

## **LAB REPORT**

*Submitted by*

**RA2011003011327\_M Sivaji Babu\_J2**

**RA2011003011336\_M Hemalatha\_J2**

**RA2011003011351\_R Dinesh\_J2**

*Under the Guidance of*

**Mr.N.A.V.S VINOOTH**

**ASSISTANT PROFESSOR**

**DEPARTMENT OF COMPUTING TECHNOLOGIES**

*In partial satisfaction of the requirements for the degree of*

**BACHELOR OF TECHNOLOGY  
in  
COMPUTER SCIENCE ENGINEERING**



**SRM**

INSTITUTE OF SCIENCE & TECHNOLOGY

Deemed to be University u/s 3 of UGC Act, 1956

**SCHOOL OF COMPUTING**

**COLLEGE OF ENGINEERING AND TECHNOLOGY  
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

**KATTANKULATHUR - 603203**

**JUNE 2022**

**SRM INSTITUTION OF SCIENCE AND TECHNOLOGY  
KATTANKULATHUR-603203**

**BONAFIDE CERTIFICATE**

Certified that this lab report titled “....**QR Code based on door lock system....**” is the bonafide work done by R Dinesh(RA2011003011351) who carried out the lab exercises under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other work.

**SIGNATURE:**

**Mr.N.A.V.S.VINOTH**

**SEPM – Course Faculty**

**ASSISTANT PROFESSOR**

**DEPARTMENT OF COMPUTING TECHNOLOGIES**

## **ABSTRACT**

In this project an advanced security system is presented using QR Identification code, which is specially designed to be used in door locks. The QR system presented here is a new methodology implemented to provide security services to hotel rooms along with better hospitality to guests (or) for homes. Just we go back to old door lock they can be cracked easily by using some tools. Door locks are a common occurrence in our everyday lives. Yet, we still rely on traditional doorknobs that use physical keys that brings with it many problems such as key duplication from photos and lock-picking. There are also costs associated with making keys. This project aims to create a digital door lock system as a better alternative that accepts QR codes. when we are using a barcode to open a door lock it will be safer. When user comes to home, he simply holds this QR code against the door computer which authenticates whether the right QR code has been presented by the guest/user and unlocks the door or keeps the door locked accordingly.

## **PROBLEM STATEMENT**

We know that security is the main priority for us and our door knobs are less secure compared to modern technology. To improve our security, we have to move towards modern technology. **QR CODE DOOR LOCK SYSTEM** is more secure compared to traditional door lock.

## TABLE CONTENT

CHAPTER	TITLE	PAGE
1	PROBLEM STATEMENT	1
2	STAKEHOLDERS & PROCESS MODELS	6
3	IDENTIFYING REQUIREMENTS	9
4	PROJECT PLAN & EFFORT	14
5	WORK BREAKDOWN STRUCTURE & RISK ANALYSIS	20
6	SYSTEM ARCHITECTURE, USE CASE & CLASS DIAGRAM	25
7	ENTITY RELATIONSHIP DIAGRAM	30
8	DATA FLOW DIAGRAM	37
9	SEQUENCE & COLLABORATION DIAGRAM	42
10	DEVELOPMENT OF TESTING FRAMEWORK/USER INTERFACE	47
11	TEST CASES & REPORTING	50
12	ARCHITECTURE/DESIGN/FRAMEWORK/IMPLEMENTATION	59

**CONCLUSION**

**REFERENCES**

**APPENDIX (CODE)**

## **LIST OF FIGURES**

<b>FIGURE NO</b>	<b>TITLE</b>	<b>PAGE NO</b>
1	WORK BREAKDOWN STRUCTURE	24
2	SYSTEM ARCHITECTURE	27
3	USE CASE DIAGRAM	28
4	CLASS DIAGRAM	29
5	ENTITY RELATION DIAGRAM	31
6	DATA FLOW DIAGRAM LEVEL 0	40
7	DATA FLOW DIAGRAM LEVEL 1	41
8	SEQUENCE DIAGRAM	43
9	COLLABORATION DIAGRAM	44
10	USER INTERFACE	48

## **LIST OF ABBREVIATIONS**

- 1. CNN- Convolutional Neural Network**
- 2. ERD- Entity Relationship Diagram**
- 3. DFD- Data Flow Diagram**
- 4. AI- Artificial Intelligence**

# ONE PAGE BUSINESS CASE TEMPLATE

DATE	17/03/22
SUBMITTED BY	M.Shivaji,M.Hemalatha,Dinesh
TITLE / ROLE	DOOR LOCKS BASED ON QR CODE



## THE PROJECT

In bullet points, describe the problem this project aims to solve or the opportunity it aims to develop.

- This project aims to create a digital door lock system as a better alternative that accepts QR codes.
- We know that security is the main priority for us and our door knobs are less secure compared to modern technology.
- To improve our security, we have to move towards modern technology. **QR CODE DOOR LOCK SYSTEM** is more secure compared to traditional door lock.

## THE HISTORY

In bullet points, describe the current situation.

Door locks are a common occurrence in our everyday lives. Yet, we still rely on traditional doorknobs that use physical keys that brings with it many problems such as key duplication from photos and lock-picking. There are also costs associated with making keys. So we can implement QR code based door knobs for our safety,

## LIMITATIONS

List what could prevent the success of the project, such as the need for expensive equipment, bad weather, lack of special training, etc.

- Smartphones used to scan QR codes are often expensive in comparison with simpler phones
- you should only buy a QR code scanner if you want to avoid the possibility of viruses.
- Relatively new barcode type, people are not much familiar with its use. Requires training in order to fully understand the concept.

## APPROACH

List what is needed to complete the project.

1. OPEN CV4 to run the code belongs to computer vision
- 2.QR CODES
- 3.DATA BASE to save the key for door lock
- 4.CAMERA to scan the QR code.

## BENEFITS

In bullet points, list the benefits that this project will bring to the organization.

- **Keyless Door Entry:** Keyless Door Entry is increasingly popular for its flexibility both for the user and system administrator.
- **Immediate access code generation :**  
An access QR code can be generated and distributed in a matter of seconds.
- **Contactless / touch-free door access:** by scanning the QR code from your smart phone supports the trend for **contactless door entry** to help prevent the transmission of germs and viruses.



## Department of Networking and Communications

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	2
<b>Title of Experiment</b>	Identification of Process and Methodology Stakeholder Description
<b>Name of the candidate</b>	M.Hemalatha
<b>Team Members</b>	M.Sivaji , R.Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	28/03/2022

**Mark Split Up**

S.No	Description	Maximum Mark	Mark Obtained
1	Exercise	5	
2	Viva	5	
	<b>Total</b>	<b>10</b>	

**Staff Signature with date**

### Aim

To identify the appropriate Process Model for the project and prepare Stakeholder and

User Description.

### Team Members:

Sl No	Register No	Name	Role
1	<b>RA2011003011336</b>	Mannam.Hemalatha	<b>Rep/Member</b>
2	<b>RA2011003011327</b>	M.Sivaji	<b>Member</b>
3	<b>RA2011003011351</b>	R.Dinesh	<b>Member</b>

### Project Title: QR CODE based on door lock system

### Selection of Methodology

- < Summarize their understanding of “Waterfall” or “Agile” Methodology>

### Agile Methodology

The meaning of Agile is swift or versatile."Agile process model" refers to a software development approach based on iterative development. Agile methods break tasks into smaller iterations, or parts do not directly involve long term planning. The project scope and requirements are laid down at the beginning of the development process. Plans regarding the number of iterations, the duration and the scope of each iteration are clearly defined in

advance.

Each iteration is considered as a short time "frame" in the Agile process model, which typically lasts from one to four weeks. The division of the entire project into smaller parts helps to minimize the project risk and to reduce the overall project delivery time requirements. Each iteration involves a team working through a full software development life cycle including planning, requirements analysis, design, coding, and testing before a working product is demonstrated to the client.

Following are the phases in the Agile model are as follows:

1. Requirements gathering
2. Design the requirements
3. Construction/ iteration
4. Testing/ Quality assurance
5. Deployment
6. Feedback



**Fig. Agile Model**

Incorporate information to below table regarding stakeholders of the project [Make use of below examples]

Stakeholder Name	Activity/ Area /Phase	Interest	Influence	Priority (High/ Medium/ Low)
Investors	Funding	Provide capital to start the business and ensure it is invested in a correct way.	Low	6
Project Manager	Key stakeholder	leading role in planning, executing, monitoring, controlling the QR code project	High	1
Technology Experts	Troubleshoot IT problems	managing technological based - programs, services and products	Med	5

Subject Matter Experts	Advisor / instructor.	Makes decisions about the content structure & sequences and make strategies that will support .	High	3
Online Instructors	Guidance	Provide support to learners in the form of scheduled coaching sessions.	Med	2
Marketing Head	Crafting strategy	Devise strategies for all marketing teams including digital, advertising, creative & communications.	High	4
Resource Manager	Assigning	Allocate resources effectively based on the project budget.	Med	7
Corporate Learners	End Users	Provide feedback about the course and teaching methods.	Med	5

### Result

Thus the Project Methodology was identified and the stakeholders were described.



## Department Of Networking and Communications

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	3
<b>Title of Experiment</b>	System, Functional and Non-Functional Requirements of the Project
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	30/03/22

### Mark Split Up

S.No	Description	Maximum Mark	Mark Obtained
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## **Aim**

To identify the system, functional and non-functional requirements for the project.

## **Team Members:**

S No	Register No	Name	Role
1	<b>RA2011003011336</b>	M.Hemalatha	<b>Rep/Member</b>
2	<b>RA2011003011327</b>	M Sivaji	<b>Member</b>
3	<b>RA2011003011351</b>	R Dinesh	<b>Member</b>

**Project Title: <QR CODE based on door lock system >**

## **System Requirements :**

- ★ Personal Computers with Operating System : A desktop having Windows 10 , 11 with the latest version of Chrome, FireFox or Microsoft Edge or MAC OS with the latest version of Safari. (Eg : Pentium IV would be sufficient with at least 512 Megabytes of memory)
- ★ Computer Speed & Processor : One can use 4 GB of RAM but 8 GB is mostly preferred with Dual core Intel i3, i5, i7 or AMD Ryzen CPU. 128 GB harddrive will be required.
- ★ Screen Resolution : The course learning platform is designed for a minimum screen resolution of 1024x768. The content size will be 980x640 to ensure that all the content can fit in all supported browsers.
- ★ Microphones/Speakers/Headset : A microphone will let you participate in audio chats during the live classes or during doubt clearing sessions. It will also allow

you to record audio files and post them as a part of your assignment in the e-learning platform.

- ★ Internet Capability : The multimedia resources might require high- bandwidth internet access. A minimum of 512 Kbps is required for online courses using video conferencing.
- ★ Plug-ins : Some pre-installed software such as Microsoft Office (Word, Excel, PowerPoint, Publisher, Access) to create text documents and Adobe Acrobat (Professional) to view pdf files. Windows Media Player or flash player will be necessary for streaming video lectures.

### **Functional Requirements :**

- ★ The system must reduce the time consumption for taking scan and come
- ★ Learning models : Need to decide on the model which will be the best for QR code project .
- ★ Support of learning content: Training materials include DFs, docs, MP3s, MP4s, SCORM, AICC.
- ★ Briefly, the functional requirements include unlocking the door with a QR code, recording exit and entries, managing (adding, removing and editing) valid keys and providing a Lab Technician interface for key management.

### **Non-Functional Requirements**

System- related non- functional requirements:

- ★ Performance efficiency: performance relative to the amount of resources used under stated conditions.

- ★ Time-behavior: degree to which the response and processing times and throughput rates of a system, when performing its functions, meet requirements.
- ★ Resource utilization: degree to which the amounts and types of resources used by a system, when performing its functions, meet requirements.
- ★ Capacity: degree to which the maximum limits of a system parameter meet requirements.
- ★ Compatibility: degree to which a system or component can exchange information with other systems or components, and/or perform its required functions, while sharing the same hardware or software environment.
- ★ Interoperability: degree to which two or more systems or components can exchange information and use the information that has been exchanged.
- ★ Usability: degree to which a system can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use.
- ★ Learnability: degree to which a system can be used by specified users to achieve specific goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.
- ★ Accessibility: degree to which a system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.
- ★ Reliability: degree to which a system or component performs specific functions under specified conditions for a specified period of time.
- ★ Availability: degree to which a system or component is operational and accessible when required for use.
- ★ Fault tolerance: degree to which a system or component operates as intended despite the presence of hardware or software faults.

- ★ Recoverability: degree to which, in the event of an interruption or a failure, a system can recover the data directly affected and re-establish the desired state of the system.
  - ★ Security: degree to which a system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.
  - ★ Non-repudiation: degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later.
  - ★ Accountability: degree to which the actions of an entity can be traced uniquely to the entity.
  - ★ Authenticity: degree to which the identity of a subject or resource can be proved to be the one claimed.
  - ★ Maintainability: degree of effectiveness and efficiency in which a system can be modified by the intended maintainers.
  - ★ Reusability: degree to which an asset can be used in more than one system, or in building other assets.
  - ★ Modifiability: degree to which a system can be effectively and efficiently modified without introducing defects or degrading existing product quality.
  - ★ Testability degree: of effectiveness and efficiency in which test criteria can be established for a system or component and tests can be performed to determine whether those criteria have been met.
  - ★ Portability: degree of effectiveness and efficiency in which a system or component can be transferred from one
- Quality related non functional requirements
- ★ Economic risk mitigation: degree to which a system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use.

- ★ Environmental risk mitigation: degree to which a system mitigates the potential risk to property or the environment in the intended contexts of use.
- ★ Context coverage: degree to which a system can be used with effectiveness, efficiency, freedom from risk and satisfaction in both specified contexts of use and in contexts beyond those initially explicitly identified.
- ★ Context completeness: degree to which a system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use.
- ★ Flexibility: degree to which a system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements.

## Result

Thus the requirements were identified and accordingly described.



## Department of Computing Technologies

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	4
<b>Title of Experiment</b>	Prepare Project Plan based on scope, Calculate Project effort based on resources and Job roles and responsibilities
<b>Name of the candidate</b>	M.Hemalatha
<b>Team Members</b>	M.Sivaji,R.Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	20/04/22

### Mark Split Up

S.No	Description	Maximum Mark	Mark Obtained
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

### Staff Signature with date

#### Aim

To Prepare Project Plan based on scope, Calculate Project effort based on resources, Find Job roles and responsibilities

**Team Members:**

Sl No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Lead
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

## 1. Project Management Plan

Describe the key issues driving the project. **[Min 3 Focus Areas]**

Focus Area	Details
Integration Management	Governance Framework Project Team Structure Roles & Responsibilities of Team Change Management (Change Control, Issue Management) Project Closure
Quality Management	Quality Assurance: Quality assurance will be managed including governance, roles and responsibilities, tools and techniques and reporting Quality Control: Specify the mechanisms to be used to measure and control the quality of the work products
Resource Management	Estimate and Manage the need People: People & Skills Required Finance: Budget Required Physical: Facilities, IT Infrastructure
Communication Management	Determine communication requirements, roles and responsibilities, tools and techniques. [Type of Communication, Schedule, Mechanism Recipient]
Risk Management	Identifying, analysing, and prioritizing project risks

## 2. Estimation

### 2.1. Effort and Cost Estimation

Activity Description		Sub-Task	Sub-Task Description	Effort (in hours)	Cost in INR
		E1R1A1T1 (Effort- Requirement- Activity- Task)	Development Time for learning modules	3	8000
		E1R1A1T2	Integration of software and hardware	5	7000
		E1R1A1T3	Recording data	3	1500
Effort (hr)	Cost (INR)				
1	1000				

### 2.2. Infrastructure/Resource Cost [CapEx]

< OneTime Infra requirements >

Infrastructure Requirement	Qty	Cost per qty	Cost per item
Support and maintenance cost	5	1000	5000
Hosting Costs	3	3000	9000
Deployment Costs	2	5000	10000

### 2.3. Maintenance and Support Cost [OpEx]

Category	Details	Qty	Cost per qty per annum	Cost per item
People	Network, System, Middleware and DB admin  Developer , Support Consultant	3	2,000,000	6,000,000
Software	Operating System Database Middleware IDE	10	10000	100,000
Infrastructures	Server, Storage and Network	20	20000	400,000

## 3. Project Team Formation

### 3.1. Identification Team members

Name	Role	Responsibilities
Dinesh	Key Business User (Product Owner)	Provide clear business and user requirements
Sivaji	Project Manager	Manage the project
Hema	Business Analyst	Discuss and Document Requirements
Kusuma	Technical Lead	Design the end-to-end architecture
Vamsi	UX Designer	Design the user experience
Ajit	Frontend Developer	Develop user interface
Vijay	Backend Developer	Design, Develop and Unit Test Services/API/DB
Keerthi	Cloud Architect	Design the cost effective, highly available and scalable architecture
Pooja	Cloud Operations	Provision required Services
Rithesh	Tester	Define Test Cases and Perform Testing

### 3.2. Responsibility Assignment Matrix

RACI Matrix	Team Members			
Activity	Name (BA)	Name (Developer)	Name (Project Manager)	Key Business User
Login Interface	Ritesh	Kusuma,Ajit	Sivaji	Dinesh
Learning modules	Vamsi	Vijay	Sivaji	Dinesh

Result:

Thus, the Project Plan was documented successfully.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	5
<b>Title of Experiment</b>	Prepare Work breakdown structure, Timeline chart, Risk identification table
<b>Name of the candidate</b>	Hemalatha.M
<b>Team Members</b>	Dinesh, sivaji
<b>Register Number</b>	RA2011003011336,RA2011003011351,RA2011003011327
<b>Date of Experiment</b>	12-05-2022

### Mark Split Up

<b>S.No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

**Aim**

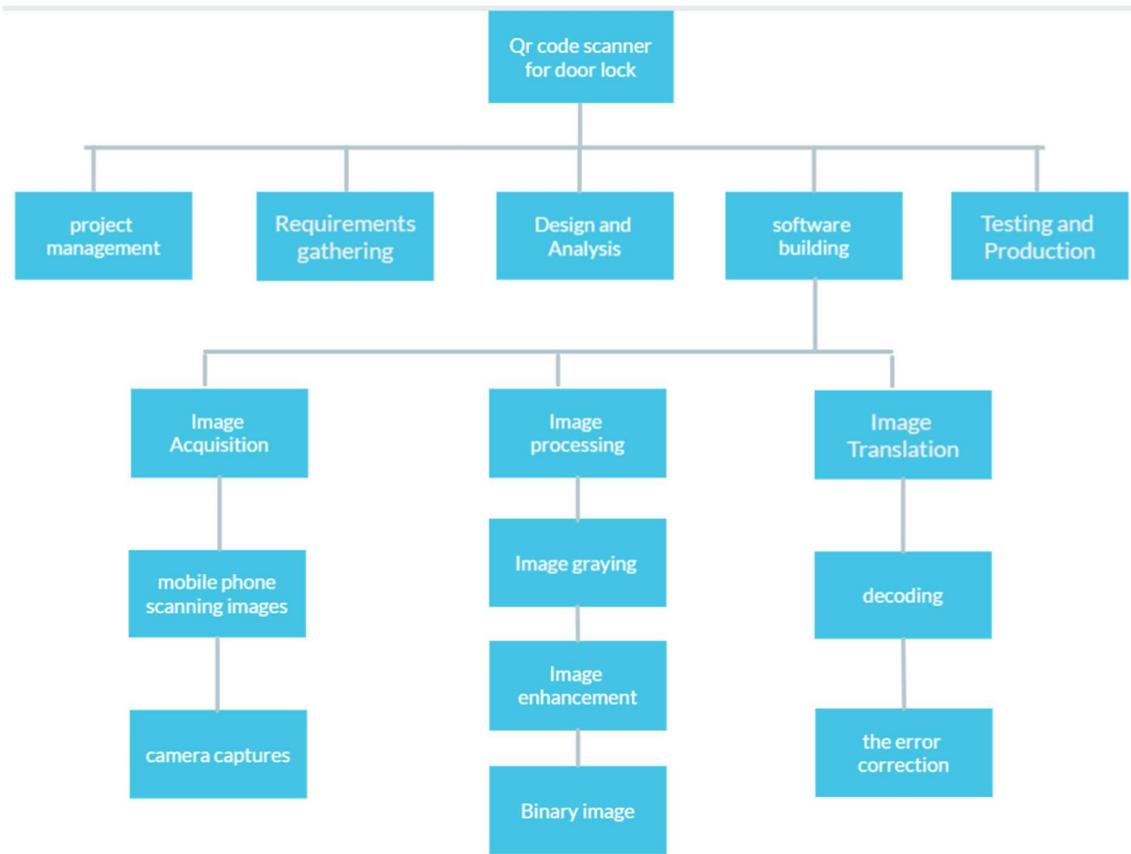
To Prepare Work breakdown structure, Timeline chart and Risk identification table

**Team Members:**

SI No	Register No	Name	Role
1	RA2011003011336	M.Hemalatha	Rep
2	RA2011003011351	Dinesh	Member
3	RA2011003011327	Sivaji	Member

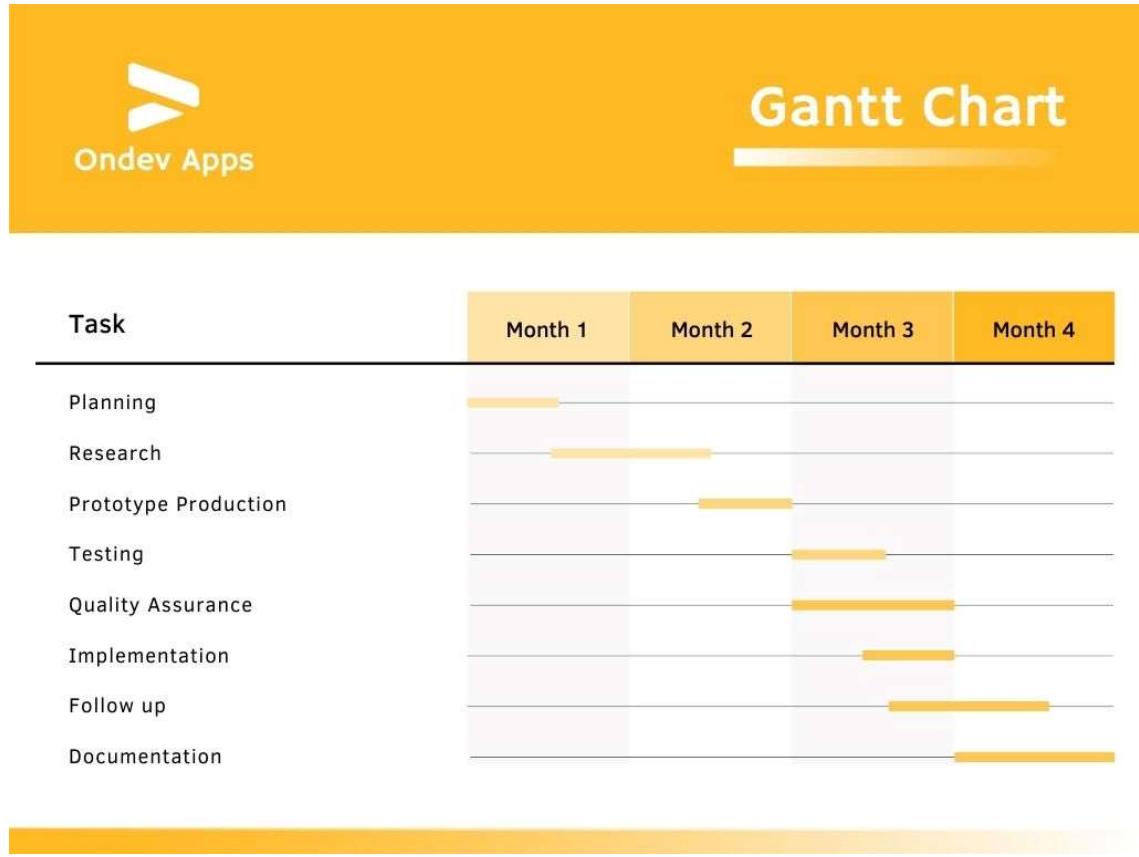
<Incorporate WBS, Timeline chart and Risk table>

## WBS for QR scanner for door lock:

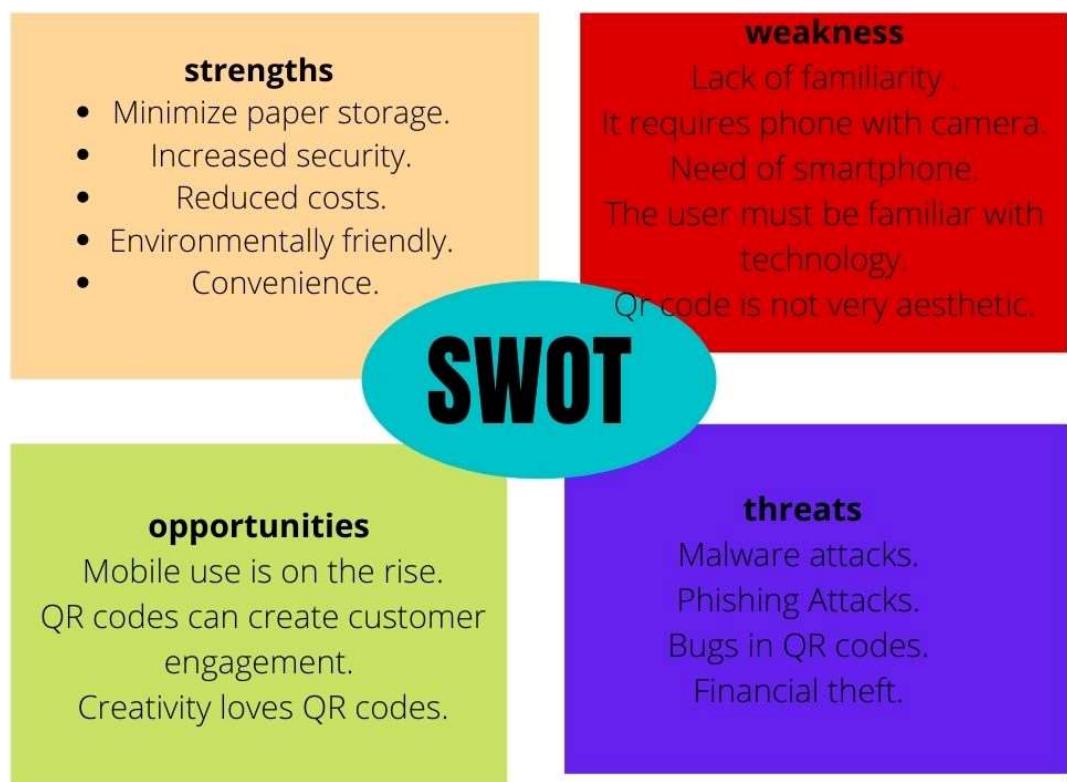


- ▶ 0.0 QR code scanner for door lock
- ▶ 1.0 Project Management
- ▶ 2.0 Requirements Gathering
- ▶ 3.0 Analysis & Design
- ▶ 4.0 Software Development
  - 4.1 Image Acquisition
    - 4.1.1 Mobile phone scanning images.
    - 4.1.2 Camera captures
  - 4.2 Image processing
    - 4.2.1 Image graying
    - 4.2.2 Image enhancement
    - 4.2.3 Binary image
  - 4.3 Image translation
    - 4.3.1 Decoding
    - 4.3.2 The error correction
- ▶ 5.0 Testing and Production

## TIMELINE – GANTT CHART



## RISK ANALYSIS – SWOT & RMMM



## **Risk Management Framework:**

Response	Attack methods	Examples
First	criminals can inject your phone with malware. This direct approach requires nothing more than an unsuspecting consumer or employee to scan a QR code out of curiosity leading to an infected website. Just visiting the infected website can trigger a malicious download	One example of how they might deliver this attack method is to send the QR code in an email that appears to be legitimate enticing the user to scan it.
Second	The attacker leads you to a phishing site to steal your credentials or to gain access to your private information on your mobile device. Phishing websites can be very hard to detect. They use a similar-looking Universal Resource Locator (URL) to a trusted website. Another approach is to change the domain extension.	For example, they change the ".org" to ".com." Other times, there is a slight change in the spelling of the URL so hard to distinguish that it tricks the user. Once the user visits the phishing site, username/login credentials are requested. After the attacker has your log in, the rest is history. They can access your accounts, make changes, see private information and cause irreversible damage to your company name.
Third	cybercriminals can print out free encoding tools on the internet to make QR codes.	They print the QR code on adhesive paper and place it over a legitimate QR code, or they can email a malicious QR code to an unsuspecting consumer.
Fourth	There's always the risk that an attacker finds a bug in a code reader application that could result in the exploitation of cameras and/or sensors in phones or other devices.	Device can be damaged during the process.

**Result:**

Thus, the work breakdown structure with timeline chart and risk table were formulated successfully.





## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	6
<b>Title of Experiment</b>	Design a System Architecture, Use Case and Class Diagram
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	1/5/2022

### **Mark Split Up**

<b>S.No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## Aim

To Design a System Architecture, Use case and Class Diagram

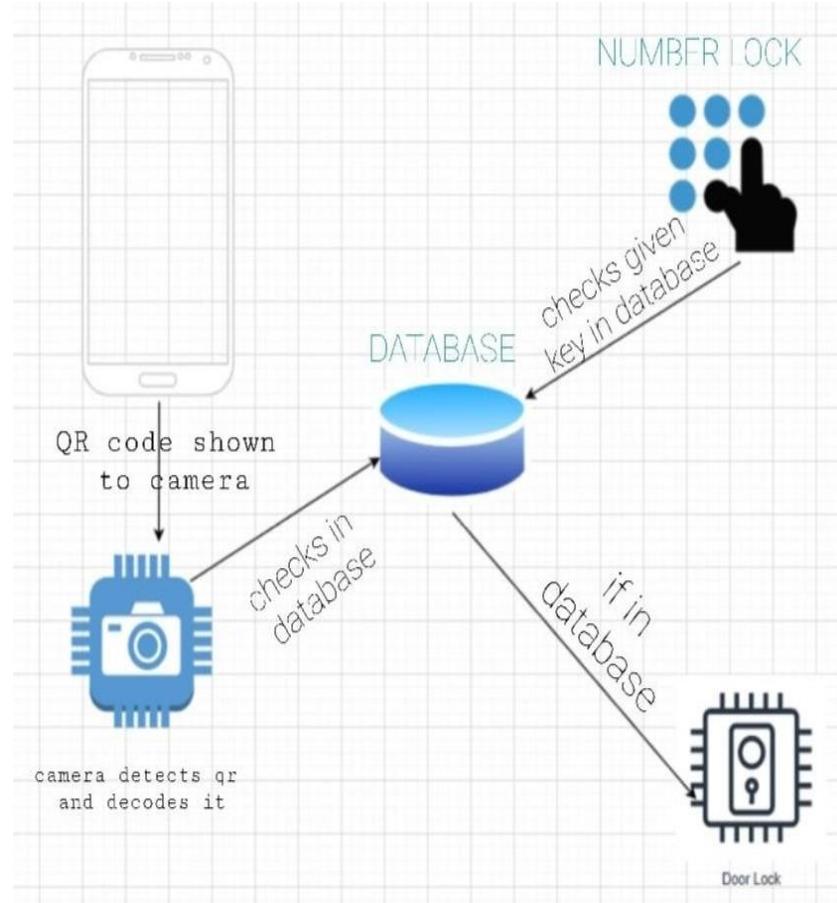
## Team Members:

Sl No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

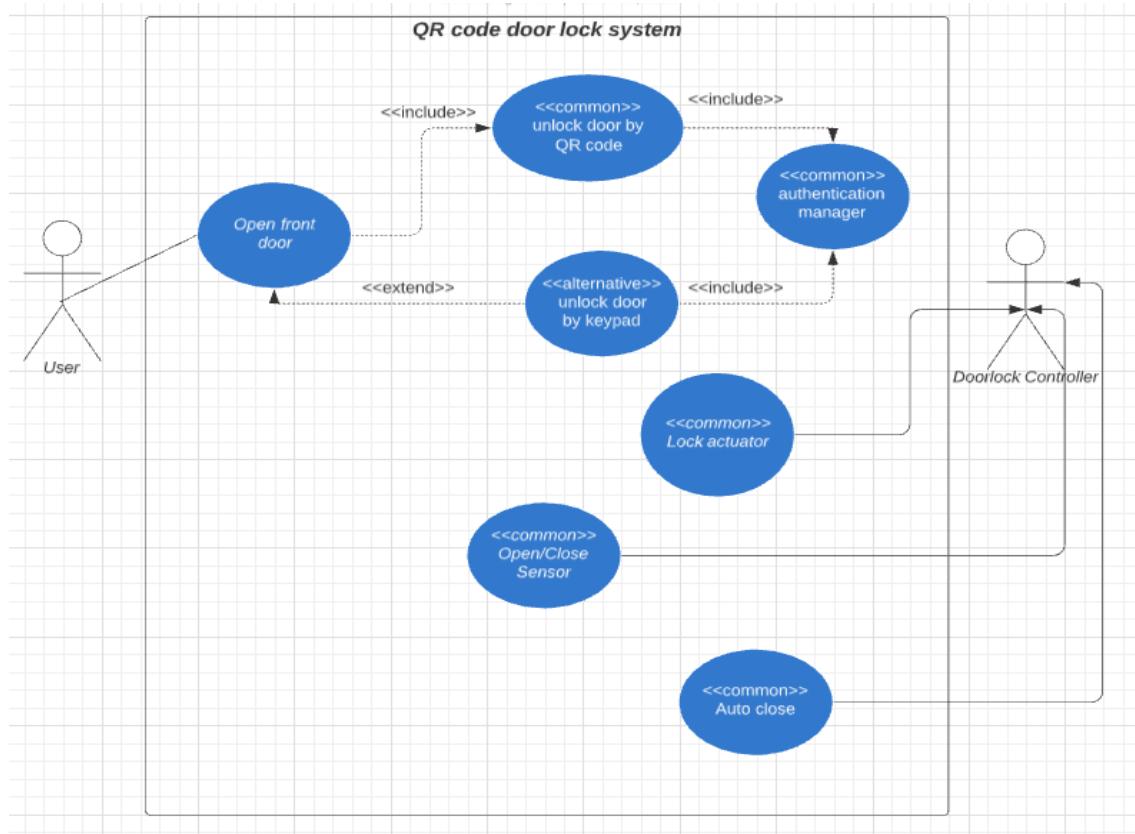
## Requirements

<System Architecture, Use Case and Class Diagram>

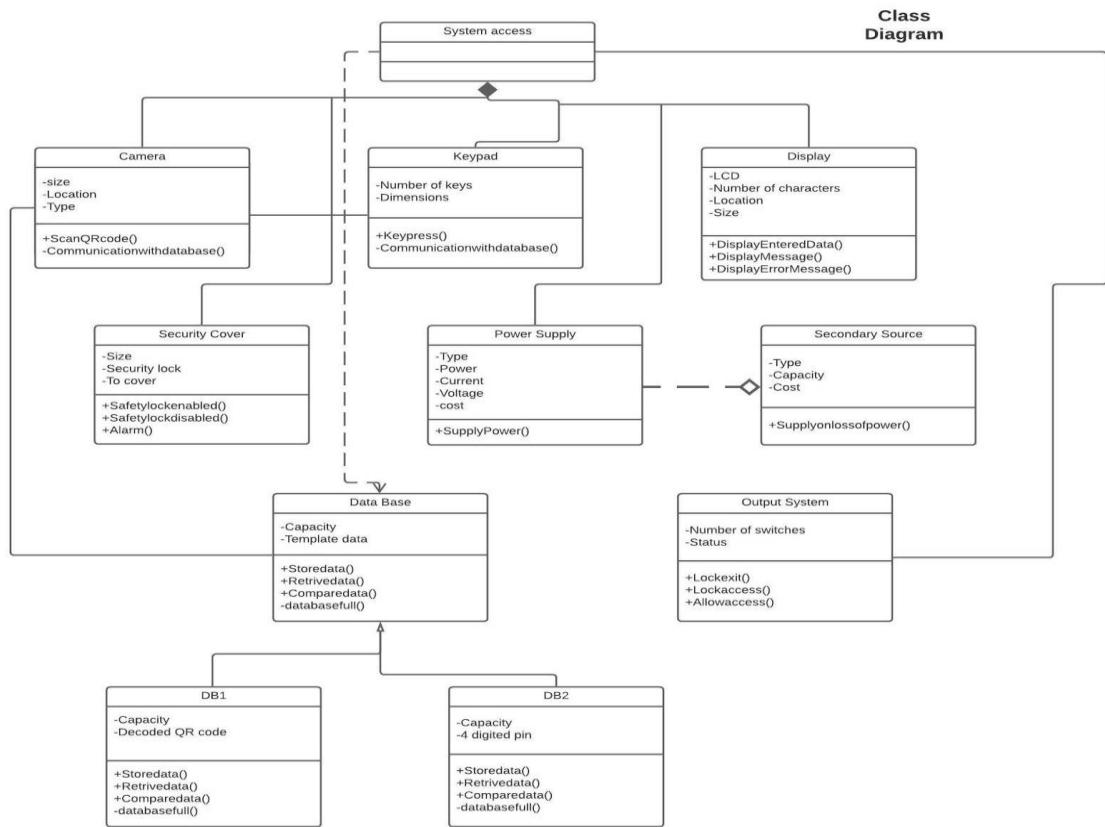
## System Architecture



## USECASE DAIGRAM



## CLASS DAIGRAM



## RESULT:

Thus, the system architecture, use case and class diagram created successfully.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	7
<b>Title of Experiment</b>	Design a Entity relationship diagram
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	7/05/2022

### **Mark Split Up**

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

## **Staff Signature with date**

### **Aim**

To create the Entity Relationship Diagram

### **Team Members:**

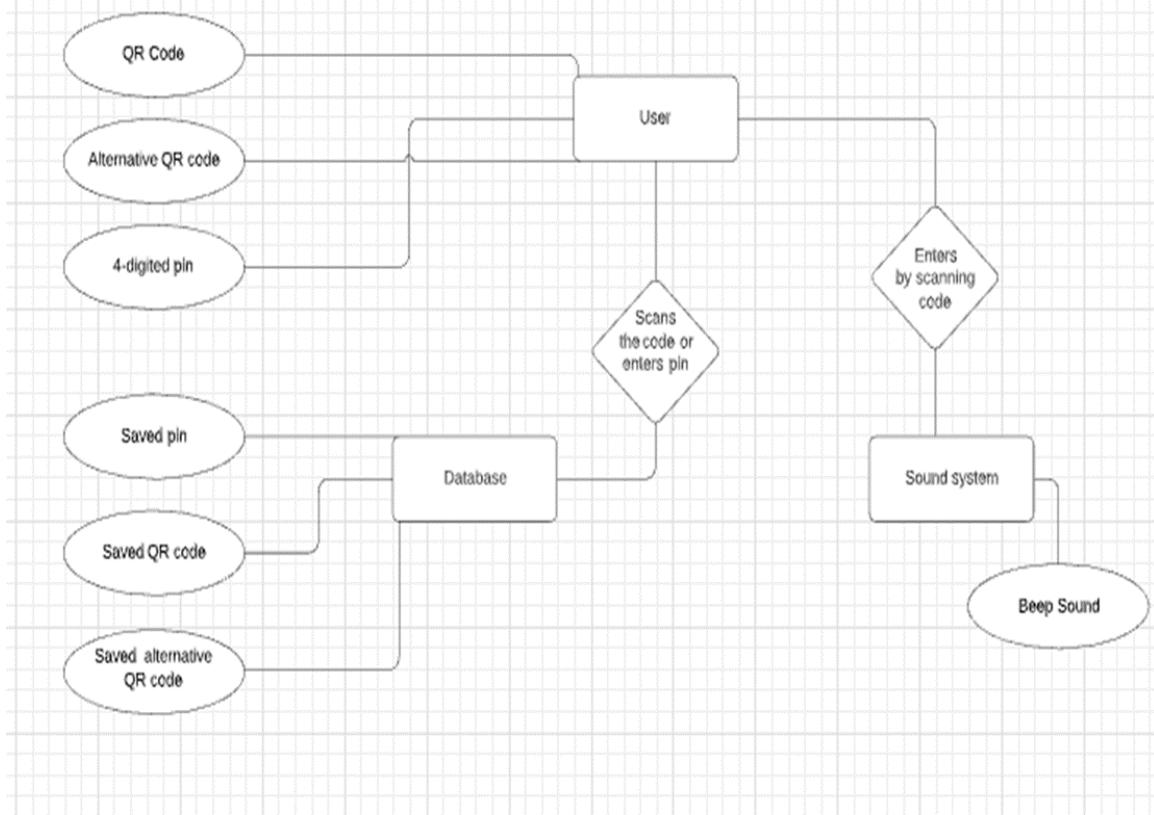
S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep
2	RA2011003011327	M Sivaji Babu	Member
3	RA2011003011351	R Dinesh	Member

### **<ER Diagram >**

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system. ER Diagrams are most often used to design or debug relational databases in the fields of software engineering, business information systems, education and research.

Door lock system using QR code has an entity of QR code, alternative QR code and a 4-digit pin functioned by the user. When the user scans the QR code it moves to the database. The entities in the database are saved QR code, saved alternative QR code and a saved 4-digit pin. As soon as it gets decoded, an entity beep sound is produced from the sound system when the door is open or closed.

## ER DIAGRAM



Result:

Thus, the entity relationship diagram was created successfully.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	8
<b>Title of Experiment</b>	Develop a Data Flow Diagram (Process-Up to Level 1)
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	1-06-2022

### Mark Split Up

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## Aim

To develop the data flow diagram up to level 1 for the <project name>

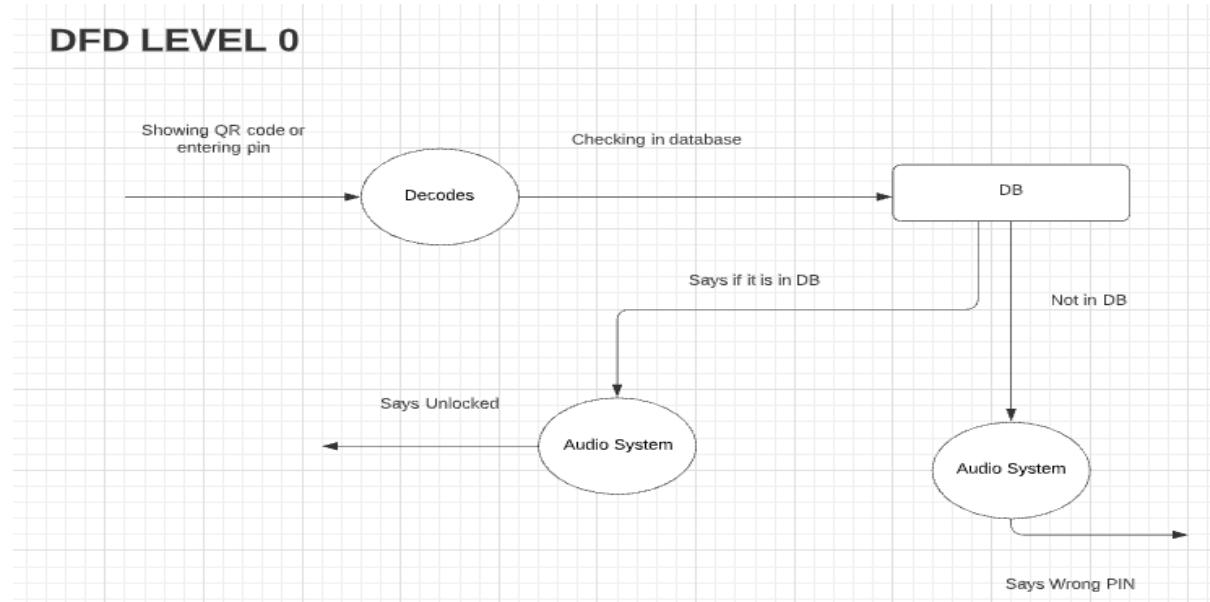
## Team Members:

S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

<DFD >

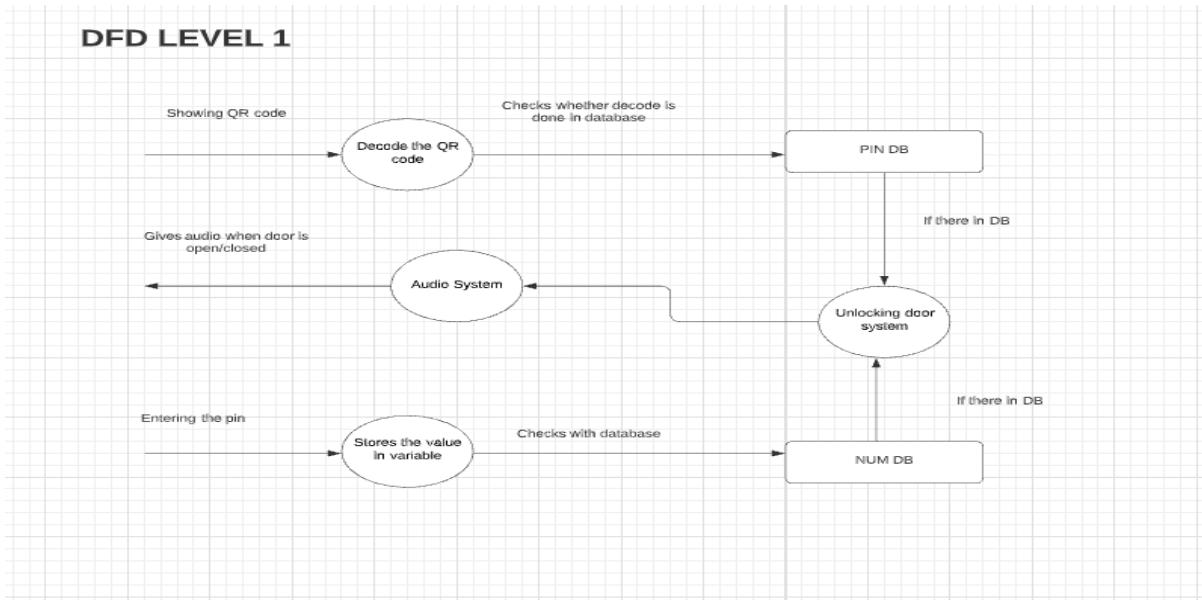
## DATA FLOW DAIGRAM:

### DFD Level 0



### DFD Level 1

### DFD LEVEL 1



Result:

Thus, the data flow diagrams have been created for the <project name>.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	9
<b>Title of Experiment</b>	Design a Sequence and Collaboration Diagram
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji, R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	1-05-2022

### Mark Split Up

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## **Aim**

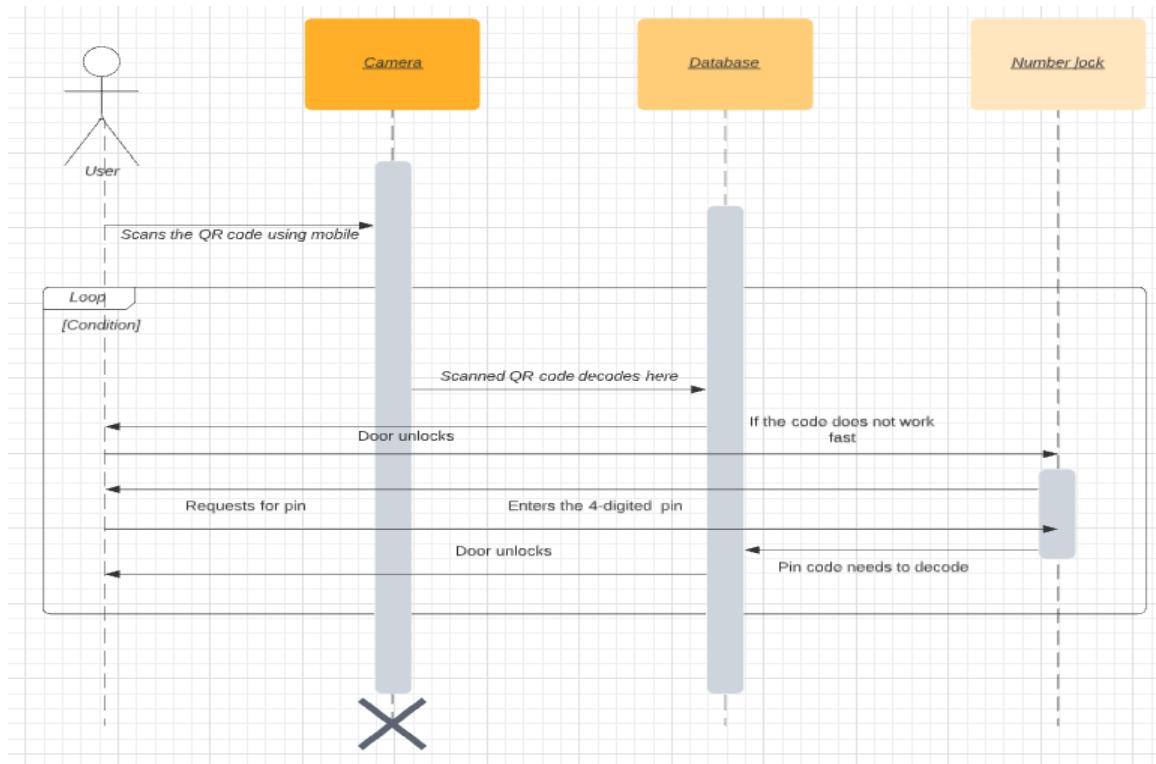
To create the sequence and collaboration diagram for the <project name>

## **Team Members:**

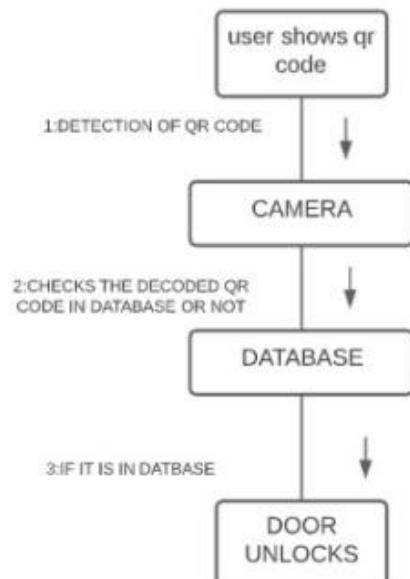
S No	Register No	Name	Role
1	RA201103011336	M Hemalatha	Rep/Member
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

<Sequence and Collaboration Diagram>

## Sequence Diagram



## Collaboration Diagram



Result:

Thus, the sequence and collaboration diagrams were created for the <project name>.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	10
<b>Title of Experiment</b>	Develop a Testing Framework/User Interface
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji, R Dinesh
<b>Register Number</b>	RA201100301136 RA2011003011327 RA2011003011351
<b>Date of Experiment</b>	

### Mark Split Up

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## Aim

To develop the testing framework and/or user interface framework for the Door locking systems using QR code.

## Team Members:

S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep/Member
2	RA2011003011327	M Sivaji Babu	Member
3	RA2011003011351	R Dinesh	Member

## Master Test Plan, Test Case Design AND Manual Testing With Report:

## Executive Summary

The testing process is done to find defects which may get created by the programmer while developing the software and to make sure that the end result meets the business and user requirements.

To ensure that it satisfies the BRS that is Business Requirement Specification and SRS that is System Requirement Specifications and also to gain the confidence of the customers by providing them a quality product.

## Test Plan

To prepare a master test plan and conduct manual test using test cases then prepare test report for the project

## Scope of Testing

**Functional:** All the Functional requirements are covered

**Non-Functional:** All the Non-Functional requirements are covered

## Types of Testing, Methodology, Tools

Category	Methodology	Tools Required
Functional Requirements	Manual	Word Template

### Result:

Thus, the testing framework/user interface framework has been created for the Door locking systems using QR code.



## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	11
<b>Title of Experiment</b>	Test Cases
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Number</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	14/05/2022

### **Mark Split Up**

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## Aim

To develop the test cases manual for the <project name>

## Team Members:

S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

<Utilize the templates below and incorporate the project's test cases - Manual Test case to be written for at least one module >

## Executive Summary

The testing process is done to find defects which may get created by the programmer while developing the software and to make sure that the end result meets the business and user requirements.

To ensure that it satisfies the BRS that is Business Requirement Specification and SRS that is System Requirement Specifications and also to gain the confidence of the customers by providing them a quality product.

## Test Plan

To prepare a master test plan and conduct manual test using test cases then prepare test report for the project

## Test Case

### Functional Test Cases

#### Functional Test Cases

Test ID (#)	Test Scenario	Test Case	Execution Steps	Expected Outcome	Actual Outcome	Status	Remarks
	Verifying the QR code by showing camera	Accept Valid QR code	<ol style="list-style-type: none"><li>1. Detecting the QR code</li><li>2. Decoding the QR code</li><li>3. Checking in database</li></ol>	User views the message as door unlocks	User views the message as door unlocks	pass	success
	Verifying the QR code	Check For incorrect QR code	Detecting, decoding and checking QR code	QR code is wrong and message displayed as “Try again”	QR code is wrong and message displayed as “Try again”	pass	success

	Adding a new QR code	Accept the new QR code	If the decoded QR code shown by the user “++NEW++”  It accepts the new QR code  Adding new QR code into database	Message displayed as  1.Show new QR code  2. “ADDED NEW QR CODE :)”  3. Door unlocks	Message displayed as  1.Show new QR code  2. “ADDED NEW QR CODE :)”  3. Door unlocks	pass	success
	Verifying user by number lock	Accepts valid number lock	1) Enter number lock 2) Checking in database	Message displayed as door unlocks	Message displayed as door unlocks	pass	success

## Non-Functional Test Cases

<b>Test ID (#)</b>	<b>Test Scenario</b>	<b>Test Case</b>	<b>Status</b>	<b>Remarks</b>
	Performance testing	Detecting and decoding QR code should not exceed more than 5 seconds	Pass	Completed
	Volume testing	Analysing the system performance by increasing the volume of data in database	Pass	Completed
	Usability testing	To identify any usability problems, collect qualitative and quantitative data and determine the participant's satisfaction with the product.	Pass	Completed
	Reliability testing	To check whether the software can perform a failure-free operation for a specified time period in a particular environment.	Pass	Completed

Result:

Thus, the test case manual has been created for the <project name>.



# SRM

INSTITUTE OF SCIENCE & TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	12
<b>Title of Experiment</b>	Manual Test Case Reporting
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji, R Dinesh
<b>Register Number</b>	RA2011003011336 RA2011003011327 RA2011003011351
<b>Date of Experiment</b>	

### Mark Split Up

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

## Aim

To prepare the manual test case report for the Door Locking Systems using QR Code.

## Team Members:

S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep/Member
2	RA2011003011327	M Sivaji Babu	Member
3	RA2011003011351	R Dinesh	Member

## Defect Log

Requirement #	Defect ID #	Defect Description	Status
M1R1	RA1	If the person shows the QR code it contains "++NEW++" and after that the person does not shows QR code then door does not unlock and system runs until it showing a new QR code	in completed

## Report

Category	Progress Against Plan	Status
Functional Testing	Green	Completed
Non-Functional Testing	Green	Completed

Functional	Test Case Coverage (%)	Status
M1R1	50%	Completed
M1R2	50%	Completed
M1R3	50%	Completed

## Conclusion

The main goal of this project was to achieve several objectives. The first objective was to investigate and analyse the requirements of a quick to use, QR code-based door lock. The Lock system is able to validate a QR code in less than 10 seconds which passes for a quick to use QR code door lock.

Result:

Thus, the test case report has been created for the Door Locking Systems using QR Code.





## School of Computing

**SRM IST, Kattankulathur – 603 203**

**Course Code: 18CSC206J**

**Course Name: Software Engineering and Project Management**

<b>Experiment No</b>	13
<b>Title of Experiment</b>	Provide the details of Architecture Design/Framework/Implementation
<b>Name of the candidate</b>	M Hemalatha
<b>Team Members</b>	M Sivaji , R Dinesh
<b>Register Numbers</b>	RA2011003011327,336,351
<b>Date of Experiment</b>	14/6/22

### Mark Split Up

<b>S. No</b>	<b>Description</b>	<b>Maximum Mark</b>	<b>Mark Obtained</b>
1	Exercise	5	
2	Viva	5	
<b>Total</b>		<b>10</b>	

**Staff Signature with date**

**Team Members:**

S No	Register No	Name	Role
1	RA2011003011336	M Hemalatha	Rep/Member
2	RA2011003011327	M Sivaji	Member
3	RA2011003011351	R Dinesh	Member

**Aim**

To provide the details of architectural design/framework/implementation

**ARCHITECTURAL DESIGN****Description:**

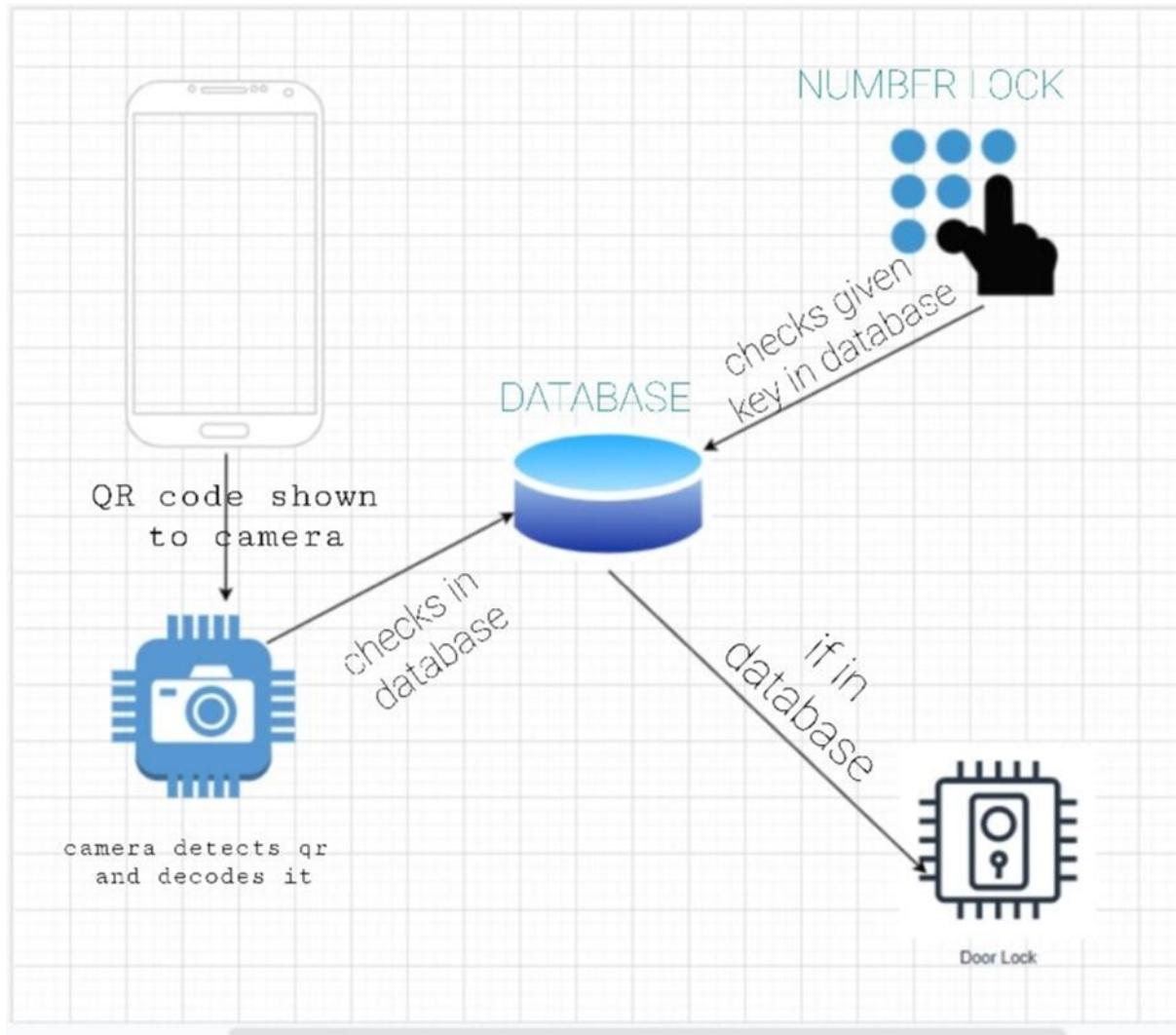
An architectural diagram is a diagram of a system that is used to abstract the overall outline of the software system and the relationships, constraints, and boundaries between components. It is an important tool as it provides an overall view of the physical deployment of the software system and its evolution roadmap.

For, door lock system the major components are:

1. A mobile with QR code to scan.
2. A camera to scan the QR code.
3. A keypad to enter the 4-digit pin.
4. A database to access all the above components.

**Process:**

Firstly, QR code is scanned with mobile using the Camera in the door. The scanned QR code will move to the database to get decoded. So, the door unlocks. As an alternative if the camera ruptures after years, a Keypad is also used. Users can unlock the door using a 4-digit pin. Even this moves to the database to decode and finally the door unlocks.



## **Module Description And Implementation:**

### **Module 1: -**

The module1 fully covers decoding of QR code shown by user.

**Software Used:** Python

**Modules included:** OPENCV2, NUMPY, PYZBAR

## **Code of Module 1:**

```
#Including or importing all modules

import cv2

import numpy as np

import pyzbar.pyzbar as pyzbar

#here we used VideoCapture to start video capturing

cap = cv2.VideoCapture(0)

#setting frame size

cap.set(3,640)

cap.set(4,480)

#setting the font on screen frame

font = cv2.FONT_HERSHEY_PLAIN

#using string variable to store the decoded qr code

str=""

#running an infinite loop to read the qr code

while True:

    success,frame = cap.read()

    #here the qr decode using decode() function and stored all data in

    decodedobjects
```

```
decodedObjects = pyzbar.decode(frame)

#We are taking variable and using that variable we are printing decoded
one

for obj in decodedObjects:

    str=obj.data.decode('utf-8')

    print("DECODED QR CODE IS",str)

    cv2.putText(frame, str(obj.data), (50, 50), font, 2,(255, 0, 0), 3)

    cv2.imshow("Frame", frame)

#wait key is used to stop running of the code

key = cv2.waitKey(0)

if key == 27:

    Break
```

## OUTPUT:

In [ ]: #including or importing all modules  
import cv2  
import numpy as np  
import pyzbar.pyzbar as pyzbar  
  
#here we used VideoCapture to start video capturing  
cap = cv2.VideoCapture(0)  
  
#setting the font on screen frame  
font = cv2.FONT\_HERSHEY\_PLAIN  
  
#setting frame size  
cap.set(3,640)  
cap.set(4,480)  
  
#using string variable to store the decoded qr code  
str=""  
  
#running an infinite loop to read the qr code  
while True:  
 \_, frame = cap.read()  
  
 #here the qr decode using decode() function and stored all data in decodedObjects  
 decodedObjects = pyzbar.decode(frame)  
  
 #we are taking variable and using that variable we are printing decoded one  
 for obj in decodedObjects:  
 print("Data", obj.data)  
 str=obj.data.decode('utf-8')  
 print("DECODED QR CODE IS: ",str)  
 cv2.putText(frame, str,(obj.data), (50, 50), font, 2,  
 (255, 0, 0), 3)  
  
cv2.imshow("Frame", frame)  
  
#wait key is used to stop running of the code  
key = cv2.waitKey(1)  
if key == 27:  
 break

#running an infinite loop to read the qr code  
while True:  
 \_, frame = cap.read()  
  
 #here the qr decode using decode() function and stored all data in decodedObjects  
 decodedObjects = pyzbar.decode(frame)  
  
 #we are taking variable and using that variable we are printing decoded one  
 for obj in decodedObjects:  
 print("Data", obj.data)  
 str=obj.data.decode('utf-8')  
 print("DECODED QR CODE IS: ",str)  
 cv2.putText(frame, str,(obj.data), (50, 50), font, 2,  
 (255, 0, 0), 3)  
  
cv2.imshow("Frame", frame)  
  
#wait key is used to stop running of the code  
key = cv2.waitKey(1)  
if key == 27:  
 break

DECODED QR CODE IS: hello  
DECODED QR CODE IS: hello  
DECODED QR CODE IS: hello

## Module 2:

*This module 2 is about unlocking the door using the number lock alternate for QR lock. When the user enters the correct number lock door unlocks by searching the entered lock in the database.*

### **CODE:**

```
import sqlite3

def func(num):

    conn=sqlite3.connect('owner.db')

    c=conn.cursor()

    c.execute(""""CREATE TABLE IF NOT EXISTS ju ( pass varchar(20))"""") 

    c.execute("SELECT * FROM ju ")

    if len(c.fetchall())==0:

        c.execute("INSERT INTO ju VALUES('12345')")

        c.execute("INSERT INTO ju VALUES('112233')")

        c.execute("INSERT INTO ju VALUES('998877')")

        c.execute("SELECT * FROM ju where pass=?",(num,))

    le=len(c.fetchall())

    conn.commit()

    conn.close()
```

```
return le
```

```
while 1<2:
```

```
    num=input("Enter number lock: ")
```

```
    if func(num)>=1:
```

```
        print("DOOR UNLOCKED :)")
```

```
        break
```

```
    else:
```

```
        print("*****TRY AGAIN*****")
```

## OUTPUT:

The screenshot shows a Jupyter Notebook interface with the title "jupyter Untitled15". The menu bar includes File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. Below the menu is a toolbar with various icons for file operations like Open, Save, Run, and Cell Type selection. The code cell contains the following Python script:

```
conn=sqlite3.connect('owner.db')
c=conn.cursor()
c.execute("""CREATE TABLE IF NOT EXISTS ju ( pass varchar(20))""")
c.execute("SELECT * FROM ju ")
if len(c.fetchall())==0:
    c.execute("INSERT INTO ju VALUES('12345')")
    c.execute("INSERT INTO ju VALUES('112233')")
    c.execute("INSERT INTO ju VALUES('998877')")
c.execute("SELECT * FROM ju where pass=?",(num,))
le=len(c.fetchall())
conn.commit()
conn.close()
return le
while 1<2:
    num=input("Enter number lock: ")
    if func(num)>=1:
        print("DOOR UNLOCKED :)")
        break
    else:
        print("*****TRY AGAIN*****")
```

The output pane shows the interaction with the code:

```
Enter number lock: 3456
*****TRY AGAIN*****
Enter number lock: 112233
DOOR UNLOCKED :)
```

The bottom status bar indicates "In [ ]:".

## Module 3: -

This module 3 is about adding a new QR code as lock and unlocking the door.

And in this module, there will be a separate QR code when we show that QR it will accept the new QR into the database.

### **CODE:**

```
#including or importing all modules

import cv2

import numpy as np

import pyzbar.pyzbar as pyzbar

import sqlite3

#THIS FUNCTION USED TO DECODE QR CODE

def func():

    #here we used VideoCapture to start video capturing

    cap = cv2.VideoCapture(0)

    #setting the font on screen frame

    font = cv2.FONT_HERSHEY_PLAIN

    #setting frame size

    cap.set(3,640)

    cap.set(4,480)
```

```
#using string variable to store the decoded qr code

sr=""

decodedObjects=[]

#running an infinite loop to read the qr code

while len(decodedObjects)==0:

    _, frame = cap.read()

#here the qr decode using decode() function and stored all data in decodedobjects

decodedObjects = pyzbar.decode(frame)

#We are taking variable and using that variable we are printing decoded one

for obj in decodedObjects:

    #print("Data", obj.data)

    sr=obj.data.decode('utf-8')

    #print("DECODED QR CODE IS: ",sr)

    cv2.putText(frame, str(obj.data), (50, 50), font, 2, (255, 0, 0), 3)

    cv2.imshow("Frame", frame)

return sr

#THIS FUNCTION USED TO CONNECT WITH DATABASE AND SEARCHING IN
DATABASE

def func2():

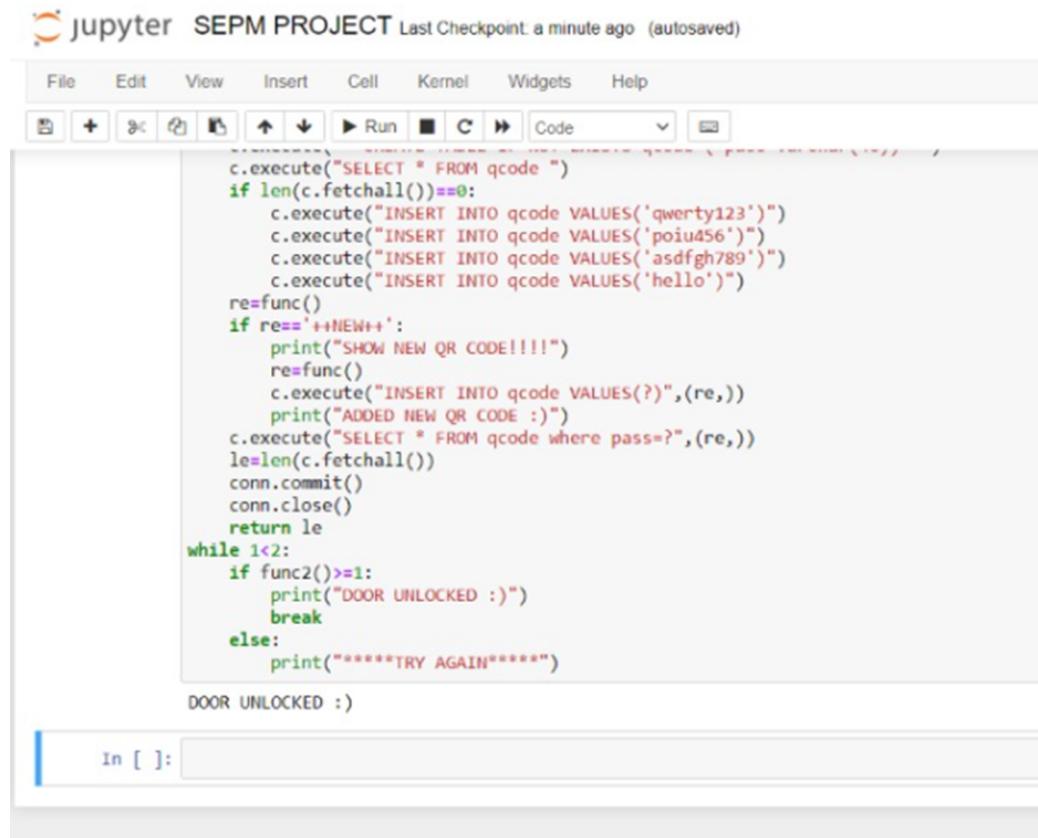
    conn=sqlite3.connect('owner.db')

    c=conn.cursor()
```

```
c.execute("""CREATE TABLE IF NOT EXISTS qcode ( pass varchar(40))""")  
  
c.execute("SELECT * FROM qcode ")  
  
if len(c.fetchall())==0:  
  
    c.execute("INSERT INTO qcode VALUES('qwerty123')")  
  
    c.execute("INSERT INTO qcode VALUES('poiu456')")  
  
    c.execute("INSERT INTO qcode VALUES('asdfgh789')")  
  
    c.execute("INSERT INTO qcode VALUES('hello')")  
  
re=func()  
  
if re=='++NEW++':  
  
    print("SHOW NEW QR CODE!!!!")  
  
re=func()  
  
c.execute("INSERT INTO qcode VALUES(?)",(re,))  
  
print("ADDED NEW QR CODE :)")  
  
c.execute("SELECT * FROM qcode where pass=?",(re,))  
  
le=len(c.fetchall())  
  
conn.commit()  
  
conn.close()  
  
return le  
  
while 1<2:  
  
    if func2()>=1:  
  
        print("DOOR UNLOCKED :)")
```

```
break  
  
else:  
  
    print("*****TRY AGAIN*****")
```

## OUTPUTS :



The screenshot shows a Jupyter Notebook interface with the title "jupyter SEPM PROJECT". The notebook has a single cell containing Python code. The code performs the following steps:

- It executes a query to select all from the "qcode" table.
- If the result set is empty (len(c.fetchall())==0), it performs four insertions into the "qcode" table with values ('qwerty123'), ('poiuytrew'), ('asdfghjkl'), and ('hello').
- It defines a function "re" which increments a counter.
- If "re" is "+NEW++", it prints "SHOW NEW QR CODE!!!!" and calls "func()". Then it inserts a new value into the "qcode" table and prints "ADDED NEW QR CODE :)".
- It executes a query to select all from "qcode" where pass=?" and stores the result in "le".
- It increments the counter "re" by 1.
- It commits the transaction and closes the connection.
- It returns the value of "le".
- In a loop, it calls "func2()". If "func2()>=1", it prints "DOOR UNLOCKED :" and breaks the loop. Otherwise, it prints "\*\*\*\*\*TRY AGAIN\*\*\*\*\*".

The output of the cell is "DOOR UNLOCKED :)".

The above code is the output for the decoded QR code. To add a new QR code the procedure is as follows.

jupyter SEPM PROJECT Last Checkpoint: 4 minutes ago (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help

Code

```
c.execute("INSERT INTO qcode VALUES('qwerty123')")  
c.execute("INSERT INTO qcode VALUES('poiuyt789')")  
c.execute("INSERT INTO qcode VALUES('asdfghjkl')")  
c.execute("INSERT INTO qcode VALUES('hello')")  
re=func()  
if re=='+NEW++':  
    print("SHOW NEW QR CODE!!!!")  
    re=func()  
    c.execute("INSERT INTO qcode VALUES(?)",(re,))  
    print("ADDED NEW QR CODE :")  
    c.execute("SELECT * FROM qcode where pass=?",(re,))  
    le=len(c.fetchall())  
    conn.commit()  
    conn.close()  
    return le  
while 1<2:  
    if func2()>=1:  
        print("DOOR UNLOCKED :")  
        break  
    else:  
        print("*****TRY AGAIN*****")  
  
SHOW NEW QR CODE!!!!  
ADDED NEW QR CODE :)  
DOOR UNLOCKED :)
```

In [ ]:



Result:

Thus, the details of architectural design/framework/implementation along with the screenshots were provided.