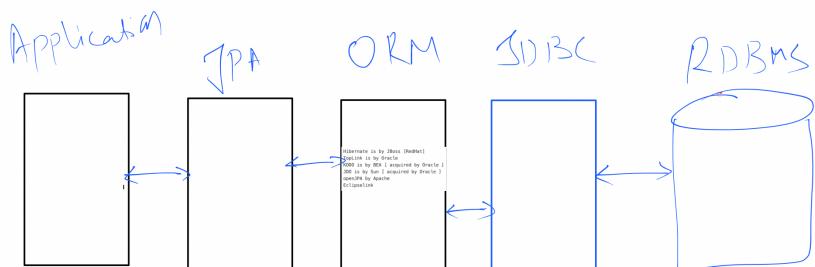
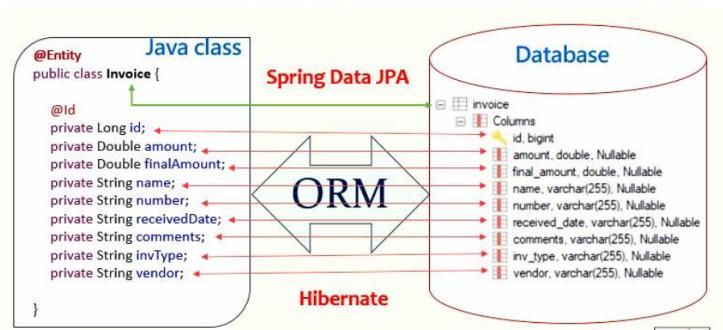
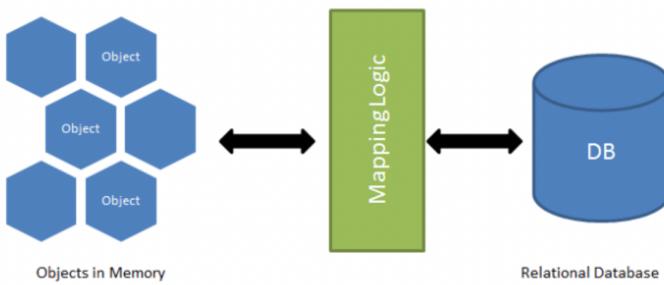


O/R Mapping



JDBC

```
@Override
public void addProduct(Product p) {
    Connection con = null;
    String SQL = "INSERT INTO products (id, name, price) VALUES (?, ?, ?)";
    try {
        con = DriverManager.getConnection(URL, USER, PWD);
        PreparedStatement ps = con.prepareStatement(SQL);
        ps.setString(1, p.getName());
        ps.setDouble(2, p.getPrice());
        ps.executeUpdate();
    } catch (SQLException ex) {
        ex.printStackTrace();
    } finally {
        if(con != null) {
            try {
                con.close();
            } catch (SQLException e) {
                throw new RuntimeException(e);
            }
        }
    }
}
```

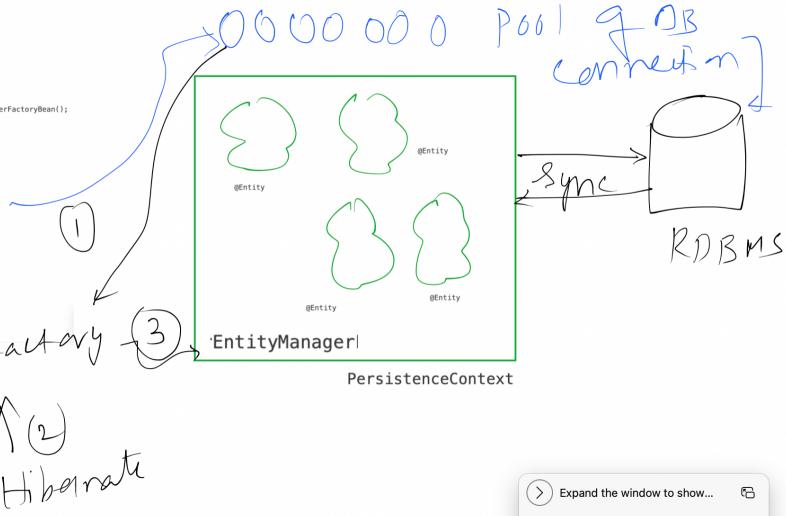
ORM

```
@Override
public void addProduct(Product p) {
    em.persist(p);
}
```

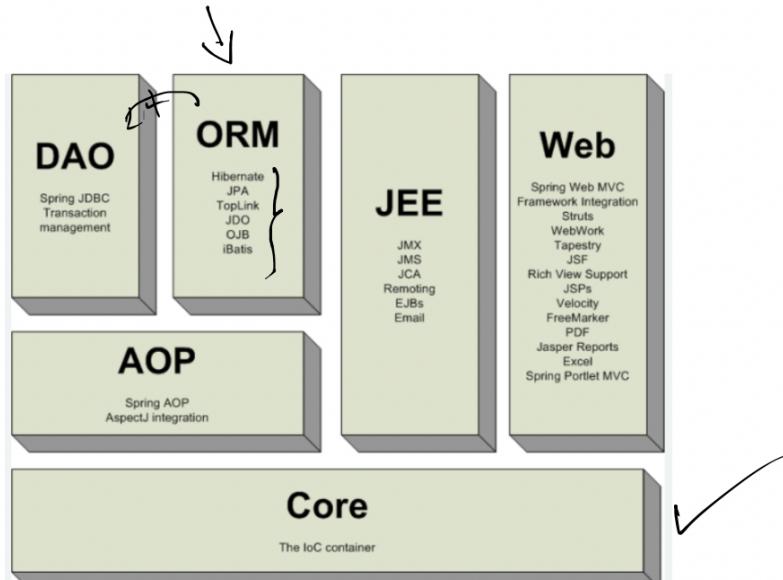
```
@Configuration
```

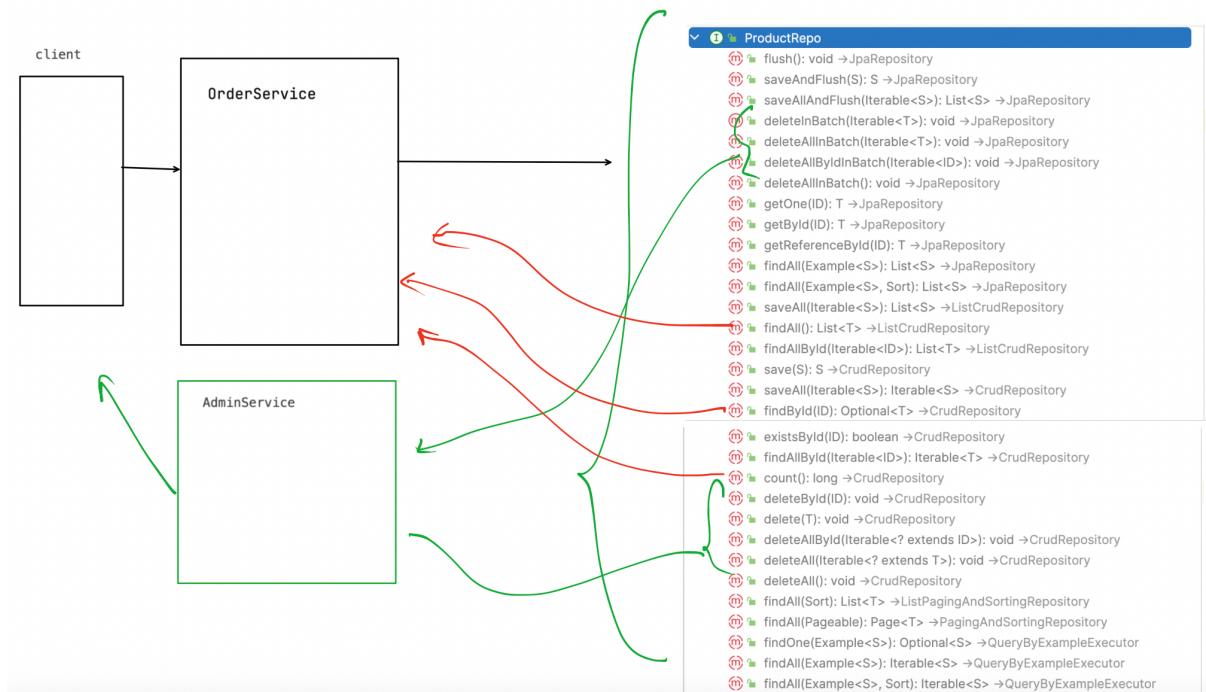
```
public class AppConfig {  
    @Bean  
    public LocalContainerEntityManagerFactoryBean emf(DataSource ds) {  
        LocalContainerEntityManagerFactoryBean emf = new LocalContainerEntityManagerFactoryBean();  
        emf.setDataSource(ds);  
        emf.setPackagesToScan("com.cisco.prj.entity");  
        emf.setJpaVendor(new HibernateJpaVendor());  
        ...  
        return emf;  
    }  
  
    // factory method  
    @Bean  
    public DataSource getDataSource() throws Exception {  
        ComboPooledDataSource cpds = new ComboPooledDataSource();  
        cpds.setDriverClassName("com.mysql.jdbc.Driver"); // loads the jdbc driver  
        cpds.setJdbcUrl("jdbc:mysql://localhost:3306/cj");  
        cpds.setUser("root");  
        cpds.setPassword("Welcome123");  
        cpds.setMaxPoolSize(5);  
        cpds.setAcquireIncrement(5);  
        cpds.setMaxPoolSize(20);  
        return cpds;  
    }  
}
```

Entity manager factory
Hibernate



(1) Expand the window to show...





```

mysql> select * from customers;
+-----+-----+-----+
| email | fname | lname |
+-----+-----+-----+
| anne@cisco.com | Anne | Hathaway |
| brad@cisco.com | Brad | Pitt |
| raj@cisco.com | Raj | Kumar |
+-----+-----+-----+

```

SQL
based on table and column names

```

select * from customers
select * from customers where lname = 'Kumar'
select email, fname from customers

```

```

@Table(name="customers")
public class Customer {
    @Id
    private String email;

    @Column(name="FNAME", length = 100, nullable = false)
    private String firstName;

    @Column(name="LNAME", length = 100, nullable = false)
    private String lastName;
}

```

JP-QL
based on class and field names

```

from Customer
from Customer where lastName = 'Kumar'
select email, firstName from Customer

```

```
mysql> select * from customers;
+-----+-----+-----+
| email | fname | lname |
+-----+-----+-----+
| anne@cisco.com | Anne | Hathaway |
| brad@cisco.com | Brad | Pitt |
| raj@cisco.com | Raj | Kumar |
+-----+-----+-----+
```

orders

Order_id	Order_date	Customer_fk	total
890	14 JUL 2025 4:50:10	brad@cisco.com	98823.33
891	14 JUL 2025 6:20:12	anne@cisco.com	8234.14
892	15 JUL 2025 10:30:00	brad@cisco.com	800.00

```
mysql> select * from products;
+-----+-----+-----+
| id | name | price | qty |
+-----+-----+-----+
| 1 | iPhone 16 | 89000 | 100 |
| 2 | Sony Bravia | 279000 | 100 |
| 3 | Logitech Mouse | 789 | 100 |
| 4 | Tata Play | 8900 | 100 |
| 5 | LG AC | 45000 | 100 |
+-----+-----+-----+
```

Line_items	Item_id	Order_fk	Product_fk	Qty	amount
611	890	2		1	2,60,000.00
612	890	3		2	1200.00
613	891	1		2	1,60,000.00
614	892	3		1	500.00

