**CS342 Project**

**Manufacturing Requirements Planning Use Cases**

**General:** This document contains some use cases for a manufacturing planning system. The use cases describe how team members create and manage inventory, plan jobs in the factory, accept orders from customers, predict future sales and determine future capacity. These use cases form the basis of planning

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| **Use Case ID** | **Use Case Name** | **Brief Description** |
| 1.1 | Add Part | Each item, whether purchased or made, has an inventory record to maintain current levels and related information such as pricing. |
| 1.2 | Identify Resource | Identify a manufacturing resource that can be used (mold, machine) |
| 1.3 | Create bill of materials | Lists the items that go into a manufactured part and the resources needed to create the part |
| 1.4 | Create a vendor account. | Set up basic information about a vendor |
| 2.1 | Create a customer account | Set up customer information. |
| 2.2 | Enter customer order. | Record a customer’s order and report to them availability of product. |
| 2.3 | Update customer order | Change orders that have not been shipped yet to include cancellation |
| 3.1 | Ship customer order | Prepare an order for shipment to include printing a label. |
| 3.2 | Plan production run of product | Identify products that will be built based on need and availability of inventory |
| 3.3 | Order product | Order products from a vendor. |
| 3.4 | Receive Vendor product into inventory | Receive product that has been ordered from a vendor. Also, rate the service of the vendor providing the product is evaluated for each shipment received. |
| 3.5 | Enter produced product into inventory | Enter into inventory product that has been created. |
| 3.6 | Hilo Driver Pickup | Determine the nearest point for HILO driver pickup in a warehouse storage location. |

**USE CASE ID: UCL 1.1**

**USE CASE NAME: Add Part to System**

**General Description:** Each part in the company is assigned a unique inventory ID. Parts can be either purchased from a vendor or made in the factory. If a part is an assembled product in the factory, it must be identifiable as such.

**Stakeholder and Interests:**

Order Entry: Needs to know what is available for shipment to a customer and future stock levels to predict when shipment can be made.

Planner: Needs to know what can be produced based on current inventories.

Controller: Must know cost information about current levels of inventory.

Line Worker: Must be able to easily identify parts based on name and unique description.

**Preconditions:**

User has started application.

**Post Condition:**

System has new unique item in inventory

**Main Success Scenario:**

1. User tells system new item in inventory is to be added.

2. System prompts user for the basic following information:

a. Name of product

b. Description of the product

c. Unit description such as “each,” lb, feet etc

d. Indicate if it is a raw product, consumable, finished product (built in-house) or a capital asset

e. If it is a raw product, consumable, or a capital asset, enter the current cost of the product.

f. Three quantities are associated with any item in inventory. They are on-hand, on-order, and committed.

**on-hand:** The physical quantity actually in inventory.

**on-order:** The quantity currently expected from a vendor based on a purchase order

**committed:** The quantity that will be shipped to fulfill customer orders.

Since this is a new product, only the on-hand and on-order quantities may be entered in the setup screen.

3. The product may be from either a vendor or built in house. If it is built in-house, the user merely tells the system it is built internally. If it is purchased from a vendor, the following information is entered.

a. Primary origin information:

The user will identify a vendor already added to the system. The user will also enter the vendor’s identification code of the product.

b. Unit cost from vendor.

c. Economic order quantity. This includes the best price based on quantity and shipping considerations.

4. If it is a raw or consumable product, the following additional information is needed:

a. Safety stock.

b. Maximum level to be on hand.

c. Order lead time for the vendor.

5. The system must allow the user to save an illustration of the product.

6. System assigns a unique ID number to the category.

7. User asks system to save new product definition.

**Alternate Scenario**

3a. Duplicate of vendor information and product identification code:

1. System tells user of duplication

2. User either enters new description or quits.

3b. Vendor does not show up on list

1. System should allow user to set up new vendor account using use case 1.4

6a. System failure in saving new definition:

1. Prompt user of failure.

2. Allow user to continue retrying or to quit.

**USE CASE ID: UC 1.2**

**USE CASE NAME: Identify Resource**

**General Description:** Part of the planning process includes understanding the resources available within a plant. Examples of this include molds, presses and other forms of machinery. The capacity and status of a resource must be known at any time.

**Stakeholder and Interests:**

Planner: Needs to easily identify resources for use in planning.

Maintenance: Needs to know what must be done on a regular basis to keep the resource usable.

**Preconditions:**

Inventory item has been entered into the system.

**Post Condition:**

System has record of resource available.

**Main Success Scenario:**

1. User selects inventory item that is to be considered as a resource.
2. User identifies location of resource.
3. User identifies current status of resource.
4. User identifies number of operators required for resource.
5. The user describes the maintenance requirements to the system. For every maintenance requirement, the user must tell the system the following:
   1. A narrative describing the maintenance activity.
   2. The frequency of the maintenance (e.g. monthly, weekly etc).
6. The system must have a description of when the resource must be replaced.

**Alternate Scenario**

1. User selects a raw materiel as a resource

1a. System tells user item is not a resource

1b. User acknowledges message

**USE CASE ID: UCL 1.3**

**USE CASE NAME: Create Bill of Materials**

**General Description:** To plan out the manufacturing process, it is critical to know the resources that go into a product. This becomes even more challenging when considering that some parts of a built item may have been built as well. For instance, a car will include several pre-made parts such as an engine, a transmission and a frame. The frame is made of steel beams (raw product) which are formed using a press (a resource) and welded together. This use case describes the information that must be entered into the system to support planning. (General note: the number of levels of built products going into built products should have no limitations built into the system.)

**Stakeholder and Interests:**

Planner: Must know what components go into a product.

Order Entry Clerk: Must know if enough components are on hand to produce a product.

Inventory Manager: Must be able to predict what to order based on product need.

**Preconditions:**

Product that is to be built has been entered into system.

**Post Condition:**

Bill of material information is created.

**Main Success Scenario:**

1. User tells system which product needs to have a bill of materiel created.
2. System displays known information about product.
3. System then shows list of raw products, built products, consumables and resources required to build the product.
4. User adds or deletes to list presented from known inventory and resource items.
5. For raw and built products, the user tells the system how much is used to build the product of concern.
6. For consumables and resources, the user tells the system how many are needed for how long.
7. User tells system to save information.

**Alternate Scenario:**

1a. System reports that product that needs a bill of materiel itself is not already listed in the database.

1b. User quits application and resolves the issue.

2a User can not locate an inventory item that will be part of bill of materiel.

2b. User quits application and resolves the issue.

**USE CASE ID: UCL 1.4**

**USE CASE NAME: Create a Vendor Account**

**General Description:** Before ordering products from a vendor, the vendor should be recognized and approved.

**Stakeholder and Interests:**

COO: Wants to ensure vendors are capable of delivering

Controller: Wants to ensure accurate payment to vendor

Quality Control: Wants to track vendor performance

Purchasing Clerk: Set up purchase orders with only qualified vendor

**Preconditions:**

Vendor is approved.

**Post Condition:**

System has new record of vendor.

**Main Success Scenario:**

1. Purchase clerk receives vendor approval form from COO’s office
2. The following information is entered:
   1. Name of company
   2. Main contact at vendor’s company (EDI coordination)
   3. Standard phone number for orders
   4. Payment address
3. The purchasing clerk then enters all the known products that will be ordered from a vendor
4. Since the vendor is “new” and “approved” it is assumed the will have an “A” rating. Other ratings are as follows:
   1. AA = Provides optimal discount for history, and always timely and accurate in shipments
   2. A = Reasonable prices. Always timely and accurate
   3. B = Always timely and occasionally over ships, but never under ships
   4. C = Never timely and is inconsistent in other areas (DO NOT USE UNLESS IT’S AN EMERGENCY)

**USE CASE ID: UCL 2.1**

**USE CASE NAME: Create Customer Account**

**General Description:** Before a customer can order, the company must have basic information about the customer. In addition to identifying information, the system will also collect information in regards to the customer’s credit history should the customer desire want to order on credit.

**Stakeholder and Interests:**

Customer: Needs to ensure information is accurate to expedite delivery of order.

Order Entry Clerk: Must have all the information available to process orders.

Controller: Must ensure credit worthiness of customer

Shipping Clerk: Must have accurate information for shipping

**Preconditions:**

NA

**Post Condition:**

System has new record of customer to include required fields.

**Main Success Scenario:**

1. The order entry clerk enters the following basic information about:
   1. Name of company
   2. Customer’s account name
   3. Bill to address
   4. Standard shipping address
   5. Default credit card for orders
2. If a customer desires credit with our company, at least three credit references must be provided. Each credit reference requires the following to be entered into the system by the order entry clerk:
   1. Name of creditor
   2. Account number
   3. Current balance
3. System assigns new identification code to the customer.
4. User tells system to save customer information.

**Alternate Scenario**

1a. System recognizes customer as one already in system through duplication of addresses.

1. Service clerk asks customer if this is an error
2. If customer wants a separate account, service clerk enters unique “account name” for customer
3. If customer does not want a new account, service clerk exits the application without saving anything

**USE CASE ID: UCL 2.2**

**USE CASE NAME: Create Customer Order**

**General Description:** Typically, customers will know the products they are ordering and will have the product number available. This particular use case describes accepting a customer order via the phone. A WEB based application for customers will be considered in the future.

**Stakeholder and Interests:**

Order Entry Clerk: Must be able to submit customer’s order and communicate accurate information about the order to the customer.

Controller: Must be assured that only credit-worthy customers have ordered.

**Preconditions:**

Customer information exists in system.

Products for order exist in system.

**Post Condition:**

System has saved new order.

**Main Success Scenario:**

1. Order entry clerk greets customer on the phone and requests identifying information such as account number or name and address.
2. Order entry clerk searches for customer information on system and starts a new order with customer information added.
3. Order entry clerk will verify the shipping address and change if needed.
4. For each item being ordered, based on what the customer tells them, the order entry clerk will do the following:
   1. Tell the system the ID of product
   2. Verify the price of the product with the customer
   3. Tell the system the desired quantity
   4. The system will tell the order entry clerk when the product will be available. It can either be shipped immediately or there will be an estimated date of when it will be built.
   5. Customer will tell order entry clerk whether it is acceptable. Customer will also tell clerk if items must be shipped in one shipment or if split shipments are acceptable. Order entry clerk will tell system customer preference.
5. Total of order is calculated with appropriate sales tax information based on the state of customer bill-to address.
6. System verifies if order is within customer’s credit limits if they are not paying by credit card.
7. Customer saves order to system with the current date and time.
8. System generates unique identifier for the order, which the order entry clerk tells the customer.

**USE CASE ID: UCL 2.3**

**USE CASE NAME: Update Customer Order**

**General Description:** From time to time, customers will realize they have over ordered an item. This may result in a reduction of quantities desired or a complete cancellation of an order. Additional quantities are treated as if they are new orders. This use case is to support order changes.

**Stakeholder and Interests:**

Order Entry Clerk: Must be able to locate customer’s previous order and change only those items that are not in the shipping process.

Planner: Must build only products that are needed to satisfy customer needs and prevent overbuilding.

**Preconditions:**

Order already exists on system.

**Post Condition:**

System has updated customer order.

**Main Success Scenario:**

1. Customer tells order entry clerk information about order to locate order. This will include either the order identification number or their customer account. Order entry clerk will find the order on the system.
2. Order entry clerk reviews line items on the order.
3. Customer identifies line item to change.
4. Order entry clerk verifies none of that item has been shipped.
5. Order entry clerk changes order quantity as needed.
6. System remembers the change made.
7. System recalculates price of order, which the order entry clerk tells the customer.
8. Steps 2 through 7 are repeated as necessary.
9. Customer saves new record of order.

**USE CASE ID: UCL 3.1**

**USE CASE NAME: Prepare Customer Order Shipments**

**General Description:** The final step in the process is delivering the goods to the customer. This requires identifying which orders to ship based on customer orders and the availability of product inventory. This use case provides a listing of what products to ship.

**Stakeholder and Interests:**

Shipping Clerk: Must ship as much product to customers who are expecting a delivery.

Controller: Must ensure inventories are accurate.

Order Entry Clerk: Must know what product is in the shipping process.

**Preconditions:**

Customer order is in system.

**Post Condition:**

System has marked items in inventory as being in the shipping process.

**Main Success Scenario:**

1. Shipping clerk requests report of product available to ship.
2. Report is generated based on the following criteria:
   1. All customer orders are reviewed and prioritized based on date of their order.
   2. Each line item is referenced and if inventory is available it is committed to that customer’s order. Inventory availability is based on on-hand less committed quantity.
   3. The committed quantity of product is incremented by that amount.
   4. The customer’s order record is updated to reflect quantity ready to ship.
   5. If the customer wants only a “full order” the inventory will still be reserved for them.
3. Labels will be printed for all items to be shipped.

**USE CASE ID: UCL 3.2**

**USE CASE NAME: Plan Production Run**

**General Description:** A manufacturer wants to ensure it builds only the products that will satisfy customer demand. Part of the planning process includes building as many similar products at the same time to reduce setup costs.

**Stakeholder and Interests:**

Planner: Build only products needed.

Inventory Manager: Ensure needs of raw product are known.

Controller: Avoid excess inventory.

**Preconditions:**

Bill of materials has been entered.

**Post Condition:**

System has set up job orders.

**Main Success Scenario:**

1. Planner requests report on products needed by customer and based on needs of upcoming month based on historical trends
2. Planner determines how many are needed in addition to current inventories
3. Planner determines number of intermediate products that need to be built as well
4. Planner groups build of products according to product type.
5. Planner identifies resources to build products
6. Planner schedules build of products based on need and resources available
7. Planner selects range of serial numbers to be applied to each built product
8. Planner tells system what is pending so customer service and others know future availability

**USE CASE ID: UCL 3.3**

**USE CASE NAME: Order Product from Vendor**

**General Description:** Raw products come from vendors who are listed on the system. When a product is ordered, it must have an inventory number on the system and a purchase order with a unique number must be created. The inventory manager typically does the ordering.

**Stakeholder and Interests:**

Planner: Knows of products on order.

Inventory Manager: Can provide product when needed.

Controller: Avoid excess inventory.

Purchase Clerk: Can submit order on time.

**Preconditions:**

Vendor is setup on the system.

Product is setup on the system.

**Post Condition:**

Purchase order with vendor information, products and quantities is created on the system. PO status is set to pending.

**Main Success Scenario:**

1. Inventory manager identifies the vendor which will fulfill the order.
2. For each product ordered from the vendor, the inventory manager does the following:
   1. identifies products to order from vendor.
   2. inputs the vendor’s ID number of the products.
   3. inputs the type of units desired (ie gallons, liters, each, case, lot etc) and the cost to the unit
   4. inputs quantities of unit desired.
3. Inventory manager verifies the bill to address is correct.
4. Inventory manager identifies date when the order must be fulfilled
5. Inventory manager sees total and verifies it is acceptable
6. System assigns PO number
7. Inventory manager tells system to process PO ( a separate process will either mail or electronically submit the PO to the vendor)

**USE CASE ID: UCL 3.4**

**USE CASE NAME: Receive Vendor Product into Inventory**

**General Description:** When raw products arrive, they must be verified against the original PO to receive only products that were ordered at the agreed upon price.

**Stakeholder and Interests:**

Planner: Knows of products on order.

Inventory Manager: Can provide product when needed.

Controller: Avoid excess inventory and cost.

**Preconditions:**

PO is setup on system

**Post Condition:**

PO is marked either as still pending, partial or received.

**Main Success Scenario:**

1. Inventory manager reviews packing receipt.
2. Inventory manager queries system for PO number which product was ordered under.
3. For each product received the inventory manager does the following:
   1. Verifies the inventory ID number.
   2. Reviews what has been received for that PO to date.
   3. Enters the quantity just received, but not to exceed total PO quantity.
4. If all line items are complete, PO status is updated from pending to partial if only some of the items have been received or to full if all the items have been received.

**UCL: 3.5**

**USE CASE NAME: Transfer Produced Product into Inventory**

**General Description:** After completing the manufacturing of an item, it must be accounted for as a single unit and stored in the warehouse until shipment to a customer.

**Stakeholder and Interests:**

Planner: Knows product is complete.

Inventory Manager: Has accurate count of completed products and raw product on shelf.

Controller: Avoid excess inventory and cost.

Line Worker: Must be able to update system

**Preconditions:**

Job order was created.

**Post Condition:**

Job order is marked as complete.

Reductions are made to “raw” inventory.

Spot for product has been identified in warehouse.

**Main Success Scenario:**

1. Line worker is given completed product and job order
2. Line worker looks up job order and identifies which serial number to use off job order
3. Line worker tells system to add manufactured product to inventory
4. System subtracts parts used from raw inventory.
5. If this is the last item on the production run job order, job order is closed out.
6. Empty slot in warehouse is identified. Note: The warehouse has thirty lanes of shelves, 7 rows high with 50 bins per row. Lanes are numbered 1 through 30, rows are either on the north or south side of a lane and are lettered A through G. Bins run east to west and are numbered 1 to 50.

**UCL: 3.6**

**USE CASE NAME: Hilo Driver Pickup**

**General Description:** Hilo drivers pick up and drop off products between bins throughout the day. This use case requires that they be automatically directed to the next piece of work to do.

**Stakeholder and Interests:**

COO: Wants minimal movement to accomplish tasks.

HILO Driver: Needs to know where to go

**Preconditions:**

HILO driver is known to system.

Product exists in bin.

**Post Condition:**

HILO Driver is provided trip plan

**Main Success Scenario:**

1. Hilo driver tells system he is available for work.
2. System tells Hilo driver where it thinks driver is at in the facility.
3. Hilo driver either acknowledges system or enters correct information.
4. System finds the next item to be moved that is closest to the driver’s current location.
5. Driver acknowledges instructions.
6. System prints out destination of product after it is picked up.