EA Practice midterm

Question 1 [10 points] {10 minutes}

a. Suppose we have a Spring application with the following given XML configuration

```
<bean id="customerService" class="basic.CustomerService">
   <constructor-arg ref="emailService"/>
</bean>
<bean id="emailService" class="basic.EmailService">
   <constructor-arg ref="customerService"/>
</bean>
```

When we run the application, Spring gives an error. Explain clearly why Spring gives an error based on the given XML configuration.

Answer:

b. Explain why we need an **init()** method in Spring Boot.

Answer:

Question 2 [15 points] {20 minutes}

Suppose we need to write a **Spring Boot** application that allow us to store and find Products. A Product consists of the following attributes: productNumber, name, price and categoryName. A categoryName is something like “clothing” or “toys” or “electronics” The application should allow us to store new Products and we should be able to find products with the following functionality:

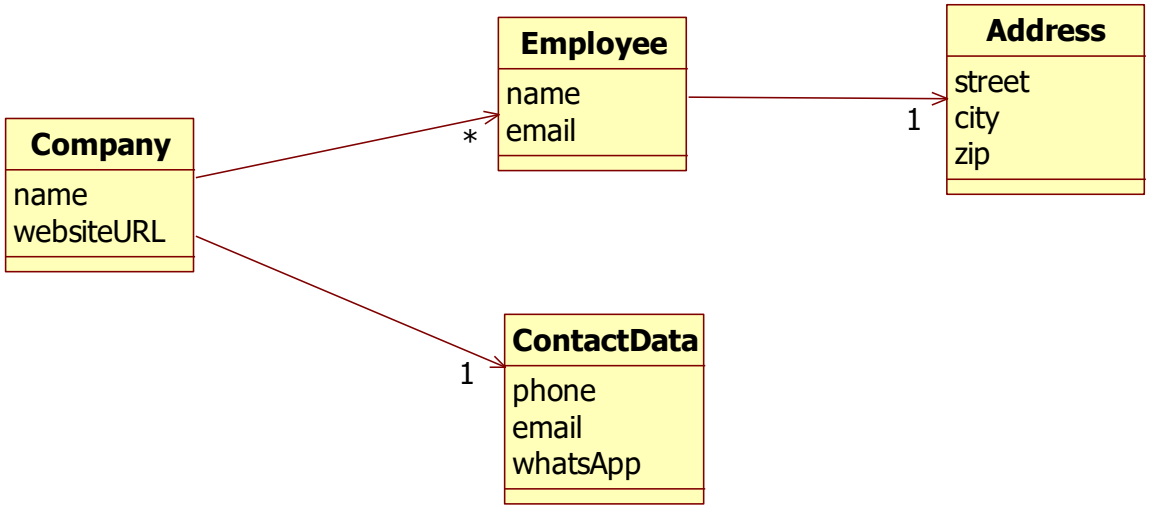
- Give all products with a price bigger than a given amount
- Give all products from a certain category

Write **ALL** necessary Java code including annotations. Do **NOT** write the Application class (that contains the main() method). Do **NOT** write imports and do **NOT** write getter and setter methods. Also do **NOT** write constructors.

Use all the best practices we learned in this course.

Question 3 [15 points] {15 minutes}

Suppose we have the following JPA entities:



We need to write the following queries:

These queries should be defined by the method name in the repository:

- **Give all Companies with a given name. Name is a parameter.**
- **Give all streets given a certain city and a certain zip**

These queries should be defined by **@Query** in the repository:

- **Give the name of all companies from a given city**
- **Give the name of the company given a certain phone number**
- **Give all Companies where an employee works with a certain given name.**

Write the queries in the corresponding repositories. Write the **complete Java code** of all necessary repositories including the methods and the annotations. **Do not write Java imports**

Question 4 [20 points] {20 minutes}

Given are the following entities:

```
public abstract class Vehicle {


   private long id;
   private String brand;
   private String color;

   public Vehicle() { }

   public Vehicle(String brand, String color) {
      this.brand = brand;
      this.color = color;
   }
}
```

```
public abstract class Car extends Vehicle{
   private String licencePlate;
   public Car() { }
   public Car(String brand, String color, String licencePlate) {
      super(brand, color);
      this.licencePlate = licencePlate;
   }
}
```

```
public class RentalBycicle extends Vehicle{
   private double pricePerHour;
   public RentalBycicle() {    }
   public RentalBycicle(String brand, String color, double pricePerHour) {
      super(brand, color);
      this.pricePerHour = pricePerHour;
   }
}
```

```
public class SellableCar extends Car {
   private double sellPrice;
   public SellableCar() { }
   public SellableCar(String brand, String color, String licencePlate, double
sellPrice) {
      super(brand, color, licencePlate);
      this.sellPrice = sellPrice;
   }
}
```

```
public class RentalCar extends Car {
   private double pricePerDay;
   public RentalCar() {   }
   public RentalCar(String brand, String color, String licencePlate, double
pricePerDay) {
      super(brand, color, licencePlate);
      this.pricePerDay = pricePerDay;
   }
}

public interface RentalBycicleRepository extends JpaRepository<RentalBycicle,
Long> {
}
public interface RentalCarRepository extends JpaRepository<RentalCar, Long> {
}
public interface SellableCarRepository extends JpaRepository<SellableCar,
Long> {
}

@SpringBootApplication
public class Application implements CommandLineRunner {
   @Autowired
   RentalCarRepository rentalCarRepository;
   @Autowired
   SellableCarRepository sellableCarRepository;
   @Autowired
   RentalBycicleRepository rentalBycicleRepository;

   public static void main(String[] args) {
      SpringApplication.run(Application.class, args);
   }

   @Override
   public void run(String... args) throws Exception {
      RentalCar rentalCar = new RentalCar("BMW", "Black", "KL-980-1", 67.00);
      rentalCarRepository.save(rentalCar);
      SellableCar sellableCar = new SellableCar("Audi", "White", "KM-956-2",
45980.00);
      sellableCarRepository.save(sellableCar);
      RentalBycicle rentalBycicle = new RentalBycicle("Moof", "Grey", 10.50);
      rentalBycicleRepository.save(rentalBycicle);
```

```
    }
}
```

a. In the given code above, add **all the necessary mapping annotations** so that the whole inheritance hierarchy is mapped according the **single table per hierarchy** strategy. Do **NOT** rewrite any code. Only write the correct annotations in the given code.

b. Explain **ALL** advantages and disadvantages we learned about the **single table per hierarchy** strategy.
Answer:

c. Draw the corresponding database table with all the columns and corresponding data if we run Application.java.

d. Suppose we map the given inheritance hierarchy with the strategy **Joined Tables**. Draw the corresponding database tables with all the columns and corresponding data if we use the strategy **Joined Tables**

e. Suppose we map the given inheritance hierarchy with the strategy **Table per concrete class**. Draw the corresponding database tables with all the columns and corresponding data if we use the strategy **Table per concrete class**

Question 5 [10 points] {15 minutes}

Circle all statements that are correct:

a. When we add a version attribute to an entity and we annotate this with @Version then you will never have the dirty read problem on this entity.
b. If we do not allow the phantom read problem in our application, we cannot run 2 transactions at the same time.
c. In a Spring boot application that uses JPA, you cannot use dependency injection on JPA entities.
d. When you make one method of a Spring bean transactional the 2 phase commit protocol will never be used. If you make 2 or more methods of a Spring bean transactional the 2 phase commit protocol will be used.
e. Cascading is only applicable for inserts, updates and deletes.
f. In JPA, a @OneToOne relation is stored in the database as a @ManyToOne relation.
g. A named query cannot contain a join.
h. An entity class in a Spring Boot JPA application is always a singleton.
i. With the TransactionReadCommitted isolation level, you can never have the lost update problem
j. In databases that use sequences, every table contains a sequence column.