IN4MATX 133: User Interface Software

Lecture 14: Separation in Angular

Professor Daniel A. Epstein
TA Jamshir Goorabian
TA Simion Padurean

Class notes

- A1 grades posted
    - Average ~9/10
    - Everyone got at least 1/3 for “spirit of the assignment”, top got 4/3 (max 11/10 total)
- If you have a 0 for A1, it means one of two things:
    - You didn’t submit an assignment, so a 0 would be expected
    - We couldn’t find your repository and/or connect it to your name.
      Email us a link to your repository and your UCI ID
        - There’s no penalty for this or for the same for A2. Just help us find it :-)

Class notes

- A3 is up
  - There will be a few updates to the starter code later today
  - Also some updates to the instructions to help resolve compilation issues
  - Discussion tomorrow will review HTTP requests and Angular binding

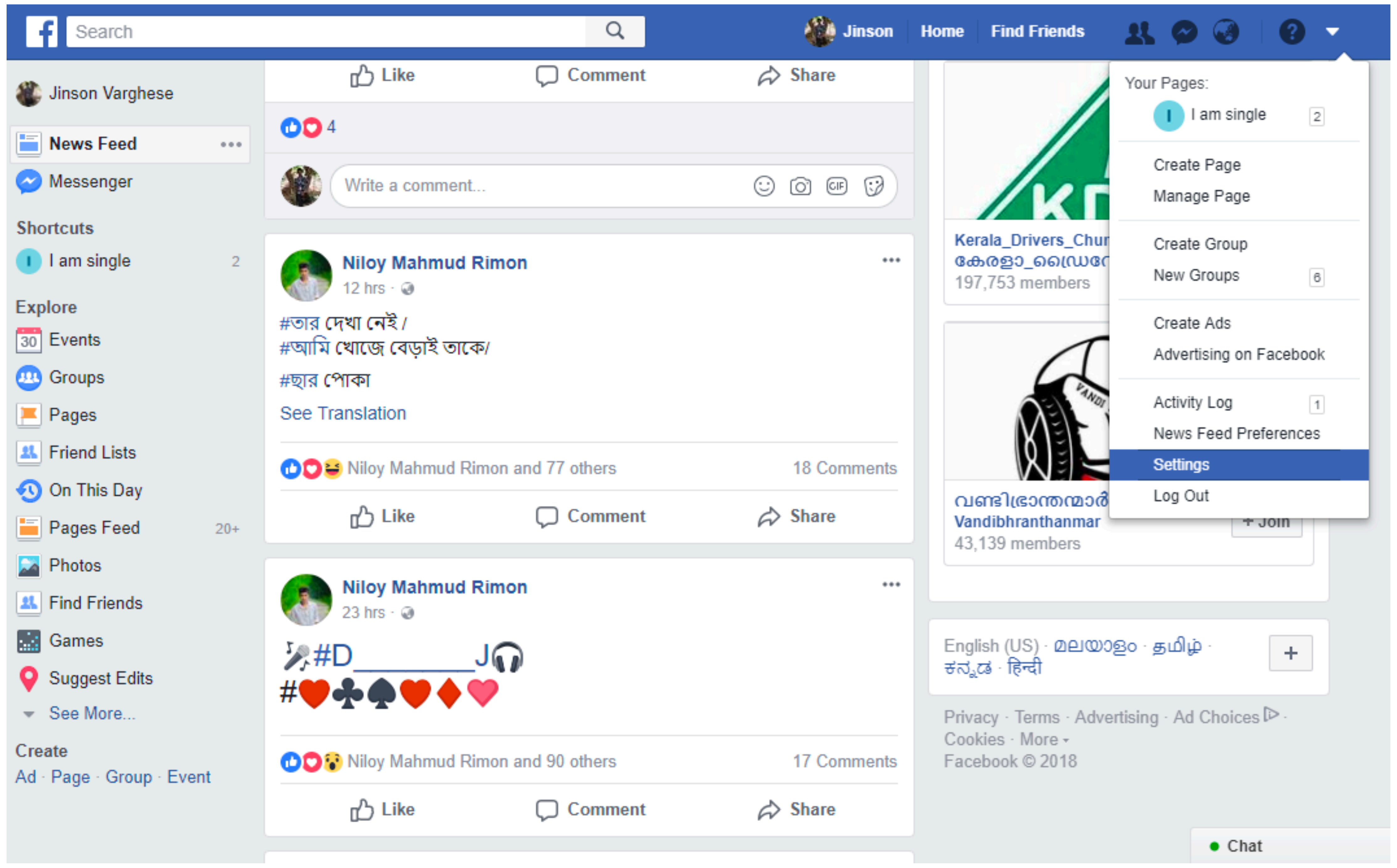
Today’s goals

By the end of today, you should be able to…

- Differentiate and explain the roles of Angular components, modules, and services
- Implement a service in Angular
- Navigate Angular’s file structure to get started

A “large” client interface

- Hundreds of pages and ways to navigate between pages
- Repeated UI elements (status updates)
  - Angular implements these as *components*
- Different content, links, etc. displayed for each person



Niloy Mahmud Rimon
12 hrs
#তার দেখা নেই /
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See Translation
Niloy Mahmud Rimon and 77 others · 18 Comments

Niloy Mahmud Rimon
23 hrs
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Niloy Mahmud Rimon and 90 others · 17 Comments

Kerala_Drivers_Chur
197,753 members

Vandibhranthanmar
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A “large” client interface

- Loading lots of libraries can be slow and expensive
- So Angular supports sectioning parts of projects into distinct modules

Angular modules

- Segment code into a library, similar to a JavaScript library
- A component only imports the modules it needs

Angular modules

- By default, each Angular app has one module, `app.module.ts`
- But an app can create multiple modules to section off code
- `ng generate module [name]`
- Modules can *import* other modules
- Modules also *declare* which components they use
  - When you create a new component (`ng generate component [name]`), it automatically gets added to the declarations for the root module

Angular modules

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';

import { AppRoutingModule } from './app-routing.module';
import { AppComponent } from './app.component';
import { HelloComponent } from './hello/hello.component';
import { DayComponent } from './day/day.component';

@NgModule({
  declarations: [ ⬅Components used
    AppComponent,
    HelloComponent,
    DayComponent
  ],
  imports: [      ⬅Modules to import
    BrowserModule,
    AppRoutingModule
  ],
  providers: [],
  bootstrap: [AppComponent] ⬅The “root” component of the module
})
export class AppModule { }
```

Angular modules

- `BrowserModule` is included by default
  - Required to run any app in the browser
- When creating an Angular project, can specify whether a *Routing* module should be created
  - Routing: defines what URIs to send to what endpoints
  - For Angular, defines what URIs to send to what components

Angular routing

app-routing.module.ts

```
import { NgModule } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { ArtistPageComponent } from './pages/artist-page/artist-page.component';
import { TrackPageComponent } from './pages/track-page/track-page.component';
import { AlbumPageComponent } from './pages/album-page/album-page.component';
import { HomePageComponent } from './pages/home-page/home-page.component';

const routes: Routes = [
  { path: 'artist/:id', component: ArtistPageComponent},
  { path: 'track/:id', component: TrackPageComponent},
  { path: 'album/:id', component: AlbumPageComponent},
  { path: '', component: HomePageComponent}
];

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

Listens for any endpoint `artist/:id`

`id` can be retrieved in `album-page.component.ts`

Retrieving route in a component

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

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

  constructor(private route: ActivatedRoute) { }

  ngOnInit() {
   var albumId = this.route.snapshot.paramMap.get('id');
  }

}
```

“Injecting a service”

Retrieve the id from the URI

Angular services

- Anything not associated with a specific view should be turned into a *service*
  - e.g., getting data from an API, parsing URIs for routing information
- Helps keep components lightweight
- Services can then be *injected* into a component (importing)
- To inject, import the service and retrieve it as a parameter in the constructor
- `ng generate service [name]`

Angular services

```
import { Component, OnInit } from '@angular/core';
import { ActivatedRoute } from '@angular/router';
```
Importing a service

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

  constructor(private route: ActivatedRoute) { }
```
Injecting it

```
  ngOnInit() {
   var albumId = this.route.snapshot.paramMap.get('id');
  }
}
```
Service can be referenced later

Angular services

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

Defined as injectable

```
import { HttpClient, HttpHeaders } from '@angular/common/http';
```

Services can inject other services!

```
@Injectable({
  providedIn: 'root'
```

What module(s) can use this service

```
})
export class SpotifyService {
 baseUrl:string = 'http://localhost:8888';

  constructor(private http:HttpClient) { }
```

HttpClient injected

```
  private sendRequestToExpress(endpoint:string) {
  }
}
```

Import a custom service

```
import { Component, OnInit } from '@angular/core';
import { ActivatedRoute } from '@angular/router';
import { SpotifyService } from '../../services/spotify.service';
```

Import service via file structure

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

  constructor(private route: ActivatedRoute,
private spotifyService:SpotifyService) { }
```

Inject it like any other service

Question

Which of these is best implemented as a *module*, *service*, and *component*?

1. A library which communicates with Snapchat's database
2. The interface and packages needed to create and send a Snap
3. The interface and interaction for putting text on a Snapped photo

- (A) (1) Service, (2) Component, (3) Component
- (B) (1) Service, (2) Module, (3) Component
- (C) (1) Service, (2) Module, (3) Module
- (D) (1) Module, (2) Service, (3) Component
- (E) (1) Module, (2) Module, (3) Module

Angular classes

- Plain-old classes can also be made in Angular
    - Any processing or munging you need to do, for example
- `ng generate class [name]`

```
export class Dataparser {
 public constructor() {
  console.log('Hello, world!');
 }
}
```

Import a class

```
import { Component, OnInit, Input } from '@angular/core';
import { Dataparser } from '../dataparser';

@Component({
  selector: 'app-day',
  templateUrl: './day.component.html',
  styleUrls: ['./day.component.css']
})
export class DayComponent implements OnInit {
  @Input() today:string;

  days = ["Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"];

  constructor() {
    var data = new Dataparser();
  }

  ngOnInit() {
  }
}
```

Import class via file structure

Instantiate it like any other class

Import a library

- Since Angular is in TypeScript, it can use any JavaScript or TypeScript library
- Install as normal with npm: `npm install [packagename]`
  - If you want TypeScript typings, don’t forget to install `@types/[packagename]`

Import a library

- Since Angular is in TypeScript, it can use any JavaScript or TypeScript library
- Install as normal with npm: `npm install [packagename]`
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Import a library

```
import * as chroma from 'chroma-js';
```

Note: different syntax

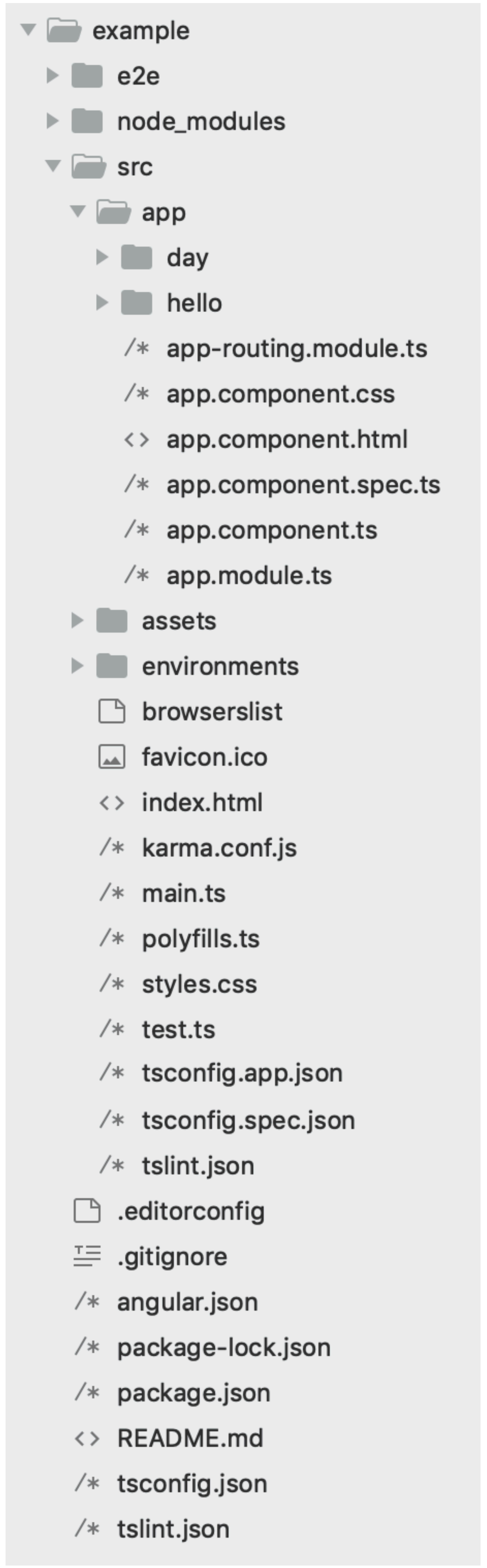
```
export class Dataparser {

  constructor() {
   console.log(chroma('royalblue')); //‘#4169e1’
  }
}
```

Can now be referenced

Angular's file structure

- Angular projects generate a *lot* of files
  - There are about 75 in the starter code for A3
- Most are boilerplate



```
example
  e2e
  node_modules
  src
    app
      day
      hello
      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
  .editorconfig
  .gitignore
  angular.json
  package-lock.json
  package.json
  README.md
  tsconfig.json
  tslint.json
```

[Live walkthrough of Angular's structure]

Assignment partners

- We’re not going to create pairs because there’s a long list of properties which go into creating a good match; most of which we don’t know
  - Programming background/interest (frontend, backend, user experience, etc.)
  - Schedule and other commitments
  - Preferred working style (in-person, remote, etc.)

Good questions to ask an assignment partner

- When do you normally work (morning, afternoon, evening, late evening)?
- Do you live on campus? Near campus?
- Would you prefer meeting up in-person or online?
- Are you interested in frontend development, backend development, user experience, etc.?
- What’s the minimum grade you would be comfortable receiving on this assignment?

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