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C

Tutorial 07

Membuat Web Service Menggunakan Spring Boot Framework

Latihan 1:

Buatlah service untuk mengembalikan seluruh student yang ada di basis data. Service ini mirip seperti method viewAll di Web Controller. Service tersebut di-mapping ke "/rest/student/viewall".

```java
@RequestMapping("/student/viewall")
public List<StudentModel> viewAll() {
    List<StudentModel> students = studentService.selectAllStudents ();
    return students;
}
```

[{"npm":"123","name":"Ichsandy","gpa":3.4,"courses":[{"idCourse":null,"name":"MPKT","credits":6,"students":null}]},
{"npm":"124","name":"Aisyah","gpa":3.75,"courses":[{"idCourse":null,"name":"PSP","credits":4,"students":null},
{"idCourse":null,"name":"SDA","credits":3,"students":null}]}]

Ratri Ayu
1506689276
C

String parse

```
[
  {
    "npm":"123",
    "name":"Ichsandy",
    "gpa":3.4,
    "courses":[
      {
        "idCourse":null,
        "name":"MPKT",
        "credits":6,
        "students":null
      }
    ]
  },
  {
    "npm":"124",
    "name":"Aisyah",
    "gpa":3.75,
    "courses":[
      {
        "idCourse":null,
        "name":"PSP",
        "credits":4,
        "students":null
      },
      {
        "idCourse":null,
        "name":"SDA",
        "credits":3,
        "students":null
      }
    ]
  }
]
```

JS eval

```
[
  {
    "npm":"123",
    "name":"Ichsandy",
    "gpa":3.4,
    "courses":[
      {
        "idCourse":null,
        "name":"MPKT",
        "credits":6,
        "students":null
      }
    ]
  },
  {
    "npm":"124",
    "name":"Aisyah",
    "gpa":3.75,
    "courses":[
      {
        "idCourse":null,
        "name":"PSP",
        "credits":4,
        "students":null
      },
      {
        "idCourse":null,
        "name":"SDA",
        "credits":3,
        "students":null
      }
    ]
  }
]
```

Method ini mengembalikan List<StudentModel> yang memiliki value selectAllStudents. Kemudian, return type method diubah menjadi List<StudentModel> dengan return List<StudentModel> yang telah dibuat sebelumnya di dalam mapper.

Latihan 2:

Buatlah service untuk class Course. Buatlah controller baru yang terdapat service untuk melihat suatu course dengan masukan ID Course (view by ID) dan service untuk melihat semua course (view all).

Ratri Ayu
1506689276
C

```java
package com.example.rest;

import java.util.List;

@RestController
@RequestMapping("/rest")
public class CourseRestController {
    @Autowired
    CourseService courseService;

    @RequestMapping("/course/view/{id}")
    public CourseModel view(@PathVariable(value = "id") String id) {
        CourseModel course = courseService.selectCourse(id);
        return course;
    }

    @RequestMapping("/course/viewall")
    public List<CourseModel> viewAll() {
        List<CourseModel> courses = courseService.selectAllCourses ();
        return courses;
    }

}
```

Tampilan untuk view:

localhost:8080/rest/course/view/CSC123

{"idCourse":"CSC123","name":"PSP","credits":4,"students":[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]}

String parse	JS eval
{	{
"idCourse":"CSC123",	"idCourse":"CSC123",
"name":"PSP",	"name":"PSP",
"credits":4,	"credits":4,
"students":[	"students":[
{	{
"npm":"124",	"npm":"124",
"name":"Aisyah",	"name":"Aisyah",
"gpa":3.75,	"gpa":3.75,
"courses":null	"courses":null
}	}
]	]
}	}

Tampilan untuk viewall:

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1506689276
C

[{"idCourse":"CSC123","name":"PSP","credits":4,"students":[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]},{"idCourse":"CSC124","name":"SDA","credits":3,"students":
[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]},{"idCourse":"CSC125","name":"DDP 1","credits":4,"students":[]},{"idCourse":"CSC126","name":"MPKT","credits":6,"students":
[{"npm":"123","name":"Ichsandy","gpa":3.4,"courses":null}]}]

String parse	JS eval

```
[
  {
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC124",
    "name":"SDA",
    "credits":3,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":[
    ]
  },
```

```
[
  {
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC124",
    "name":"SDA",
    "credits":3,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":{
    }
  },
```

Ratri Ayu
1506689276
C

```
{
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":[
    ]
},
{
    "idCourse":"CSC126",
    "name":"MPKT",
    "credits":6,
    "students":[
        {
            "npm":"123",
            "name":"Ichsandy",
            "gpa":3.4,
            "courses":null
        }
    ]
}
]
```

```
{
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":{
    }
},
{
    "idCourse":"CSC126",
    "name":"MPKT",
    "credits":6,
    "students":[
        {
            "npm":"123",
            "name":"Ichsandy",
            "gpa":3.4,
            "courses":null
        }
    ]
}
]
```

Method ini memiliki struktur yang serupa dengan StudentRestController. Sebelumnya telah ditambahkan method yang dibutuhkan pada CourseMapper, CourseService, dan CourseServiceDatabase.

Latihan 3:

Implementasikan service consumer untuk view all Students dengan melengkapi method selectAllStudents yang ada di kelas StudentServiceRest.

Pertama-tama, menyambungkan StudentDAO dengan StudentRestService untuk method selectAllStudents. Pada StudentDAOImpl menyambungkan dengan method pada Producer atau *back end*, dengan method getForObject pada restTemplate dengan url: localhost:8080/rest/student/viewall.

Pada StudentServiceRest

```java
@Override
public List<StudentModel> selectAllStudents() {
    log.info ("REST - select all students");
    return studentDAO.selectAllStudents();
}
```

Pada StudentDAOImpl

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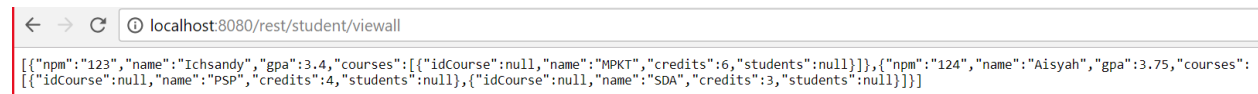C

```java
package com.example.service;

import java.util.List;

@Service
public class StudentDAOImpl implements StudentDAO {
    @Autowired
    private RestTemplate restTemplate;

    @Override
    public StudentModel selectStudent(String npm) {
        StudentModel student = restTemplate.getForObject("http://localhost:8080/rest/student/view/" + npm, StudentModel.class
        return student;
    }

    @Override
    public List<StudentModel> selectAllStudents() {
        List<StudentModel> students = restTemplate.getForObject("http://localhost:8080/rest/student/viewall", List.class);
        return students;
    }
}
```

Tampilan:

← → C ⓘ localhost:8080/rest/student/viewall

[{"npm":"123","name":"Ichsandy","gpa":3.4,"courses":[{"idCourse":null,"name":"MPKT","credits":6,"students":null}]},{"npm":"124","name":"Aisyah","gpa":3.75,"courses":
[{"idCourse":null,"name":"PSP","credits":4,"students":null},{"idCourse":null,"name":"SDA","credits":3,"students":null}]}]

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1506689276
C

String parse

```
[
    {
        "npm":"123",
        "name":"Ichsandy",
        "gpa":3.4,
        "courses":[
            {
                "idCourse":null,
                "name":"MPKT",
                "credits":6,
                "students":null
            }
        ]
    },
    {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":[
            {
                "idCourse":null,
                "name":"PSP",
                "credits":4,
                "students":null
            },
            {
                "idCourse":null,
                "name":"SDA",
                "credits":3,
                "students":null
            }
        ]
    }
]
```

JS eval

```
[
    {
        "npm":"123",
        "name":"Ichsandy",
        "gpa":3.4,
        "courses":[
            {
                "idCourse":null,
                "name":"MPKT",
                "credits":6,
                "students":null
            }
        ]
    },
    {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":[
            {
                "idCourse":null,
                "name":"PSP",
                "credits":4,
                "students":null
            },
            {
                "idCourse":null,
                "name":"SDA",
                "credits":3,
                "students":null
            }
        ]
    }
]
```

localhost:9090/student/viewall

Navbar   Home   Daftar Mahasiswa   Menambah Mahasiswa

All Students

Show 10 ▼ entries

Search:

No	NPM	Name	GPA	Cum laude	Delete	Update
No. 1	NPM = 123	Name = Ichsandy	GPA = 3.4	Sangat Memuaskan	Delete Data	Update Data
No. 2	NPM = 124	Name = Aisyah	GPA = 3.75	Cum Laude!	Delete Data	Update Data

Showing 1 to 2 of 2 entries

Previous   1   Next
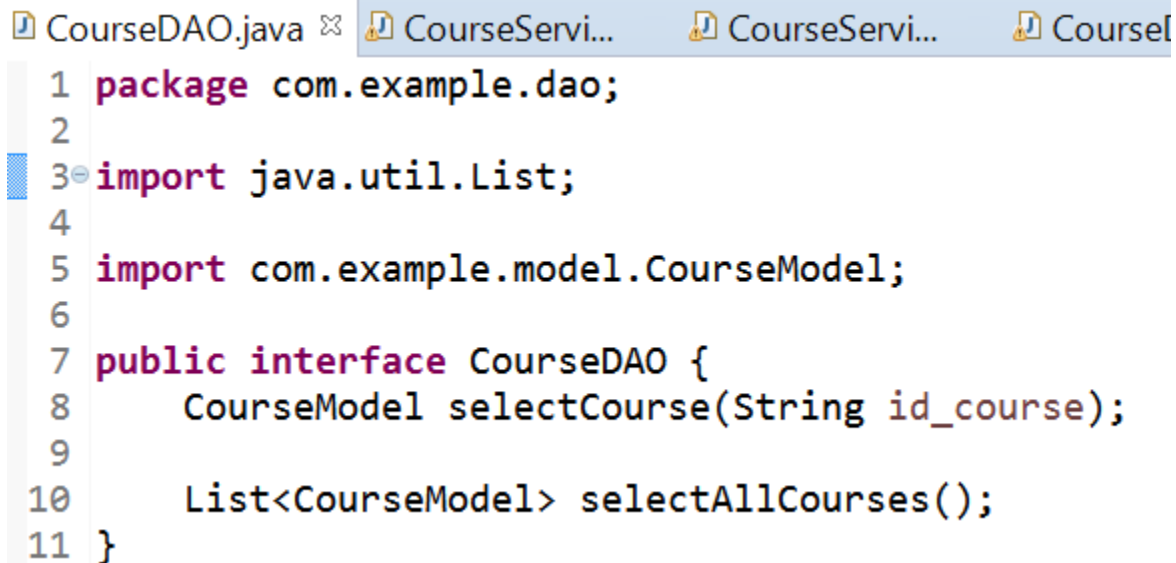
Mata Kuliah APAP

Latihan 4:

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Implementasikan service consumer untuk class CourseModel dengan membuat class-class DAO dan service baru

Method untuk ServiceRest, DAO, dan DAOImpl serupa dengan Student. Lalu pada course controller, dibuat course/viewall untuk mengambil view yang dituju, yaitu viewallcourse. Kemudian, method dapat mengembalikan view dan viewall dari localhost:8080/rest/course/view dan localhost:8080/rest/course/viewall yang ada pada CourseRestController pada Producer.

Pada CourseDAO:

```
CourseDAO.java ⊠  CourseServi...      CourseServi...      CourseD

 1 package com.example.dao;
 2
 3 import java.util.List;
 4
 5 import com.example.model.CourseModel;
 6
 7 public interface CourseDAO {
 8     CourseModel selectCourse(String id_course);
 9
10     List<CourseModel> selectAllCourses();
11 }
```

CourseServiceRest:

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1506689276
C

```java
package com.example.service;

import java.util.List;

@Slf4j
@Service
@Primary
public class CourseServiceRest implements CourseService {
@Autowired
private CourseDAO courseDAO;
@Override
public CourseModel selectCourse (String id)
{
    Log.info ("REST - select course with id {}", id);
    return courseDAO.selectCourse(id);
}

    @Override
    public List<CourseModel> selectAllCourses() {
        Log.info ("REST - select all courses");
        return courseDAO.selectAllCourses();
    }
}
```

CourseDAOImpl:

```java
package com.example.service;

import java.util.List;

@Service
public class CourseDAOImpl implements CourseDAO {
    @Autowired
    private RestTemplate restTemplate;

    @Override
    public CourseModel selectCourse(String id) {
        CourseModel course = restTemplate.getForObject("http://localhost:8080/rest/course/view/" + id, CourseModel.class);
        return course;
    }

    @Override
    public List<CourseModel> selectAllCourses() {
        List<CourseModel> courses = restTemplate.getForObject("http://localhost:8080/rest/course/viewall", List.class);
        return courses;
    }
}
```

Html untuk viewallcourse:

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1506689276
C

```html
<!DOCTYPE html>
<html xmlns:th="http://www.thymeleaf.org">
    <head>
        <title>View All Student</title>
        <div th:replace="fragments/fragment :: links"></div>
    </head>
    <body>
        <div th:replace="fragments/fragment :: header"></div>
        <h1>All Students</h1>
            <table id="table_id" class="display">
                <thead>
                    <tr>
                        <th>No</th>
                        <th>ID</th>
                        <th>Name</th>
                        <th>Credits</th>
                    </tr>
                </thead>
                <tbody>
                    <div th:each="course,iterationStatus: ${courses}" th:class="${iterationStatus.odd}? 'odd'">
                        <tr>
                            <td><h3 th:text="${iterationStatus.count}">No. 1</h3></td>
                            <td><h3 th:text="${course.idCourse}">Course ID</h3></td>
                            <td><h3 th:text="${course.name}">Course Name</h3></td>
                            <td><h3 th:text="${course.credits}">Course Credits</h3></td>
                        </tr>
                    </div>
                </tbody>
            </table>
        <div th:replace="fragments/fragment :: footer"></div>
    </body>
</html>
```

Tampilan untuk view course:

localhost:8080/rest/course/view/CSC123

{"idCourse":"CSC123","name":"PSP","credits":4,"students":[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]}

String parse	JS eval

```
{
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students": [
        {
            "npm":"124",
            "name":"Aisyah",
            "gpa":3.75,
            "courses":null
        }
    ]
}
```

```
{
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students": [
        {
            "npm":"124",
            "name":"Aisyah",
            "gpa":3.75,
            "courses":null
        }
    ]
}
```

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1506689276
C

ID = CSC123
Name = PSP
Credits = 4
Mahasiswa yang mengambil
- 124-Aisyah

Mata Kuliah APAP

Untuk view all:

[{"idCourse":"CSC123","name":"PSP","credits":4,"students":[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]},{"idCourse":"CSC124","name":"SDA","credits":3,"students":
[{"npm":"124","name":"Aisyah","gpa":3.75,"courses":null}]},{"idCourse":"CSC125","name":"DDP 1","credits":4,"students":[]},{"idCourse":"CSC126","name":"MPKT","credits":6,"students":
[{"npm":"123","name":"Ichsandy","gpa":3.4,"courses":null}]}]

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C

String parse	JS eval
| ```json
[
  {
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC124",
    "name":"SDA",
    "credits":3,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":[
    ]
  },
``` | ```json
[
  {
    "idCourse":"CSC123",
    "name":"PSP",
    "credits":4,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC124",
    "name":"SDA",
    "credits":3,
    "students":[
      {
        "npm":"124",
        "name":"Aisyah",
        "gpa":3.75,
        "courses":null
      }
    ]
  },
  {
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":{
    }
  },
``` |

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1506689276
C

```
{
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":[
    ]
},
{
    "idCourse":"CSC126",
    "name":"MPKT",
    "credits":6,
    "students":[
        {
            "npm":"123",
            "name":"Ichsandy",
            "gpa":3.4,
            "courses":null
        }
    ]
}
]
```

```
{
    "idCourse":"CSC125",
    "name":"DDP 1",
    "credits":4,
    "students":{
    }
},
{
    "idCourse":"CSC126",
    "name":"MPKT",
    "credits":6,
    "students":[
        {
            "npm":"123",
            "name":"Ichsandy",
            "gpa":3.4,
            "courses":null
        }
    ]
}
]
```

localhost:9090/course/viewall

Navbar   Home   Daftar Mahasiswa   Menambah Mahasiswa   Search   Search

All Students

Show 10 ▼ entries   Search:

No	ID	Name	Credits
1	CSC123	PSP	4
2	CSC124	SDA	3
3	CSC125	DDP 1	4
4	CSC126	MPKT	6

Showing 1 to 4 of 4 entries   Previous   1   Next

Mata Kuliah APAP

Ringkasan:

Pada Tutorial 7 kali ini, saya telah mempelajari mengenai cara menggunakan *web service* pada Springboot, yaitu dengan membagi aplikasi menjadi dua layer yang bertujuan untuk memisahkan antara *back end* dengan *front end*, yaitu pada hal ini layer *Producer* dan layer *Consumer*. Untuk back end yaitu layer *Producer*, dan untuk front end yaitu layer *Consumer*. Selain itu, saya juga telah memahami penggunaan RestTemplate pada Springboot.