Auto Mapping Objects DTO

Auto Mapping – DTOs and Domain Objects, Model Mapper

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Data Transfer Objects

Transmitting Aggregated Data from Entities

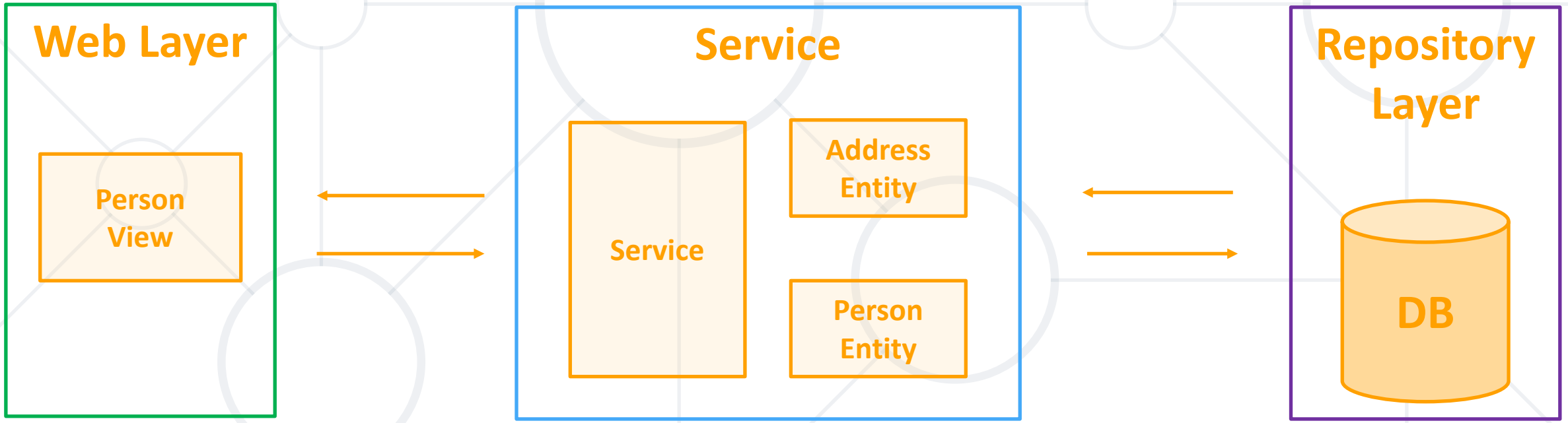
Data Transfer Object Concept

- Domain objects are mapped to view models – **DTO**s
  - A DTO is a **container class**
  - Exposes only properties, **not methods**
- In **simple** applications, domain objects can be used in the meaning of DTOs
  - Otherwise, we accomplish nothing but **object replication**

Entity Usage

Information is passed in the form of DTO

Information is passed by domain objects(entities)



Information is aggregated and entities are mapped to corresponding DTOs

DTO Usage

Employee.java

```
@Entity
@Table(name = "employees")
public class Employee {
    //…
    @Column(name = "first_name")
    private String firstName;
    @Column(name = "salary")
    private BigDecimal salary;
    @ManyToOne
    @JoinColumn(name = "address_id")
    private Address address;
    //…}
```

Address.java

```
@Entity
@Table(name = "addresses")
public class Address {
    //…
    @Column
    private String city;
    //…
}
```

EmployeeDTO.java

```
public class EmployeeDto {

    private String firstName;
    private BigDecimal salary;
    private String addressCity;
}
```

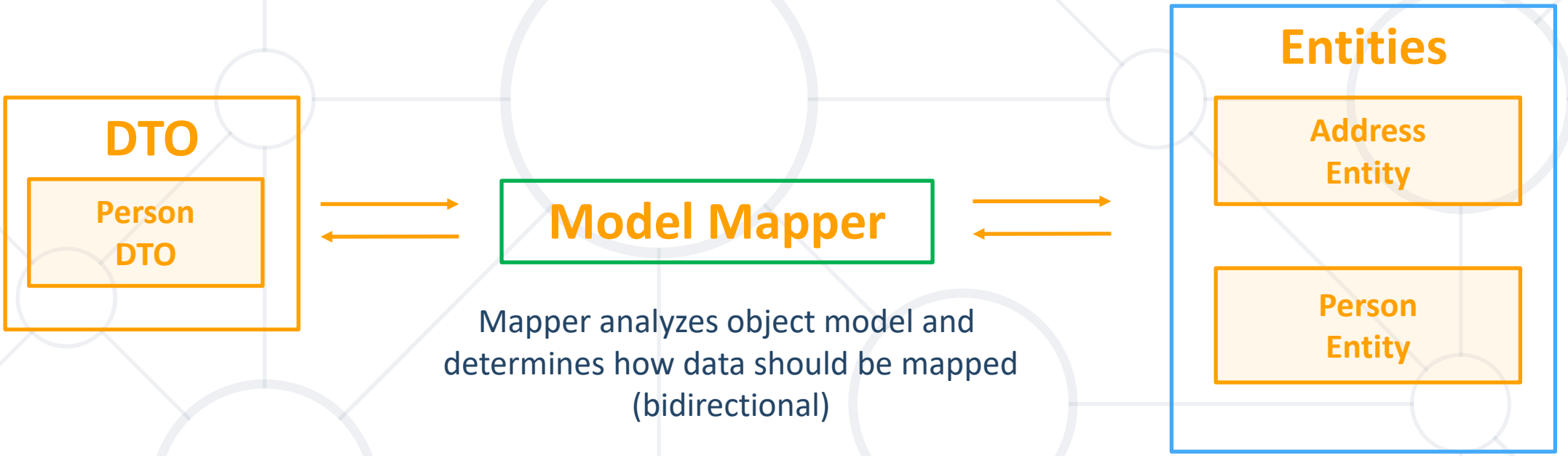
Model Mapping

Converting Entity Objects to DTOs

Model Mapping

- We often want to map data between **objects with similar structure**
- Model mapping is an easy way to **convert one model to another**
- Separate **models** must **remain segregated**
- We can **map entity objects to DTOs** using ModelMapper
- Uses **conventions** to determine how properties and values are mapped to each other

Model Mapper



Mapper analyzes object model and determines how data should be mapped (bidirectional)

Adding Model Mapper

- Add as maven dependency:

pom.xml

```
<dependency>
    <groupId>org.modelmapper</groupId>
    <artifactId>modelmapper</artifactId>
    <version>2.4.2</version>
</dependency>
```

- Create object:

ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
EmployeeDto employeeDto = modelMapper.map(employee, EmployeeDto.class);
```

Source of information

Destination object(DTO)

Simple Mapping Entity to DTO

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EmployeeDto.java

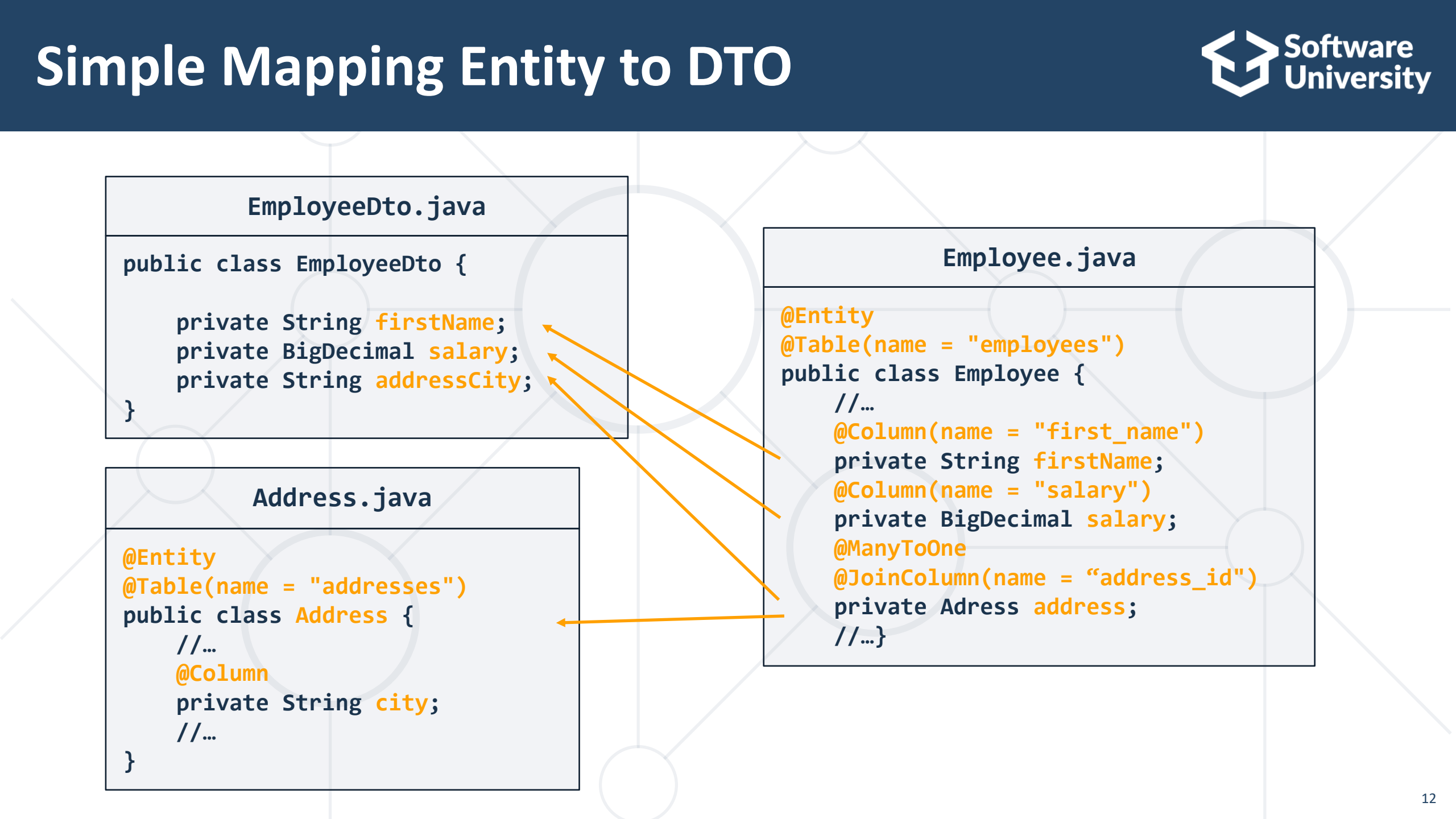
```
public class EmployeeDto {

    private String firstName;
    private BigDecimal salary;
    private String addressCity;
}
```

Address.java

```
@Entity
@Table(name = "addresses")
public class Address {
    //…
    @Column
    private String city;
    //…
}
```

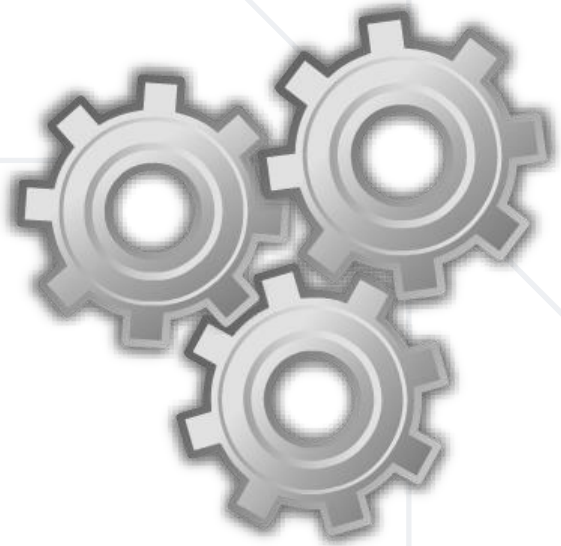
Employee.java

```
@Entity
@Table(name = "employees")
public class Employee {
    //…
    @Column(name = "first_name")
    private String firstName;
    @Column(name = "salary")
    private BigDecimal salary;
    @ManyToOne
    @JoinColumn(name = “address_id")
    private Adress address;
    //…}
```



Model Mapping

- ModelMapper uses **conventions** to map objects
  - Sometimes fields differ and mapping **won't be done properly**
  - In this case some manual mapping is needed



Explicit Mapping DTO to Entity (1)

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EmployeeDto.java

```
public class EmployeeDto {

    private String firstName;

    private BigDecimal salary;

    private String addressCity;
}
```

Employee.java

```
@Entity
@Table(name = "employees")
public class Employee {
    //…
    @Column(name = "first_name")
    private String firstName;
    @Column(name = "salary")
    private BigDecimal salary;
    @ManyToOne
    @JoinColumn(name = “address_id")
    private Adress address;
    //…}
```

Address.java

```
@Entity
@Table(name = "addresses")
public class Address {
    //…
    @Basic
    private City city;
    //…
}
```

City.java

```
@Entity
@Table(name = "cities")
public class Address {
    //…
    @Basic
    private String name;
    //…
}
```

Explicit Mapping DTO to Entity (2)

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ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
PropertyMap<EmployeeDto, Employee> employeeMap = new PropertyMap<EmployeeDto, Employee>()
{
        @Override
        protected void configure() {
            map().setFirstName(source.getName());
            // Add mappings for other fields
            map().setAddressCity(source.getAddress().getCity().getName());
        }
};

modelMapper.addMappings(employeeMap).map(employeeDto,employee);
```

Explicit Mapping DTO to Entity – Java 8

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ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
TypeMap<EmployeeDto, Employee> typeMap = mapper.createTypeMap(
EmployeeDto.class, Employee.class);
typeMap.addMappings(m -> m.map(src -> src.getName(),
Employee::setFirtsName));
typeMap.map(employeeDto);
```

Validation

ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
modelMapper.createTypeMap(EmployeeDto.class, Employee.class);
modelMapper.validate();
```

Source

Destination

Exception

```
1) Unmapped destination properties found in TypeMap[EmployeeDto -> Employee]:

        com.persons.domain.entities.Employee.setAddress()
        com.persons.domain.entities.Employee.setId()
        com.persons.domain.entities.Employee.setBirthday()
```

Skipping Properties

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ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
PropertyMap<EmployeeDto, Employee> employeeMap = new PropertyMap<EmployeeDto, Employee>()
{
            @Override
            protected void configure() {
                skip().setSalary(null);
            }
        };

modelMapper.addMappings(employeeMap).map(employeeDto,employee);
```

Skip Salary

ConsoleRunner.java – Java 8

```
typeMap.addMappings(mapper -> mapper.skip(Employee::setSalary));
typeMap.map(employeeDto);
```

Converting Properties – Java 7

Terminal.java

```
ModelMapper modelMapper = new ModelMapper();
Converter<String, String> stringConverter = new AbstractConverter<String, String>() {
            @Override
            protected String convert(String s) {
                return s == null ? null : s.toUpperCase();
            }
        };

PropertyMap<EmployeeDto, Employee> employeeMap = new PropertyMap<EmployeeDto, Employee>()
{
            @Override
            protected void configure() {
                using(stringConverter).map().setFirstName(source.getName());
            }
        };

modelMapper.addMappings(employeeMap).map(employeeDto,employee);
```

Convert Strings to Upper Case

Use Convertion

Converting Properties – Java 8

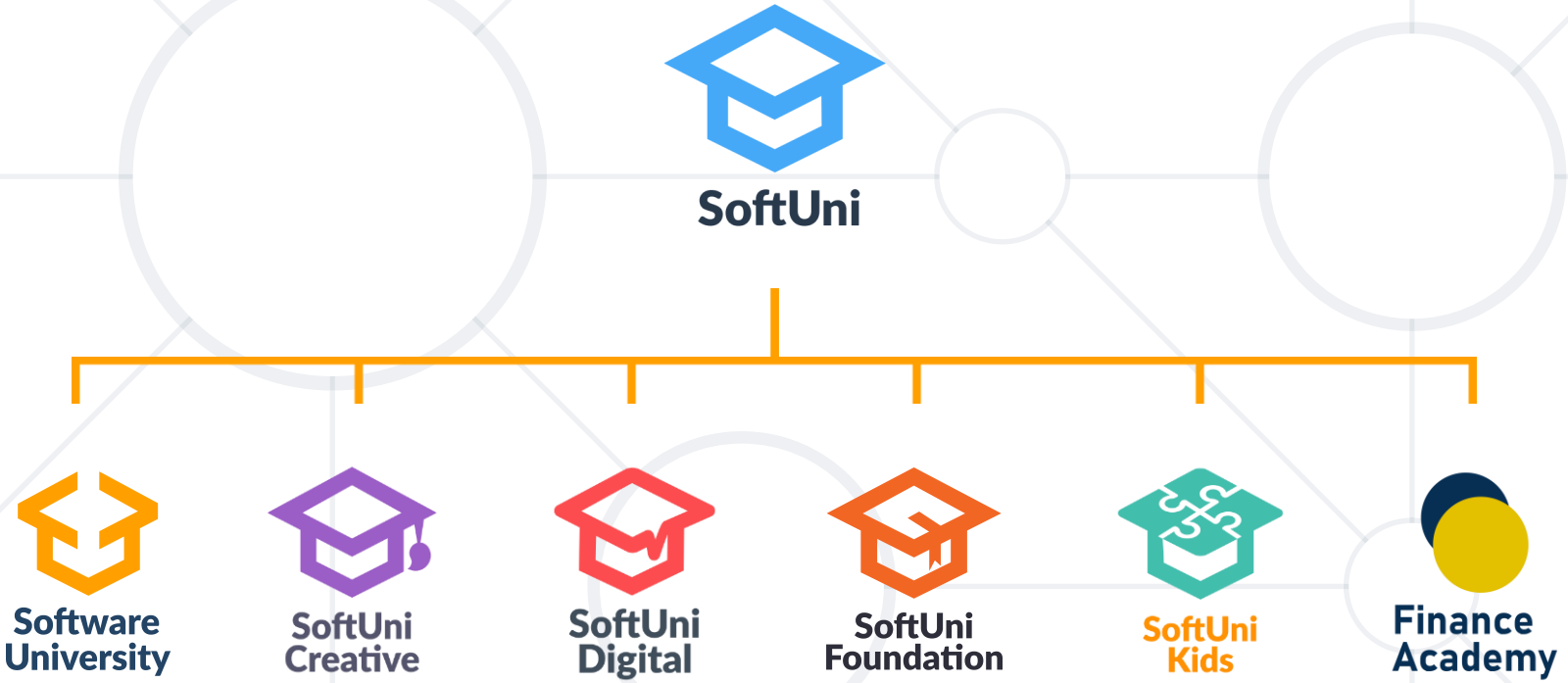
ConsoleRunner.java

```
ModelMapper modelMapper = new ModelMapper();
Converter<String, String> toUppercase = ctx -> ctx.getSource() == null ? null :         c
tx.getSource().toUpperCase();
TypeMap<EmployeeDto, Employee> typeMap = mapper.createTypeMap(EmployeeDto.class, Employee
.class).addMappings(mapper -> mapper.using(toUppercase).map(EmployeeDto::getName, Employe
e::setFirstName));
typeMap.map(employeeDto);
```

Summary

- We should **not expose full data** about our entities
  - Present only those which should be visible to the outside world
- Mapping is **done with ModelMapper**
  - Allows us to **map all or single fields**
  - Allows us to **convert field values**

Questions?



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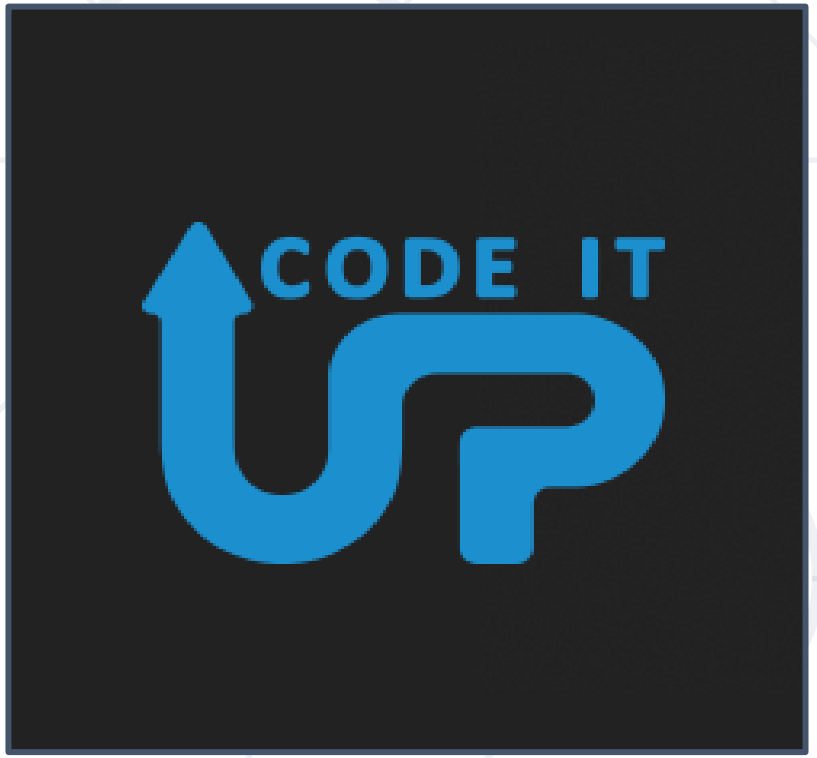

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