

## Angular 2+

### Workshop. HttpClient.

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## Task 01. Import Modules

1. Make changes to **AppModule**. Use the following snippet of code:

```
// 1
import { HttpClientModule } from '@angular/common/http';

// 2
imports: [
  ...
  HttpClientModule,
  AppRoutingModule
]
```

## Task 02. Simulating Web API

1. Run the following command from command line:

```
>npm install -g json-server  
>npm install concurrently -D
```

2. Create file **db\db.json (in project folder)**. Use the following snippet of code:

```
{  
  "tasks": [  
    { "id": 1, "action": "Estimate", "priority": 1, "estHours": 8},  
    { "id": 2, "action": "Create", "priority": 2, "estHours": 8},  
    { "id": 3, "action": "Edit", "priority": 3, "estHours": 4},  
    { "id": 4, "action": "Delete", "priority": 3, "estHours": 2},  
    { "id": 5, "action": "Build", "priority": 1, "estHours": 4},  
    { "id": 6, "action": "Deploy", "priority": 2, "estHours": 8}  
  ],  
  "users": [  
    { "id": 1, "firstName": "Anna", "lastName": "Borisova" },  
    { "id": 2, "firstName": "Boris", "lastName": "Vlasov"},  
    { "id": 3, "firstName": "Clara", "lastName": "Dmitrieva"},  
    { "id": 4, "firstName": "Dariya", "lastName": "Egorova"},  
    { "id": 5, "firstName": "Fatima", "lastName": "Georg"},  
    { "id": 6, "firstName": "Hunna", "lastName": "Jackson"}  
  ]  
}
```

3. Make changes to **package.json** file.

```
"start": "concurrently --kill-others \"ng serve -o\" \"json-server --watch  
db\\db.json\"",  
"start": "ng serve",
```

4. Run project:

```
>npm start
```

### Task 03. Task Promise Service

1. Create **TaskPromiseService**. Use the following snippet of code:

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

import { Task } from '../models/task.model';

@Injectable()
export class TaskPromiseService {
  private tasksUrl = 'http://localhost:3000/tasks';

  constructor(
    private http: HttpClient
  ) {}

  getTasks(): Promise<Task[]> {
    return this.http
      .get(this.tasksUrl)
      .toPromise()
      .then( response => <Task[]>response)
      .catch(this.handleError);
  }

  private handleError(error: any): Promise<any> {
    console.error('An error occurred', error);
    return Promise.reject(error.message || error);
  }
}
```

2. Create file **tasks/services/index.ts**. Use the following snippet of code:

```
export * from './task-array.service';
export * from './task-promise.service';
```

3. Make changes to the file **tasks/index.ts**. Use the following snippet of code:

```
export * from './services'
```

4. Make changes to **TasksModule**. Use the following snippet of code:

```
// 1
import {
  TaskListComponent,
  TaskComponent,
  TaskFormComponent,
  TaskPromiseService
} from '.';

// 2
providers: [
  TaskPromiseService
]
```

5. Make changes to **TaskListComponent**. Use the following snippet of code:

```
// 1
```

```
import { TaskArrayService, TaskPromiseService } from '../services/task-  
promise.service';  
  
// 2  
constructor(  
    ...  
    private taskPromiseService: TaskPromiseService) { }  
  
// 3  
private async getTasks() {  
    this.tasks = await this.taskPromiseService.getTasks();  
    this.tasks = await this.taskArrayService.getTasks();  
}
```

## Task 04. GetTask

1. Make changes to **TaskPromiseService**. Use the following snippet of code:

```
getTask(id: number): Promise<Task> {  
    const url = `${this.tasksUrl}/${id}`;  
  
    return this.http  
        .get(url)  
        .toPromise()  
        .then(response => <Task>response)  
        .catch(this.handleError);  
}
```

2. Make changes to **TaskFormComponent**. Use the following snippet of code:

```
// 1  
import { TaskArrayService, TaskPromiseService } from '../services/task-  
array.service';  
  
// 2  
constructor(  
    ...  
    private taskPromiseService: TaskPromiseService  
) { }  
  
// 3  
this.route.paramMap  
    .pipe(  
        switchMap((params: Params) =>  
            this.taskArrayService.getTask(+params.get('taskID'))  
            this.taskPromiseService.getTask(+params.get('taskID'))  
        )  
    ).subscribe(  
        task => this.task = {...task},  
        err => console.log(err)  
    );
```

## Task 05. UpdateTask

1. Make changes to **TaskPromiseService**. Use the following snippet of code:

```
// 1
import { HttpClient, HttpHeaders } from '@angular/http';

// 2
updateTask(task: Task): Promise<Task> {
  const url = `${this.tasksUrl}/${task.id}`,
    body = JSON.stringify(task),
    options = {
      headers: new HttpHeaders({ 'Content-Type': 'application/json' }),
    };

  return this.http
    .put(url, body, options)
    .toPromise()
    .then(response => <Task>response)
    .catch(this.handleError);
}
```

2. Make changes to method **onSaveTask** of **TaskFormComponent**. Use the following snippet of code:

```
if (task.id) {
  this.taskArrayService.updateTask(task);
  this.taskPromiseService.updateTask(task)
    .then( () => this.goBack() );
}
else {
  this.taskArrayService.addTask(task);
  this.goBack();
}

this.goBack();
```

3. Make changes to **TaskListComponent**. Use the following snippet of code:

```
// 1
import { TaskArrayService, TaskPromiseService } from '../services';

// 2
constructor(
  private router: Router,
  private taskArrayService: TaskArrayService,
  private taskPromiseService: TaskPromiseService
) { }

// 3
onCompleteTask(task: Task): void {
  this.updateTask(task).catch(err => console.log(err));
}

// 4
private async updateTask(task: Task) {
  const updatedTask = await this.taskPromiseService.updateTask({
    ...task,
```

```
        done: true
    });

    if (updatedTask) {
        const index = this.tasks.findIndex(t => t.id === updatedTask.id);
        if (index > -1) {
            this.tasks.splice(index, 1, updatedTask);
        }
    }
}
```



## Task 06. CreateTask

1. Make changes to **TaskListComponent** template. Use the following snippet of HTML:

```
<div>
  <button class="btn btn-primary"
    (click)="onCreateTask()">New Task</button>
  <br><br>
  <app-task
    *ngFor="let task of tasks"
    [task]="task"
    (completeTask)="onCompleteTask($event)"
    (editTask)="onEditTask($event)">
  </app-task>
</div>
```

2. Make changes to **TaskListComponent**. Use the following snippet of code:

```
// 1
onCreateTask() {
  const link = ['/add'];
  this.router.navigate(link);
}
```

3. Make changes to **TasksRoutingModule**. Use the following snippet of code:

```
const routes: Routes = [
  ...
  {
    path: 'add',
    component: TaskFormComponent
  },
  {
    path: 'edit/:taskID',
    component: TaskFormComponent
  }
];
```

4. Make changes to **TaskPromiseService**. Use the following snippet of code:

```
createTask(task: Task): Promise<Task> {
  const url = this.tasksUrl,
    body = JSON.stringify(task),
    options = {
      headers: new HttpHeaders({ 'Content-Type': 'application/json' })
    };

  return this.http
    .post(url, body, options)
    .toPromise()
    .then(response => <Task>response)
    .catch(this.handleError);
}
```

5. Make changes to method **ngOnInit** of **TaskFormComponent**. Use the following snippet of code:

```
switchMap((params: Params) => this.taskPromiseService.getTask(+params.get('taskID')))
```

```

switchMap((params: Params) => {
  return params.get('taskID')
    ? this.taskPromiseService.getTask(+params.get('taskID'))
    : Promise.resolve(null);
}))

```

6. Make changes to method **onSaveTask** of **TaskFormComponent**. Use the following snippet of code:

```

if (task.id) {
  this.taskPromiseService.updateTask(task)
    .then( () => this.goBack() );
}
else {
  this.taskArrayService.addTask(task);
  this.goBack();
}
const method = task.id ? 'updateTask' : 'createTask';
this.taskPromiseService[method](task)
  .then(() => this.goBack())
  .catch(err => console.log(err));

```

7. Make changes to **TaskFormComponents**. Use the following snippet of code:

```

// 1
import { TaskArrayService, TaskPromiseService } from '../../services';

// 2
constructor(
  private taskArrayService: TaskArrayService,
  ...
) { }

```

## Task 07. DeleteTask

1. Make changes to **TaskComponent template**. Use the following snippet of HTML:

```
<div class="panel panel-default">
  <div class="panel-heading">Task</div>
  <div class="panel-body">
    <ul>
      <li>Action: {{task.action}}</li>
      <li>Priority: {{task.priority}}</li>
      <li>Estimate Hours: {{task.estHours}}</li>
      <li>Actual Hours: {{task.actHours}}</li>
      <li>Done: {{task.done}}</li>
    </ul>
    <button class="btn btn-primary btn-sm"
      (click)="onCompleteTask()"
      [disabled]="task.done">
      Done
    </button>
    <button class="btn btn-warning btn-sm"
      (click)="onEditTask()">
      Edit
    </button>
    <button class="btn btn-danger btn-sm"
      (click)="onDeleteTask()">
      Delete
    </button>
  </div>
</div>
```

2. Make changes to **TaskComponent**. Use the following snippet of code:

```
// 1
@Output() deleteTask = new EventEmitter<Task>();

// 2
onDeleteTask() {
  this.deleteTask.emit(this.task);
}
```

3. Make changes to **TaskListComponent template**. Use the following snippet of code:

```
<app-task
  *ngFor="let task of tasks"
  [task]="task"
  (completeTask)="onCompleteTask($event)"
  (editTask)="onEditTask($event)"
  (deleteTask)="onDeleteTask($event)">
</app-task>
```

4. Make changes to **TaskPromiseService**. Use the following snippet of code:

```
deleteTask(task: Task): Promise<Task> {
  const url = `${this.tasksUrl}/${task.id}`;

  return (
    this.http
```

```
        .delete(url)
        .toPromise()
        // json-server return empty object
        // so we don't use .then(...)
        .catch(this.handleError)
    );
}
```

5. Make changes to **TaskListComponent**. Use the following snippet of code:

```
onDeleteTask(task: Task) {
    this.taskPromiseService.deleteTask(task)
        .then(() => (this.tasks = this.tasks.filter(t => t.id !== task.id)))
        .catch(err => console.log(err));
}
```

## Task 08. User Observable Service

1. Create file **users/users.config.ts**. Use the following snippet of code:

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

const usersBaseUrl = 'http://localhost:3000/users';
export const UsersAPI = new InjectionToken<string>('UsersAPI');

export const UsersAPIProvider = {
  provide: UsersAPI,
  useValue: usersBaseUrl
};
```

2. Create **UserObservableService**. Use the following snippet of code:

```
import { Injectable, Inject } from '@angular/core';
import { HttpClient, HttpHeaders, HttpResponse, HttpResponseError } from
 '@angular/common/http';

import { Observable, throwError } from 'rxjs';
import { catchError } from 'rxjs/operators';

import { User } from '../models/user.model';
import { UsersAPI } from '../users.config';

@Injectable()
export class UserObservableService {

  constructor(
    private http: HttpClient,
    @Inject(UsersAPI) private usersUrl: string
  ) {}

  getUsers(): Observable<User[]> {
    return this.http.get<User[]>(this.usersUrl)
      .pipe( catchError( this.handleError ) );
  }

  getUser(id: number) {

  }

  updateUser(user: User) {

  }

  createUser(user: User) {

  }

  deleteUser(user: User) {

  }

  private handleError(err: HttpResponseError) {
    let errorMessage: string;
```

```

    // A client-side or network error occurred.
    if (err.error instanceof Error) {
        errorMessage = `An error occurred: ${err.error.message}`;
    }
    // The backend returned an unsuccessful response code.
    // The response body may contain clues as to what went wrong,
    else {
        errorMessage = `Backend returned code ${err.status}, body was: ${err.error}`;
    }

    console.error(errorMessage);
    return throwError(errorMessage);
}
}

```

3. Create file **users/services/index.ts**. Use the following snippet of code:

```

export * from './user-array.service';
export * from './user-observable.service';

```

4. Make changes to file **users/index.ts**. Use the following snippet of code:

```

export * from './services/user-array.service';

```

5. Make changes to **UsersModule**. Use the following snippet of code:

```

// 1
import { UsersAPIProvider } from './users.config';
import { UserComponent, UserArrayService, UserResolveGuard, UserObservableService } from
    '.';

// 2
providers: [
    ...
    UsersAPIProvider,
    UserObservableService
]

```

6. Make changes to **UserListComponent**. Use the following snippet of code:

```

// 1
import { UserArrayService, UserObservableService } from './../../services/user-
    array.service';

// 2
constructor(
    ...
    private userObservableService: UserObservableService
) { }

// 3
ngOnInit() {
    this.users$ = this.userObservableService.getUsers();
    this.users$ = this.userArrayService.getUsers();
    ...
}

```

## Task 09. GetUser

1. Make changes to **UserObservableService**. Use the following snippet of code:

```
getUser(id: number): Observable<User> {  
  const url = `${this.usersUrl}/${id}`;  
  
  return this.http.get<User>(url)  
    .pipe(  
      catchError(this.handleError)  
    );  
}
```

2. Make changes to **UserResolveGuard**. Use the following snippet of code:

```
// 1  
import { UserArrayService, UserObservableService } from '../services/user-  
array.service';  
  
// 2  
constructor(  
  private userArrayService: UserArrayService,  
  private userObservableService: UserObservableService,  
  ...  
) {}  
  
// 3  
resolve(route: ActivatedRouteSnapshot): Observable<User> {  
  ...  
    return this.userArrayService.getUser(id)  
    return this.userObservableService.getUser(id)  
  ...  
}
```

3. Make changes to method **ngOnInit** of **UserListComponent**. Use the following snippet of code:

```
// 1  
import { Observable, of } from 'rxjs';  
  
// 2 ngOnInit  
switchMap((params: Params) =>  
  this.userArrayService.getUser(+params.get('editedUserID')))  
switchMap((params: Params) => {  
  return params.get('editedUserID')  
    ? this.userObservableService.getUser(+params.get('editedUserID'))  
    : of(null);  
})
```

## Task 10. updateUser and createUser

1. Make changes to the method **updateUser** of **UserObservableService**. Use the following snippet of code:

```
updateUser(user: User): Observable<User> {
  const url = `${this.usersUrl}/${user.id}`,
  body = JSON.stringify(user),
  options = {
    headers: new HttpHeaders({ 'Content-Type': 'application/json' })
  };

  return this.http
    .put<User>(url, body, options)
    .pipe( catchError(this.handleError) );
}
```

2. Make changes to the method **createUser** of **UserObservableService**. Use the following snippet of code:

```
createUser(user: User): Observable<User> {
  const url = this.usersUrl,
  body = JSON.stringify(user),
  options = {
    headers: new HttpHeaders({ 'Content-Type': 'application/json' })
  };
  return this.http
    .post<User>(url, body, options)
    .pipe(
      catchError( this.handleError )
    );
}
```

3. Make changes to **UserFormComponent**. Use the following snippet of code:

```
// 1
import { Component, OnInit, OnDestroy } from '@angular/core';
import { Observable, Subscription } from 'rxjs';
import { UserArrayService } from '../services/user-array.service';
import { UserObservableService } from '../services';
import { Location } from '@angular/common';

// 2
export class UserFormComponent implements OnInit, OnDestroy, CanComponentDeactivate {

// 3
  private sub: Subscription;

// 4
  constructor(
    private userArrayService: UserArrayService,
    private userObservableService: UserObservableService,
    private location: Location,
    ...
  ) { }

// 5
```



```

ngOnDestroy(): void {
  if (this.sub) {
    this.sub.unsubscribe();
  }
}

// 6 onSaveUser method
if (user.id) {
  this.userArrayService.updateUser(user);
  // optional parameter: http://localhost:4200/users;editedUserID=2
  this.router.navigate(['users', {editedUserID: user.id}]);
}
else {
  this.userArrayService.addUser(user);
  this.goBack();
}
this.originalUser = {...this.user};

const method = user.id ? 'updateUser' : 'createUser';
this.sub = this.userObservableService[method](user)
  .subscribe(
    () => {
      this.originalUser = {...this.user};
      user.id
        // optional parameter: http://localhost:4200/users;editedUserID=2
        ? this.router.navigate(['users', { editedUserID: user.id }])
        : this.goBack();
    },
    error => console.log(error)
  );

// 7
goBack() {
  this.router.navigate(['../..'], { relativeTo: this.route });
  this.location.back();
}

```

4. Make changes to **UsersComponent template**. Use the following snippet of HTML:

```

<h2>Users</h2>
<button class="btn btn-primary"
  (click)="onCreateUser()">New User</button>
<br><br>
<router-outlet></router-outlet>

```

5. Make changes to **UsersComponent**. Use the following snippet of code:

```

// 1
import { Router } from '@angular/router';

// 2
constructor(
  private router: Router
) { }

```

```
// 3
onCreateUser() {
  const link = ['/users/add'];
  this.router.navigate(link);
}
```

## Task 11. DeleteUser

1. Make changes to **UserComponent template**. Use the following snippet of HTML:

```
<button class="btn btn-warning btn-sm"
  (click)="onEditUser()">
  Edit
</button>
<button class="btn btn-danger btn-sm"
  (click)="onDeleteUser()">
  Delete
</button>
```

2. Make changes to **UserComponent**. Use the following snippet of code:

```
// 1
@Output() deleteUser = new EventEmitter<User>();

// 2
onDeleteUser() {
  this.deleteUser.emit(this.user);
}
```

3. Make changes to **UserListComponent template**. Use the following snippet of HTML:

```
<user
  *ngFor='let user of users'
  [user]="user"
  [class.edited]="isEdited(user)"
  (editUser)="onEditUser($event)"
  (deleteUser)="onDeleteUser($event)">
</user>
```

4. Make changes to **UserObservableService**. Use the following snippet of code:

```
// 1
import { concatMap, catchError } from 'rxjs/operators';

// 2
deleteUser(user: User): Observable<User[]> {
  const url = `${this.usersUrl}/${user.id}`;

  return this.http.delete(url)
    .pipe(
      concatMap(() => this.getUsers())
    );
}
```

5. Make changes to **UserListComponent**. Use the following snippet of code:

```
onDeleteUser(user: User) {
  this.users$ = this.userObservableService.deleteUser(user);
}
```

## Task 12. AutoUnsubscribe Decorator

1. Create file **app/core/decorators/auto-unsubscribe.decorator.ts**. Use the following snippet of code:

```
export function AutoUnsubscribe(subName: string = 'sub') {
  return function (constructor) {
    const original = constructor.prototype.ngOnDestroy;

    constructor.prototype.ngOnDestroy = function () {
      const sub = this[subName];

      if (sub) {
        sub.unsubscribe();
      }

      if (original && (typeof original === 'function')) {
        original.apply(this, arguments);
      }

      console.log(`Unsubscribe decorator is called. Subscription name is: ${subName}.`);
    };
  };
}
```

2. Create file **app/core/decorators/index.ts**. Use the following snippet of code:

```
export * from './auto-unsubscribe.decorator';
```

3. Make changes to file **app/core/index.ts**. Use the following snippet of code:

```
export * from './decorators';
```

4. Make changes to **UserFormComponent**. Use the following snippet of code:

```
// 1
import { Component, OnInit, OnDestroy } from '@angular/core';
import { AutoUnsubscribe, DialogService, CanComponentDeactivate } from
'../../core';

// 2
@Component({
  templateUrl: './user-form.component.html',
  styleUrls: ['./user-form.component.css'],
})
@AutoUnsubscribe()
export class UserFormComponent implements OnInit, OnDestroy, CanComponentDeactivate {

// 3
  ngOnDestroy(): void {
    if (this.sub) {
      this.sub.unsubscribe();
    }
  }
}
```

## Task 13. Interceptors

1. Create file **app/core/interceptors/my.interceptor.ts**. Use the following snippet of code:

```
import {Injectable} from '@angular/core';
import { HttpEvent, HttpInterceptor, HttpHandler, HttpRequest, HttpResponse, HttpParams } from '@angular/common/http';

import { Observable } from 'rxjs';

@Injectable()
export class MyInterceptor implements HttpInterceptor {
  intercept(req: HttpRequest<any>, next: HttpHandler): Observable<HttpEvent<any>> {
    // request interceptor
    let clonedRequest;
    if (req.url.includes('users')) {
      clonedRequest = req.clone({
        params: new HttpParams()
          .set('ts_interceptor', Date.now().toString())
      });
      console.log(clonedRequest);
    } else {
      clonedRequest = req;
    }

    return next.handle(clonedRequest);
  }
}
```

2. Make changes to **AppModule**. Use the following snippet of code:

```
import { HttpClientModule, HTTP_INTERCEPTORS } from '@angular/common/http';

import { MyInterceptor } from './core/interceptors/my.interceptor';

providers: [
  ...
  {
    provide: HTTP_INTERCEPTORS,
    useClass: MyInterceptor,
    multi: true,
  }
]
```

3. Look at the requests in the browser console. Ensure that only the user requests are processed by My interceptor.
4. Make changes to **MyInterceptor**. Use the following snippet of code:

```
// 1
import { map } from 'rxjs/operators';

// 2
return next.handle(clonedRequest);
return next.handle(clonedRequest)
  .pipe(
    // response interceptor
    map((event: HttpEvent<any>) => {
```

```
        if (event instanceof HttpResponse) {  
            // do stuff with response  
            console.log('Response Interceptor');  
            console.log(event);  
            console.log(event.body);  
            return event;  
        }  
    })  
);
```

5. Look in the console on the result of applying My interceptor.