# Deliverable 1

## Tutorial Group: iSulotions (SEOC 6)
Team: Plant

### Team Members

Scott Hofman (s0943941) – stumpitron@gmail.com

Callum Jamieson (s0923194) – callumscottjamieson@gmail.com

Simon Zhong (s1159359) – simondzhong@gmail.com

Andrei Manolache (s0923322) – s0923322@sms.ed.ac.uk

Ankit Sawa (s1105191) – ankitsawa@yahoo.co.in

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# Project Drivers

## Purpose of the Product

To provide an interface with a centralized database where the delivery department can provide the respective Plant the details of the consignment that is to be produced. The Plant on the other hand acts on the order received and starts its production. It also uses the interface to calculate the cost of the item produced and check on the stock level at the distribution center.

## Scope of the product

The Plant system allows the delivery department to give a production order and the order is sent to the respective plant. The production is estimated to be over in a standard production time and in case of a delay the delivery people are sent and alert. At the end of the production the finished goods are transported to the distribution center and the system sends a notification to the delivery system about the successful production.

## Clients

- Delivery Representative: The one who will be placing the production order and will be given the production details.

- Plant manager: The one who is responsible for the complete production process that is being carried out.

- Workers in Plant: Whose safety depends on the system as the system alerts for any danger that will be happening in the plant.

- Costumers: Who are expecting to receive the consignment on time as any delay in production will result in the delay in delivery.

- Delivery department: They count on the plant to finish the production on time in order to deliver the product as promised.

- Order Department: The one who are responsible to inform the costumer to about the product and the production details.

- Database manager: The one who will be maintaining all the data in a centralized database system.

# Project Constraints

- Resource Constrains: The system will be developed in Eclipse IDE for java Developers and a centralized Database. Since other teams (Order & Delivery) will be using the same Database it is to be made sure that the database is not over written in the places which might create confusion. The size of the database is to be set optimally in order to not waste any space. The machine on which the system will be running on should be capable enough to carry out all the tasks the system needs to run.

- Work Constraints: The whole system will be responsible for the complete production process any failure or delay should not occur because of a flaw in the system.  The system should be in a running state throughout the production process.

- Time Constraints: The response and working of the system should be fast enough to update the database in an efficient way. The notification is to be sent to the Delivery System as soon as the production is complete. Retrieving of data from the database should be easy and fast so there is no delay in the production. The alert system is to be active and should response instantly to avoid loss of resource and life.

# Functional Requirements

- The system should receive production order from the Delivery System
- The system sends the Production order to the respective plant which builds it
- The system should be able to get what Distribution Centre the order is to be delivered to.
- Once in production the system should be able to keep checking for alerts during production and report them if they arise.
- The system should check the stock at the Distribution Centre.
- The system should provide an estimate on production time, calculate cost and calculate the quantity to be delivered in pallets.
- Once production is complete the system should verify the cost of production.
- The system should alert deliveries once the production is complete providing them with the cost.

# Non-Functional Requirements
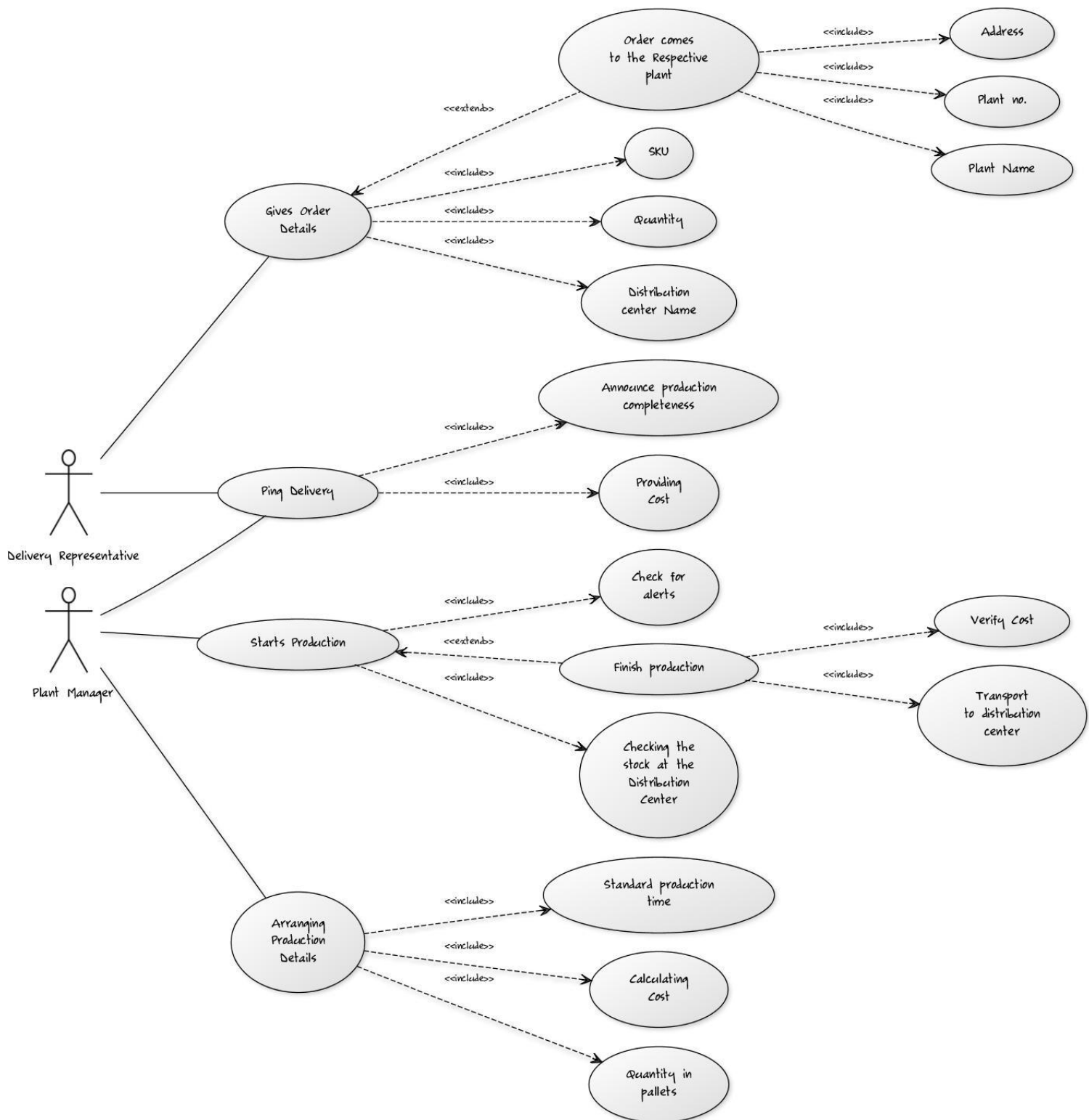
- We assume that all monetary values will be expressed in pounds sterling (£).
- We assume that, at all times during the production process, the plant will operate in a manner that maximizes safety of both machinery and employees.
- We assume that all software and machinery will operate in an "ecofriendly" manner.
- We assume that plant operations continue to operate on a 24-hour basis.

- We assume that the transportation process will be conducted in a safe manner.
- We assume the production is finished when we reach the required quantity.
- We assume the database and any User Interface will be easy accessible and maintainable.
- We assume the plant will continue to be maintained outside the control of the system.
- We assume all data within the system will be secured to the highest degree, to avoid potential compromises and information leaks.
- We assume a line of communication between the plant, the delivery centre and the deliveries system will be maintained at all time.
- We assume the availability of resources to all plants at all time.
- We assume there is a standard delivery rate for transportation between the plant and the delivery centre.

## Open Issues

- Procter & Gamble is a large, fluid company. Upon introduction of a new product, do our plants have the ability to adapt to produce it?
- Upon data corruption, a possibility in any database system, how does the system recover? Is there a database backup?
- Is the transfer of the product between the plant and the distribution centre controlled by means of the system?
- Will the waste produced by the system be dealt with?
- An alert system is in place during plant production. Does a similar system need to be in place for managing the incoming order?
- Despite optimization for efficiency, the distribution centres' stock may go unused for a long period of time. Is there a set date for the removal of expired stock?
- Should resource availability be taken into account upon creation of product?
- When calculating cost, does Procter & Gamble have a system to ensure enough cash reserves? If the amount of cash does not meet requirements, how does the system react?
- Upon database downtime, how does the system react? Can it sustain production, or will it shut down?
- Will the system be maintained/supervised by an individual, or will the process be entirely automated?

# The Use Case Diagram

# The Use Case Description

| Use Case 1 | Product Details |
|---|---|
| **Goal in Context** | This use case allows the delivery agent to interact with the system and establish the product specifications required for production. |
| **Preconditions** | The delivery agent knows all the exact details of the product required. |
| **Success End Condition** | The agent has successfully provided a known product that has a plant location into the system. |
| **Failed End Condition** | The product does not exist in the database |
| **Primary Actor** | Delivery Representative |
| **Secondary Actors** | None. |
| **Trigger** | The agent provides a new product to the system. |

| | Step | Action |
|---|---|---|
| **Description** | 1. | The agent provides the name and quantity of the product plus the SKU and the location for the Distribution Center that will be used to return the desired order. |
| | 2. | Order is accepted and the plant name that produces the specific product is searched. |

| | Step | Branching Action |
|---|---|---|
| **Extensions** or **Variations** | | Product details are correct |
| | 1.1 | The Plant where the product is produced is accessed. |

| Use Case 2 | Establishing Production Details |
|---|---|
| Goal in Context | This use case is designed to enable the manager to establish the details for the production including number of pallets and cost |
| Preconditions | The plant location has a plant manager. |
| Success End Condition | The plant manager has successfully established the production details. |
| Failed End Condition | The plant manager cannot establish the required details. |
| Primary Actor | Plant Manager |
| Secondary Actors | None. |
| Trigger | The Plant Location for the required product is found |

| | Step | Action |
|---|---|---|
| Description | 1. | The plant manager arranges the production specifications before the actual production starts and also calculates in advance the production cost along with the number of pallets and makes sure that the production will be completed in the standard time. |
| | | |
| | | |

| | Step | Branching Action |
|---|---|---|
| Extensions or Variations | None | |
| | | |
| | | |

| Use Case 3 | Starting Production |
|---|---|
| Goal in Context | This use case will allow the manager to start the production while he checks for possible alerts and the stock capacity from the distributing center. Once the process of production is finalized the total cost will be verified and the product delivered to the distribution center. |
| Preconditions | The product details, number of pallets and cost has been successfully finalized |
| Success End Condition | The production has been successful and the product delivered to the distribution center |
| Failed End Condition | Either the production hasn't been able to finish because of particular alerts or the products haven't been delivered. |
| Primary Actor | Plant Manager |
| Secondary Actors | None. |
| Trigger | The production details have been successfully established. |

| Description | Step | Action |
|---|---|---|
| | 1. | The plant manager starts the production, while keeping an eye on the possible alerts and the diminution center stock. |
| | | |
| | | |

| Extensions or Variations | Step | Branching Action |
|---|---|---|
| | Production is finished | |
| | 1 | The production is finished and the total cost is verified. |
| | 2. The products are delivered directly to the Distribution Center. | |

| Use Case 4 | Alerting the Delivery Center | |
|---|---|---|
| **Goal in Context** | This use case has the purpose of alerting the delivery people of the products arrival | |
| **Preconditions** | The products have been produced. | |
| **Success End Condition** | The Distribution Center receives the ordered products. | |
| **Failed End Condition** | The Distribution Center doesn't receive the ordered products | |
| **Primary Actor** | Plant Manager | |
| **Secondary Actors** | Delivery Representative | |
| **Trigger** | The production has been finalized. | |
| **Description** | **Step** | **Action** |
| | 1. | The plant manager contacts the delivery representative and announces the end of production and provides a cost for the expenses. |
| | | |
| | | |
| **Extensions** or **Variations** | **Step** | **Branching Action** |
| | Delivery is announced | |
| | 1 | The delivery people receive the message... |
| | . | |

## The Class Model
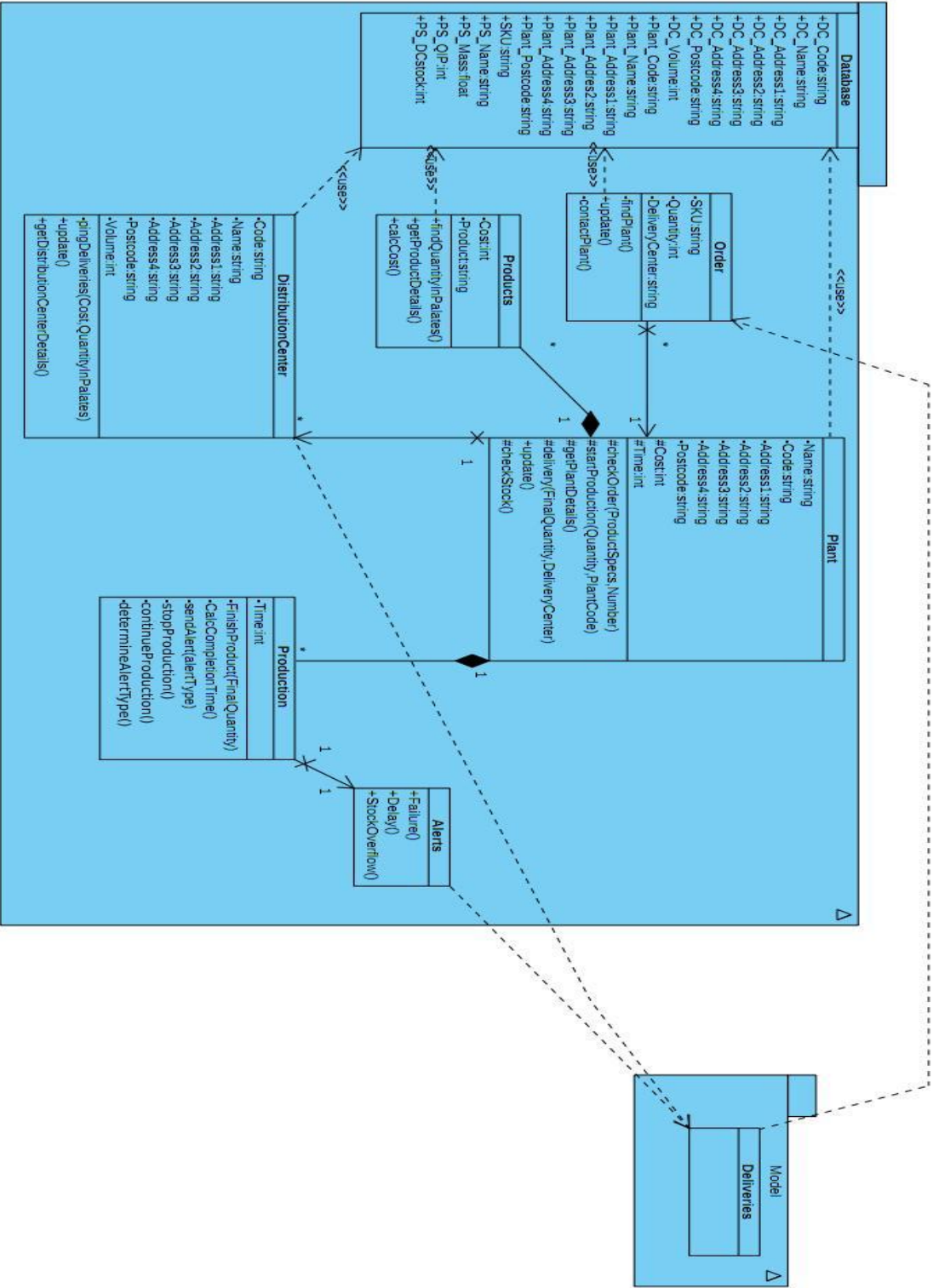
## CRC Cards

| Deliveries | |
|---|---|
| **Responsibilities** | **Collaborators** |
| Create Order | Order |

| Order | |
|---|---|
| **Responsibilities** | **Collaborators** |
| Find Plant | Database |
| Contact Plant | Plant |

| Plant | |
|---|---|
| **Responsibilities** | **Collaborators** |
| Get Product Details | Products |
| Start Production | Production |
| Delivery | DistributionCenter |

| Products | |
|---|---|
| **Responsibilities** | **Collaborators** |
| Get Product Details | Database |
| Find Quantity in Palates | |
| Calculate Costs | |
| Send Product Details | Plant |

| Production | |
|---|---|
| **Responsibilities** | **Collaborators** |
| Calculate Completion Time | |
| Finish Product | Plant |
| Stop Production | |
| Continue Production | |
| Determine Alert Type | |
| Send Alert | Alerts |

| DistributionCenter | |
| --- | --- |
| Responsibilities | Collaborators |
| Get DistributionCenter Details | Database |
| | Deliveries |
| Ping Deliveries | |

| Alerts | |
| --- | --- |
| Responsibilities | Collaborators |
| Send Alert Details | Deliveries |

| Database | |
| --- | --- |
| Responsibilities | Collaborators |
| Give Plant Details | Order |
| Get Product Details | Products |
| Give DistributionCenter Details | DistributionCenter |

# CRC Validation Game

## Scenario 1: Successful Delivery

| Class | Responsibility | Collaborator |
|---|---|---|
| Deliveries | Create Order | Order |
| Order | Find Plant | Database |
| Database | Give Plant Details | Order |
| Order | Contact Plant | Plant |
| Plant | Get Product Details | Products |
| Products | Get Product Details | Database |
| Database | Give Product Details | Products |
| Products | Find Quantity in Palates | |
| Products | Calculate Costs | |
| Products | Send Product Details | Plant |
| Plant | Start Production | Production |
| Production | Calculate Completion Time | |
| Production | Finish Product | Plant |
| Plant | Delivery | DistributionCentre |
| DistributionCentre | Get DistributionCentre Details | Database |
| Database | Give DistributionCentre Details | DistributionCentre |
| DistributionCentre | Ping Deliveries | Deliveries |
| Deliveries | Create Order | Order |
| Order | Find Plant | Database |
| Database | Give Plant Details | Order |
| Order | Contact Plant | Plant |
| Plant | Get Product Details | Products |
| Products | Get Product Details | Database |
| Database | Give Product Details | Products |
| Products | Find Quantity in Palates | |
| Products | Calculate Costs | |

## Scenario 2: Unsuccessful Delivery

| Class | Responsibility | Collaborator |
|---|---|---|
| Deliveries | Create Order | Order |
| Order | Find Plant | Database |
| Database | Give Plant Details | Order |
| Order | Contact Plant | Plant |
| Plant | Get Product Details | Products |
| Products | Get Product Details | Database |
| Database | Give Product Details | Products |
| Products | Find Quantity in Palates | |
| Products | Calculate Costs | |
| Products | Send Product Details | Plant |
| Plant | Start Production | Production |
| <problem arises> | | |
| Production | Stop Production | |
| Production | Determine Alert Type | |
| Production | Send Alert | Alerts |
| Alerts | Send Alert Details | Deliveries |