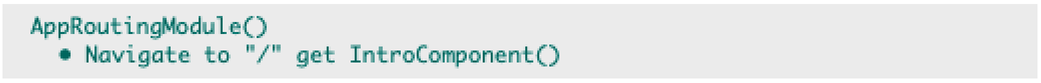
Angular Unit Testing - Part 2

1. Unit Testing `App Routing Module`

Pengujian App Routing Module bertujuan untuk menguji fungsionalitas routing pada aplikasi.

Mulailah dengan memnbuat sebuah file `src/app/app.routing.module.spec.ts` dan tulis kode dibawah ini kedalam file yang sudah dibuat.

```
import { Router } from '@angular/router';
import { fakeAsync, TestBed } from '@angular/core/testing';
import { RouterTestingModule } from '@angular/router/testing';
import { Location } from '@angular/common';

describe('AppRoutingModule()', () => {

  let location: Location;
  let router: Router;

  beforeEach(() => {
    TestBed.configureTestingModule({
      imports: [
        RouterTestingModule.withRoutes([])
      ]
    })

    router = TestBed.inject(Router);
    location = TestBed.inject(Location);
    router.initialNavigation();
  })

  it('Navigate to "/" get IntroComponent()', fakeAsync(() => {
    router.navigate(["/"]).then(() => {
      expect(location.path()).toBe("/");
    })
  }))
})
```



```
AppRoutingModule()
  • Navigate to "/" get IntroComponent()
```

Penjelasan

1. `location.path` merupakan salah satu fungsi untuk mendapatkan path saat ini.
2. `router.navigate` merupakan salah satu fungsi dari router untuk mengarahkan sesuai url yang di masukan kedalam parameter.

2. Unit Testing `Form Login`

Pengujian Form Login Component ditujukan untuk memastikan bahwa component `Form Login` berjalan dengan sesuai yang di inginkan

Mulailah dengan membuat file `src/app/login/component/form-login.component.spec.ts` dan tulislah kode dibawah ini

```
import { Location } from '@angular/common';
import { HttpClientTestingModule } from '@angular/common/http/testing';
import { ComponentFixture, TestBed } from '@angular/core/testing';
import { AbstractControl, FormsModule, ReactiveFormsModule, ValidationErrors } from
import { ActivatedRoute, Router } from '@angular/router';
import { RouterTestingModule } from '@angular/router/testing';
import { Observable, of } from 'rxjs';
import { Login, LoginToken } from '../model/login';
import { LoginService } from '../service/login.service';
import { FormLoginComponent } from './form-login.component';

describe('6. FormLoginComponent Dependency Injection Test', () => {

  let fixture: ComponentFixture<FormLoginComponent>;
  let component: FormLoginComponent;
  let loginService: jasmine.SpyObj<LoginService>;
  let activatedRoute: ActivatedRoute;
  let router: Router;
  let location: Location;

  beforeEach(() => {
    const loginServiceSpy = jasmine.createSpyObj('LoginService', ['login']);

    TestBed.configureTestingModule({
      declarations: [FormLoginComponent],
      imports: [FormsModule, ReactiveFormsModule, HttpClientTestingModule, RouterTes
      providers: [
        {provide: LoginService, useValue: loginServiceSpy}
      ]
    });

    fixture = TestBed.createComponent(FormLoginComponent);
    component = fixture.componentInstance;
    loginService = TestBed.inject(LoginService) as jasmine.SpyObj<LoginService>;
    activatedRoute = TestBed.inject(ActivatedRoute);
    router = TestBed.inject(Router);
    location = TestBed.inject(Location);


    fixture.detectChanges();

  });

  afterEach(() => {
    sessionStorage.removeItem('token');
  });
})
```

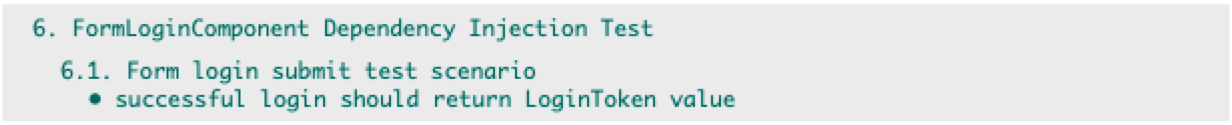
Penjelasan

1. `afterEach` sebuah salah satu fungsi dari Jasmine, untuk menghilangkan duplicated setup atau kode setelah selesai melakukan unit test
2. `ComponentFixture` sebuah API dari angular/core untuk melakukan testing dan debugging component.
3. `activatedRoute` sebuah API dari angular untuk menyediakan akses informasi tentang route yang terkait dengan komponent yang dimuat.
4. `jasmine.createSpyObj` sebuah fungsi dari jasmine untuk membuat service dummy.
5. `fixture.detectChanges` sebuah fungsi dari jasmine untuk mendeteksi apakah ada perubahan pada komponent yang dimuat.

Test Scenario `FormLogin` Component

1. Test scenario pertama berupa pengujian apakah FormLogin berhasil membalikan LoginToken ketika submit username dan password.

```
describe('6.1. Form login submit test scenario', () => {
    it('successful login should return LoginToken value', async () => {
      const stubLoginToken: LoginToken = { token: 'thisIsJustAStubbedTokenValue' };

      loginService.login.and.returnValue(of(stubLoginToken));
      component.form.setValue({ username: 'demo', password: 'demo' });

      component.onFormSubmit();

      const loginToken: LoginToken = await loginService.login.calls.mostRecent().ret

      expect(loginService.login.calls.count()).toBe(1);
      expect(loginToken).toEqual(stubLoginToken);
    });
  });
```



```
6. FormLoginComponent Dependency Injection Test
  6.1. Form login submit test scenario
    • successful login should return LoginToken value
```

2. Test scenario ketika user dengan parameter `logout` .
3. Test scenario mengarahkan kesebuah halaman ketika user dengan parameter `login` dan `session token` sudah diset.

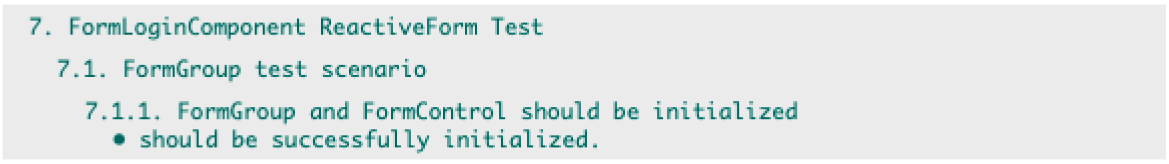
```
describe('6.2. Form login redirections by "action" parameter', () => {
  it('should redirect user if action value is "logout"', async () => {
    const action = 'logout';
    const spy = spyOn(activatedRoute.params, 'pipe')
        .and.callThrough()
        .and.callFake(() => of(action) as Observable<any>);
    component.ngOnInit();
    fixture.detectChanges();

    const actualAction = await spy.calls.mostRecent().returnValue.toPromise();

    expect(spy).toHaveBeenCalled();
    expect(spy.calls.count()).toBe(1);
    expect(actualAction).toEqual(action);
    expect(sessionStorage.getItem('token')).toBeFalsy();
    expect(location.path()).toMatch('/');
  });

  it('6.3. should redirect user if action value is "login" and session token already
    const action = 'login';
    const spy = spyOn(activatedRoute.params, 'pipe')
        .and.callThrough()
        .and.callFake(() => of(action) as Observable<any>);

    sessionStorage.setItem('token', 'thisIsJustAStubbedTokenValue');
    component.ngOnInit();
    fixture.detectChanges();

    const actualAction = await spy.calls.mostRecent().returnValue.toPromise();

    expect(spy).toHaveBeenCalled();
    expect(spy.calls.count()).toBe(1);
    expect(actualAction).toEqual(action);
    expect(sessionStorage.getItem('token')).toBeTruthy();
    expect(location.path()).toMatch('/');
  });
})
```

```
  6.2. Form login redirections by "action" parameter
    • should redirect user if action value is "logout"
    • 6.3. should redirect user if action value is "login" and session token already set
```

4. Unit Testing `FormLoginComponent` Reactive Form

Pengujian `FormLoginComponent` Reactive Form ditujukan untuk memastikan bahwa form berhasil dibuat.

```
describe('7. FormLoginComponent ReactiveForm Test', () => {
  let fixture: ComponentFixture<FormLoginComponent>;
  let component: FormLoginComponent;
  let loginService: jasmine.SpyObj<LoginService>;
  let location: Location;

  beforeEach(() => {
    const loginServiceSpy = jasmine.createSpyObj('LoginService', ['login']);

    TestBed.configureTestingModule({
      declarations: [FormLoginComponent],
      imports: [FormsModule, ReactiveFormsModule, HttpClientTestingModule, RouterTes
      providers: [
        {provide: LoginService, useValue: loginServiceSpy}
      ],
    });

    fixture = TestBed.createComponent(FormLoginComponent);
    component = fixture.componentInstance;
    loginService = TestBed.inject(LoginService) as jasmine.SpyObj<LoginService>;
    location = TestBed.inject(Location);
  });

  describe('7.1. FormGroup test scenario', () => {

    describe('7.1.1. FormGroup and FormControl should be initialized', () => {
      it('should be successfully initialized.', () => {
        expect(component.form).toBeTruthy();

        expect(component.form.get('username')).toBeDefined();

        expect(component.form.get('username')).toBeInstanceOf(AbstractControl);

        expect(component.form.get('password')).toBeDefined();
        expect(component.form.get('password')).toBeInstanceOf(AbstractControl);
      });
    });
  });
});
```

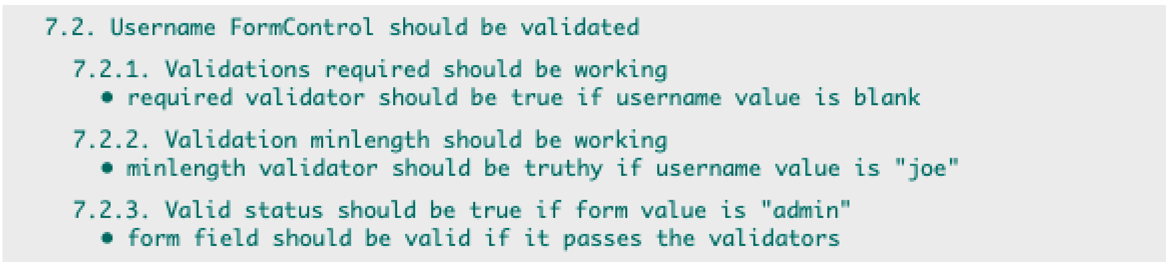


```
7. FormLoginComponent ReactiveForm Test
  7.1. FormGroup test scenario
    7.1.1. FormGroup and FormControl should be initialized
      • should be successfully initialized.
```

Test Scenario Form Username

1. Test Scenario ketika Form username di isi dengan value blank atau kosong, form Validator akan aktif.
2. Test Scenario ketika Form username di isi dengan value `joe` dan tidak memenuhi minimun panjang form username, form validator akan aktif.
3. Test Scenario ketika Form username di isi dengan value `admin` , form Validator akan aktif dan mengembalikan value true yang berarti value tersebut `Valid` .

```
describe('7.2. Username FormControl should be validated', () => {
    let usernameControl: AbstractControl;

    beforeEach(() => {
      usernameControl = component.form.get('username') as AbstractControl;
    });

    describe('7.2.1. Validations required should be working', () => {
      it('required validator should be true if username value is blank', () => {
        usernameControl.setValue('');
        usernameControl.markAsTouched();
        fixture.detectChanges();
        const errors = usernameControl.errors as ValidationErrors;

        expect(errors).toBeTruthy();
        expect(errors['required']).toBeTruthy();
        expect(usernameControl.invalid).toBeTrue();
        expect(component.isFieldValid('username')).toMatch('is-invalid');
      });
    });

    describe('7.2.2. Validation minlength should be working', () => {
      it('minlength validator should be truthy if username value is "joe"', () => {
        usernameControl.setValue('joe');
        usernameControl.markAsTouched();
        fixture.detectChanges();

        const errors = usernameControl.errors as ValidationErrors;

        expect(errors).toBeTruthy();
        expect(errors['minlength']).toBeTruthy();
        expect(usernameControl.invalid).toBeTrue();
        expect(component.isFieldValid('username')).toMatch('is-invalid');
      });
    });

    describe('7.2.3. Valid status should be true if form value is "admin"', () => {
      it('form field should be valid if it passes the validators', () => {
        usernameControl.setValue('admin');
        usernameControl.markAsTouched();
        fixture.detectChanges();

        expect(component.form.get('username')?.valid).toBeTrue();
        expect(component.form.get('username')?.value).toMatch('admin');
        expect(component.isFieldValid('username')).toMatch('is-valid');
      });
    });
  });
```



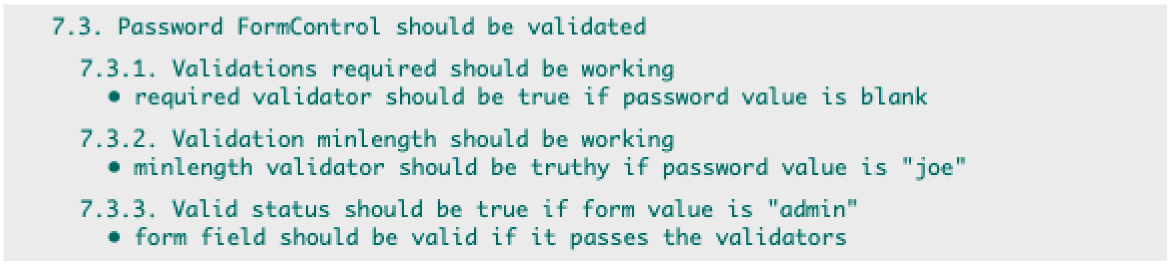
```
7.2. Username FormControl should be validated
  7.2.1. Validations required should be working
    • required validator should be true if username value is blank
  7.2.2. Validation minlength should be working
    • minlength validator should be truthy if username value is "joe"
  7.2.3. Valid status should be true if form value is "admin"
    • form field should be valid if it passes the validators
```

Test Scenario Form Password

1. Test Scenario ketika Form password di isi dengan value blank atau kosong, form Validator akan aktif.
2. Test Scenario ketika Form password di isi dengan value `joe` dan tidak memenuhi minimun panjang form password, form Validator akan aktif.

3. Test Scenario ketika Form password di isi dengan value `admin` , form Validator akan aktif dan mengembalikan value true yang berarti value tersebut `Valid` .

```
describe('7.3. Password FormControl should be validated', () => {
    let passwordControl: AbstractControl;

    beforeEach(() => {
      passwordControl = component.form.get('password') as AbstractControl;
    });

    describe('7.3.1. Validations required should be working', () => {
      it('required validator should be true if password value is blank', () => {
        passwordControl.setValue('');
        passwordControl.markAsTouched();
        fixture.detectChanges();

        const errors = passwordControl.errors as ValidationErrors;

        expect(errors).toBeTruthy();
        expect(errors['required']).toBeTrue();
        expect(passwordControl.invalid).toBeTrue();
        expect(component.isFieldValid('password')).toMatch('is-invalid');
      });
    });

    describe('7.3.2. Validation minlength should be working', () => {
      it('minlength validator should be truthy if password value is "joe"', () => {
        passwordControl.setValue('joe');
        passwordControl.markAsTouched();
        fixture.detectChanges();

        const errors = passwordControl.errors as ValidationErrors;

        expect(errors).toBeTruthy();
        expect(errors['minlength']).toBeTruthy();
        expect(passwordControl.invalid).toBeTrue();
        expect(component.isFieldValid('password')).toMatch('is-invalid');
      });
    });

    describe('7.3.3. Valid status should be true if form value is "admin"', () => {
      it('form field should be valid if it passes the validators', () => {
        passwordControl.setValue('admin');
        passwordControl.markAsTouched();
        fixture.detectChanges();

        expect(component.form.get('password')?.valid).toBeTrue();
        expect(component.form.get('password')?.value).toMatch('admin');
        expect(component.isFieldValid('password')).toMatch('is-valid');
      });
    });
  });
```



```
   7.3. Password FormControl should be validated
     7.3.1. Validations required should be working
       • required validator should be true if password value is blank
     7.3.2. Validation minlength should be working
       • minlength validator should be truthy if password value is "joe"
     7.3.3. Valid status should be true if form value is "admin"
       • form field should be valid if it passes the validators
```

Kembali