QR CODE INVENTORY MANAGEMENT SOFTWARE

SYSTEM THINKING PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this lab report is the bonafide work of "Ashwath S – 19C009 , Charu sneha L R- 19C013 , Kushagra kapoor – 19C046, Nandhakumar raj S – 19C057, S Pradhiksha – 19C068, Ramprasad R – 19C078, Varshini S – 19C111" who carried out the lab work during the Academic Year 2021-2022.

Subject Code: 18ES590

Subject Name: SYSTEM THINKING

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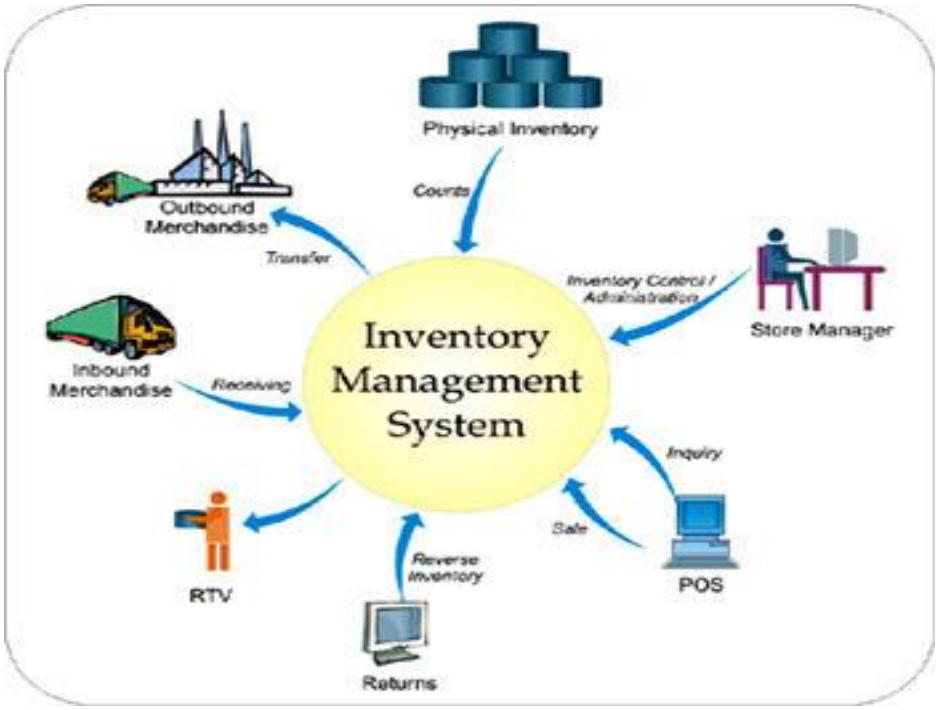
EXAMINER 1 EXAMINER 2

1 INTRODUCTION:

This system thinking document is about inventory management system using QR code. Inventory management systems are your means of organizing all the elements that go into inventory management. It's the process by which you track goods from one end to the other along your supply chain. Ensuring throughout that you know what you have, where it is, and how to manage it.



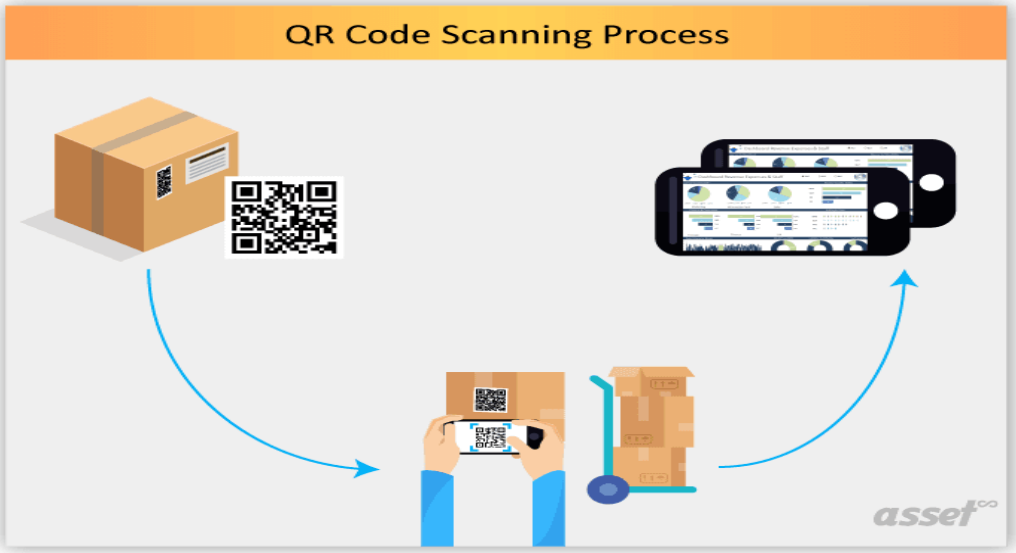
An inventory management system optimizes inventory levels and ensures product availability across multiple channels. It provides a single, real-time view of items, inventory and orders across all locations and selling channels.

Tracking your assets should be one of your several business priorities. To get the most out of your fixed assets, you must at all times be in the know about the history of your assets. To collect and analyze info you need an asset tracking system in place. The traditional way of tracking assets involves using barcodes, which is still popular, however, many businesses now use QR code inventory management software. As hard as it may be for you to believe, QR codes were invented for asset tracking and not marketing. You can use a smartphone or a handheld scanner to scan QR codes. That said, only scanners that can read both 1D and 2D barcodes can scan QR codes. QR codes or Quick Response codes are 2-dimensional barcodes that include black and white squares. QR codes can accommodate more data than barcodes. A conventional QR code can store up to 4,296 characters including punctuation marks, words and phrases, and special characters or 7,089 digits.

It ensures:

- You don’t need to invest in a handheld scanner and can use your smartphone to scan QR codes.
- QR codes can scan numerals, alphabets, and special and binary characters.

- Superior data storage capabilities.
- Fewer errors
- Cost effective



2. SYSTEM

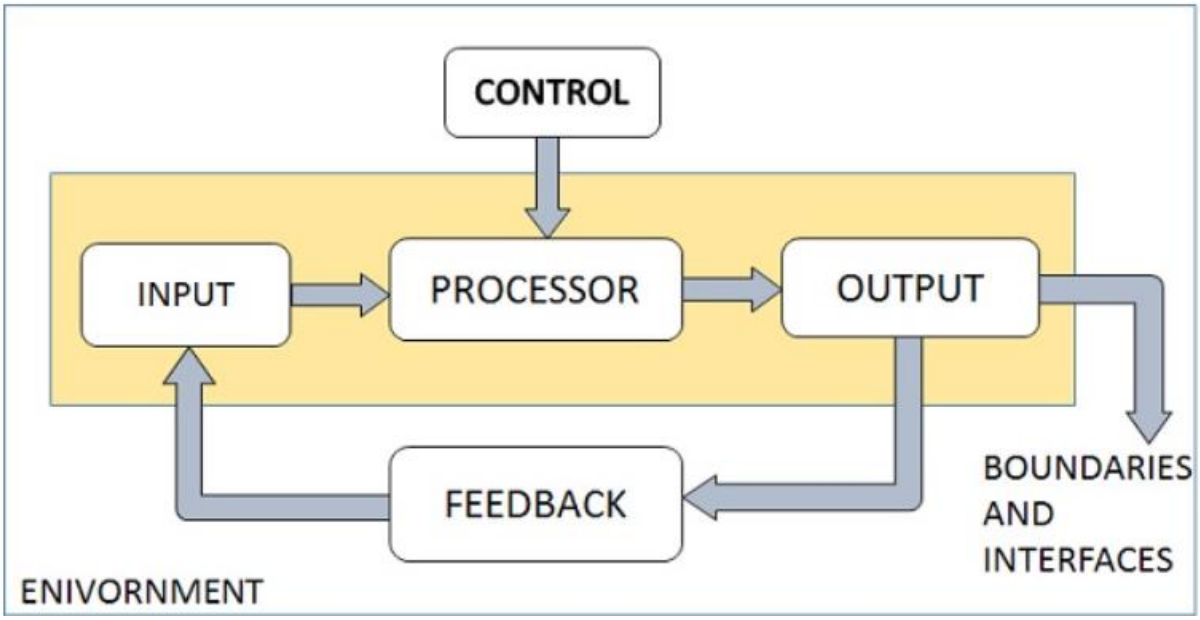
1.1 SYSTEM ELEMENTS

In this project we are implementing an inventory management system using qr code. Here we are going to store and track items and deliver it effectively, which can be used for a large franchise. This system records the products, helps to restock and provides a warning of low stock. The maintenance of the store will be made easy and effective.

The elements of a system describes the how the system works along with the components involved in it.

The basic three elements of a system are:

1. Input
2. Processing
3. Output
4. Other elements include control, feedback, boundaries, environment etc.



Description of the key elements:

Input: Input is what data the system receives to produce a certain output.

In this system the input is the packages and the restocking items, that has to be tracked and supplied

Output: What goes out from the system after being processed is known as Output.

The output we get is the detailed list of products in stock, list of items to be restocked and availability, and warning to show which items has to be restocked.

Processing: The process involved to transform input into output is known as Processing.

Using the QR scanning we get the list of packages available and process to classify the data.

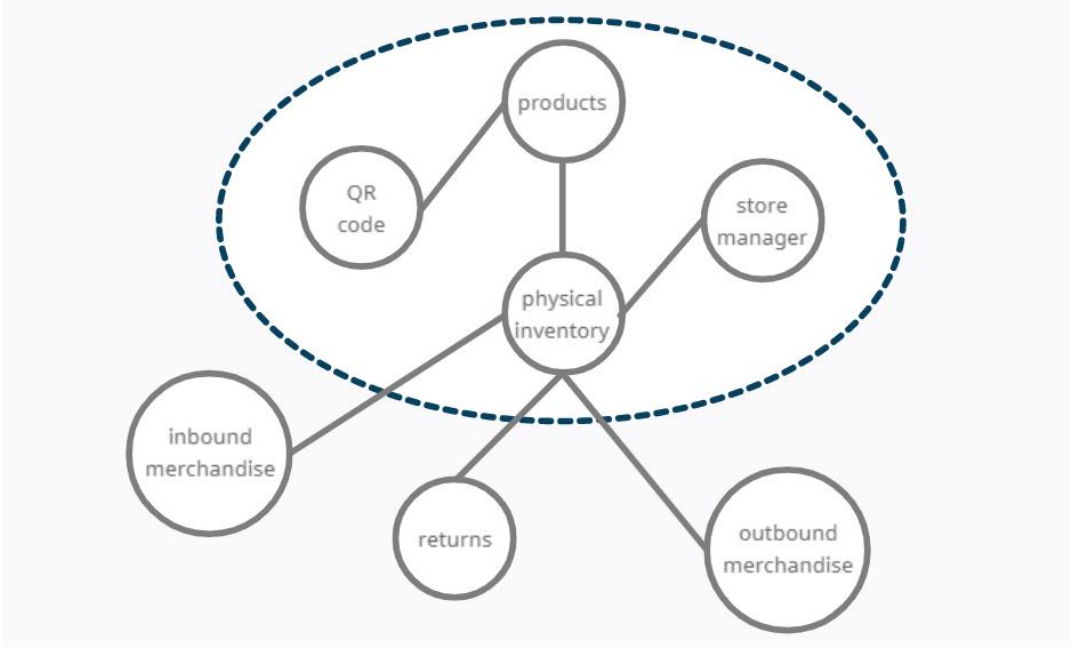
Control: In order to get the desired results it is essential to monitor and control the input, Processing and the output of the system. This job is done by the control.

Here the control is to check the availability of packages to stock, ie from the supplier.

Feedback: The Output is checked with the desired standards of the output set and the necessary steps are taken for achieving the output as per the standards, this process is called as Feedback. It helps to achieve a much better control in the system.

Now the feedback, is a cyclic check to see if all the above elements are executed properly. And if there is are error we check where this particular error has occurred and try to correct it in the next cycle of stock.

1.2 INTERACTIONS BOUNDARIES



SOI OF OUR PROBLEM STATEMENT

The interconnections between system elements in a given system is called Interactions

The system boundary covers all the components of the system and they are the limits that identify its components, processes, and interrelationship when it interfaces with another system.

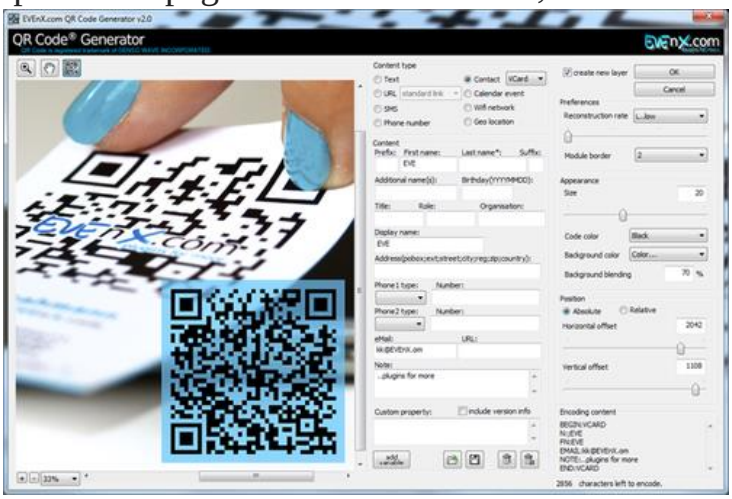
Interactions and Boundary is shown in the SOI image. Interaction with external and internal system elements is shown with proper boundaries.

1.3 SYSTEM OF INTEREST

The system-of-interest is the system that is the focus of the systems engineering effort. The system-of-interest contains system elements, system element interconnections, and the environment in which they are placed.

Various system-of-interest are:

1. QR Code Generator Software:
   QR code is a 2D matrix code which became popular and is commonly used to display text to the user, to open a webpage on the user's device, to add a vCard contact



2. Maintenance System:
   Since the main objective of our project is to manage the inventory using QR code it is also mandatory to prevent the stocks from external damage. Hence maintenance system falls under enabling systems category that is they still come under system-of-interest as our project depends on it.

3. Transportation System:
   While managing inventory often there is a need to transport a stock from a place to another. So transportation system also comes under system-of-interest. Here the transportation may take place within an inventory or between inventories based on the

needs. If it happens between inventories we can use GPS enables systems to track the status of a particular inventory.

3. STAKEHOLDER NEEDS AND REQUIREMENTS.

2.1 TECHNIQUES FOR ELICITING/GENERATING REQUIREMENTS

Existing System

Tracking our assets should be one of our several business priorities. To get the most out of our fixed assets, we must at all times be in the know about the history of your assets. To collect and analyse info we need an asset tracking system in place.

The traditional way of tracking assets involves using barcodes, which is still popular, however, many businesses now use QR code inventory management software. As hard as it may be for us to believe, QR codes were invented for asset tracking and not marketing. We can use a smartphone or a handheld scanner to scan QR codes. That said, only scanners that can read both 1D and 2D barcodes can scan QR codes.

Project Scope

We here propose an inventory system using QR codes which will speed up the process of keeping records easier and faster. We plan to decrease the cost of maintenance.

We plan to achieve three goals using our product in business:

1. Time Saving
2. Cost-effective
3. Easy to use

1. **Time Saving**

Using QR code scanner the process can be sped up. Manually entering the product code is tedious and time-consuming. It is also error-prone and wrong entry can be made.

Many QR code inventory management software can be connected to the cloud. Data stored in the cloud can be accessed by different teams. When it comes to saving time cloud connectivity can be of great help, especially if your teams spend a lot of time on the floor every day. Your team members won't have to go back to an office every time they want to update records, which helps them update records in real time.

2. **Cost-effective**

We don't need to invest in expensive handheld barcode scanners which helps save cost. Additionally, QR code inventory management software can generate a number of reports that you can use to identify new avenues for cost cuts.

3. **Easy to Use**

With the current popularity of QR Codes surging, they can be read using most smartphones and devices, which makes it easier to use it as opposed to other technology solutions.

QR Codes are easy to scan, even if it is slightly misaligned because QR Code scanners are powerful enough to scan them even from an angle. In addition, QR Codes can store a myriad of information such as URLs, business cards, PDFs, and even GPS coordinates. QR Codes are easy to create, track, and use because of their versatility.

2.2 STAKEHOLDER NEEDS

STAKEHOLDER NEEDS:

Real-time asset tracking

QR codes can be scanned using smartphones, which means your team members won't have to travel to the warehouse every time they want to learn about a particular asset's location

Help speed up the entire process

Many QR code inventory management software can be connected to the cloud. Data stored in the cloud can be accessed by different teams. When it comes to saving time cloud connectivity can be of great help, especially if your teams spend a lot of time on the floor every day. Your team members won't have to go back to an office every time they want to update records, which helps them update records in real time.

Help identify asset location

Unlike spreadsheets and manual entry systems, QR codes allow you to add additional info such as GPS location and asset photos. GPS location and asset photos help your teams locate inventory swiftly and eliminate confusion.

Help keep a tab on costs

You don't need to invest in expensive handheld barcode scanners which helps save cost. Additionally, QR code inventory management software can generate a number of reports that you can use to identify new avenues for cost cuts.

2.3 STAKEHOLDER NEEDS AND REQUIREMENTS (SNR)

NON FUNCTIONAL REQUIREMENTS

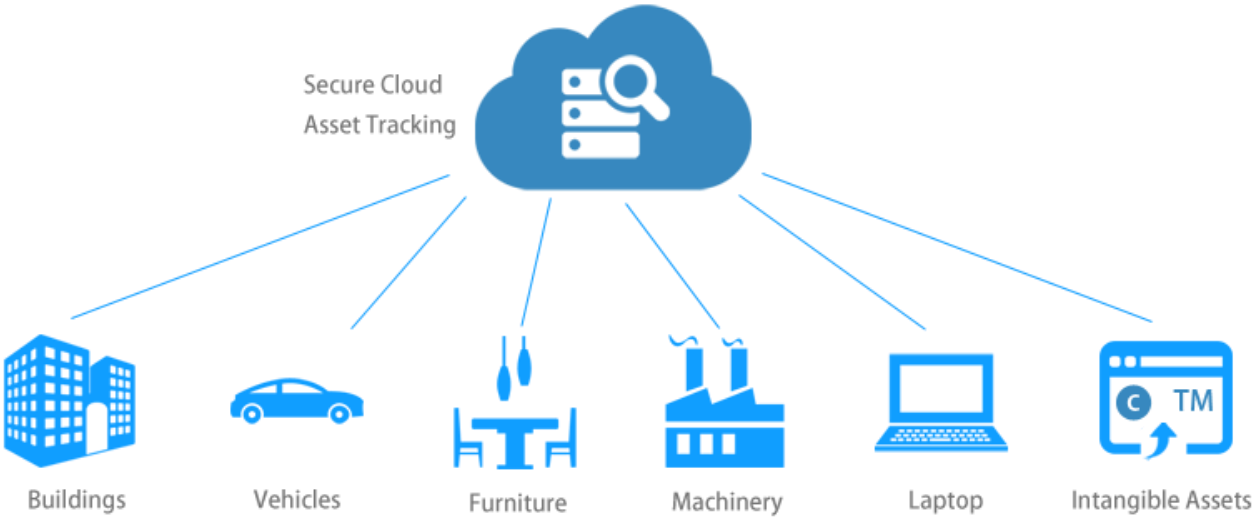
1. Managing Inventory should be less time consuming.
2. The process of Inventory management should be easy and quick.
3. Should help track an asset's location easily.
4. The devices and software used for inventory management should be cost effective.
5. The information about the inventory should be secured.
6. The system should have enhanced fault tolerance.
7. The system should commit few to none errors.

FUNCTIONAL REQUIREMENTS

1. Managing inventory using QR codes should save time
   1.1 The inventory should be connected to cloud
   QR code inventory management can be connected to the cloud. Data stored in clouds can be accessed by many teams simultaneously. Cloud can be of great help in saving time.
   1.2 Swift data entry and Updation
   Updation of records is very easy as it can be done using their phones in real time. Data entry process is quick and effective using QR codes and also avoids errors which enables us to take swift decisions.
   1.3 Swift scanning
   Also, the scanning of QR codes is very swift.

2. Easy to use system
   2.1 By just scanning an asset, it is automatically entered into the inventory, so it does not require much efforts.
   2.2 Similarly the updation and deletion on assets is easy.

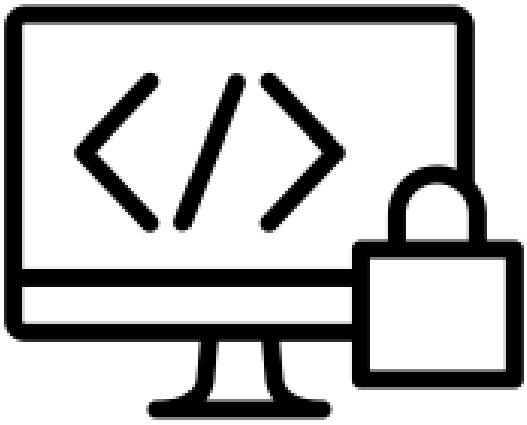
3. Asset tracking should be easy
   3.1 Asset tracking is much easier using this system as one does not have to walk around the warehouse searching for a particular asset, it can be easily done using our phone.
   3.2 Unlike spreadsheets and manual entry systems, QR codes allow you to add additional info such as GPS location and asset photos. GPS location and asset photos help your teams locate inventory swiftly and eliminate confusion.



4. Cost effective system
   4.1 You don't need to invest in expensive handheld barcode scanners which helps save cost.
   4.2 Additionally, QR code inventory management software can generate a number of reports that you can use to identify new avenues for cost cuts.

4.3 QR code inventory management software helps avoid overstocking, understocking, and duplication errors which saves time.

5. Secured system
   5.1 QR based system is more secured than the traditional barcode scanning methods.



6. System should have fewer errors
   6.1 This system helps address various issues such as errors that arise due to missed or incorrect documentation of parts and assets.
   6.2 The fault tolerance of the system is also enhanced because of this.

4 System Requirements

3.1 System Requirement Specification document (SyRS)

FUNCTIONAL REQUIREMENTS

1.Managing inventory using QR codes should save time

- QR code inventory management can be connected to the cloud. Data stored in clouds can be accessed by many teams simultaneously.
- Updation of records is very easy as it can be done using their phones in real time. Data entry process is quick and effective using QR codes and also avoids errors which enables us to take swift decisions.
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SOFTWARE QUALITY ATTRIBUTES

- **AVAILABILITY:**

The application will be available for free in the Android play store and IOS app store.

- **CORRECTNESS:**

You might want to use a black background and a white or lighter foreground, however, not all QR code scanners are created equal. Some scanners cannot scan QR codes with white or lighter foregrounds, which is why it is important to select the appropriate

colour combination. Make sure the colors do not have identical contrasts.If proper images are used while scanning the QR accuracy will be high.

● **MAINTAINABILITY:**

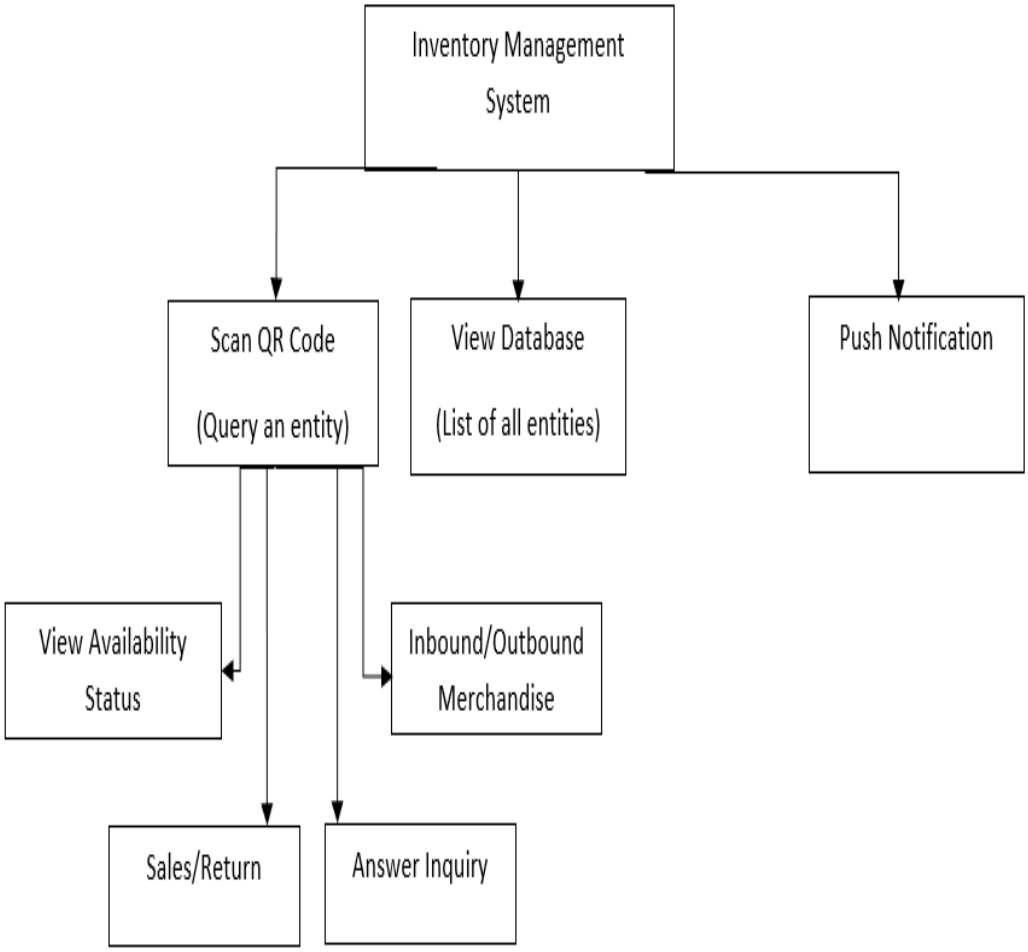
The UI is made in such a way that much maintenance will not be required.

● **USABILITY:**

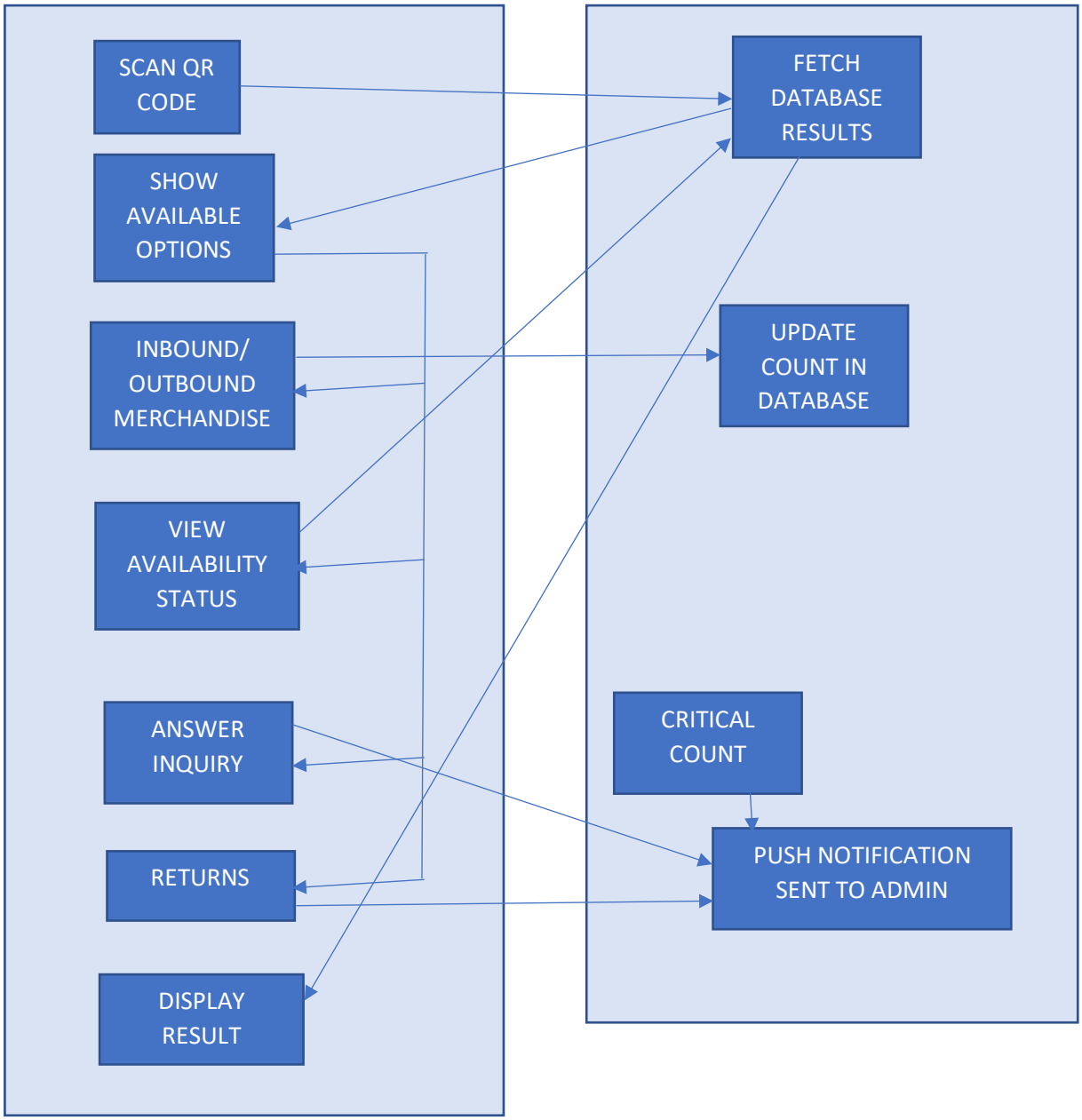
UI should be simple and everyone should be able to use all features easily. All popular languages should be available.

5.FUNCTIONAL & PHYSICAL ARCHITECTURE AND SYSTEM

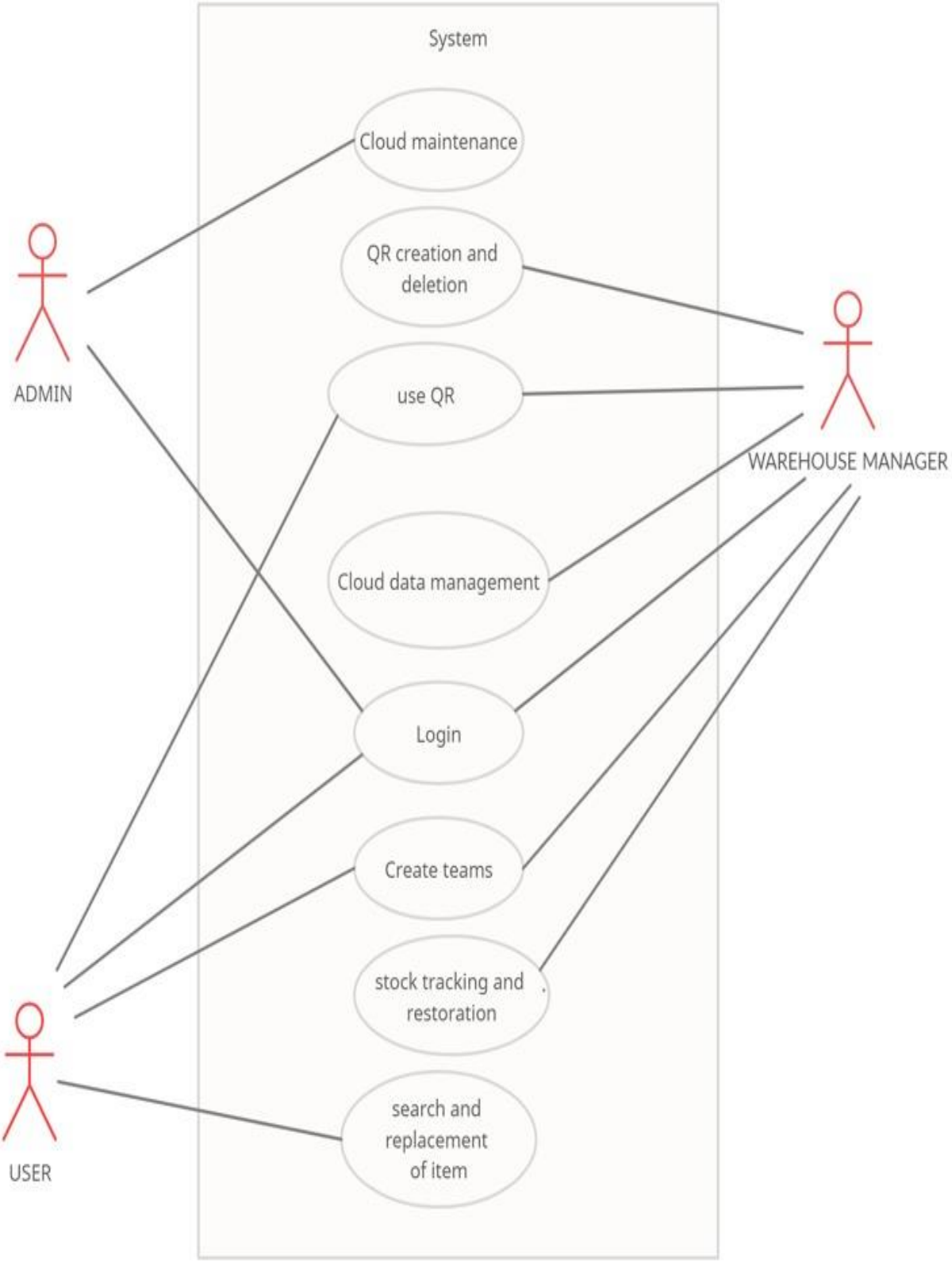
Physical Architecture:



FUNCTIONAL ARCHITECTURE



6. SYSTEMS MODELLING



7. PATENT SEARCH

LITERATURE SURVEY

Patent No.: US 6,851,611 B1

Shaw-Sinclair (45) Date of Patent: Feb. 8, 2005

A personal inventory system using a portable hand-held device that can read barcodes and communicate in human-readable form, whereby users can organize, access, edit and update information about items they own or are contemplating purchasing.

Patent Application Publication (10) Pub. No.: US 2016/0371633 A1

Stout et al. (43) Pub. Date: Dec. 22, 2016

Stout et al. (43) Pub. Date: Dec. 22, 2016A barcode scanner device **200** is formed as a wrist watch with a main body **210** and strap **220** and includes a camera **211** to capture an image of a barcode **11.** The scanner **200** generates an inventory request message sent by a communication interface **215** to a local server **30** based on the captured barcode. In a capture mode, live camera images may be displayed on touch-screen display **212** while capturing the barcode with guides and feedback for the user. In a display mode, inventory data from database **32** may be accessed in a large data field on the touch screen display **212.**