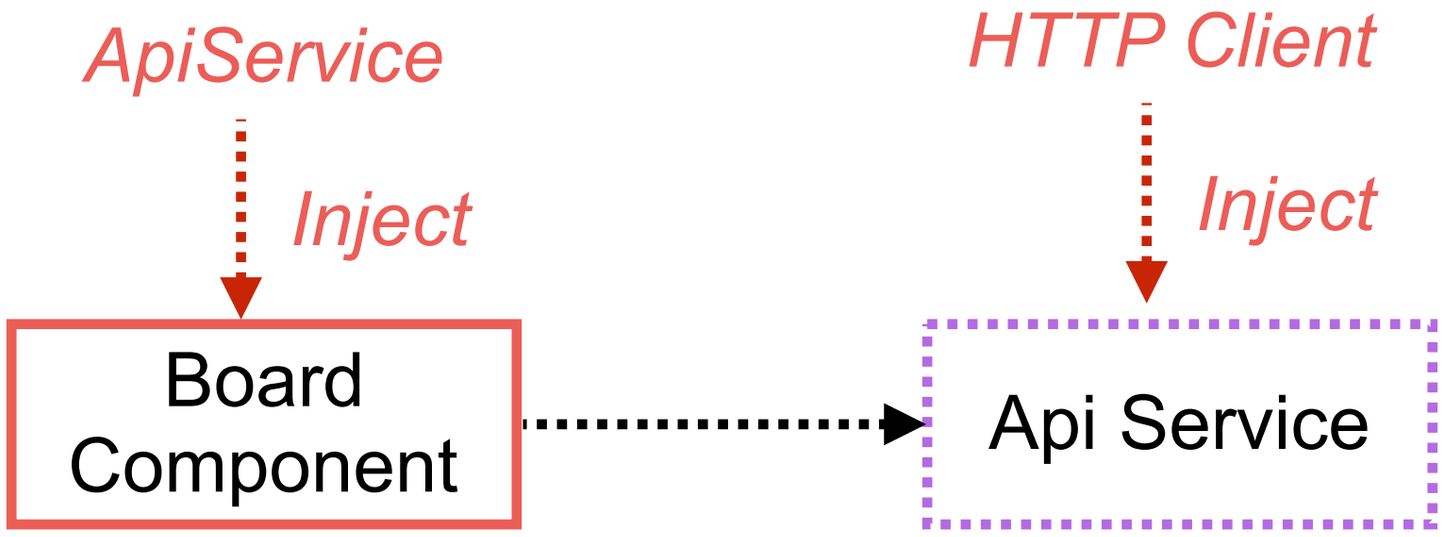
Add function to service

Get data from API

```
import { Injectable } from '@angular/core';
import {Observable, of} from 'rxjs';
import {HttpClient} from '@angular/common/http';

@Injectable({
  providedIn: 'root'
})
export class ApiService {
  private url = '<url of api>';

  constructor(
    private http: HttpClient) { }

  getDatas(): Observable<string> {
    return this.http.get<string>(this.url);
  }
}
```

Call api with HttpClient + RxJs

Call service from component



Call service from component

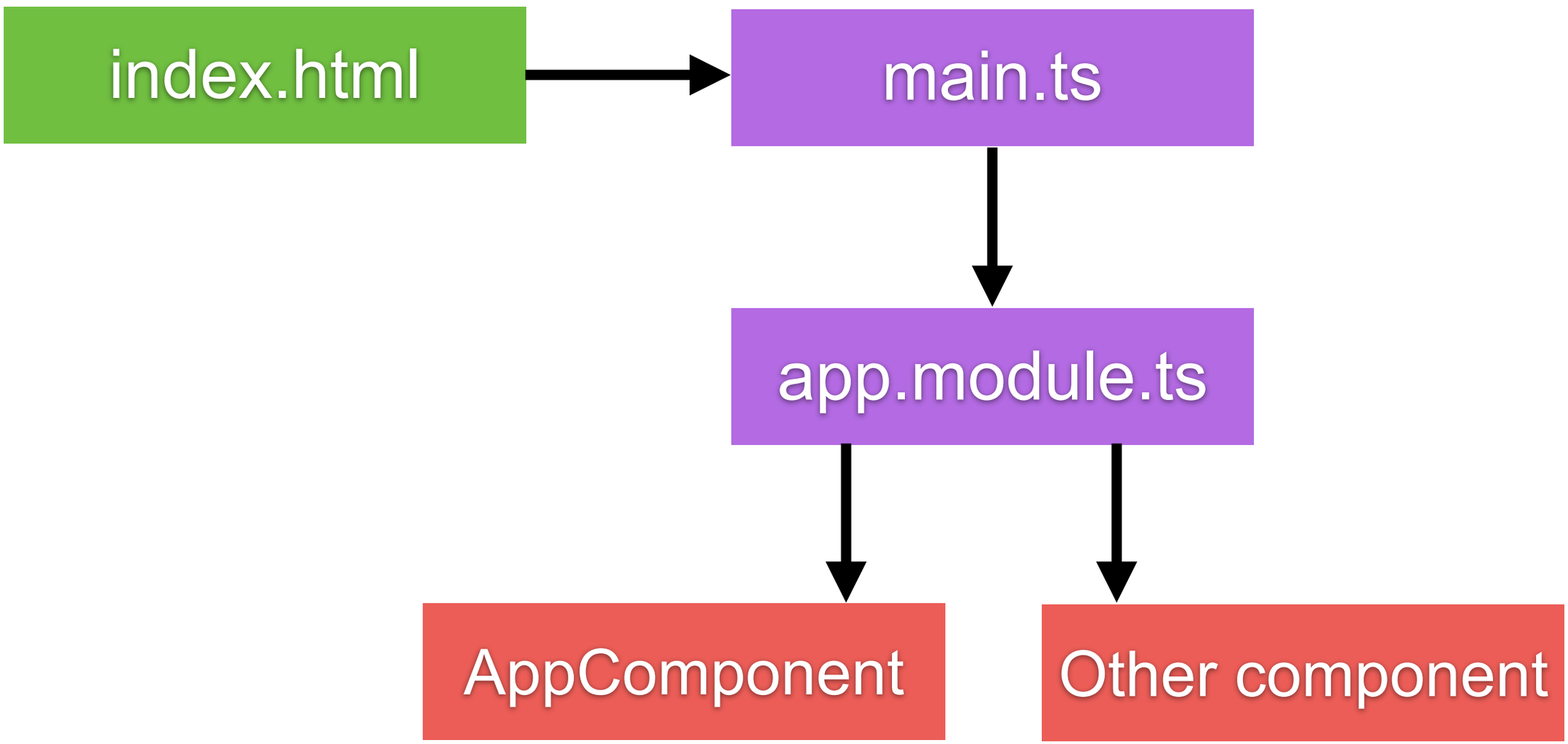
Inject service to component

```
export class AppComponent {
  name = '';

  constructor(private apiService: ApiService) {
    this.apiService.getDatas()
      .subscribe(data => this.showAll(data) );
  }

  showAll(data: string) {
    console.log(data);
  }
}
```

Error !!

```
▶ERROR Error: StaticInjectorError(AppModule)[HttpClient]:
  StaticInjectorError(Platform: core)[HttpClient]:
    NullInjectorError: No provider for HttpClient!
    at NullInjector.push../node_modules/@angular/core/fesm
    at resolveToken (core.js:9140)
    at tryResolveToken (core.js:9084)
    at StaticInjector.push../node_modules/@angular/core/fe
1)
    at resolveToken (core.js:9140)
    at tryResolveToken (core.js:9084)
```

How Angular working ?



Add HttpClient Module

Edit in file app.module.ts

```
@NgModule({
  declarations: [
    AppComponent,
    NoteComponent
  ],
  imports: [
    BrowserModule,
    HttpClientModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
```

Angular Architecture