Chapter 1: Getting Started

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: [   ] Verify Restart

No of guesses : 0

Your Guess: 444 Verify Restart

Your guess is higher.

No of guesses : 6 ← noOfTries changes with each guess

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: [   ] Verify Restart

Your guess is higher.

Your guess is lower.

Yes! That's it.

No of guesses : 0

View Template

After Data Binding

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: [   ] Verify Restart

No of guesses : 0

Rendered View

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: [   ]   **Verify**   **Restart**   ← property binding

No of guesses : **0**   `<input type="number" [value]="guess" (input)="guess = $event.target.value" />`

Elements | **Network** | **Sources** | **Timeline** | **Profiles** | **Resources** | **Audits** | **Console** | **AngularJS** | **KnockoutJS**

app.ts ×

```
30  class GuessTheNumberComponent {
31    deviation: number;
32    noOfTries: number;
33    original: number;
34    guess: number;
35
36    constructor() {
37      this.initializeGame();
38    }
39    verifyGuess() {
40      this.deviation = this.original - this.guess;
41      this.noOfTries = this.noOfTries + 1;
42    }
43    initializeGame() {
44      this.noOfTries = 0;
45      this.original = Math.floor((Math.random() * 1000) + 1);
46      this.guess = null;
47      this.deviation = null;
48    }
49  }
50
51  bootstrap(GuessTheNumberComponent);
52  |
```

Methods operate on properties

Paused in debugger ▶ ↻

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: 6   Verify   Restart

No of guesses : **0**

Elements | **Console** | **Sources** | **Network** | **Timeline** | **Profiles** | **Resources** | **Audits** | **KnockoutJS** | **AngularJS**

Sourc... | Cont... | Snipp... | (index) | app.ts ×

- (no domain)
- 127.0.0.1:8080
  - (index)
  - app.ts
  - app.ts!transpiled
- aadgmnobpdmgmigai
- code.angularjs.org
- netdna.bootstrapcdn.c

```
28    noOfTries: number;
29    original: number;
30    guess: number;
31
32    constructor() {
33      this.initializeGame();
34    }
35    verifyGuess() {
36      this.deviation = this.original - this.guess;
37      this.noOfTries = this.noOfTries + 1;
38    }
39    initializeGame() {
40      this.noOfTries = 0;
41    
```

{} Line 38, Column 3

▼ Watch
  this.noOfTries: 1
  this.original: 735
  this.guess: "6"
  this.deviation: 729
► Call Stack
► Scope
► Breakpoints
► DOM Breakpoints
► XHR Breakpoints
► Event Listener Breakpoints
► Event Listeners

Guess the Number !

Guess the computer generated random number between 1 and 1000.

Your Guess: 6   Verify   Restart

Your guess is lower.

No of guesses : 1


```
28   noOfTries: number;
29   original: number;
30   guess: number;
31
32   constructor() {
33     this.initializeGame();
34   }
35   verifyGuess() {
36     this.deviation = this.original - this.guess;
37     this.noOfTries = this.noOfTries + 1;
38   }
39   initializeGame() {
40     this.noOfTries = 0;
41     this.original = Math.floor((Math.random() * 1000) + 1);
```

Watch
this.noOfTries: 1
this.original: 735
this.guess: "6"
this.deviation: 729

Chapter 2: Building Our First App-7 Minute Workout

```
Current Exercise: {
  "exercise": {
    "name": "jumpingJacks",
    "title": "Jumping Jacks",
    "description": "A jumping jack or star jump, also called side-
    "image": "JumpingJacks.png",
    "nameSound": "",
    "procedure": "Assume an erect position, with feet together and
inches into the air.\n                        While in air, br
 you are moving your legs outward, you should raise your arms up o
         Your feet should land shoulder width or wider as your h
    "videos": [
      "dmYwZH_BNd0",
      "BABOdJ-2Z6o",
      "c4DAnQ6DtF8"
    ]
  },
  "duration": 30
}
```

```
Time Left: 28
```

Jumping Jacks

Time Remaining: 17

Steps

Assume an erect position, with feet together and arms at your side
 Slightly bend your knees, and propel yourself a few inches into the air
 While in air,
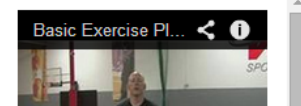
Description

A jumping jack or star jump, also called side-straddle hop is a

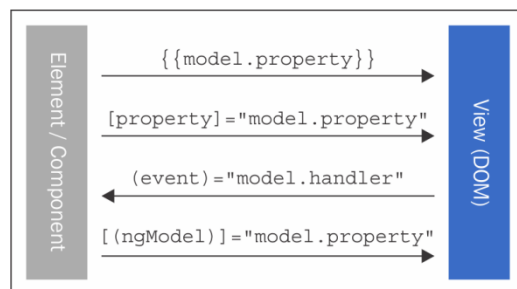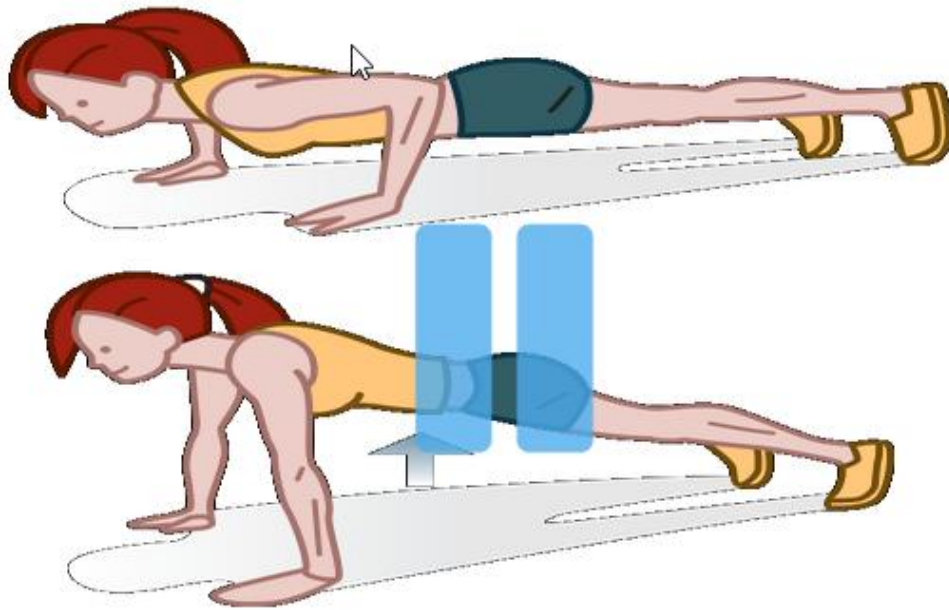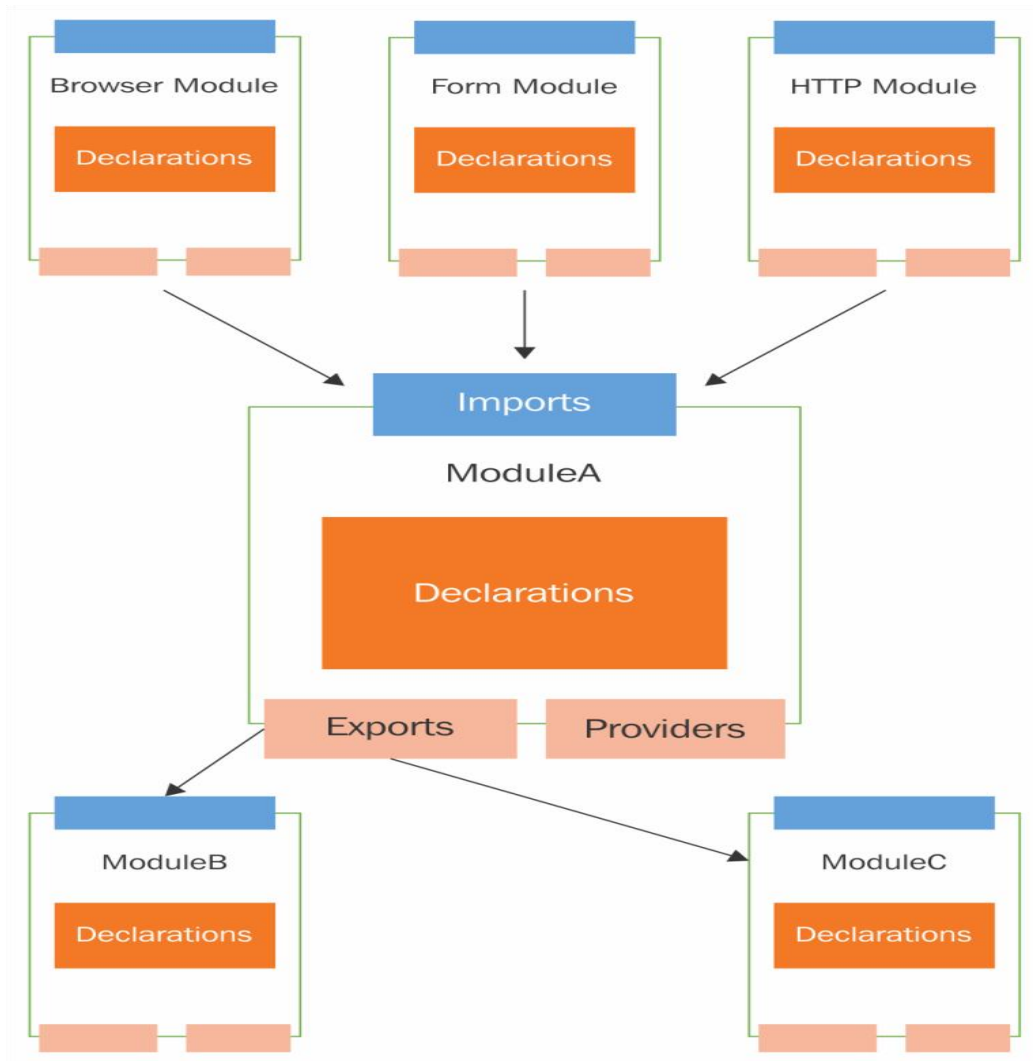Workout Remaining - **00:07:38**

Jumping Jacks

Videos

Basic Exercise Pl...

Time Remaining: **3**

Next up: **Wall Sit**

Push Up

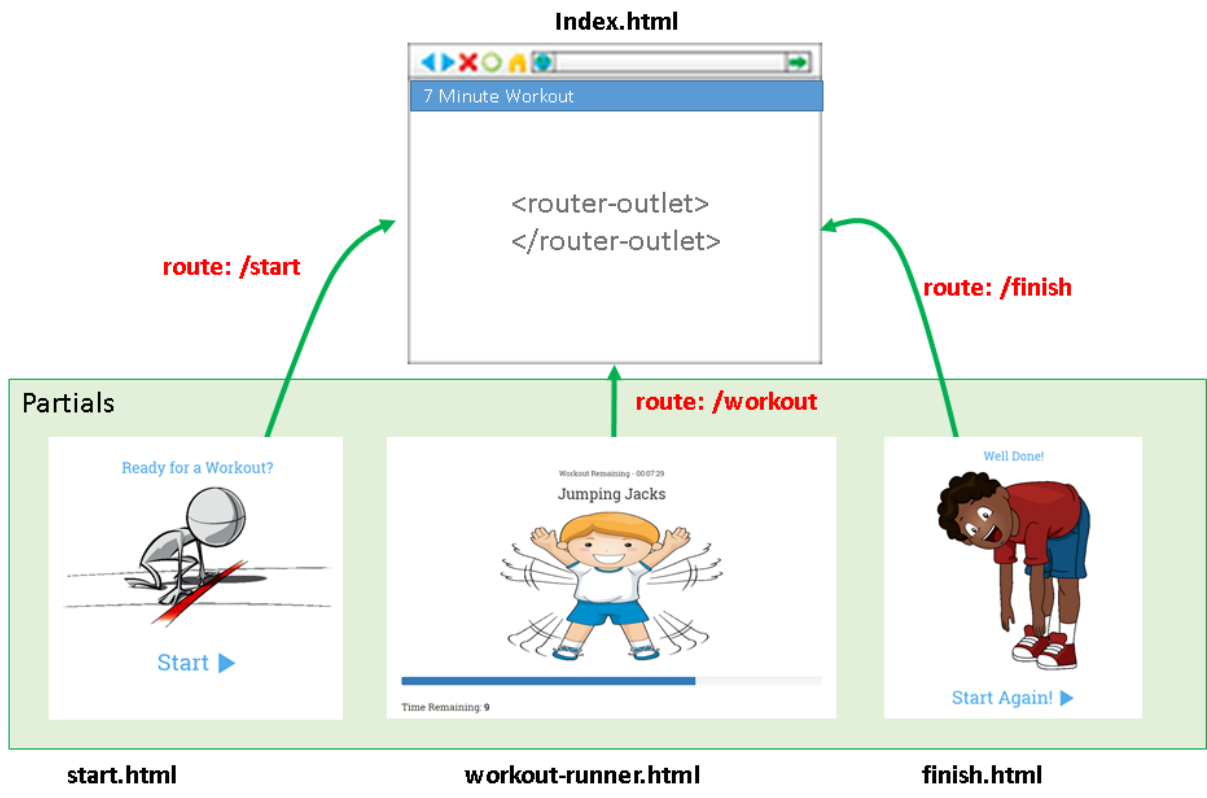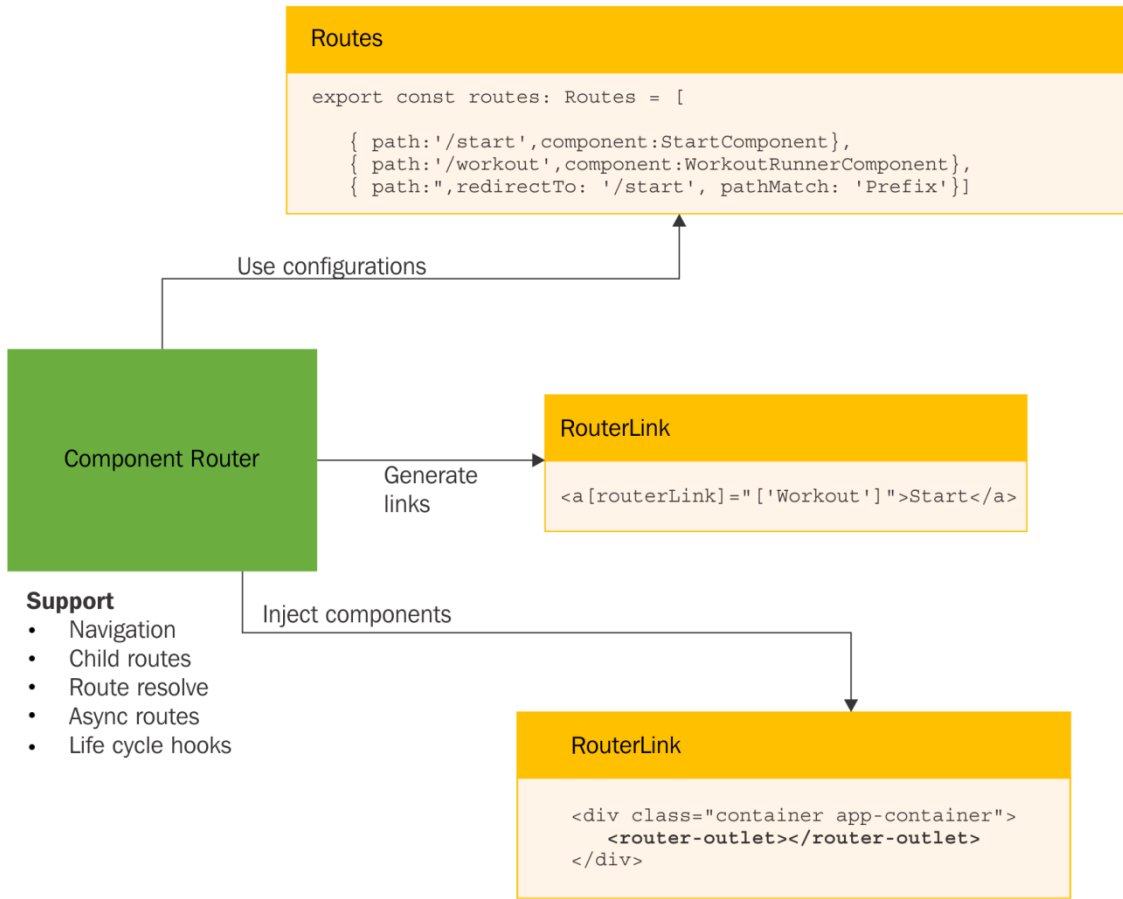| Element / Component		View (DOM)
	`{{model.property}}` →	
	`[property]="model.property"` →	
	← `(event)="model.handler"`	
	`[(ngModel)]="model.property"` →	

Chapter 3: More Angular 2 – SPA, Routing, and Data Flows in Depth

Routes

```
export const routes: Routes = [

    { path:'/start',component:StartComponent},
    { path:'/workout',component:WorkoutRunnerComponent},
    { path:'',redirectTo: '/start', pathMatch: 'Prefix'}]
```

Use configurations

Component Router

Generate links

RouterLink

```
<a[routerLink]="['Workout']">Start</a>
```

Support
- Navigation
- Child routes
- Route resolve
- Async routes
- Life cycle hooks

Inject components

RouterLink

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

Index.html

7 Minute Workout

```
<router-outlet>
</router-outlet>
```

route: /start

route: /finish

route: /workout

Partials

Ready for a Workout?

Start ▶

Workout Remaining - 00:07:29

Jumping Jacks

Time Remaining: 9

Well Done!

Start Again! ▶

start.html

workout-runner.html

finish.html

7 Minute Workout

History

All Workouts:

No	Started	Ended	Last Exercise	Exercises Done	Completed
1	1/10/2016, 9:49 AM	1/10/2016, 9:57 AM	Side Plank	12	Yes
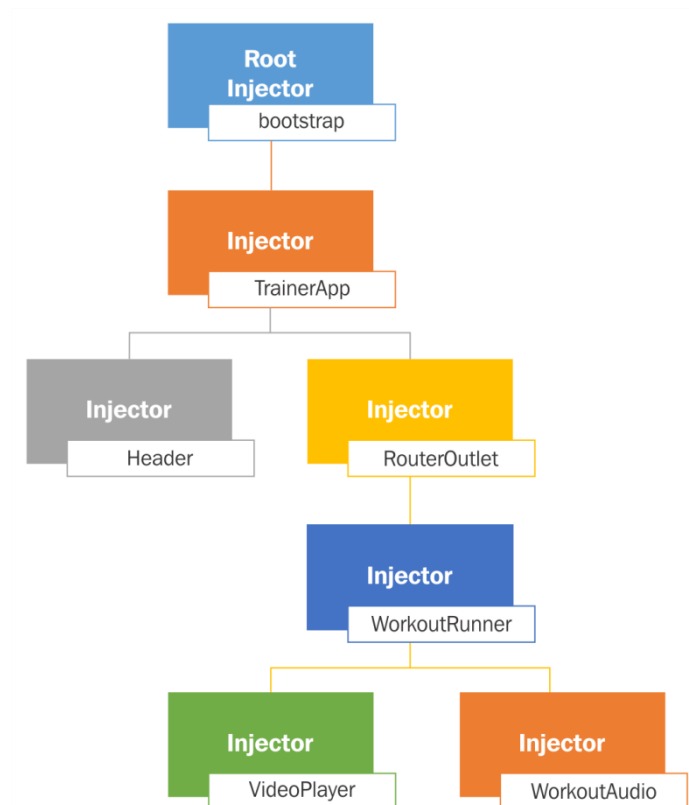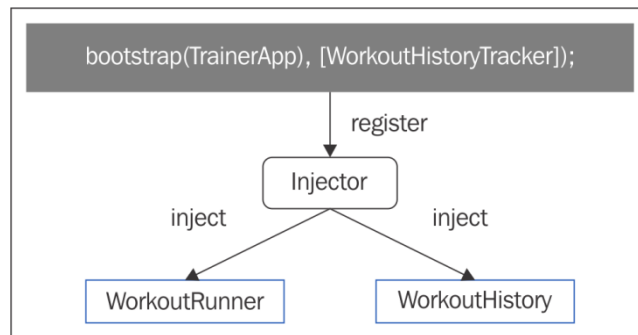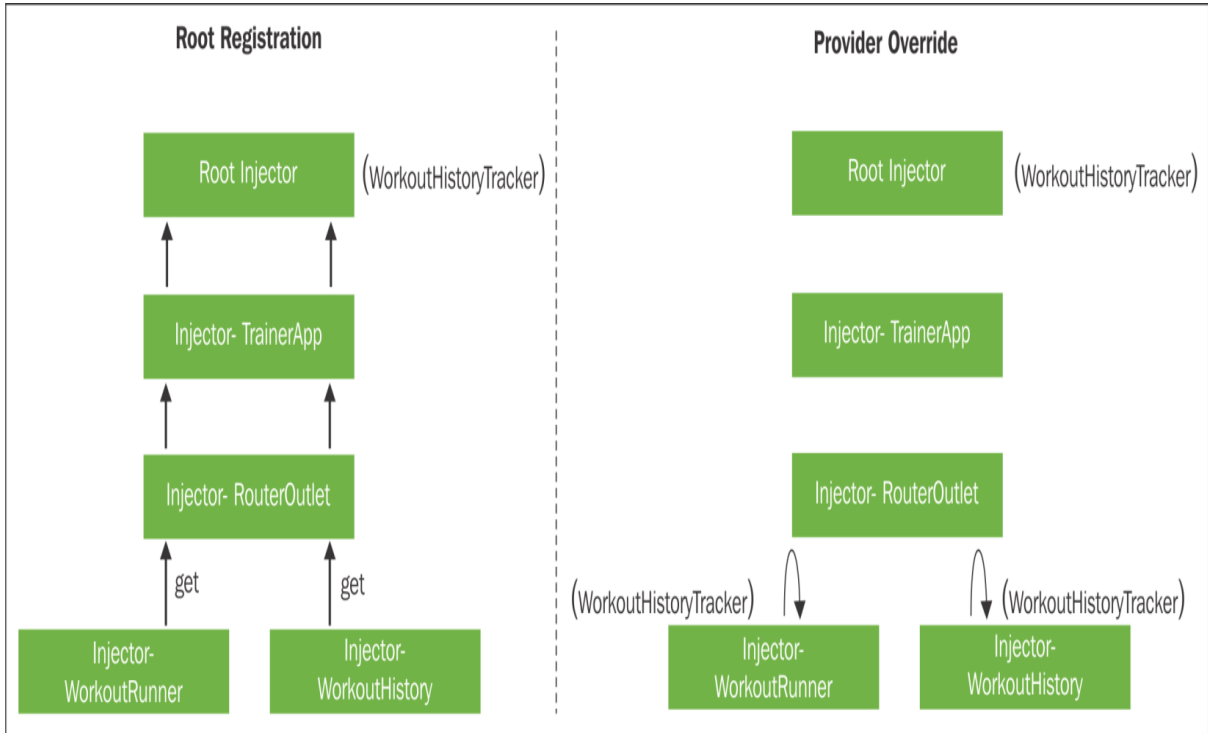
Chapter 4: Personal Trainer

Ready for a Workout?
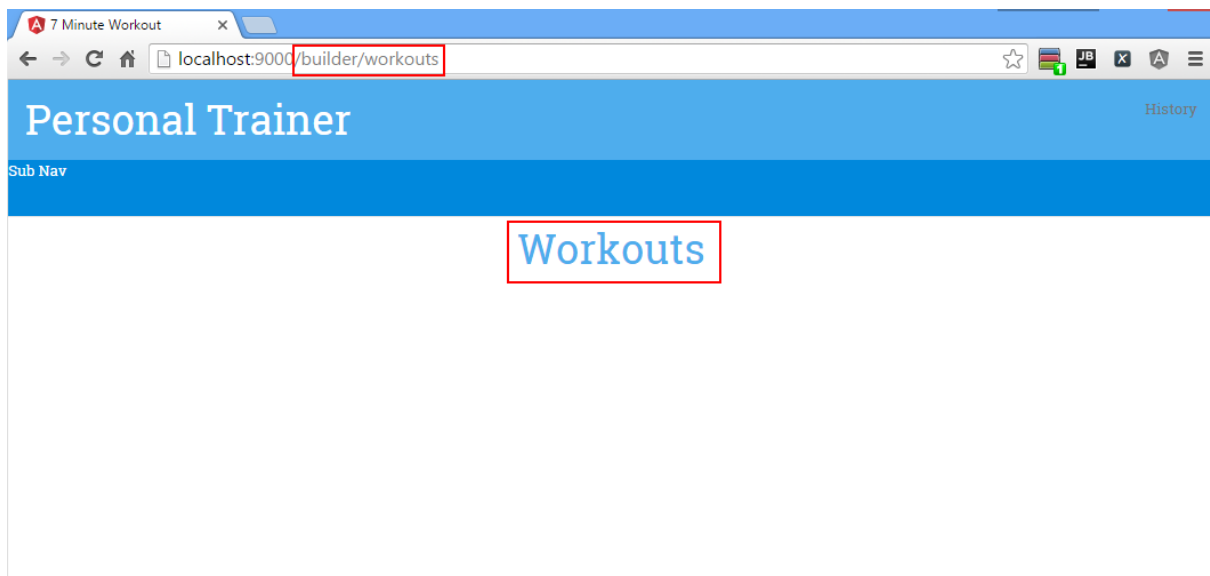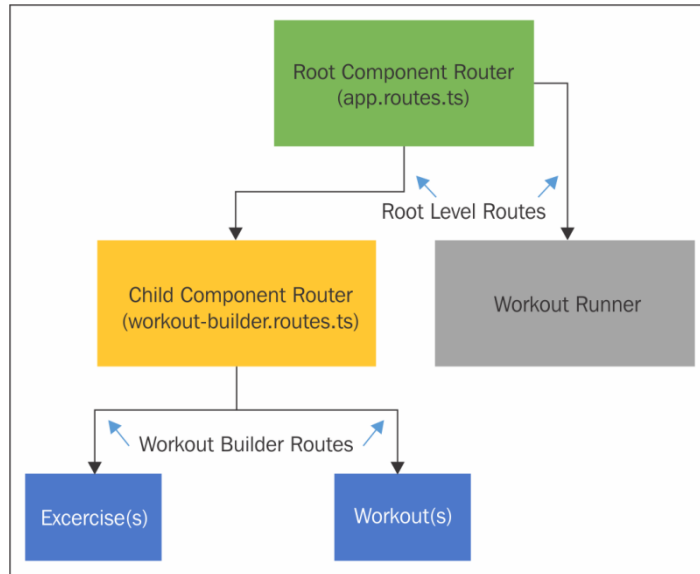
Select Workout ▶
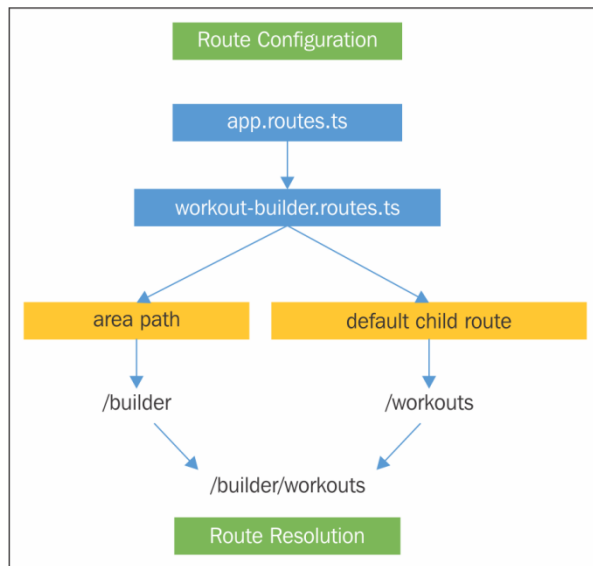
Create a Workout ✚

Personal Trainer   History

Workout Builder

```
▼ ☁ localhost:9000
   ▶ 📁 dist
   ▶ 📁 node_modules
   ▶ 📁 static/css
   ▼ 📁 source
      ▼ 📁 components
         ▶ 📁 app
         ▶ 📁 finish
         ▶ 📁 shared
         ▶ 📁 start
         ▼ 📁 workout-builder
            ▼ 📁 exercise
                  📄 exercise.component.ts
            ▼ 📁 exercises
                  📄 exercises.component.ts
            ▼ 📁 navigation
                  📄 left-nav-exercises.component.ts
                  📄 left-nav-main.component.ts
                  📄 sub-nav.component.ts
            ▼ 📁 workout
                  📄 workout.component.ts
            ▼ 📁 workouts
                  📄 workouts.component.ts
            📄 workout-builder.component.ts
            📄 workout-builder.module.ts
            📄 workout-builder.routes.ts
         ▶ 📁 workout-history
         ▶ 📁 workout-runner
```

▼ ☁ localhost:9000
  ▶ 📁 dist
  ▶ 📁 node_modules
  ▶ 📁 static
  ▼ 📁 source
    ▼ 📁 components
      ▶ 📁 app
      ▶ 📁 finish
      ▶ 📁 shared
      ▶ 📁 start
      ▶ 📁 workout-history
      ▶ 📁 workout-runner
        📄 base-dynamic-component.ts
        📄 css-backdrop.ts
        📄 css-dialog-container.ts
        📄 swap-component.directive.ts
    ▶ 📁 framework
    ▶ 📁 models
    ▶ 📁 overlay
    ▶ 📁 plugins/bootstrap
    ▶ 📁 providers
    ▶ 📁 services
      📄 angular2-modal.module.ts
      📄 bootstrap.ts
  📄 start

Name	Method▲	Status	Type	Initiator	Size	Time	Timeline
workout-builder.module.js	GET	200	xhr	zone.js:1274	7.0 KB	3 ms	
exercise.component.js	GET	200	xhr	zone.js:1274	2.8 KB	5 ms	
exercises.component.js	GET	200	xhr	zone.js:1274	2.8 KB	5 ms	
left-nav-exercises.component.js	GET	200	xhr	zone.js:1274	2.9 KB	6 ms	
left-nav-main.component.js	GET	200	xhr	zone.js:1274	2.9 KB	6 ms	
sub-nav.component.js	GET	200	xhr	zone.js:1274	2.8 KB	6 ms	
workout-builder.component.js	GET	200	xhr	zone.js:1274	3.2 KB	6 ms	
workout.component.js	GET	200	xhr	zone.js:1274	2.8 KB	4 ms	
workouts.component.js	GET	200	xhr	zone.js:1274	2.8 KB	4 ms	
workout-builder.routes.js	GET	200	xhr	zone.js:1274	5.3 KB	4 ms	
workout.component.html	GET	200	xhr	zone.js:1274	461 B	6 ms	
workouts.component.html	GET	200	xhr	zone.js:1274	452 B	5 ms	
exercise.component.html	GET	200	xhr	zone.js:1274	449 B	5 ms	
exercises.component.html	GET	200	xhr	zone.js:1274	453 B	3 ms	
sub-nav.component.html	GET	200	xhr	zone.js:1274	728 B	3 ms	
left-nav-exercises.component.html	GET	200	xhr	zone.js:1274	335 B	3 ms	
left-nav-main.component.html	GET	200	xhr	zone.js:1274	571 B	3 ms	

Personal Trainer

Sub Nav

Workouts

Personal Trainer

🏠 Home | ➕ New Workout | ➕ New Exercise

Exercise

Personal Trainer

🏠 Home | ➕ New Workout | ➕ New Exercise

| Workouts |
| Exercises |
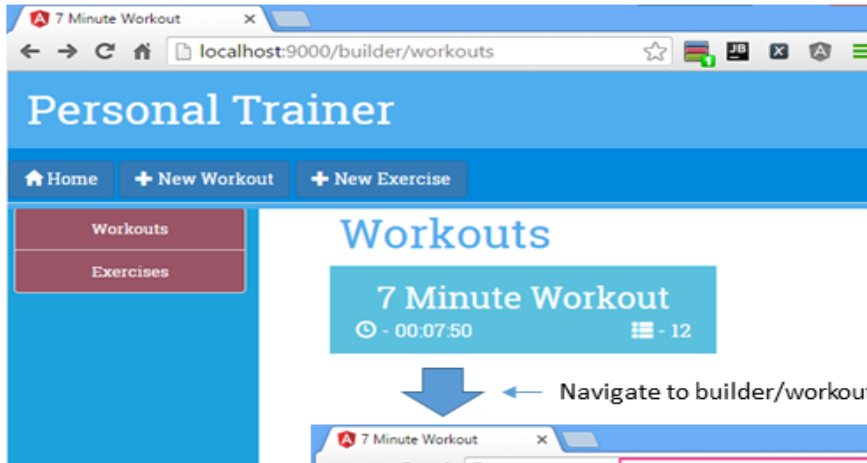
Workouts

Navigate to builder/workout/{workout name}

Personal Trainer

A Home **+ New Workout** **+ New Exercise**

Exercises

- Abdominal Crunches ›
- High Knees ›
- Jumping Jacks ›
- Lunges ›
- Plank ›
- Pushup And Rotate ›
- Side Plank ›
- Squat ›
- Step Up Onto Chair ›
- Tricep Dips On Chair ›
- Wall Sit ›

7 Minute Workout

Jumping Jacks

1

30 seconds

Wall Sit

2

WALL SIT

30 seconds

Name:

7MinWorkout

Title:

7 Minute Workout

Description:

Enter workout description.

Rest Time (in seconds):

10

Total Exercises: 11

Total Duration: 00:07:10

Save

Name:

7minwork

7minwork

Name:

Enter workout name. Must be unique.

form-control ng-untouched ng-pristine ng-invalid

Name:

My New Workout

form-control ng-dirty ng-valid ng-touched

Name:

Enter workout name. Must be unique.

Name is required

My New Workout

The workout should have at least one exercise!

Workout Title

The workout should have at least one exercise!

Name:

Enter workout name. Must be unique.

Name is required

Title:

What would be the workout title?

Title is required.

Description:

Enter workout description.

Rest Time (in seconds):

0

Rest time is required

Total Exercises: 0

Total Duration:

Save

Personal Trainer

Abdominal Crunches

Name:

crunches

Title:

Abdominal Crunches

Description:

The basic crunch is a abdominal exercise in a strength-training

Exercise Steps:

Lie on your back with your knees bent and feet flat on the floor, hip-

Exercise Audio:

crunches.wav

Exercise Image (Will be scaled to: 540 X 360 px):

crunches.png

Videos:

Xyd_fa5zoEU   🗑

MKmrqcoCZ-M   🗑

Add Video

Save

Videos:

Xyd_fa5zoEU   🗑

MKmrqcoCZ-M   🗑

Add a related youtube video identified.   🗑

Add Video

Name:

a workout

Name must be alphanumeric

Chapter 5: Supporting Server Data Persistence

NAME	DOCUMENTS	CAPPED?	SIZE
exercises	12	false	19.30 KB
workouts	1	false	8.97 KB

7 Minute Workout
🕐 - 00:00:00   ▤ - 12

Model

```
WorkoutPlan {
  "name": "7minworkout",
  "title": "7 Minute Workout",
  "description": "A high intensity ...",
  "restBetweenExercise": 10
  "exercises": [
    { Exercise, "duration": 30 },
    { Exercise, "duration": 30 },
    ...
    { Exercise, "duration": 30 },
  ];
  totalWorkoutDuration(): number {...}
}
```

```
Exercise {
    name = "jumpingJacks"
    title = "Jumping Jacks"
    . . .
}
```

Server data

```
WorkoutPlan {
  "_id": "7minworkout",
  "name": "7minworkout",
  "title": "7 Minute Workout",
  "description": "A high intensity ...",
  "restBetweenExercise": 10
  "exercises": [
    {"name": "jumpingJacks", "duration": 30 },
    {"name": "wallSit", "duration": 30 },
    ...
    {"name": "pushUp", "duration": 30 }
  ]
}
```

7 Minute Workout
🕐 - 470   ▤ - 12

Name	Method	Status
7minworkout?apiKey=9xfT :ll Kha azv9I_8 vCzo5kg exx	OPTIONS	200
7minworkout?apiKey=	PUT	200
workouts?apiKey=9xf Wt Kha azv9I_8 vCzo5kg exx	GET	200

Workouts

Exercises

Workouts

Could not load the specific workout!

Chapter 6: Angular 2 Directives in Depth

Name:

7minworkout

A workout with this name already exists.

⟳ Save

```
<ajax-button [execute]="save" [parameter]="f">
   <span class="glyphicon glyphicon-refresh
         spin" data-animator></span>
   <span data-content>Save</span>
</ajax-button>
```
Component Use

Content injected

```
<button [attr.disabled]="busy" ...>
  <span [hidden]="!busy">
    <ng-content select="[data-animator]">
    </ng-content>
  </span>
  <ng-content select="[data-content]">
  </ng-content>
</button>
```
Component View

View Rendered

```
<ajax-button>
  <button class="btn btn-primary">
    <span>
      <span class="glyphicon glyphicon-refresh spin"
        data-animator="">
      </span>
    </span>
    <span data-content="">Save</span>
  </button>
</ajax-button>
```
⟳ Save

▶ ───○──────── 0:00 🔊 ────────○
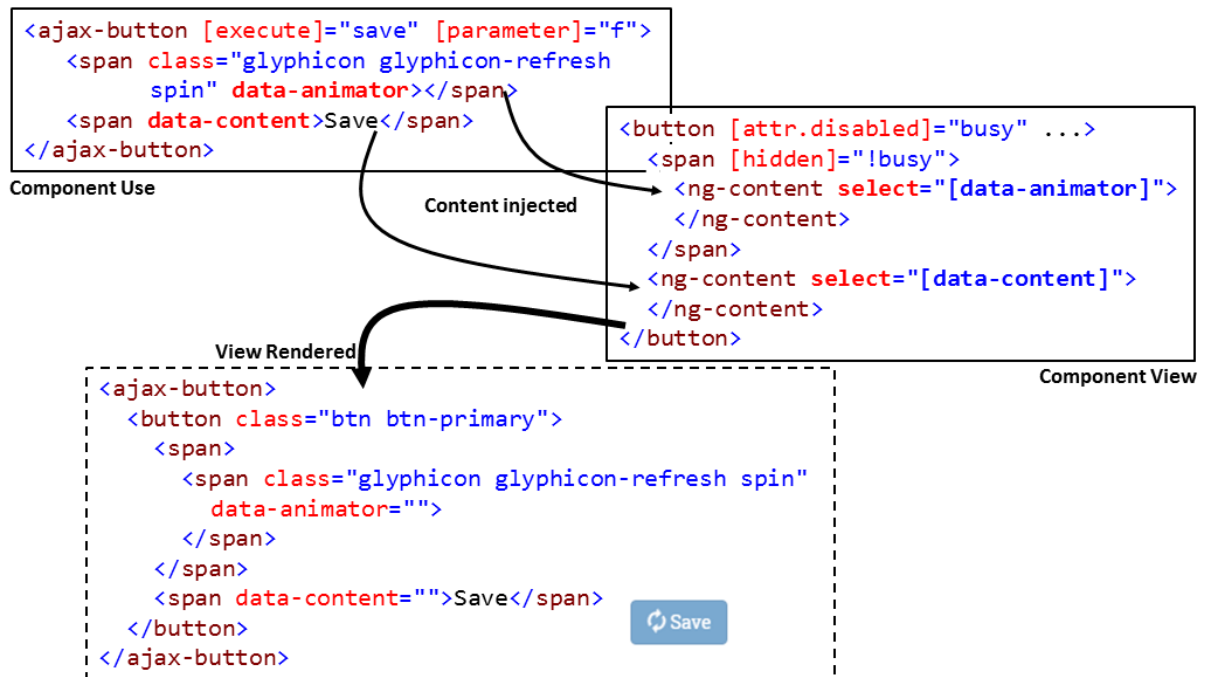
Elements

Color format: As authored ▾

☑ Show user agent shadow DOM

☑ Word wrap

☐ Show rulers

```html
▼<audio controls src="/static/audio/nextup.mp3">
  ▼#shadow-root (user-agent)
    ▼<div pseudo="-webkit-media-controls">
      ▼<div pseudo="-webkit-media-controls-overlay-enclosure">
        ▶<input type="button" style="display: none;">…</input>
        </div>
      ▼<div pseudo="-webkit-media-controls-enclosure">
        ▼<div pseudo="-webkit-media-controls-panel">
          ▶<input type="button" pseudo="-webkit-media-controls-play-button">…</input>
          ▶<input type="range" step="any" pseudo="-webkit-media-controls-timeline" max="0.972">…</input>
            <div pseudo="-webkit-media-controls-current-time-display" style>0:00</div>
            <div pseudo="-webkit-media-controls-time-remaining-display" style="display: none;">0:00</div>
          ▶<input type="button" pseudo="-webkit-media-controls-mute-button">…</input>
          ▶<input type="range" step="any" max="1" pseudo="-webkit-media-controls-volume-slider" style>…</input>
          ▶<input type="button" pseudo="-webkit-media-controls-toggle-closed-captions-button" style="display: none;">…</input>
          ▶<input type="button" style="display: none;">…</input>
          ▶<input type="button" pseudo="-webkit-media-controls-fullscreen-button" style="display: none;">…</input>
          </div>
        </div>
      </div>
  </audio>
```

```html
▼<ajax-button>
  ▼<button class="btn btn-primary">
    ▼<span hidden>
        <span class="glyphicon glyphicon-refresh spin" data-animator></span>
      </span>
      <span data-content>Save</span>
    </button>
  </ajax-button>
```

```html
▼<ajax-button _nghost-eaq-14>
  ▼<button class="btn btn-primary" _ngcontent-eaq-14>
    ▼<span _ngcontent-eaq-14 hidden>
        <span class="glyphicon glyphicon-refresh spin" data-animator></span>
      </span>
      <span data-content>Save</span>
    </button>
  </ajax-button>
```
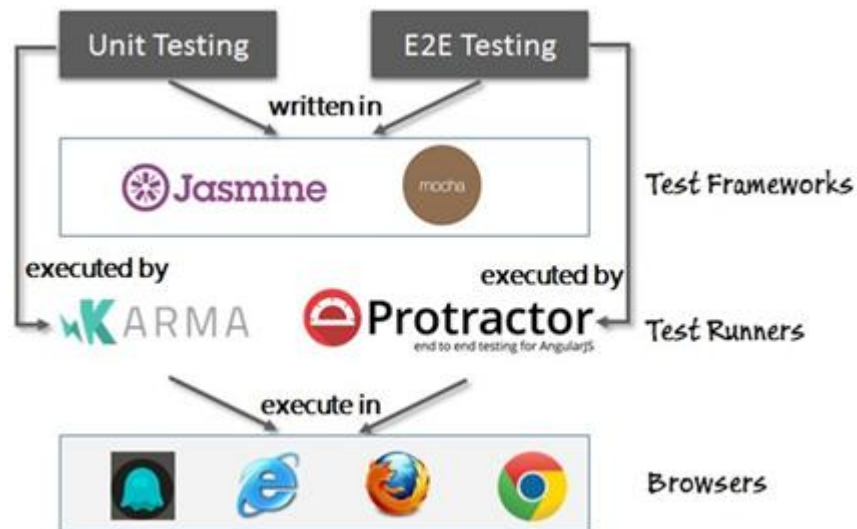
```
<style>button[_ngcontent-eaq-14] {
    background: green;
  }</style>
```

```
▼<ajax-button>
  ▼#shadow-root (open)
      <style>
          button {
            background: green;
          }
          </style>
    ▼<button class="btn btn-primary">
      ▶<span hidden>…</span>
        <span data-content>Save</span>
      </button>
  </ajax-button>
```
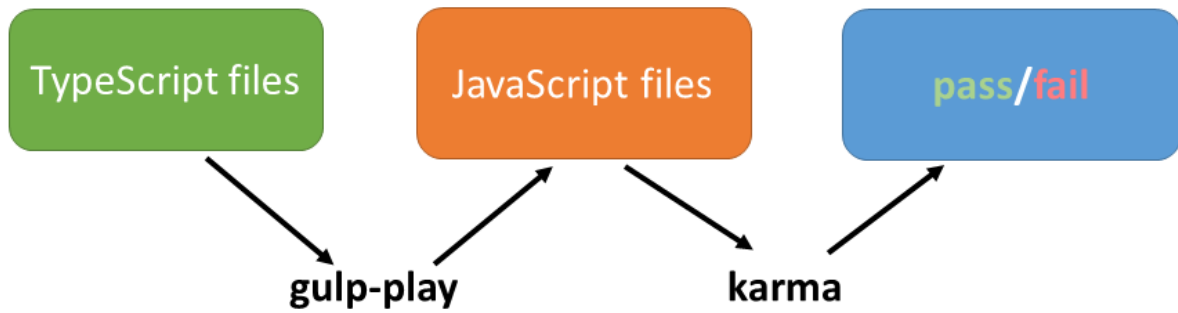
Name:

```
7MinWorkou
```

Chapter 7: Testing Personal Trainer


```
19 03 2016 14:28:47.012:INFO [karma]: Karma v0.13.22 server started at http://localhost:9876/
19 03 2016 14:28:47.031:INFO [launcher]: Starting browser Chrome
19 03 2016 14:28:49.617:INFO [Chrome 49.0.2623 (Windows 8 0.0.0)]: Connected on socket /#Awjpf2kJKARV0f9mAAAA with id 49661790
Chrome 49.0.2623 (Windows 8 0.0.0): Executed 1 of 1 SUCCESS (0.007 secs / 0.003 secs)
```

```
Chrome 49.0.2623 (Windows 8 0.0.0) SecondsToTime pipe should convert integer to time format FAILED
        Expected '00:00:05' to equal '00:00:06'.
```
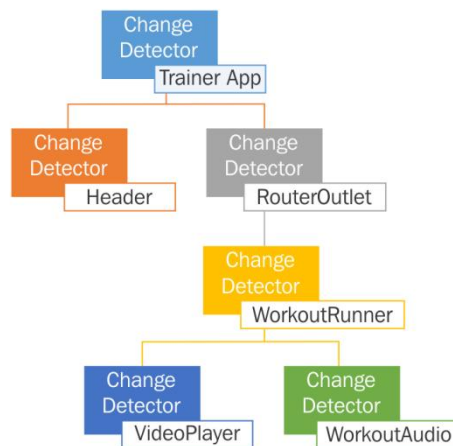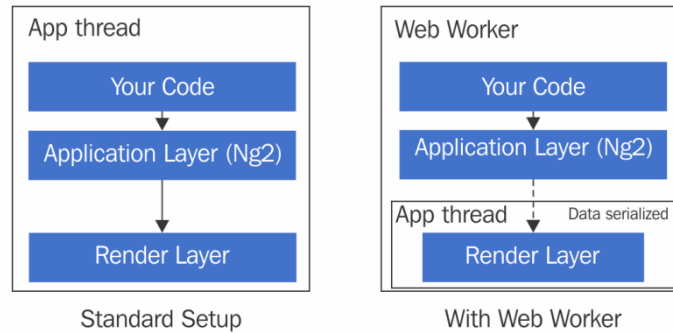
```
Chrome 49.0.2623 (Windows 8 0.0.0): Executed 1 of 1 (1 FAILED) ERROR (0.012 secs / 0.005 secs)
```
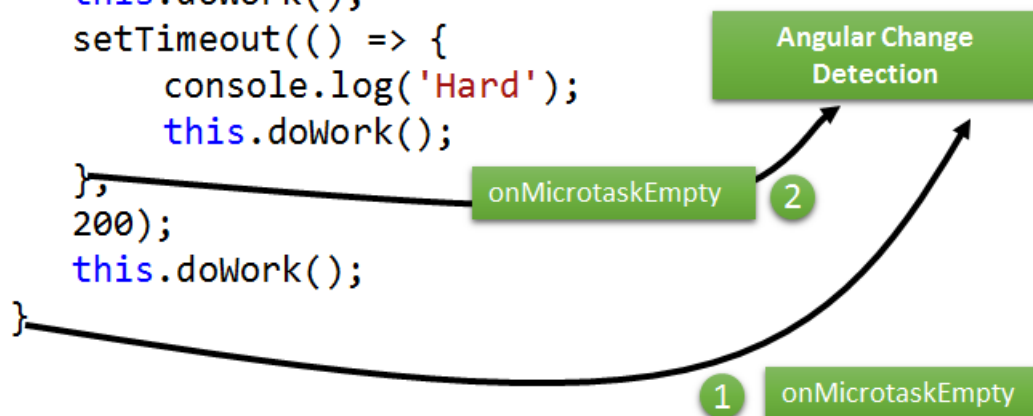
TypeScript files → gulp-play → JavaScript files → karma → pass/fail

```
▼ 📁 components
  ▶ 📁 shared
  ▶ 📁 workout-builder/shared
  ▼ 📁 workout-runner
      📄 seconds-to-time.pipe.spec.ts
      📄 seconds-to-time.pipe.ts
      📄 workout-runner.component.spec.ts
      📄 workout-runner.component.ts
```

```
67    expect(fixture.componentInstance instanceof WorkoutRunnerComponent).toBe(true, 'should create Work
68  });                                          workout-runner.component.spec.ts
69
70  it('should start the workout', () => {
71    expect(runner.workoutTimeRemaining).toEqual(runner.workoutPlan.totalWorkoutDuration());
72    expect(runner.workoutPaused).toBeFalsy();
73  });
74
75  it('should start the first exercise', () => {
76    spyOn(runner, 'startExercise').and.callThrough();
77    runner.ngOnInit();
78    runner.ngDoCheck();
```
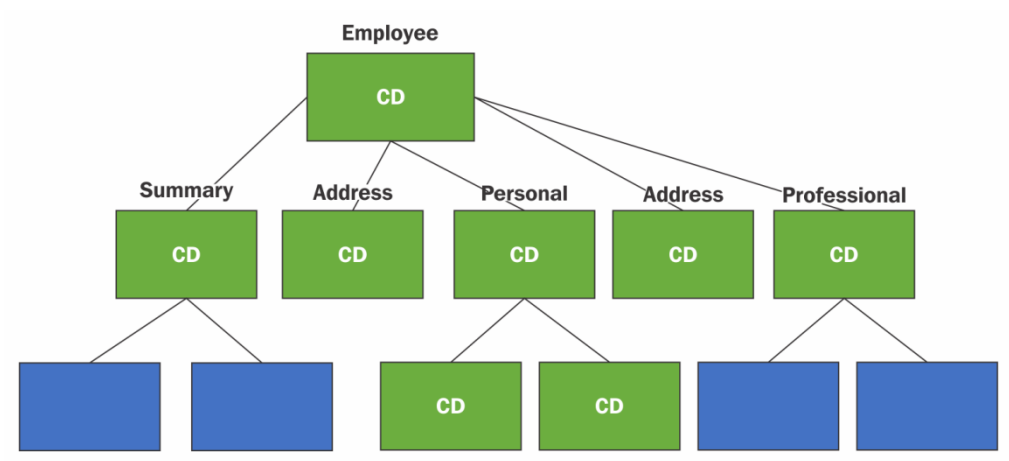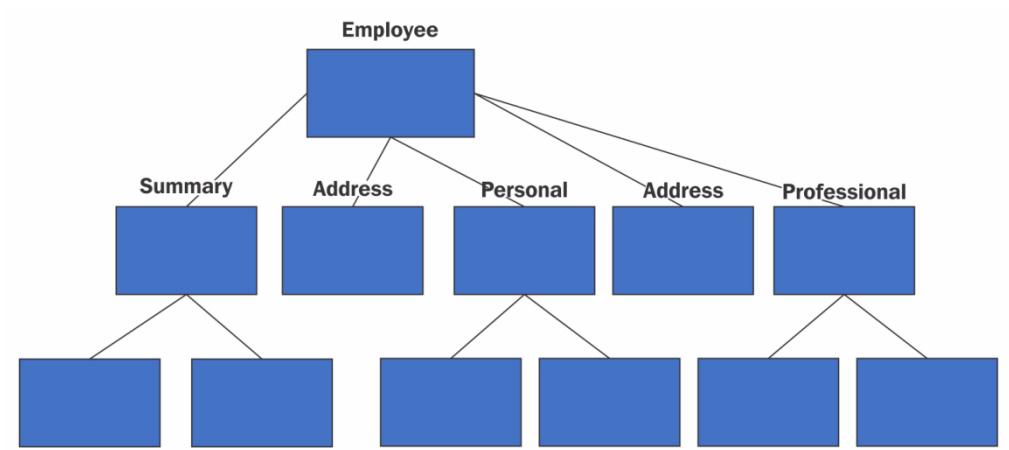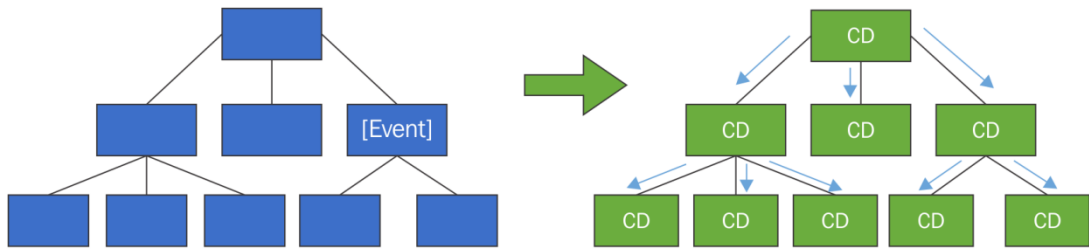
```
▼ 📁 components
  ▶ 📁 shared
  ▶ 📁 workout-builder/shared
  ▼ 📁 workout-runner
      📄 seconds-to-time.pipe.spec.ts
      📄 seconds-to-time.pipe.ts
      📄 workout-runner.component.spec.ts
      📄 workout-runner.component.ts
  ▶ 📁 services
    📄 debug.html
▶ ☁ (no domain)
```

```
35  ngOnInit() {
36    this.getWorkout(this.workoutName);       workout-runner.component.ts
37  }
38
39  ngDoCheck():any {
40    if (!this.dataLoaded) {
41      this.start();
42    }
43  }
57  start() {
58    if(this.workoutPlan)
59    {
60      this.dataLoaded = true;
61      this.restExercise = new ExercisePlan(new Exercise("rest", "Relax!", "Relax a bit", "rest.png")
62      this.tracker.startTracking();
63      this.workoutTimeRemaining = this.workoutPlan.totalWorkoutDuration();
64      this.currentExerciseIndex = 0;
65      this.startExercise(this.workoutPlan.exercises[this.currentExerciseIndex]);
66      this.workoutStarted.emit(this.workoutPlan);
67    }
```
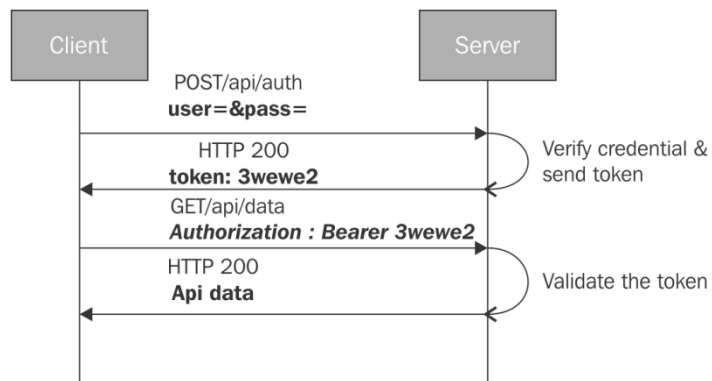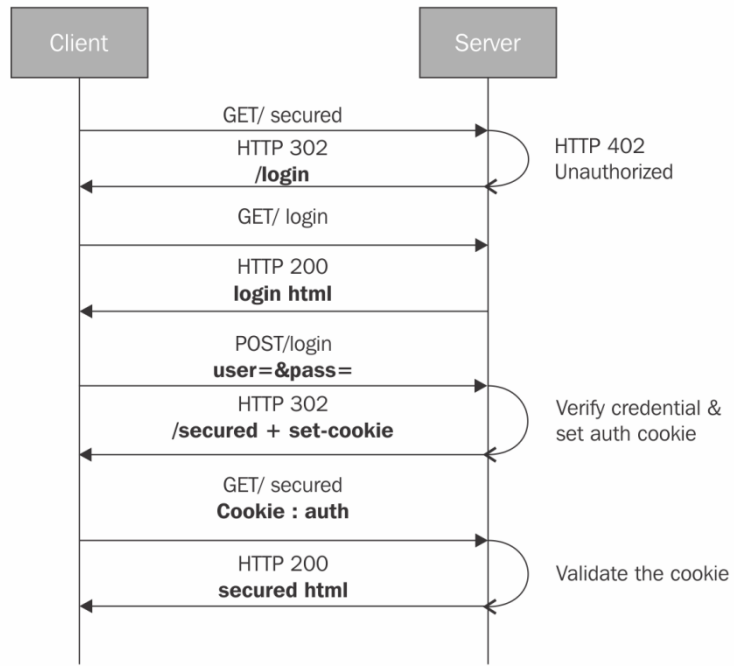
Chapter 8: Some Practical Scenarios

App thread

| Your Code |
| Application Layer (Ng2) |
| Render Layer |

Standard Setup

Web Worker

| Your Code |
| Application Layer (Ng2) |
App thread — Data serialized
| Render Layer |

With Web Worker


```
function onClick() {
    this.doWork();
    setTimeout(() => {
        console.log('Hard');
        this.doWork();
    },
    200);
    this.doWork();
}
```
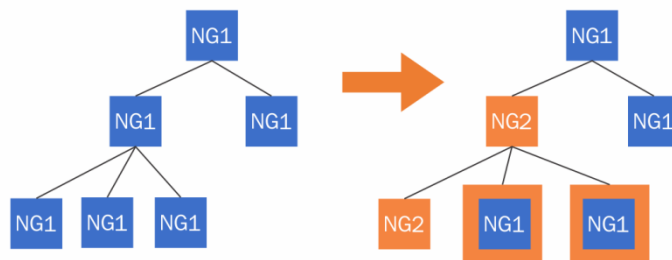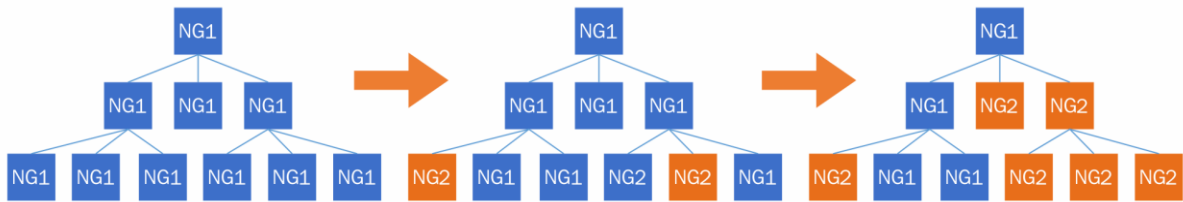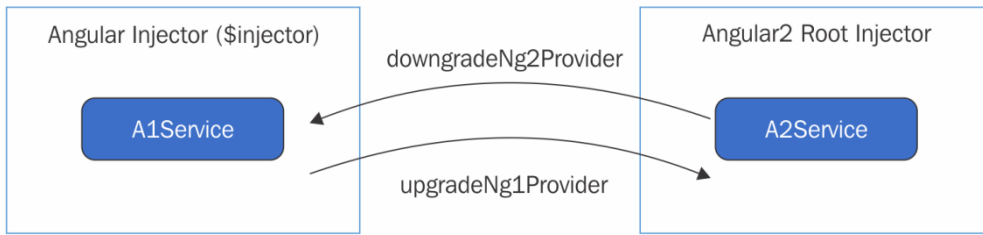
onMicrotaskEmpty ②

Angular Change Detection

① onMicrotaskEmpty

Client — Server sequence:

GET/ secured
HTTP 302 /login → HTTP 402 Unauthorized
GET/ login
HTTP 200 login html
POST/login user=&pass=
HTTP 302 /secured + set-cookie → Verify credential & set auth cookie
GET/ secured Cookie : auth
HTTP 200 secured html → Validate the cookie

Client — Server sequence:

POST/api/auth user=&pass=
HTTP 200 token: 3wewe2 → Verify credential & send token
GET/api/data Authorization : Bearer 3wewe2
HTTP 200 Api data → Validate the token

Exercises
Abdominal Crunches ❯
High Knees ❯
Jumping Jacks ❯
Lunges ❯
Plank ❯

```
ng1 ▼<body class="ng-scope">
  ng2 ▼<ng2-root #ng2root id="NG2_UPGRADE_0_ng2Root_c0">
    ng1 ▼<ng1-root class="ng-isolate-scope">
          ►<div ng-controller="RootController" class="ng-scope">…</div>
        </ng1-root>
        <!--ng1 insertion point-->
      </ng2-root>
  </body>
```