SOFTWARE ENGINEERING MINI PROJECT

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COURSE: BSc IT

TOPIC: MANUFACTURING- SMARTPHONES

INTRODUCTION

The Manufacturing-Smart Phones aims to design and develop a software solution for the manufacturing process of smart phones. This software will automate and streamline the various stages of production, from sourcing materials to delivering finished products. The goal of this project is to improve the efficiency and reliability of the manufacturing process, while also reducing costs and improving the overall quality of the smart phones being produced. By leveraging cutting-edge technologies such as artificial intelligence and the Internet of Things, this software will provide a comprehensive solution for the smart phone manufacturing industry.

USES:

The Manufacturing-Smart Phones can have several key uses, including:

1. **Supply chain management:** The software can be used to manage the entire supply chain, from sourcing raw materials to delivering finished products.

2. **Production planning and scheduling:** The software can help to optimize production schedules and ensure that resources are allocated efficiently.

3. **Quality control:** The software can be integrated with quality control systems to monitor and ensure the quality of each step in the manufacturing process.

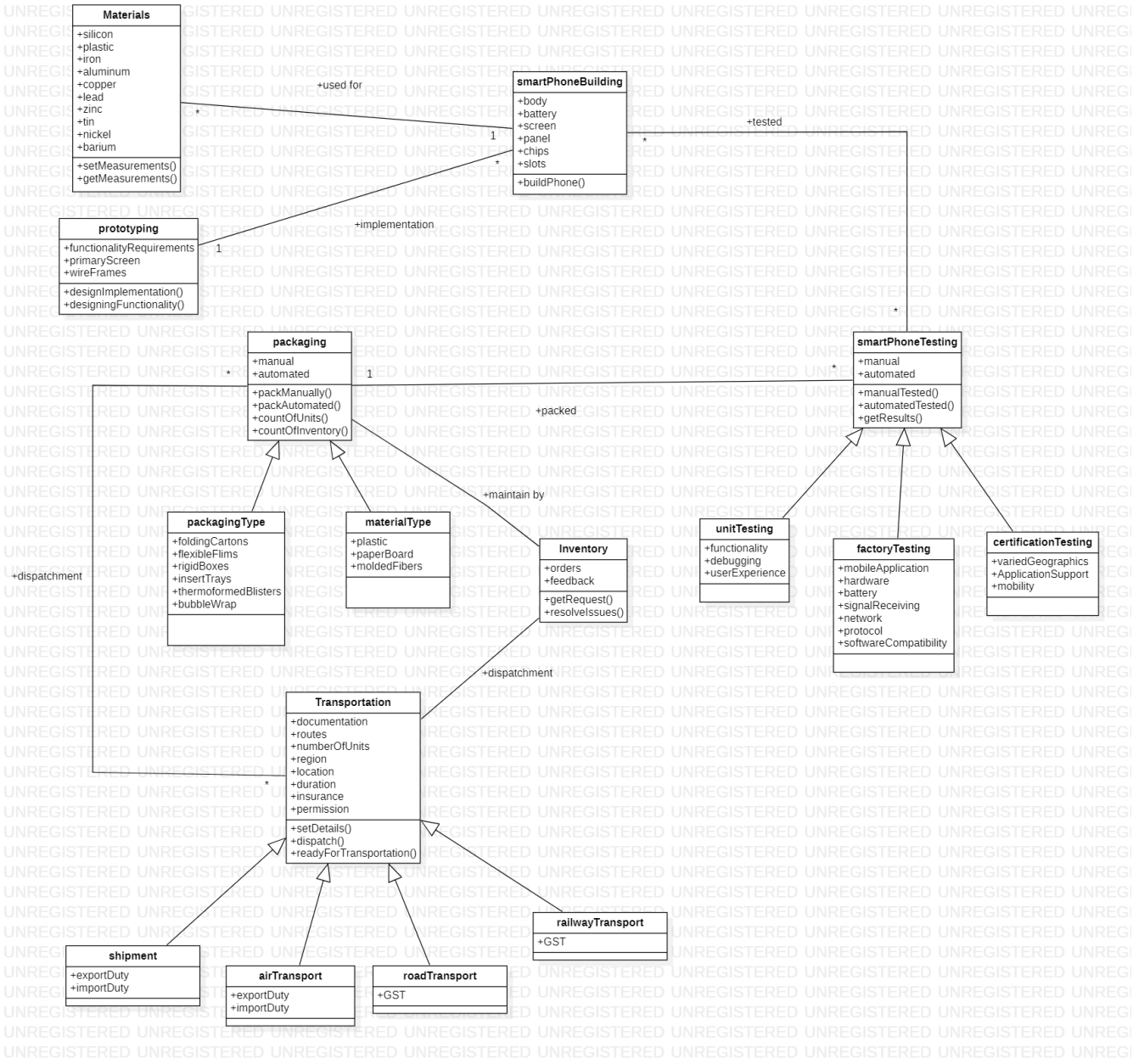
4. **Real-time monitoring:** The software can provide real-time monitoring of the manufacturing process, allowing for early detection of any issues and rapid resolution.

5. **Data analysis:** The software can collect and analyze large amounts of data from the manufacturing process, providing valuable insights into process efficiency and product quality.

6. **Cost reduction:** The automation and optimization of the manufacturing process can result in significant cost reductions, while also improving the overall quality of the products being produced.

These are some of the potential uses of the Manufacturing-Smart Phones software engineering project.

1. Class Diagram



Prototyping: This class is representing the process of creating prototypes of the smartphone.

Materials: This class is representing the materials used in the manufacturing process, such as raw components and packaging materials.

SmartPhoneBuilding: This class is representing the process of building the smartphone.

Testing: This class is representing the process of testing the smartphone to ensure that it meets quality standards.

Packaging: This class is representing the process of packaging the smartphone for shipment, air transport, water transport, road transport.

Inventory: This class is representing the inventory of smartphones i.e. the stock of the smart phones.

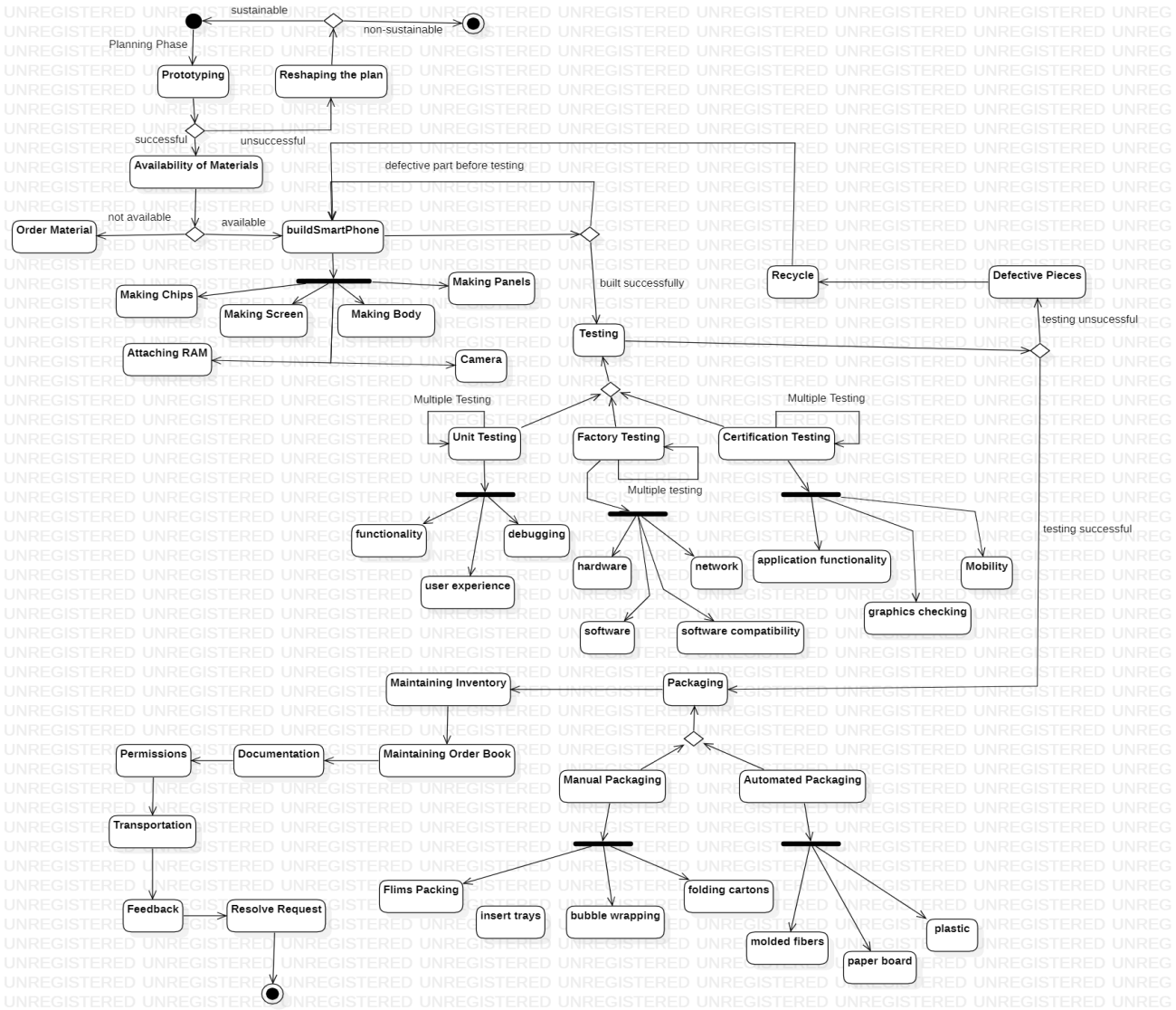
The relationships between the classes is represented using association annotation:

1. The object of material and prototyping class is connected to another object of smartPhoneBuilding class.
2. The object of smartPhoneBuilding class is connected to another object of packaging class.
3. The object of packaging class is connected to another object of inventory class.
4. The object of packaging is connected to another object of transportation class.
5. The object of inventory is connected to another object of transportation class.

The parent-child relationship represented using association annotation:

1. The classes unitTesting, factoryTesting and certificationTesting are the specialization of class smartPhoneTesting.
2. The classes packagingType and materialType are the specialization of class smartPhoneTesting.
3. The classes shipment, airTransport, waterTransport are the specialization of class smartPhoneTesting.

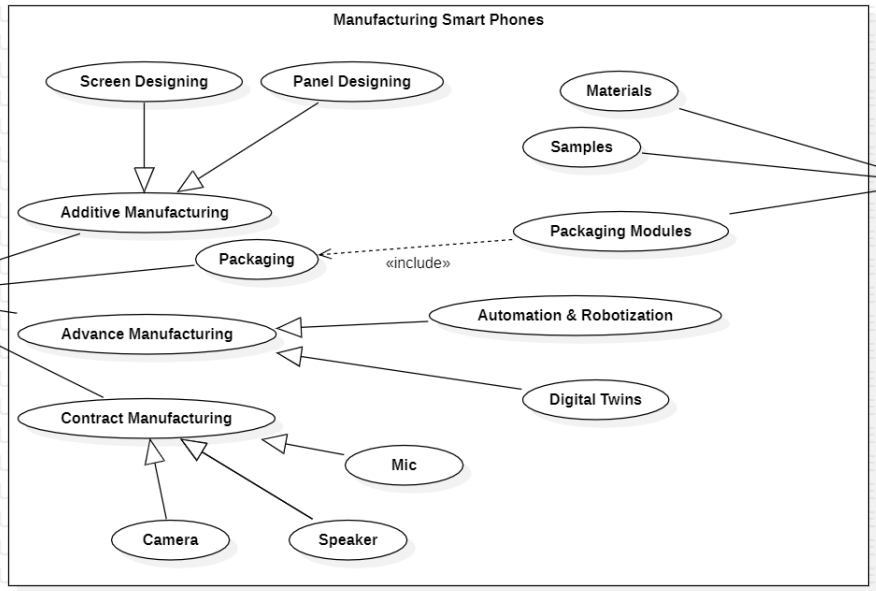
2. Activity Diagram



Activity Diagram for Manufacturing–Smart Phones includes following elements:

1. **Start**: The starting point of the activity diagram, representing the beginning of the smartphone manufacturing process.
2. **Prototyping**: The planning phase of smart phones.
3. Materials: This activity represents the process of purchasing raw materials, such as chipsets, processors, semi-conductors, and other components required for manufacturing the smartphone.
4. **Testing and quality control**: This activity represents the process of checking the functionality and performance of the smartphone to ensure it meets quality standards.
5. **Packaging**: This activity represents the process of packaging the smartphone for shipment to customers or distributors.
6. **Inventory**: This activity represents the process of managing smart phones and delivering to retailers.
7. **End**: The ending point of the activity diagram, representing the completion of the smartphone manufacturing process.

3. Use Case Diagram



A Use Case Diagram for smartphone manufacturing includes the following elements:

1. **Actors**: Represented as stick figures, actors represent the various entities that interact with the smartphone manufacturing system.

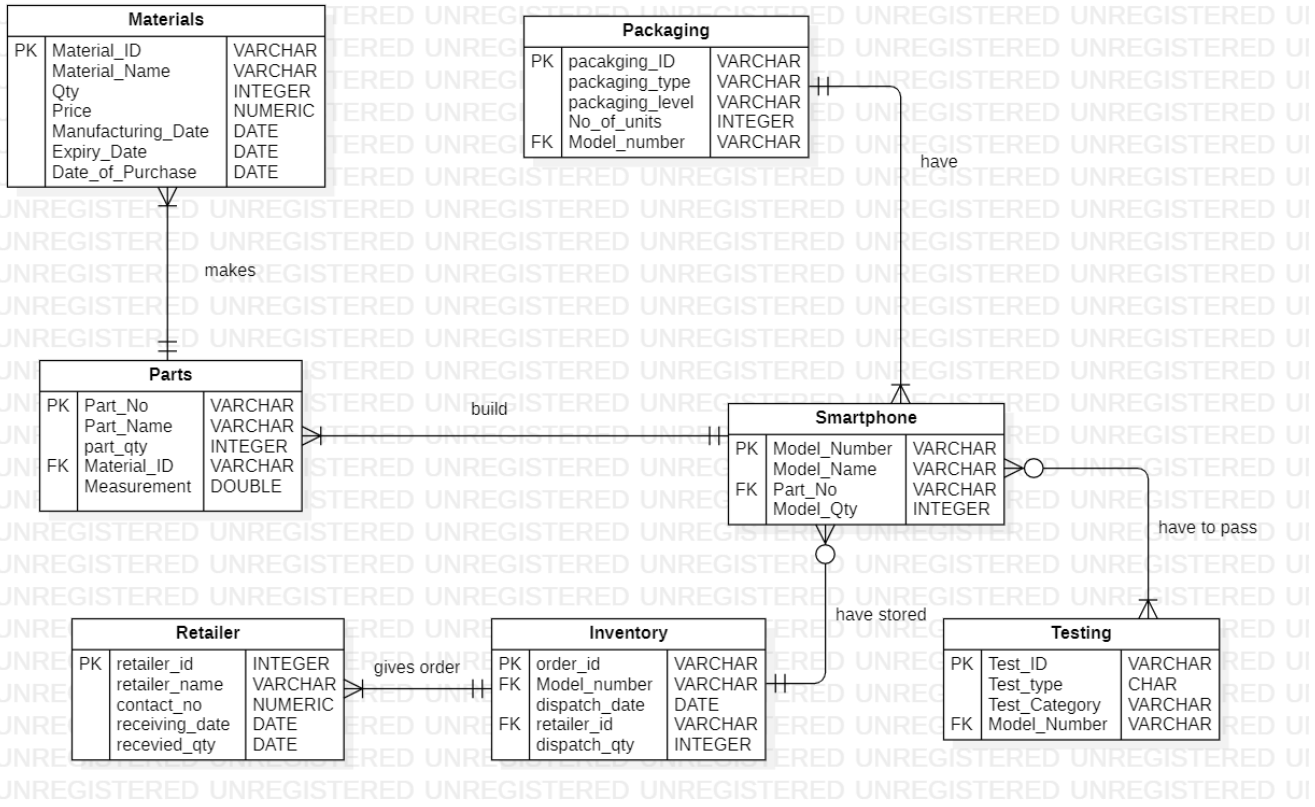
i. Manufacturing Unit:

a. The Manufacturing Unit actor is responsible for carrying out the various activities involved in smartphone manufacturing, such as procuring raw materials, assembling components, testing and quality control, and packaging.
b. The actor interacts with the smartphone manufacturing system by performing the use cases associated with these activities.
c. In a Use Case Diagram, the Manufacturing Unit actor would be represented as a stick figure and would be connected to the relevant use cases through arrows, indicating the interactions between the actor and the system.
d. This information can be used to model the processes involved in smartphone manufacturing and to identify any potential areas for improvement or optimization.

ii. Supplier:

a. The actor plays a critical role in the smartphone manufacturing process, as it is responsible for ensuring that the necessary materials and components are available when needed.
b. This may involve placing orders, coordinating delivery, and tracking inventory levels.
c. The Supplier actor interacts with the smartphone manufacturing system by performing use cases associated with materials and components, such as "Packaging Modules".

4. Entity Relationship Diagram:



1. **Entities**:
   i. **Materials**: It represents the raw materials and components used in the manufacturing of smart phones.
   ii. **Parts**: It represents the various parts and modules used in building the smart phone.
   iii. **Packaging**: It represents the packaging of finished product into various cartons.
   iv. **Smart Phone**: It represents the building of the smart phones.
   v. **Inventory**: It represents the storage capacity for smart phones.
   vi. **Testing**: It represents the various type of testings that smart phones has to undergo.
   vii. **Retailer**: It represnts the retailers to whom smart phones are delivered.

2. **Relationships**:
   i. **Materials**: represents relationship between materials and parts, indicating that many materials are used to make one part.
   ii. **Parts**: represents relationship between parts and smartphones, indicating that many parts are used to build one smartphone.
   iii. **Packaging**: represents relationship between packaging and smartphones, indicating that one packaging have many smart phones.
   iv. **Smart Phones**: represents relationship between smart phone and testing, indicating that many smart phones have to pass many testings.
   v. **Inventory**: represents relationship between smart phone and inventory, indicating that one inventory have stored many smart phones.
   vi. **Retailer**: represents relationship between inventory and retailer, indicating that many retailer gives orders to many inventories.

Reference:
https://www.youtube.com/watch?v=JIYefVc_zsw&t=6s&ab_channel=Siemens