



**Hochschule  
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University of Applied Sciences

**Semesterproject**

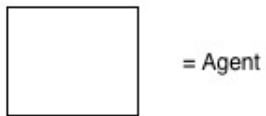
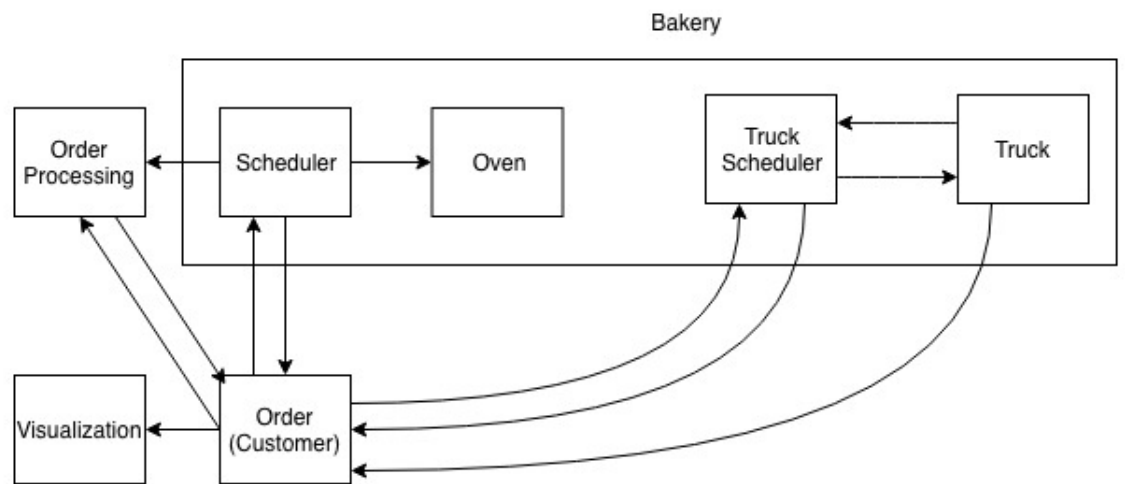
# **Multi Agent and Agent Systems**

Department of Autonomous Systems  
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Submitted by: Team PJT

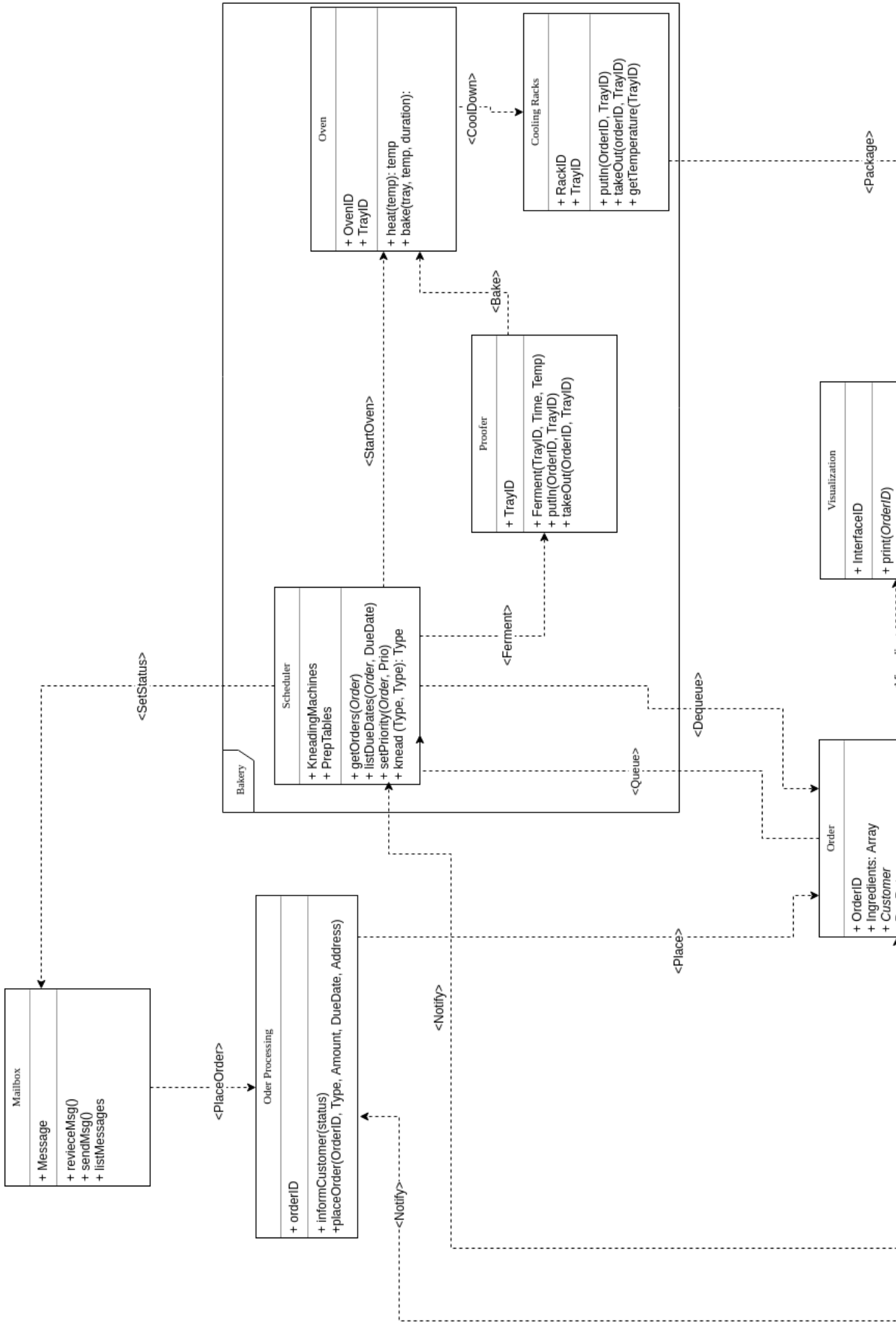
Sankt Augustin 12. November 2018

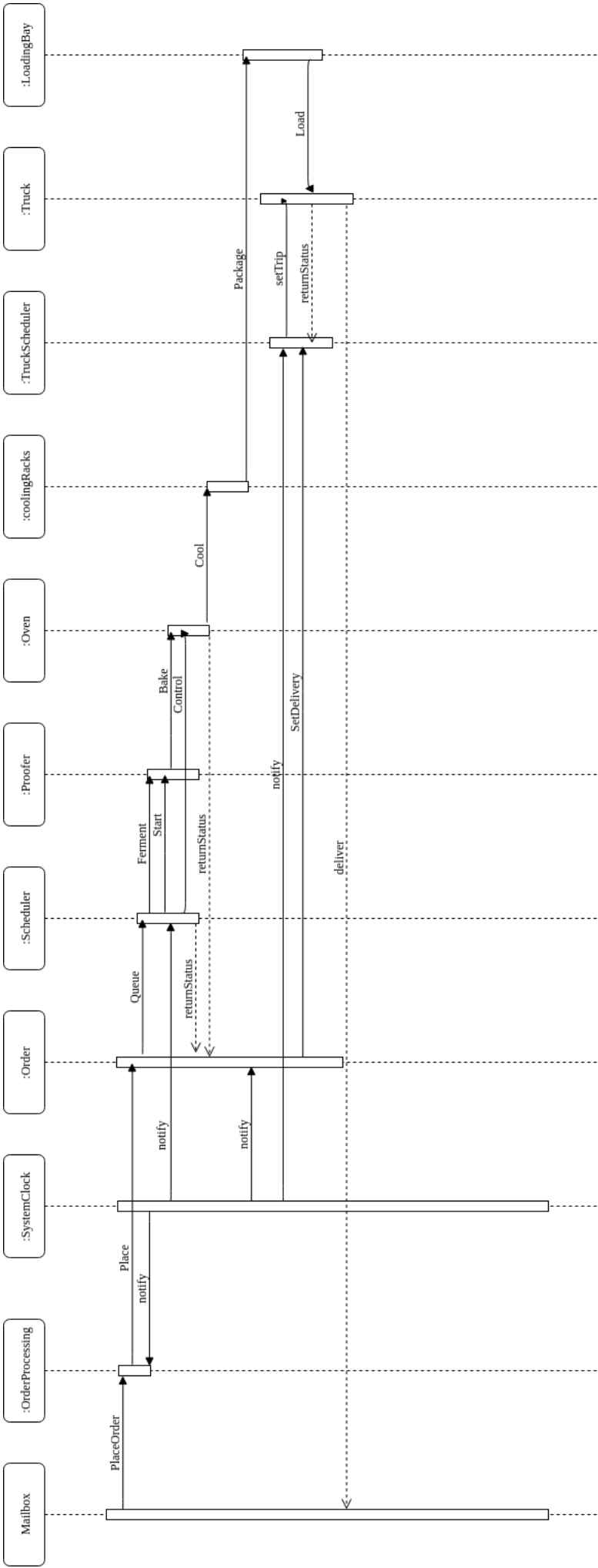
# 1 Architecture



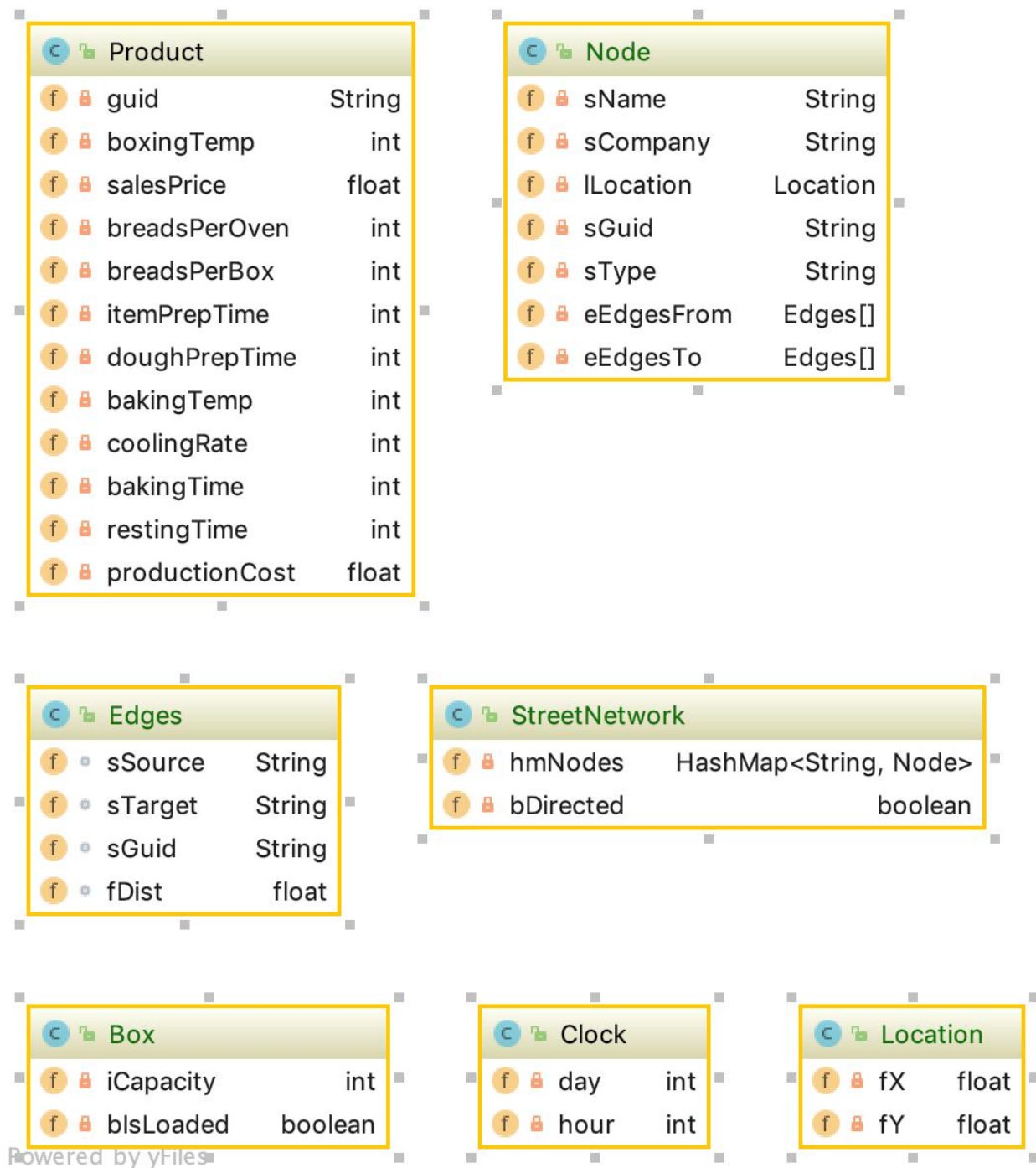
**To which stage do these agents belong?**

- Order processing
  - Customer
  - Order Processing
  - Scheduler
  - Order
- Dough preparation
  - Order
- Baking and Cooking
  - Scheduler
  - Oven
  - Order
- Packing and Loading
  - Truck Scheduler
  - Order
- Delivery
  - Truck Scheduler
  - Truck
  - Order





# Objects



## 2 Aggregation of order data

Aggregation of order data can be done in the following manner:

- An aggregation of a customer's orders for each day or each date <ddd.hh>  
→ It depends which data structure you could use

- If it is really important to you that you access date by given data format you could use a hashmap. Key is date value is order. Worst performance of searching a hashmap is  $O(n) = \log(n)$

```
HashMap<Date, Order> hmMapDaily = new HashMap<Date, Order>();
hmMapDaily.put(new Date(), new Order());
Order co = hmMapDaily.get(date);
```

- If it is not that important to use the given dateformat you could use an array. Index is day of a year. That means here worst performance of searching an array given that you know which day you want to search is  $O(n) = 1$

- **An aggregation of all orders for a particular product for each day or each date**  
 → Hashmap of Hashmaps. One entry within Hashmap represents one product. Key is product value is a hashmap. One Hashmap within Hashmap has as key a date, as value an array of orders.

```
HashMap<ProductId, HashMap<Date, Orders[]>> hMapProduct;
hMapProduct.put(new ProductId(), HashMap<Date, Orders[]>());
HashMap<Date, Orders[]> hmDate = hMapProduct.get(ProductId());
```

So hMapProduct would look the following way:

$$hMapProduct = \left( \begin{array}{c} \{ProductId, HashMap < Date, Orders[] >\} \\ \cdot \\ \cdot \\ \cdot \\ \{ProductId, HashMap < Date, Orders[] >\} \end{array} \right)$$