

A SMART -CONTRACT BASED ACCESS CONTROL FRAMEWORK FOR CLOUD SMART HEALTHCARE SYSTEM

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering Degree

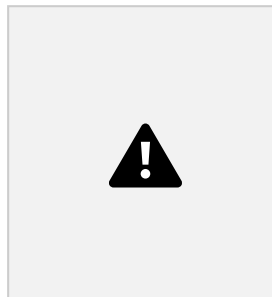
In

Computer Science and Engineering

By

PRIYADHARSHINI C (Reg. No. 38119008)

PRIYADHARSHINI M (Reg.No. 38119009)



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade “A” by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

March - 2022

**SATHYABAMA INSTITUTE
OF
SCIENCE AND
TECHNOLOGY**



(Established under Section 3 of UGC Act, 1956)

SCHOOL OF COMPUTING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **PRIYADHARSHINI C(Reg. No. 38119008), PRIYADHARSHINI M(Reg. No. 38119009)** who carried out the project entitled “**A Smart contract -Based Access Control Framework for Cloud Smart Healthcare System**” under our supervision from December 2021 to March 2022.

Internal Guide

Dr.S.Murugan M.E.Ph.D.

Head of the Department

Dr. S. VIGNESHWARI M.E., Ph.D.,

Submitted for Viva voce Examination held on —————

Internal Examiner External Examiner

DECLARATION

I **PRIYADHARSHINI C (Reg. No. 38119008), PRIYADHARSHINI M (Reg.No.38119009)** hereby declare that the Project Report entitled “**A Smart Contract-Based Access Control Framework for Smart Healthcare System**” done by me under the guidance of **Dr. M.Murugan, M.E., Ph.D.**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering / Technology degree in Computer Science and Engineering.

DATE:

**PLACE: SIGNATURE OF THE CANDIDATE
ACKNOWLEDGEMENT**

We are pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. SASIKALA, M.E., Ph.D., Dean, School of Computing**, and **DR. S. VIGNESHWARI, M.E., Ph.D., Head of the Department, Department of Computer Science and Engineering** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. KAMALESH, M.E., Ph.D.**, for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the department of **COMPUTER SCIENCE AND ENGINEERING** who were helpful in many ways for the completion of the project.

A SMART-CONTRACT-BASED ACCESS CONTROL FRAMEWORK FOR CLOUD SMART HEALTHCARE SYSTEM

ABSTRACT:

In current healthcare systems, electronic medical records (EMRs) are always

located in different hospitals and controlled by a centralized cloud provider. However, it leads to single point of failure as patients being the real owner lose track of their private and sensitive EMRs. To build an access control framework based on smart contract, which is built on the top of distributed ledger (blockchain), to secure the sharing of EMRs among different entities involved in the smart healthcare system. Health care medical field is the major important role in cloud computing. E-Medical record contains the health care providers, but its deployment process slow due to high cost and high maintenance cost. However, health care information system classified into E-Health and E-Medical, basic security procedure want to follow by health care maintenance settings. By using normal consultancy service, people may check and get the solution from the hospital.

INTRODUCTION:

The emergence of the new health crisis has played the role of an accelerator, making it possible to cross in a few days stages that usually mark out the cycle of adoption of an innovation. It was necessary to reduce the exposure of professionals and their patients to the virus. And the call by the authorities to consult only in emergencies was so well heard that general practitioners, and medical specialists in hospitals saw their offices deserted overnight. They are logically worried about the follow-up of their patients, in particular those who suffers from chronic diseases (diabetes, heart failure, etc.), whose risks are increased in the context of Covid-19. Thus, they turned to telemedicine. Telemedicine enables patients to connect with their healthcare providers at distance, to receive treatment in their homes where their health is continuously monitored, to enable doctors to follow the hospitalization process and make recommendations to patients and their supervisors.

LITERATURE SURVEY:

TITLE: Cross-Domain Data Sharing in Distributed Electronic Health Record Systems

AUTHOR: Jinyuan Sun; Yuguang Fang

YEAR: 2015

PAPER EXPLANATION:

Cross-organization or cross-domain cooperation takes place from time to time in Electronic Health Record (EHR) system for necessary and high-quality patient treatment. Cautious design of delegation mechanism must be in place as a building block of cross-domain cooperation, since the cooperation inevitably involves exchanging and sharing relevant patient data that are considered highly private and confidential. The delegation mechanism grants permission to and restricts access rights of a cooperating partner. Patients are unwilling to accept the EHR system unless their health data are guaranteed proper use and disclosure, which cannot be easily achieved without cross-domain authentication and fine-grained access control. In addition, revocation of the delegated rights should be possible at any time during the cooperation. In this paper, we propose a secure EHR system, based on cryptographic constructions, to enable secure sharing of sensitive patient data during cooperation and preserve patient data privacy. Our EHR system further incorporates advanced mechanisms for fine-grained access control, and on-demand revocation, as enhancements to the basic access control offered by the delegation mechanism, and the basic revocation mechanism, respectively. The proposed EHR system is demonstrated to fulfill objectives specific to the cross-domain delegation scenario of interest.

TITLE: A Community-Driven Access Control Approach in Distributed IoT Environments

AUTHOR: Dina Hussein; Emmanuel Bertin; Vincent Frey

YEAR: 2017.

PAPER EXPLANATION:

The distributed Internet of Things is emerging in the literature as a new paradigm for IoT where remotely controlled smart objects can act on their own to

sense/actuate, store, and interpret information either created by them or within the surrounding environment. This paradigm calls for novel security and access control mechanisms to enable smart objects with various resource limitations to evaluate a claimed access right from external entities without relying on central authorization systems. This article proposes utilizing a community-based structure to define the notion of access rights in a distributed IoT environment. With this structure, within a given community of smart objects sharing a common mission, access rights are to be evaluated based on the community norms by smart objects with sufficient resources on behalf of those with resource limitations. A novel, community-driven, access control framework is proposed in addition to a prototype to demonstrate access control granting in a user-friendly manner.

TITLE: Cognitive Smart Healthcare for Pathology Detection and Monitoring

AUTHOR: SYED UMAR AMIN, M. SHAMIM HOSSAIN,
GHULAM MUHAMMAD, MUSAED ALHUSSEIN.

YEAR: 2019

PAPER EXPLANATION:

We propose a cognitive healthcare framework that adopts the Internet of Things (IoT) cloud technologies. This framework uses smart sensors for communications

and deep learning for intelligent decision-making within the smart city perspective. The cognitive and smart framework monitors patients' state in real time and provides accurate, timely, and high-quality healthcare services at low cost. To assess the feasibility of the proposed framework, we present the experimental results of an EEG pathology classification technique that uses deep learning. We employ a range of healthcare smart sensors, including an EEG smart sensor, to record and monitor multimodal healthcare data continuously. The EEG signals from patients are transmitted via smart IoT devices to the cloud, where they are processed and sent to a cognitive module. The system determines the state of the patient by monitoring sensor readings, such as facial expressions, speech, EEG, movements, and gestures. The real-time decision, based on which the future course of action is taken, is made by the cognitive module. When information is transmitted to the deep learning module, the EEG signals are classified as pathologic or normal. The patient state monitoring and the EEG processing results are shared with healthcare providers, who can then assess the patient's condition and provide emergency help if the patient is in a critical state. The proposed deep learning model achieves better accuracy than the state-of-the-art systems.

TITLE: Internet-of-Things and Smart Homes for Elderly Healthcare: An End User Perspective

AUTHOR: DEBAJYOTI PAL, SUREE FUNILKUL, NIPON CHAROENKITKARN, AND PRASERT KANTHAMANON.

YEAR: 2018

PAPER EXPLANATION:

Although an Internet-of-Things-based smart home solution can provide an improved and better approach to healthcare management, yet its end user adoption is very low. With elderly people as the main target, these conservative users pose a serious challenge to the successful implementation of smart home healthcare services. The objective of this research was to develop and test a theoretical framework empirically for determining the core factors that can affect the elderly users' acceptance of smart home services for healthcare. Accordingly, an online

survey was conducted with 254 elderly people aged 55 years and above across four Asian countries. Partial least square structural equation modeling was applied to analyze the effect of eight hypothesized predicting constructs. The user perceptions were measured on a conceptual level rather than the actual usage intention toward a specific service. Performance expectancy, effort expectancy, expert advice, and perceived trust have a positive impact on the behavioral intention. The same association is negative for technology anxiety and perceived cost. Facilitating conditions and social influence do not have any effect on the behavioral intention. The model could explain 81.4% of the total variance in the dependent variable i.e., behavioral intention. Effort expectancy is the leading predictor of smart homes for healthcare acceptance among the elderly. Together with expert advice, perceived trust, and perceived cost, these four factors represent the key influence of the elderly peoples' acceptance behavior. This paper provides the groundwork to explore the process of the actual adoption of smart home services for healthcare by the elderly people with potential future research areas.

TITLE: Mobile Cloud-Based Big Healthcare Data Processing in Smart Cities

AUTHOR: MD. MOFIJUL ISLAM¹, MD. ABDUR
RAZZAQUE, MOHAMMAD MEHEDI HASSAN,

YEAR: 2017

PAPER EXPLANATION:

In recent years, the Smart City concept has become popular for its promise to improve the quality of life of urban citizens. The concept involves multiple disciplines, such as Smart health care, smart transportation, and Smart community. Most services in Smart Cities, especially in the Smart healthcare domain, require the real-time sharing, processing, and analyzing of Big Healthcare Data for intelligent

Decision making. Therefore, a strong wireless and mobile communication infrastructure is necessary to connect and access Smart healthcare services, people, and sensors seamlessly, anywhere at any time. In this scenario, mobile cloud computing (MCC) can play a vital role by of loading Big Healthcare Data related

Tasks, such as sharing, processing, and analysis, from mobile applications to cloud resources, ensuring quality of service demands of end users. Such resource migration, which is also termed virtual machine (VM) migration, is effective in the Smart healthcare scenario in Smart Cities. In this paper, we propose an ant colony optimization-based joint VM migration model for a heterogeneous, MCC-based Smart Healthcare system in Smart City environment. In this model, the user's mobility and provisioned VM resources in the cloud address the VM migration problem. We also present a thorough performance evaluation to investigate the effectiveness of our proposed model compared with the state-of-the-art approaches.

EXISTING SYSTEM:

Concept:

Consultancy service from the doctors, users may get the report from online service sites of hospital. Sometime third party or invalid user can check the report without receiving the authorization permission from the higher authority or authorized person.

Technique:

ECC and EdDSAAlgorithm.

Disadvantage:

Complicated and tricky to implement securely, mainly the standard curves

PROPOSED SYSTEM

Concept:

In this system though users registered their account, need to make the request to authority or authorized person including doctors to access the report of specific users. Authority no need to response to all the requests, depends on their wishes.

Technique:

AES algorithm

Advantage:

It provides the secure communication with valid efficiency.

MODULES:

LOGIN
FORM ENTRY
ADD FILE
FILE VIEW
REQUEST
RESPONSE
DOWNLOAD

MODULE DESCRIPTION:

LOGIN:

This module gives the way to enter into main page after login with valid input such as username or email id and password.

FORM ENTRY:

This module help us the doctor entry the patient details to the database. After submit the form the patient can view the form.

ADD FILE:

This module help us the doctor entry the patient details with pdf file to the database. After submit the form the patient can view the form.

FILE VIEW:

This module is help us to the doctor and patient will view the updated details and files.

REQUEST:

This module is help us to the patient will request for view the updated details.

RESPONSE:

This module is help us to the dean will forward the request to the management and management response the request.

DOWNLOAD:

This module is help us to the patient will download the file.

MODULE DIAGRAM:

LOGIN:



FORM ENTRY:





ADD FILE:



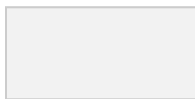
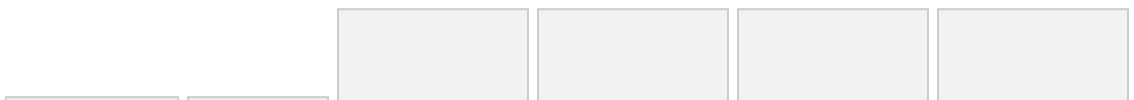
VIEW:



REQUEST:



RESPONSE:



DOWNLOAD:





ALGORITHM USED:

The **AES algorithm** (also known as the **Rijndael algorithm**) is a symmetrical block cipher algorithm that takes plain text in blocks of 128 bits and converts them to cipher text using keys of 128, 192, and 256 bits. Since the AES algorithm is considered secure, it is in the worldwide standard.

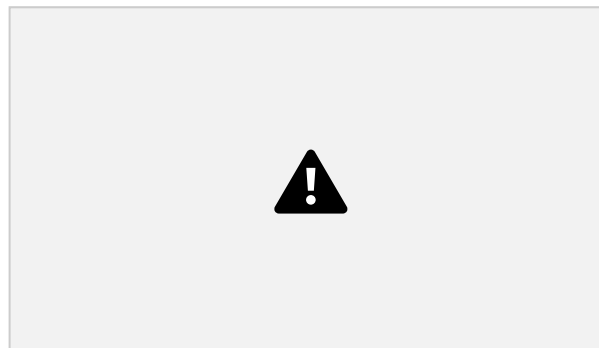
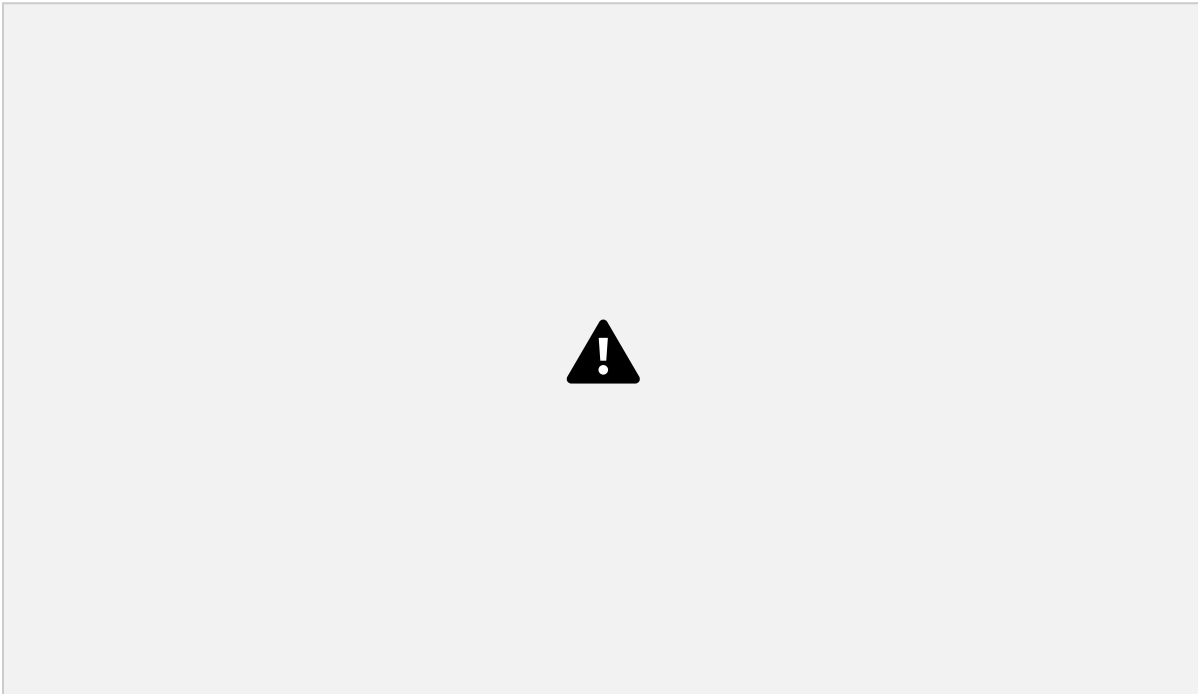
How does AES work?

The AES algorithm uses a substitution-permutation, or SP network, with multiple rounds to produce cipher text. The number of rounds depends on the key size being used. A 128-bit key size dictates ten rounds, a 192-bit key size dictates 12 rounds, and a 256-bit key size has 14 rounds. Each of these rounds requires a round key, but since only one key is inputted into the algorithm, this key needs to be expanded to get keys for each round, including round 0.



1. Substitution of the bytes

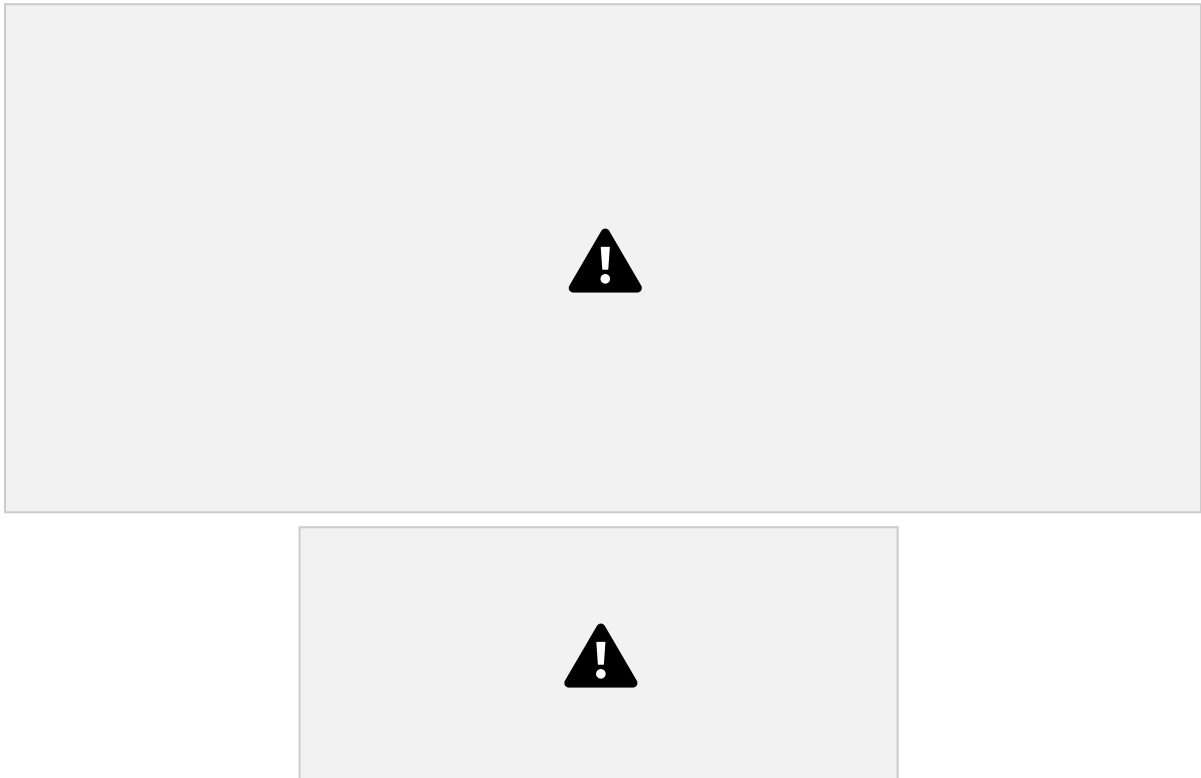
In the first step, the bytes of the block text are substituted based on rules dictated by predefined S-boxes (short for substitution boxes).



2. Shifting the rows

Next comes the permutation step. In this step, all rows except the first are shifted by one, as shown below.

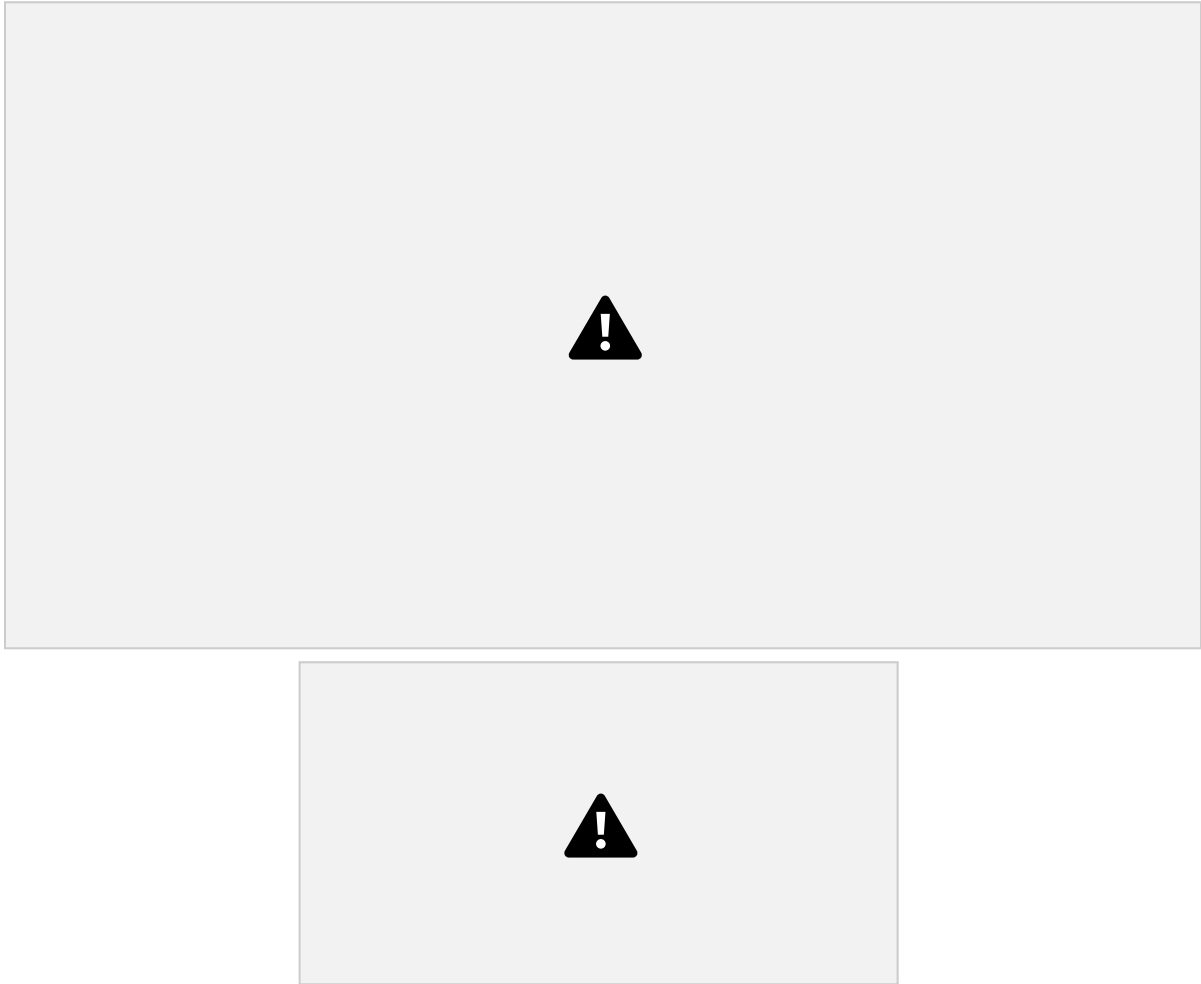




3. Mixing the columns

In the third step, the [Hill cipher](#) is used to jumble up the message more by mixing the block's columns.

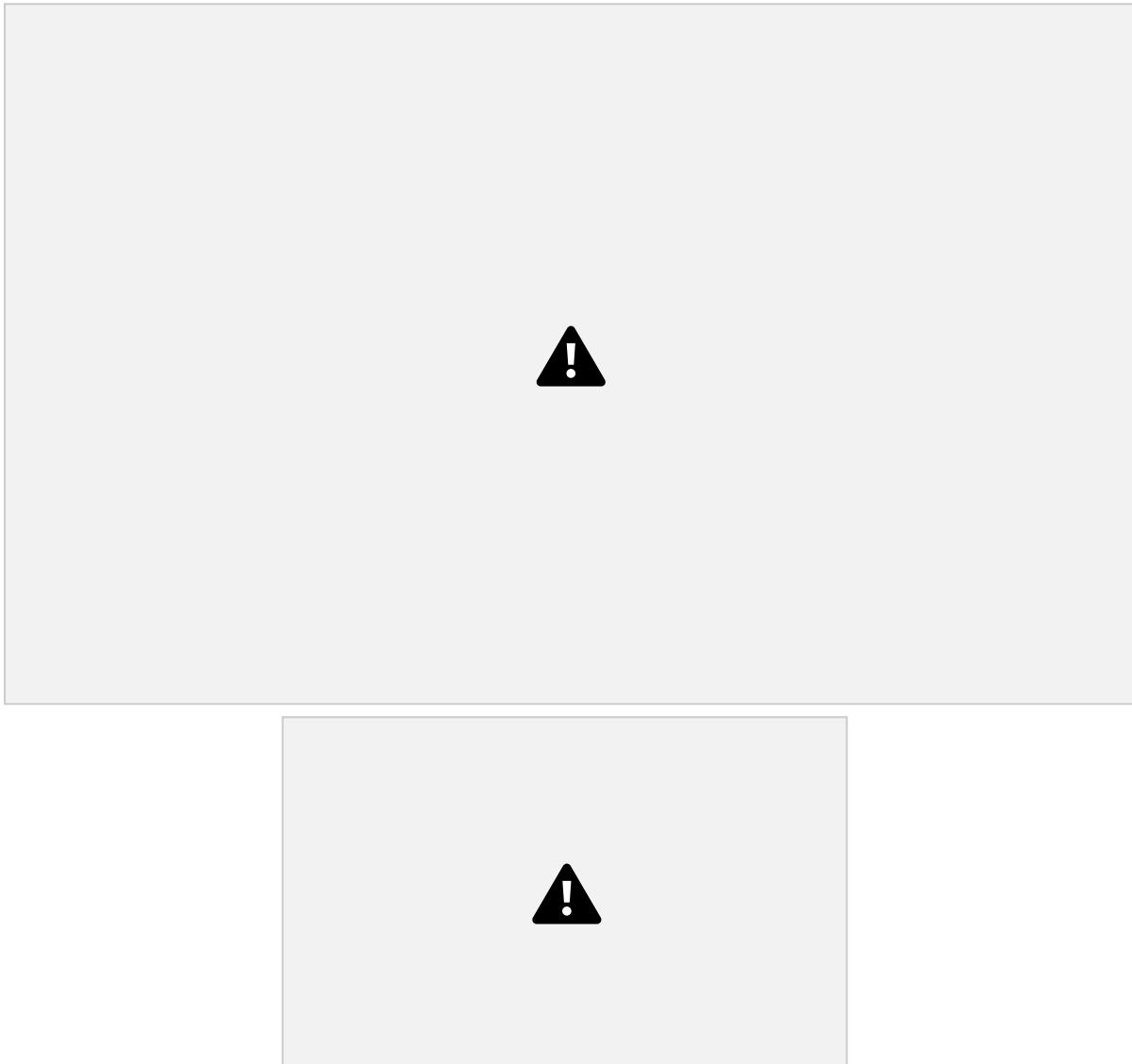




4. Adding the round key

In the final step, the message is XORed with the respective round

key. 



When done repeatedly, these steps ensure that the final ciphertext is

secure. 

REQUIREMENTS ENGINEERING

3.1 GENERAL

These are the requirements for doing the project. Without using these tools and software's we can't do the project. So we have two requirements to do the project.

They are

1. Hardware Requirements.
2. Software Requirements.

3.2 HARDWARE REQUIREMENTS

The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It shows what the system does and not how it should be implemented.

PROCESSOR : PENTIUM IV 2.6 GHz, Intel Core 2 Duo. RAM : 4GB

DD RAM

MONITOR : 15" COLOR

HARD DISK : 40 GB

3.3 SOFTWARE REQUIREMENTS

The software requirements document is the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the team's and tracking the team's progress throughout the development activity.

Front End : J2EE (JSP, SERVLETS) JAVASCRIPT Back End :

MY SQL 5.5

Operating System : Windows 07

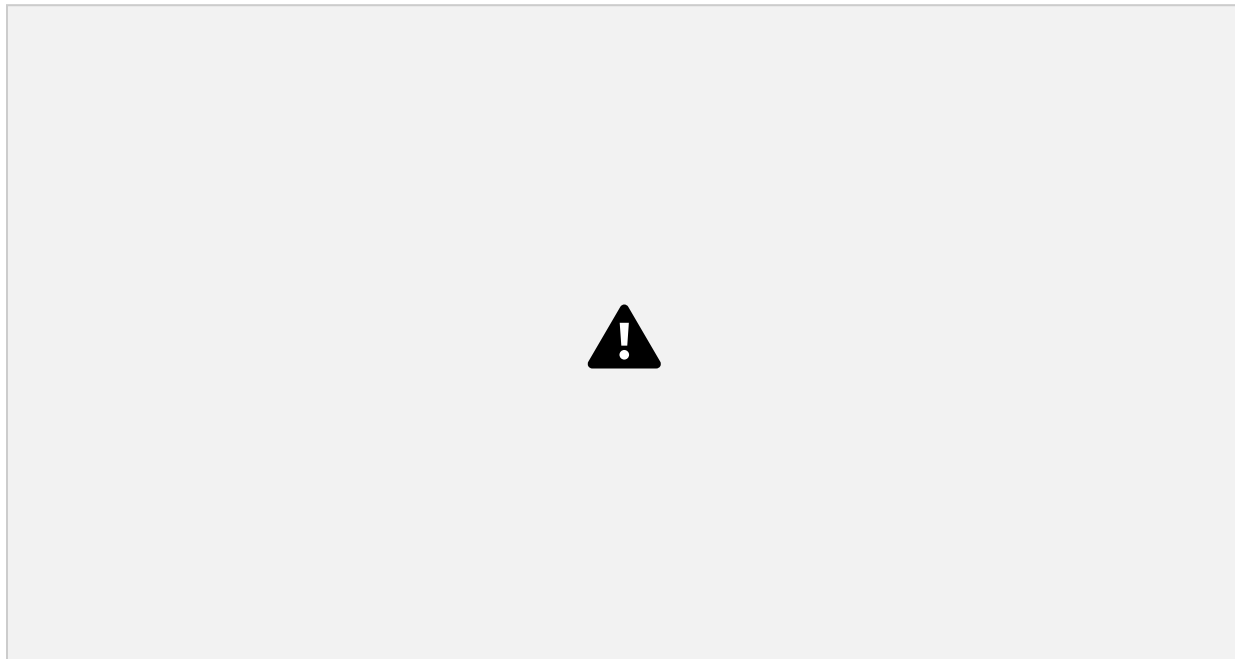
IDE : Eclipse

DESIGN ENGINEERING

4.1 GENERAL

Design Engineering deals with the various UML [Unified Modeling language] diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software. Design is the place where quality is rendered in software engineering. Design is the means to accurately translate customer requirements into finished product.

USE CASE:

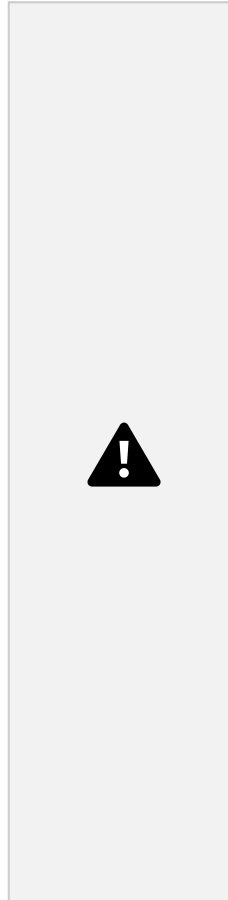


EXPLANATION:

A use case diagram is a way to summarize details of a system and the users within that system. It is generally shown as a graphic depiction of interactions among different elements in a system. Use case diagrams will specify the events in a system and how those events flow, however, use case diagram does not describe how those events are implemented. A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. In this context, the term "system" refers to something being developed or operated, such as a mail-order product sales and service Web site. Use case diagrams are employed in UML (Unified Modeling Language), a standard notation for the modeling of

real-world objects and systems. There are a number of benefits with having a use case diagram over similar diagrams such as flowcharts.

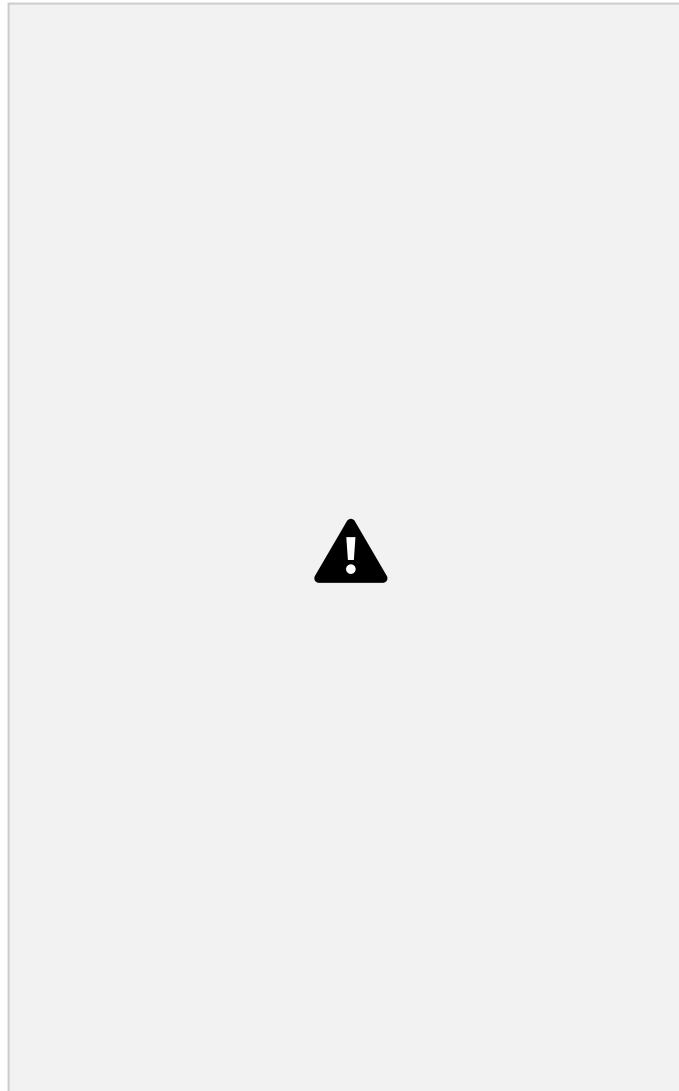
STATE DIAGRAM:



EXPLANATION:

A state diagram – also known as *state chart*, *state machine diagram* or *state transition diagram* – visualizes a sequence of states that an object can assume in its lifecycle. It is used to describe the behavior of a system, subsystem, component, or class. The use of system interfaces can also be specified by state diagrams. Particular attention is paid to the transitions between different states of the object, the triggering actions and the properties of the object that it possesses or must possess before the state change.

ACTIVITY DIAGRAM:

**EXPLANATION:**

We use Activity Diagrams to illustrate the flow of control in a system and refer to the steps involved in the execution of a use case. We model sequential and concurrent activities using activity diagrams. So, we basically depict workflows visually using an activity diagram. An activity diagram focuses on condition of flow and the sequence in which it happens. We describe or depict what causes a particular event using an activity diagram.

CLASS DIAGRAM:

**EXPLANATION:**

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling, translating the models into programming code. Class diagrams can also be used for data modeling. The classes in a class diagram represent both the main elements, interactions in the application, and the classes to be programmed.

SEQUENCE DIAGRAM:

**EXPLANATION:**

A sequence diagram or system sequence diagram (SSD) shows object interactions arranged in time sequence in the field of software engineering. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of scenario. Sequence diagrams are typically associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

COLLABORATION DIAGRAM:



EXPLANATION:

A collaboration diagram, also known as a communication diagram, is an illustration of the relationships and interactions among software objects in the Unified Modeling Language (UML). These diagrams can be used to portray the dynamic behavior of a particular use case and define the role of each object.

Collaboration diagrams are created by first identifying the structural elements required to carry out the functionality of an interaction. A model is then built using the relationships between those elements. Several vendors offer software for creating and editing collaboration diagrams.

DATA FLOW DIAGRAM:

Level 1:



Level 2:



Level 3:



EXPLANATION:

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short

text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyze an existing system or model a new one. Like all the best diagrams and charts, a DFD can often visually “say” things that would be hard to explain in words, and they work for both technical and nontechnical audiences, from developer to CEO. That’s why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems

E-R DIAGRAM:

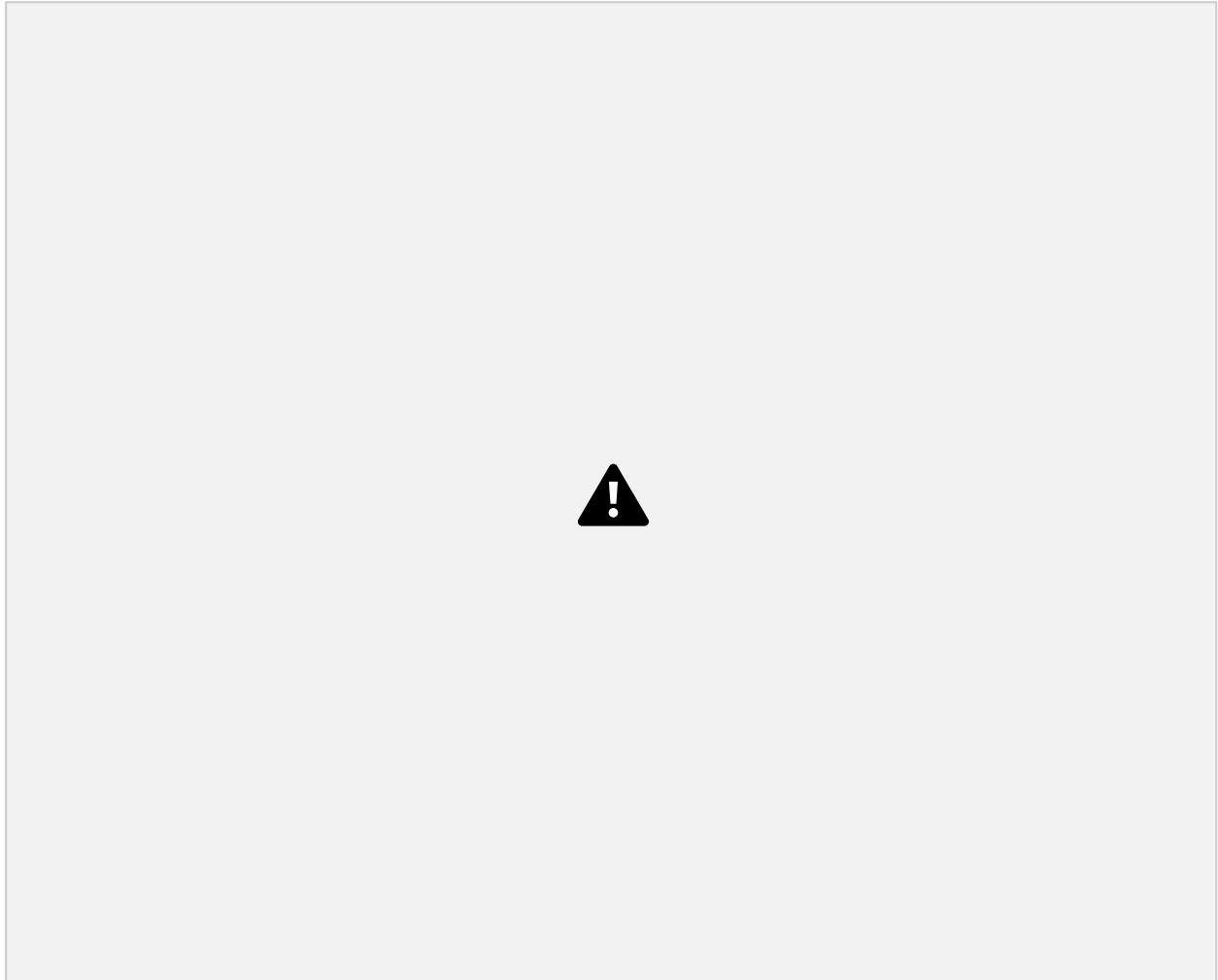


EXPLANATION:

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. Also known as ERDs or ER Models, they use a defined set of symbols

such as rectangles, diamonds, ovals and connecting lines to depict the interconnectedness of entities, relationships and their attributes. They mirror grammatical structure, with entities as nouns and relationships as verbs.

SYSTEM ARCHITECTURE:



EXPLANATION:

The purpose of system architecture activities is to define a comprehensive solution based on principles, concepts, and properties logically related to and consistent with each other. The solution architecture has features, properties, and characteristics which satisfy, as far as possible, the problem or opportunity expressed by a set of system requirements (traceable to mission/business and stakeholder requirements) and life cycle concepts (e.g., operational, support) and which are implementable through technologies (e.g., mechanics, electronics, hydraulics, software, services, procedures, human activity).

IMPLEMENTATION:

Homepage.jsp:

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>

<head>

<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">

<title>Homepage</title>


<style>


ul {
    list-style-type: none;
    margin: 0;
    padding: 0;
    overflow: hidden;
    background: linear-gradient(to bottom, #0000ff 0%, #00ff00 100%);
}


li {
    float: right;
    padding-right: 185px;
}
```

```
body {  
    background-image: url("bgimages/bcehrimg1.jpg");  
    background-repeat: no-repeat;  
    background-size: cover;  
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<ul>
```

```
<li><a href="adminlogin.jsp">Admin</a></li> <li><a  
href="chiefdoctorlogin.jsp">Chief Doctor</a></li> <li><a  
href="doctorlogin.jsp">Doctor</a></li> <li><a  
href="patientlogin.jsp">Patient</a></li>
```

```
</ul>
```

```
</body>
```

```
</html>
```

Doctorregister.jsp:

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
```

```
<%@page import="dbconn.Dbconn"%>
```

```
<%@page import="java.sql.ResultSet"%>
```

```
<%@page import="java.sql.PreparedStatement" %>
```

```
<%@page import="java.sql.*" %>
```

```
<%@page import="java.util.*" %>
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
```

```
<html>
```

```
<head>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
```

```
<title>Insert title here</title>
```

```
<style>
```

```
/* .myDiv {
    border: 5px outset #77c732;

    background-color: lightblue;

    border-radius: 10px;

    width:600px;

    height:400px;

    margin: auto;

    padding-top:30px;

    box-shadow: 25px 20px 20px #888888;
```

```
} */
```

```
.myDiv2 {  
    font-size:25px;  
    font-style: italic;  
    font-weight: bold;  
    color: #77c732;  
}
```

```
body {  
    background-image: url("bgimages/bcehrimg3.jpg");  
    background-repeat: no-repeat;  
    background-size: cover;  
}  
</style>
```

```
</head>
```

```
<body>
```

```
<br><br><br>
```

```
<center>
```

```
<div class="myDiv2">
```

Doctor Register

</div>

</center>

<div class="myDiv">

<center>

<form action="Doctorregservelt" method="post">

<input type="text" name="username" placeholder="Username"
style="width:250px;height:40px;border-radius: 10px;text-align:center;">

<input type="text" name="phonenummer" placeholder="Phonenummer"
style="width:250px;height:40px;border-radius:
10px;text-align:center;">

<input type="text" name="email" placeholder="Emailid"
style="width:250px;height:40px;border-radius: 10px;text-align:center;">

<input type="text" name="password" placeholder="Password"
style="width:250px;height:40px;border-radius: 10px;text-align:center;">

<input type="submit" value="Submit"
style="width:100px;height:40px;border-radius: 10px;">

</form>

</center>

</div>

</body>

</html>

Patientsdetails.jsp;

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
```

```
<%@page import="dbconn.Dbconn"%>
```

```
<%@page import="java.sql.ResultSet"%>
```

```
<%@page import="java.sql.PreparedStatement" %>
```

```
<%@page import="java.sql.*" %>
```

```
<%@page import="java.util.*" %>
```

```
<%@page import="javax.servlet.http.HttpSession" %>
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
```

<html>

<head>

```
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
```

```
<script type="text/javascript"
```

```
src="https://cdn.zingchart.com/zingchart.min.js"></script>
```

```
<title>Insert title here</title>
```

<style>

```
.myDiv2 {
```

```
font-size:25px;  
font-style: italic;  
font-weight: bold;  
color:red;  
}
```

```
table,td,th {  
    border: 2px solid black;  
}  
table {  
    border-collapse: collapse;  
    width: 90%;  
}
```

```
td {  
    text-align: center;  
    height: 40px;  
}
```

```
th{  
    height: 30px;  
    color: red;  
}
```

```
.backtag{  
    float:right;  
    margin-right:20px;
```

```
font-size:20px;
```

```
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<div class="backtag">
```

```
<a href="adminmainpage.jsp">Back</a>
```

```
</div>
```

```
<br>
```

```
<center>
```

```
<div class="myDiv2">
```

```
Patient Details(Admin)
```

```
</div>
```

```
<%-- <%
```

```
String uname=session.getAttribute("demailkey").toString();
```

```
%> --%>
```

```
<br><br><br>
```

```
<table>
```

```
<!-- <th>Pharmacynome</th> -->
```

```
<th>Name</th>
```

<th>Phone No.</th>

<th>Email</th>

<!-- <th>Remarks</th> -->

<%

String idlist="";

String pnamelist="";

String phnolist="";

String emaillist="";

String datelist="";

String agelist="";

String placelist="";

String diseaslist="";

String condilist="";

String descriptlist="";

%>

<%

Connection d = Dbconn.create();

PreparedStatement p = d.prepareStatement("SELECT * FROM
'healthsystem`.`patientreg`");

ResultSet rp = p.executeQuery();

```

while (rp.next()){

    idlist=rp.getString(1);
    pnamelist=rp.getString(2);
    phnolist=rp.getString(3);
    emaillist=rp.getString(4);

    %>

    <tr>

        <td><%=pnamelist%></td>

        <td><%=phnolist%></td>

        <td><%=emaillist%></td>

    </tr>

    <%

    }

    %>

</table>

</center>

</body>

</html>

```

SNAPSHOT:

SNAPSHOTS





FUTURE ENHANCEMENT:

1. Implementing a real-world anonymous database system.
2. Improving the efficiency of protocols.
3. Implementing AES ALGORITHM.

CONCLUSION:

Cloud computing is the latest technology that promises immense benefits however there is lot of research which is still required in this area as many of the concerns related to security and privacy issues are not been answered by the experts and remains open. However, there are lot of research and investment in the area by the Information technology giants like Microsoft, Google, Cisco, IBM in this area and the day is not far when the cloud will widespread adopted and all the security and privacy issues will be handled. This report discussed about the various types of cloud service models and the risk associated with each of that. Apart from it. While the proposed scheme has demonstrated attractive features, the integration of block chain and cloud to provide decentralized access control incurs challenges of scalability and performance. By using edge computing, the latency that occurs in processing and fetching the EMR can be greatly reduced. Therefore, further research is required to address this issue. Furthermore, in order to enhance the liveliness and fairness of the system, another future research work is to develop an incentive mechanism for EMR owners in the proposed scheme. Proposed scheme, each EMR is signed by the respective hospital and the corresponding hospital is therefore liable for immorality of any kind.

REFERENCE:

[1] A. Ouaddah, H. Mousannif, A. A. Elkalam, and A. A. Ouahman, "Access control in the Internet of Things: Big challenges and new opportunities," *Comput. Netw.*, vol. 112, pp. 237–262, Jan. 2017.

- [2] N. Fatema and R. Brad, "Security requirements, counterattacks and projects in healthcare applications using WSNs—A review," 2014. [Online]. Available: arXiv:1406.1795.
- [3] J. Sun and Y. Fang, "Cross-domain data sharing in distributed electronic health record systems," *IEEE Trans. Parallel Distrib. Syst.*, vol. 21, no. 6, pp. 754–764, Jun. 2010.
- [4] L. J. Kish and E. J. Topol, "Unpatients-why patients should own their medical data," *Nat. Biotechnol.*, vol. 33, no. 9, p. 921, 2015.
- [5] S. Ravidas, A. Lekidis, F. Paci, and N. Zannone, "Access control in Internet-of-Things: A survey," *J. Netw. Comput. Appl.*, vol. 144, pp. 79–101, Oct. 2019.
- [6] S. Osborn, R. Sandhu, and Q. Munawer, "Configuring role-based access control to enforce mandatory and discretionary access control policies," *ACM Trans. Inf. Syst. Security*, vol. 3, no. 2, pp. 85–106, 2000.
- [7] R. S. Sandhu, "Role-based access control," in *Advances in Computers*, vol. 46. London, U.K.: Elsevier, 1998, pp. 237–286.
- [8] V. C. Hu, D. R. Kuhn, D. F. Ferraiolo, and J. Voas, "Attribute-based access control," *Computer*, vol. 48, no. 2, pp. 85–88, 2015.
- [9] R. S. Sandhu and P. Samarati, "Access control: Principle and practice," *IEEE Commun. Mag.*, vol. 32, no. 9, pp. 40–48, Sep. 1994.
- [10] E. B. D. Hussein and V. Frey, "A community-driven access control approach in distributed IoT environments," *IEEE Commun. Mag.*, vol. 55, no. 3, pp. 146–153, Mar. 2017.