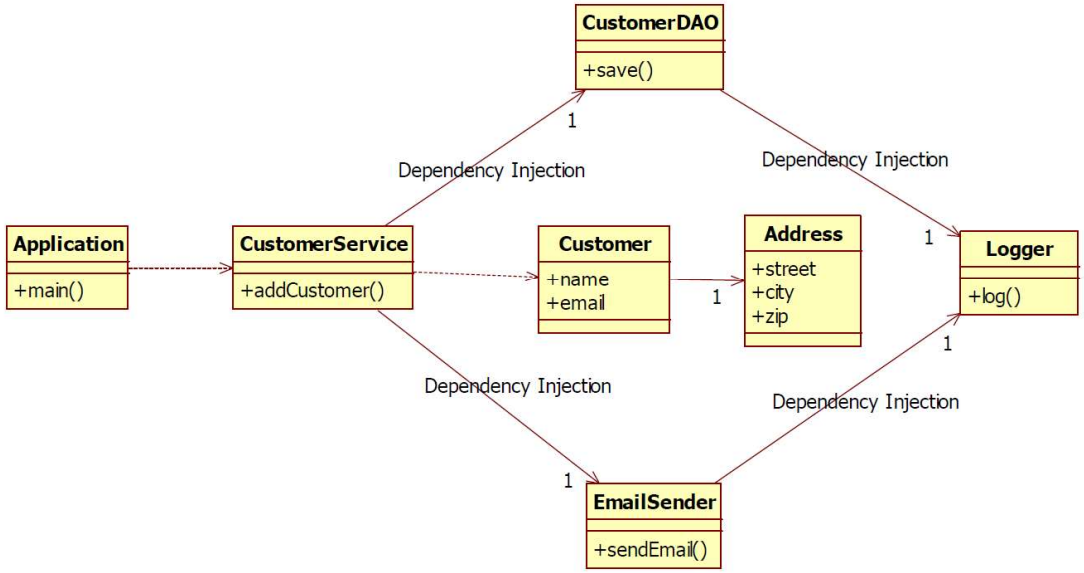
Lab 13

Part A AOP



If we run the code in the lab 12 part e, we get the following output in the console:

```
CustomerDAO: saving customer Frank Brown
Logging 2018-03-20T11:23:44.588 Customer is saved in the DB: Frank Brown
EmailSender: sending 'Welcome Frank Brown as a new customer' to
fbrown@acme.com
Logging 2018-03-20T11:23:44.588 Email is sent: message= Welcome Frank Brown
as a new customer , emailaddress =fbrown@acme.com
```

a. Modify the application so that whenever the sendEmail method on the EmailSender is called, a log message is created (using an after advice AOP annotation). This should produce the following output:

```
CustomerDAO: saving customer Frank Brown
Logging 2018-03-20T11:23:44.588 Customer is saved in the DB: Frank Brown
EmailSender: sending 'Welcome Frank Brown as a new customer' to
fbrown@acme.com
Logging 2018-03-20T11:23:44.588 Email is sent: message= Welcome Frank Brown
as a new customer , emailaddress =fbrown@acme.com
2018-03-20T11:23:44.789 method=sentEmail
```

In order to use AOP in a Spring Boot project, we have to add the following dependency in the POM file:

```
<dependency>
      <groupId>org.aspectj</groupId>
      <artifactId>aspectjweaver</artifactId>
      <version>1.8.12</version>
      <scope>compile</scope>
</dependency>
```

b. Now change the log advice in such a way that the email address and the message are logged as well. You should be able to retrieve the email address and the message through the arguments of the **sendEmail()** method. This should produce the following output:

```
CustomerDAO: saving customer Frank Brown
Logging 2018-03-20T11:23:44.588 Customer is saved in the DB: Frank Brown
EmailSender: sending 'Welcome Frank Brown as a new customer' to
fbrown@acme.com
Logging 2018-03-20T11:23:44.588 Email is sent: message= Welcome Frank Brown
as a new customer , emailaddress =fbrown@acme.com
2018-03-20T11:23:44.789 method=sentEmail address=fbrown@acme.com message=
Welcome Frank Brown as a new customer
```

c. Change the log advice again, this time so that the outgoing mail server is logged as well. The **outgoingMailServer** is an attribute of the **EmailSender** object, which you can retrieve through the **joinpoint.getTarget()** method. This should produce the following output:

```
CustomerDAO: saving customer Frank Brown
Logging 2018-03-20T11:23:44.588 Customer is saved in the DB: Frank Brown
EmailSender: sending 'Welcome Frank Brown as a new customer' to
fbrown@acme.com
Logging 2018-03-20T11:23:44.588 Email is sent: message= Welcome Frank Brown
as a new customer , emailaddress =fbrown@acme.com
2018-03-20T11:23:44.789 method=sentEmail address=fbrown@acme.com message=
Welcome Frank Brown as a new customer outgoing mail server =
smtp.mydomain.com
```

d. Write a new advice that calculates the duration of the method calls to the DAO object and outputs the result to the console. Spring provides a stopwatch utility that can be used for this by using the following code:

```
import org.springframework.util.StopWatch;

public Object invoke(ProceedingJoinPoint call ) throws Throwable {
   StopWatch sw = new StopWatch();
   sw.start(call.getSignature().getName());
   Object retVal = call.proceed();
   sw.stop();

   long totaltime = sw.getLastTaskTimeMillis();
   // print the time to the console

   return retVal
```

Part B events

In the application of part A, do the following 2 things using events:

1. Whenever we add a new Customer on the CustomerService, publish an NewCustomerEvent. Write a new class called AdvertisementService that subscribes to NewCustomerEvent's and writes the Customer information to the console
2. Write another class called CustomerRatingService that subscribes to NewCustomerEvent's and writes the Customer information to the console

Part C scheduling

In the application of part B, write a new class that calls the logger every 15 seconds with the request to write the current time in the logfile.

Part D

Write a simple webshop application using Spring Boot with the following requirements:

Product catalog

You can add, remove and get products from the product catalog.

ShoppingCart

You can add products to the shoppingcart, you can remove products from the shoppingcart, and you can update the quantity of products in the shoppingcart. Assume that every shoppingCart has an unique id.
You can get the content of the shoppingCart

If you checkout the shoppingcart, an order is created based on the content of the shoppingcart.

Order

You can create an order based on the content of the shoppingCart. Once an order is created, you can add payment information (amount, date, creditcard number, validation date, creditcard type), customer information (name, email, phone), and the shipping address and billing address (street, city, zip) to the order. Every order has an unique orderNumber. The framework only supports credit card payments, but it should be easy to plugin other type of payments. The billing and shipping addresses are domestic (street, city, zip)

You can get the content of the order

If you place an order, an email is send to the particular customer.

All data is stored in the database. The DAO classes just keep an in-memory list of all the objects (orders, shoppingcarts, products, …)

In lab 11 we wrote a vertical framework for this webshop.
In this lab we use Spring boot as a horizontal framework to implement this webshop.