

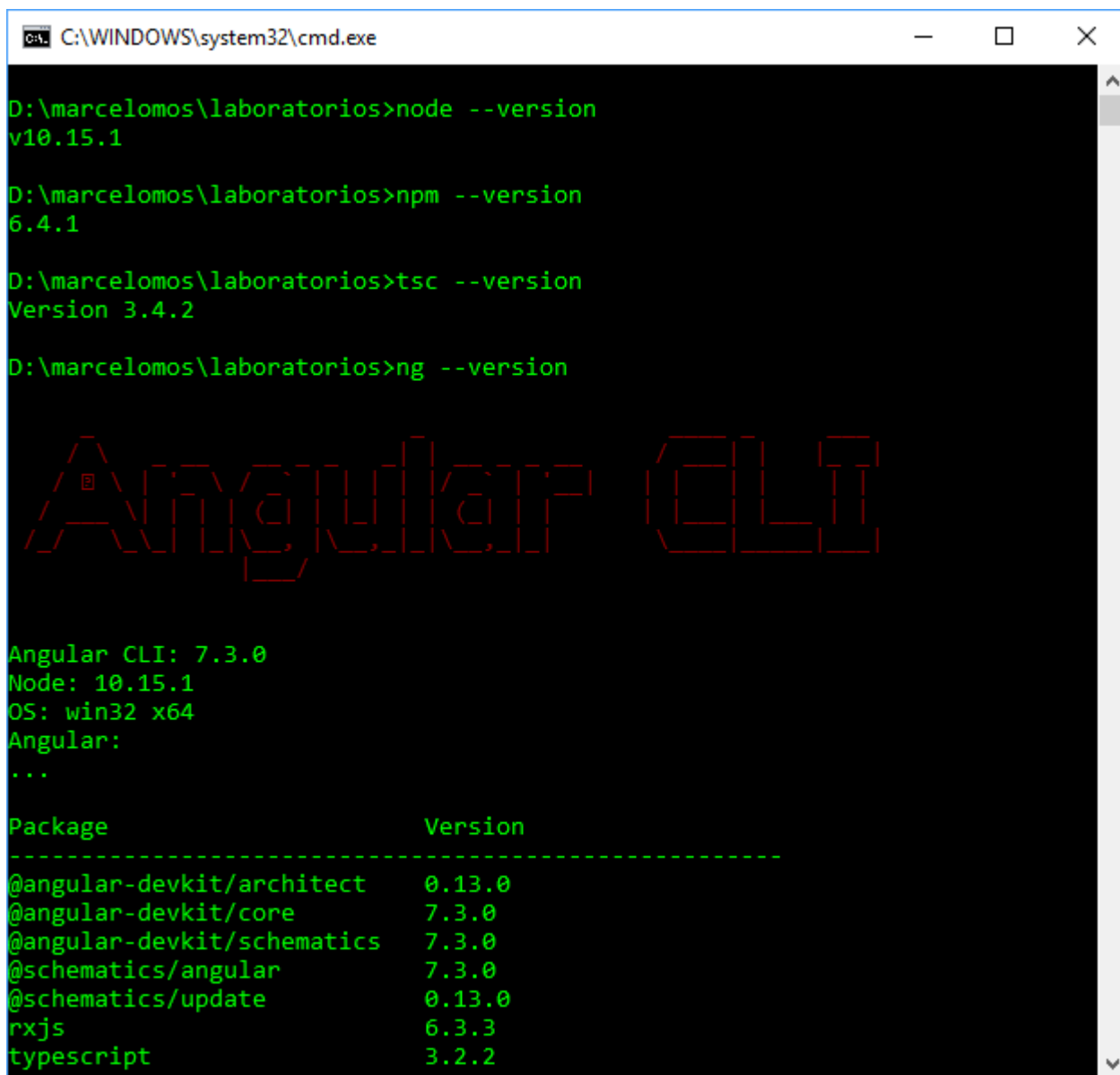
`npm install -g @angular/cli`

node --version

npm --version

tsc --version

ng --version



```
C:\WINDOWS\system32\cmd.exe

D:\marcelomos\laboratorios>node --version
v10.15.1

D:\marcelomos\laboratorios>npm --version
6.4.1

D:\marcelomos\laboratorios>tsc --version
Version 3.4.2

D:\marcelomos\laboratorios>ng --version

Angular CLI
Angular CLI: 7.3.0
Node: 10.15.1
OS: win32 x64
Angular:
...

Package                                  Version
-----
@angular-devkit/architect                0.13.0
@angular-devkit/core                     7.3.0
@angular-devkit/schematics               7.3.0
@schematics/angular                     7.3.0
@schematics/update                       0.13.0
rxjs                                     6.3.3
typescript                               3.2.2
```



¿Qué es Angular?

Angular es una plataforma y un framework para crear aplicaciones de cliente en HTML y TypeScript.

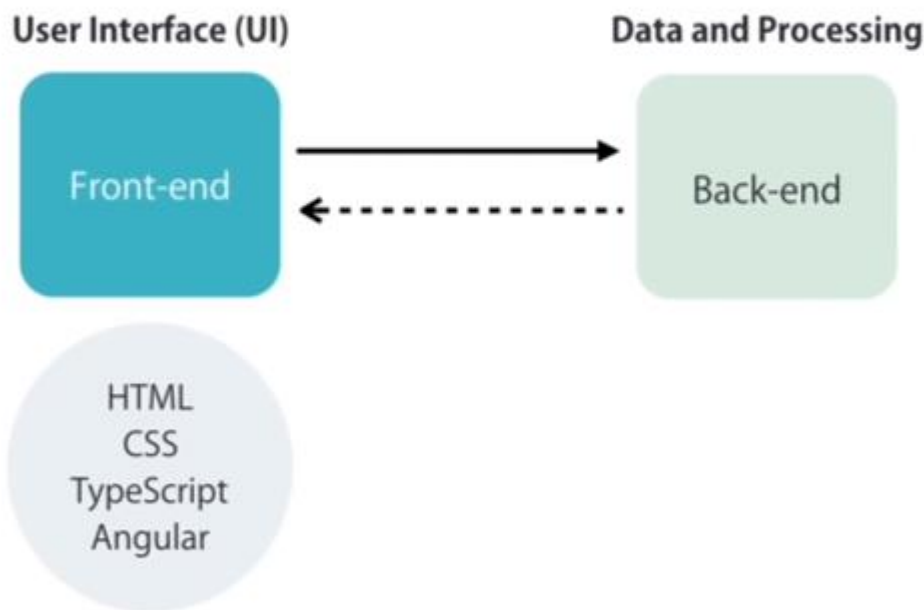
Angular está escrito en TypeScript.

Framework del lado cliente, para desarrollar aplicaciones SPA (Single Page Application). Angular fue lanzado en 2016 pero tiene una versión previa no compatible y solo mantenida para proyectos antiguos llamada Angular.js (2010).

El proyecto de Angular es propiedad de la empresa de Google.

<https://angular.io/>

Architecture



Application Programming Interface



Creación de un proyecto

```
C:\WINDOWS\system32\cmd.exe

D:\marcelomos\laboratorios>ng new angular-inicio
? Would you like to add Angular routing? Yes
? Which stylesheet format would you like to use? CSS
CREATE angular-inicio/angular.json (3879 bytes)
CREATE angular-inicio/package.json (1313 bytes)
CREATE angular-inicio/README.md (1030 bytes)
CREATE angular-inicio/tsconfig.json (435 bytes)
CREATE angular-inicio/tslint.json (1621 bytes)
CREATE angular-inicio/.editorconfig (246 bytes)
CREATE angular-inicio/.gitignore (587 bytes)
CREATE angular-inicio/src/favicon.ico (5430 bytes)
CREATE angular-inicio/src/index.html (300 bytes)
```

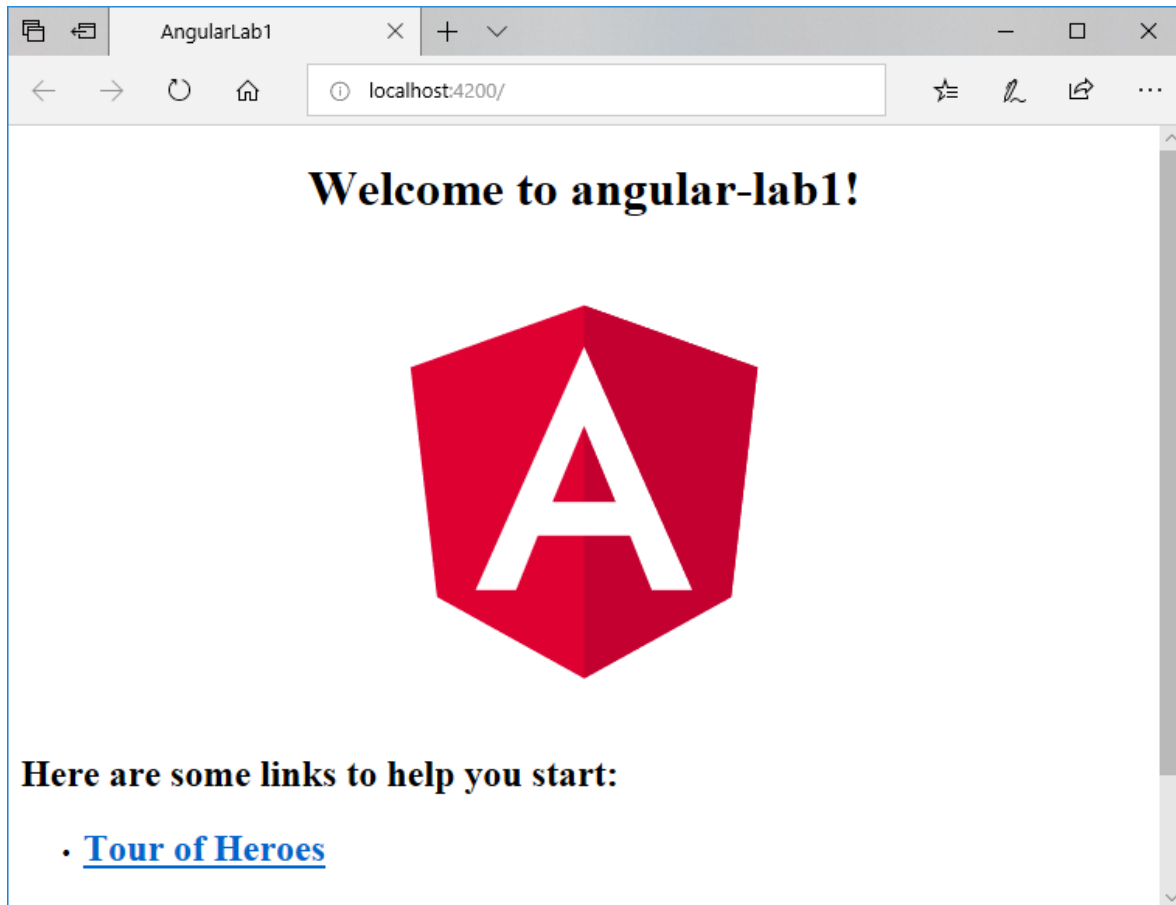
```
npm

CREATE angular-lab1/src/assets/.gitkeep (0 bytes)
CREATE angular-lab1/src/environments/environment.prod.ts (51 bytes)
CREATE angular-lab1/src/environments/environment.ts (662 bytes)
CREATE angular-lab1/src/app/app-routing.module.ts (245 bytes)
CREATE angular-lab1/src/app/app.module.ts (393 bytes)
CREATE angular-lab1/src/app/app.component.html (1173 bytes)
CREATE angular-lab1/src/app/app.component.spec.ts (1113 bytes)
CREATE angular-lab1/src/app/app.component.ts (216 bytes)
CREATE angular-lab1/src/app/app.component.css (0 bytes)
CREATE angular-lab1/e2e/protractor.conf.js (752 bytes)
CREATE angular-lab1/e2e/tsconfig.e2e.json (213 bytes)
CREATE angular-lab1/e2e/src/app.e2e-spec.ts (308 bytes)
CREATE angular-lab1/e2e/src/app.po.ts (208 bytes)
[.....] / fetchMetadata: sill pacote range manifest for tsu
```

```
ng serve -o

D:\marcelomos\laboratorios\angular-inicio>ng serve -o
** Angular Live Development Server is listening on localhost:4200, open y
our browser on http://localhost:4200/ **

Date: 2019-04-10T15:46:44.361Z
Hash: 47dd6b853186bbd726bd
Time: 9098ms
chunk {es2015-polyfills} es2015-polyfills.js, es2015-polyfills.js.map (es
2015-polyfills) 284 kB [initial] [rendered]
```



```
ng serve -o --port 5000

D:\marcelomos\laboratorios\angular-inicio>ng serve -o --port 5000
** Angular Live Development Server is listening on localhost:5000, open y
our browser on http://localhost:5000/ **

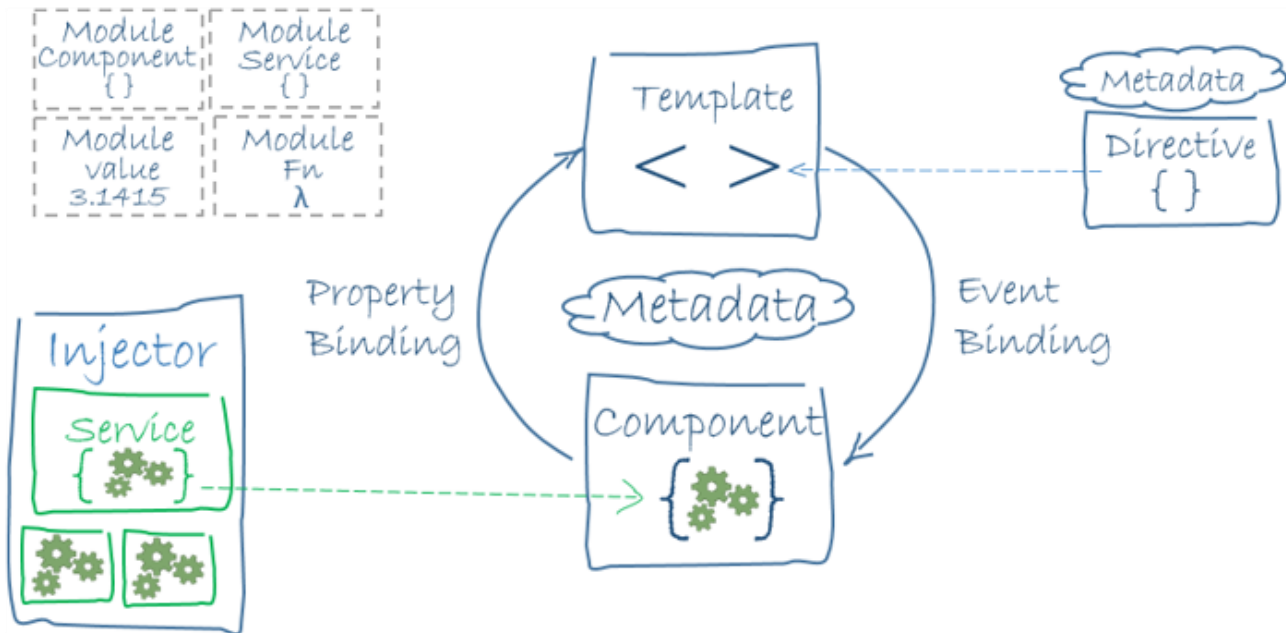
Date: 2019-04-10T16:58:21.975Z
Hash: 47dd6b853186bbd726bd
Time: 9311ms
chunk {es2015-polyfills} es2015-polyfills.js, es2015-polyfills.js.map (es
2015-polyfills) 284 kB [initial] [rendered]
```



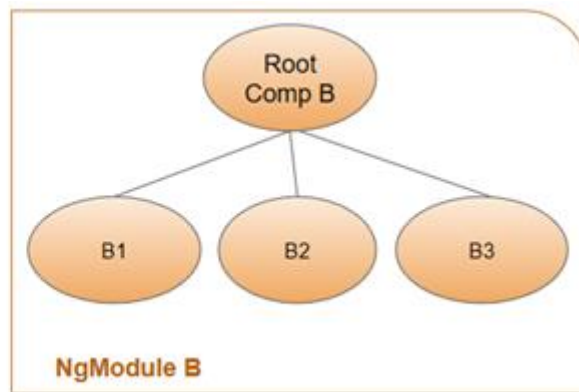
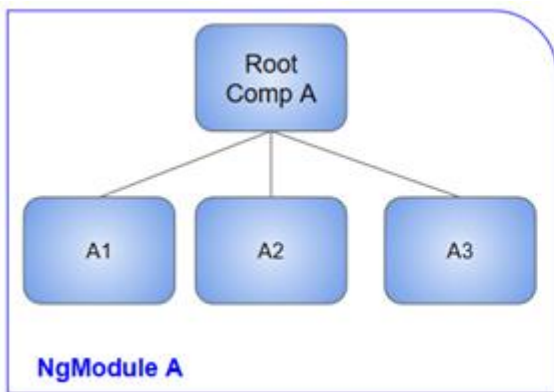
Estructura de archivos y carpetas de un proyecto en Angular

```
app.component.css  
app.component.html  
app.component.spec.ts  
app.component.ts  
app.module.ts
```

```
src  
├── app  
│   ├── app-routing.module.ts  
│   ├── app.component.css  
│   ├── app.component.html  
│   ├── app.component.spec.ts  
│   ├── app.component.ts  
│   └── app.module.ts  
├── assets  
├── environments  
├── browserslist  
├── favicon.ico  
├── index.html  
├── karma.conf.js  
├── main.ts  
├── polyfills.ts  
├── styles.css  
├── test.ts  
├── tsconfig.app.json  
├── tsconfig.spec.json  
└── tslint.json
```



NgModules components



Components



ng new angular-inicio

ng serve -o

npm install bootstrap

npm install jquery popper.js

/angular.json

```
"styles": [  
  "src/styles.css",  
  "node_modules/bootstrap/dist/css/bootstrap.min.css"  
],  
"scripts": [  
  "node_modules/jquery/dist/jquery.min.js",  
  "node_modules/popper.js/dist/popper.min.js",  
  "node_modules/bootstrap/dist/js/bootstrap.min.js"  
]
```



Alternativa CDN: <https://getbootstrap.com/docs/4.3/getting-started/introduction/>

/src/index.html

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>AngularInicio</title>
  <base href="/">

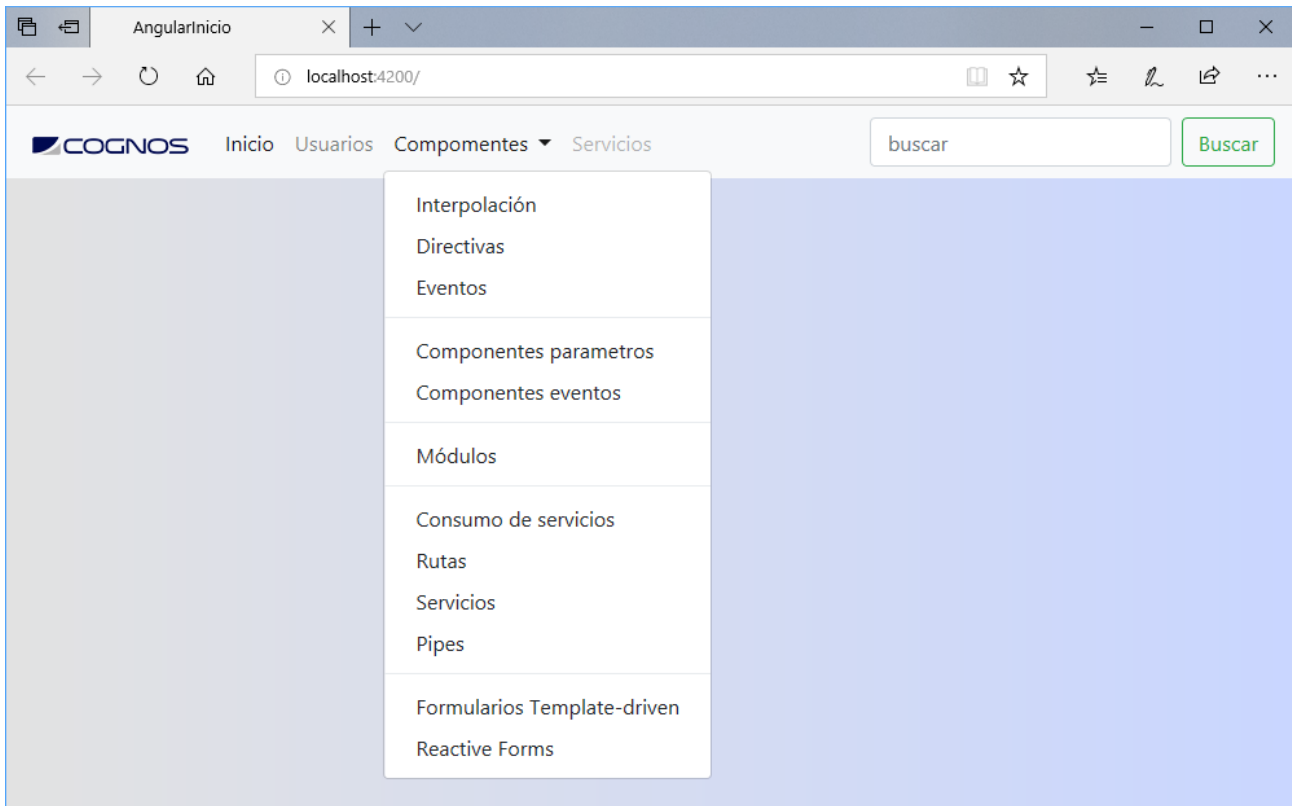
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="icon" type="image/x-icon" href="favicon.ico">

  <link rel="stylesheet" href="https://stackpath.bootstra-
pcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
    integrity="sha384-
gg0yR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T" crossorigin="anonymous">

</head>
<body>
  <app-root></app-root>

  <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js"
    integrity="sha384-q8i/X+965Dz00rT7abK41JStQIA-
qVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo"
    crossorigin="anonymous"></script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.7/umd/pop-
per.min.js"
    integrity="sha384-
U02eT0CpHqdsJQ6hJty5KVphtPhzWj9W01c1HTMGa3JDZwrnQq4sF86dIHNDz0W1"
    crossorigin="anonymous"></script>
  <script src="https://stackpath.bootstra-
pcdn.com/bootstrap/4.3.1/js/bootstrap.min.js"
    integrity="sha384-JjSmVgyd0p3pXB1rRibZUAYoIIy60rQ6VrjIE-
aFf/nJGzIxFDs4x0xIM+B07jRM"
    crossorigin="anonymous"></script>

</body>
</html>
```



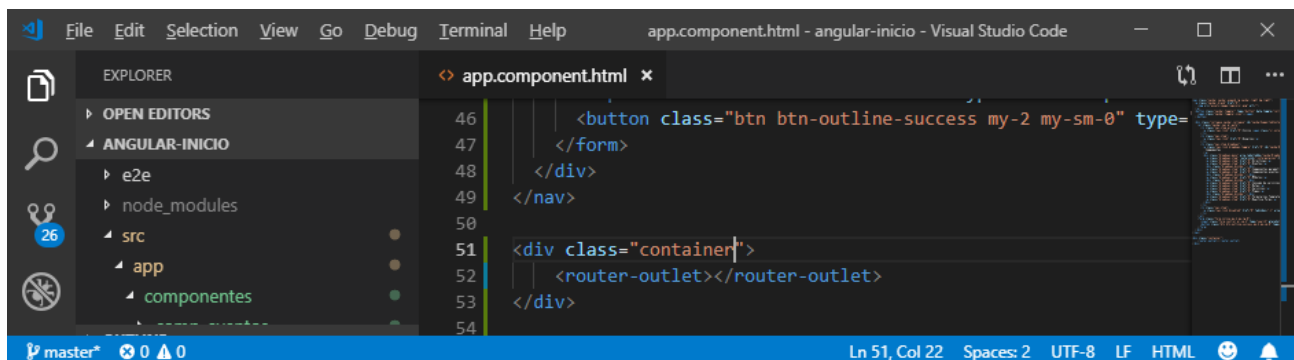
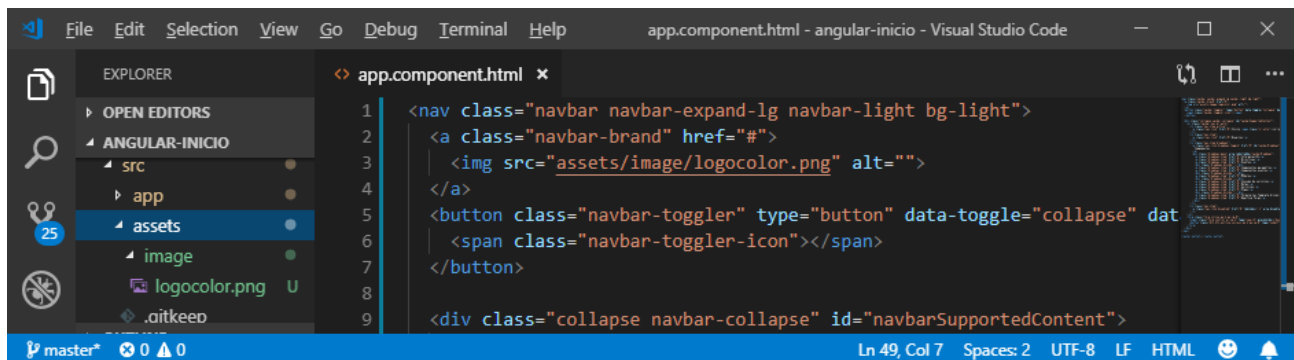
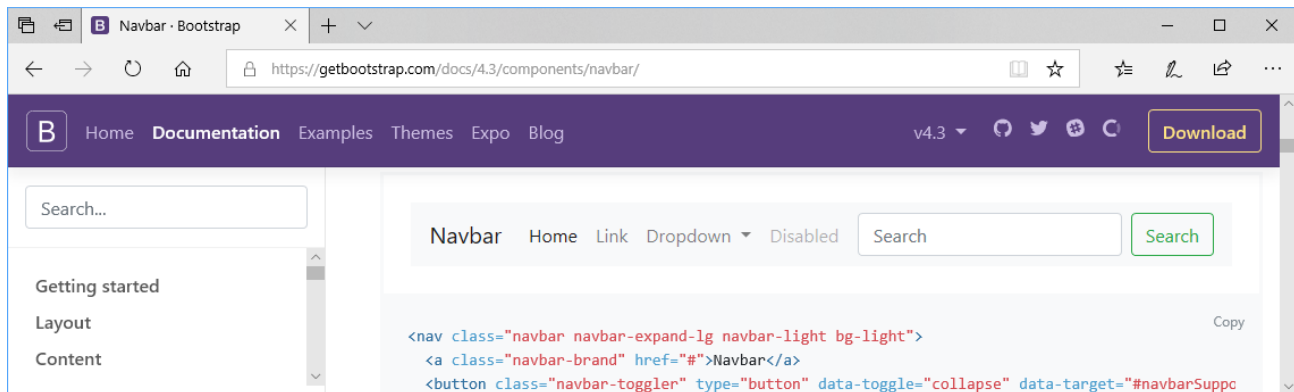
<https://uigradients.com/>

/src/styles.css

```
body{  
  background: #C9D6FF; /* fallback for old browsers */  
  background: -webkit-linear-gradient(to right, #E2E2E2, #C9D6FF); /* Chrome  
10-25, Safari 5.1-6 */  
  background: linear-gradient(to right, #E2E2E2, #C9D6FF); /* W3C, IE 10+/  
Edge, Firefox 16+, Chrome 26+, Opera 12+, Safari 7+ */  
}
```



<https://getbootstrap.com/docs/4.3/components/navbar/>



ng generate component <nombre-compomente>

```
C:\WINDOWS\system32\cmd.exe
^C
D:\marcelomos\laboratorios\angular-inicio>ng g c componentes/interpolacion
CREATE src/app/componentes/interpolacion/interpolacion.component.html (32 bytes)
CREATE src/app/componentes/interpolacion/interpolacion.component.spec.ts (677 bytes)
CREATE src/app/componentes/interpolacion/interpolacion.component.ts (297 bytes)
CREATE src/app/componentes/interpolacion/interpolacion.component.css (0 bytes)
UPDATE src/app/app.module.ts (515 bytes)

D:\marcelomos\laboratorios\angular-inicio>
```

```
C:\WINDOWS\system32\cmd.exe
D:\marcelomos\laboratorios\angular-inicio>ng g c componentes/comp-parametros
CREATE src/app/componentes/comp-parametros/comp-parametros.component.html (34 bytes)
CREATE src/app/componentes/comp-parametros/comp-parametros.component.spec.ts (685 bytes)
CREATE src/app/componentes/comp-parametros/comp-parametros.component.ts (304 bytes)
CREATE src/app/componentes/comp-parametros/comp-parametros.component.css (0 bytes)
UPDATE src/app/app.module.ts (851 bytes)

D:\marcelomos\laboratorios\angular-inicio>
```



Routes

/src/app/app-routing.module.ts

```
import { NgModule } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { InterpolacionComponent } from '../componentes/interpolacion/interpolacion.component';
import { EventosComponent } from '../componentes/eventos/eventos.component';
import { DirectivasComponent } from '../componentes/directivas/directivas.component';
import { CompParametrosComponent } from '../componentes/comp-parametros/comp-parametros.component';
import { CompEventosComponent } from '../componentes/comp-eventos/comp-eventos.component';

const routes: Routes = [
  { path: 'interpolacion', component: InterpolacionComponent },
  { path: 'eventos', component: EventosComponent },
  { path: 'directivas', component: DirectivasComponent },
  { path: 'comp-parametros', component: CompParametrosComponent },
  { path: 'comp-eventos', component: CompEventosComponent }
];

@NgModule({
  imports: [RouterModule.forRoot(routes)],
  exports: [RouterModule]
})
export class AppRoutingModule { }
```

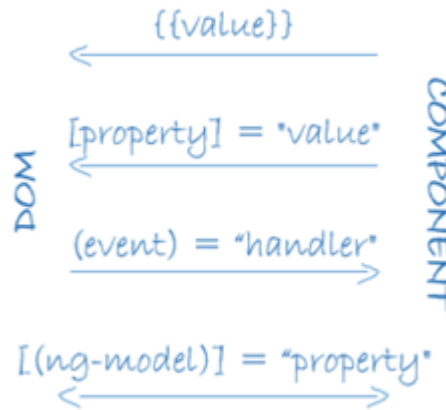
routerLink

`Interpolación`

/src/app/app.component.html

```
<div class="container">
  <router-outlet></router-outlet>
</div>
```

Interpolación



<https://angular.io/guide/template-syntax>

```
C:\WINDOWS\system32\cmd.exe

D:\marcelomos\laboratorios\angular-inicio>ng g class modelos/alumno
CREATE src/app/modelos/alumno.spec.ts (154 bytes)
CREATE src/app/modelos/alumno.ts (24 bytes)

D:\marcelomos\laboratorios\angular-inicio>
```

/src/app/modelos/alumno.ts

```
export class Alumno {

  doc_identidad: number;
  nombres: string;
  apellidos: string;
  email: string;

}
```




/src/app/componentes/interpolación/interpolación.component.ts

```
import { Component, OnInit } from '@angular/core';
import { Alumno } from 'src/app/modelos/alumno';

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

  alumno: Alumno = new Alumno();
  curso: string = 'ANGULAR 7';

  constructor() { }

  ngOnInit() {
    this.registrar();
  }

  registrar(){
    this.alumno = {
      doc_identidad: 123456,
      nombres: 'Ana',
      apellidos: 'Gomes',
      email: 'ana.gomez@test.com'
    };
  }

  generaNumero() {
    const numero: number = 123;
    return numero;
  }
}
```

/src/app/componentes/interpolación/interpolación.component.html

```
<div class="mt-2">
  <nav aria-label="breadcrumb">
    <ol class="breadcrumb">
      <li class="breadcrumb-item"><a href="#">Inicio</a></li>
      <li class="breadcrumb-item active" aria-current="page">Interpolación</li>
    </ol>
  </nav>
</div>

<div class="card mt-2">
  <div class="card-header">
    <h1>{{ curso }}</h1>
  </div>
  <ul class="list-group list-group-flush">
    <li class="list-group-item">{{ alumno.nombres }}</li>
    <li class="list-group-item">{{ alumno.apellidos }}</li>
    <li class="list-group-item">{{ alumno.email }}</li>
  </ul>
  <div class="card-footer text-muted">
    Número del día {{ generaNumero() }}
  </div>
</div>
```



The screenshot shows a web browser window with the address bar at `localhost:4200/interpolacion`. The page header includes the COGNOS logo and a navigation menu. The main content area displays 'ANGULAR 7' and a list of data: 'Ana', 'Gomes', 'ana.gomez@test.com', and 'Número del día 123'. The browser's developer console is open, showing a message: 'HTML1300: Navegación realizada. interpolacion (1,1)' and a warning: 'Angular is running in the development mode. Call enableProdMode() to enable the production mode.'



Eventos

/src/app/componentes/eventos/eventos.component.ts

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

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

  numero:number=0;
  rutaImagen:string;

  constructor() { }

  ngOnInit() {
  }

  generarAleatorio(){
    this.numero = Math.trunc(Math.random() * 10) + 1
  }

  incrementar(){
    this.numero++;
  }

  decrementar(){
    this.numero--;
  }
}
```

/src/app/componentes/eventos/eventos.component.html

```
<div class="mt-2">
  <nav aria-label="breadcrumb">
    <ol class="breadcrumb">
      <li class="breadcrumb-item"><a href="#">Inicio</a></li>
      <li class="breadcrumb-item active" aria-current="page">Eventos</li>
    </ol>
  </nav>
</div>

<div class="card mt-2">
  <div class="card-body text-center">
    <h1>{{numero}}</h1>
  </div>
  <div class="card-footer text-muted">
    <button class="btn btn-primary" (click)="generarAleatorio()">Generar Aleatorio</button>
    <button class="btn btn-secondary ml-2" (click)="ingrementar()">Incrementar</button>
    <button class="btn btn-info ml-2" (click)="decrementar()">Decrementar</button>
  </div>
</div>
```

The screenshot shows a web browser window with the address bar displaying `localhost:4200/eventos`. The browser tab is titled "AngularInicio". The application interface includes the "COGNOS" logo, a breadcrumb "Inicio / Eventos", and a large white box containing the number "9". Below the box are three buttons: "Generar Aleatorio" (blue), "Incrementar" (grey), and "Decrementar" (teal). The browser's developer console is open, showing a message: "HTML1300: Navegación realizada. eventos (1,1)". The console also displays a warning about Angular running in development mode.