

# **Risk management of e-commerce security in cloud computing environment**

A mini project report submitted in partial fulfillment of the

requirements for the award of degree of

**BACHELOR OF TECHNOLOGY IN**

**COMPUTER SCIENCE AND ENGINEERING**

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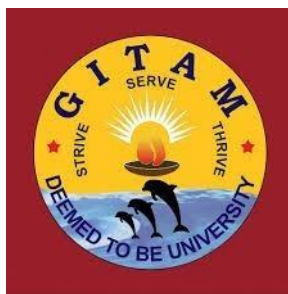
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**HYDERABAD CAMPUS OCTOBER - 2021**

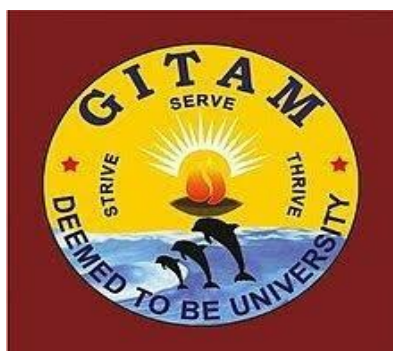
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**DECLARATION**

We, hereby declare that the minor project report entitled **“Risk management of e-commerce security in cloud computing environment”** is an original work done in the Department of Computer Science and Engineering, GITAM School of Technology, GITAM (Deemed to be University) submitted in partial fulfillment of the requirements for the award of the degree of “Bachelor of Technology” in Computer Science and Engineering. The work had not submitted to any other college or University for the award of any degree or diploma.

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**CERTIFICATE**

This is to certify that the project report entitled **“Risk management of e-commerce security in cloud computing environment”** is a bonafide record of work carried out by Koka Aneesh (221810311013), Loka Akash Reddy (221810311052), Ponugoti Vivekananda Reddy (221810311022), Dronavalli Mourya Sai (221810311048) submitted in partial fulfillment of the requirements for the award of degree of Bachelor of Technology in Computer Science and Engineering.

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**Sincerely,**

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## **ABSTRACT**

The emergence of cloud computing technology has changed the traditional business economic model and provided convenience for the application of E-commerce in the financial field. This paper using cloud computing as the entry point to analyze the security of E-commerce in a cloud computing environment in detail. It also proposes relevant solutions to how e-commerce can ensure the security of its own data in the context of cloud computing. At the same time, it also pays attention to reducing the user's trust, satisfaction and loyalty to the information system.

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### 3.ANALYSIS/PROBLEM ANALYSIS

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# 1.

## INTRODUCTION

### MOTIVATION

A cloud risk analysis and quantification method is proposed on fault tree and Monte Carlo simulation for the cloud computing environment. For a certain risk in the cloud environment, a fault tree is used to build the relationship between risk and risk factors. the assignment of risk factors uses a probability distribution function shows the probability of exceeding a given risk cost

### PROBLEM DEFINITION

In the past, you had to physically rent an office room to sell goods that added various costs, but Ecommerce emerged and offered companies the ability to sell items online without having to rent a store like before. These days, many more e-commerce companies, especially small and medium-sized businesses, are taking advantage of the benefits of cloud computing, where the growth of this innovation has led them to compete with large corporations in providing goods and services as they have a broad network given their limited network.

### OBJECTIVE OF PROJECT

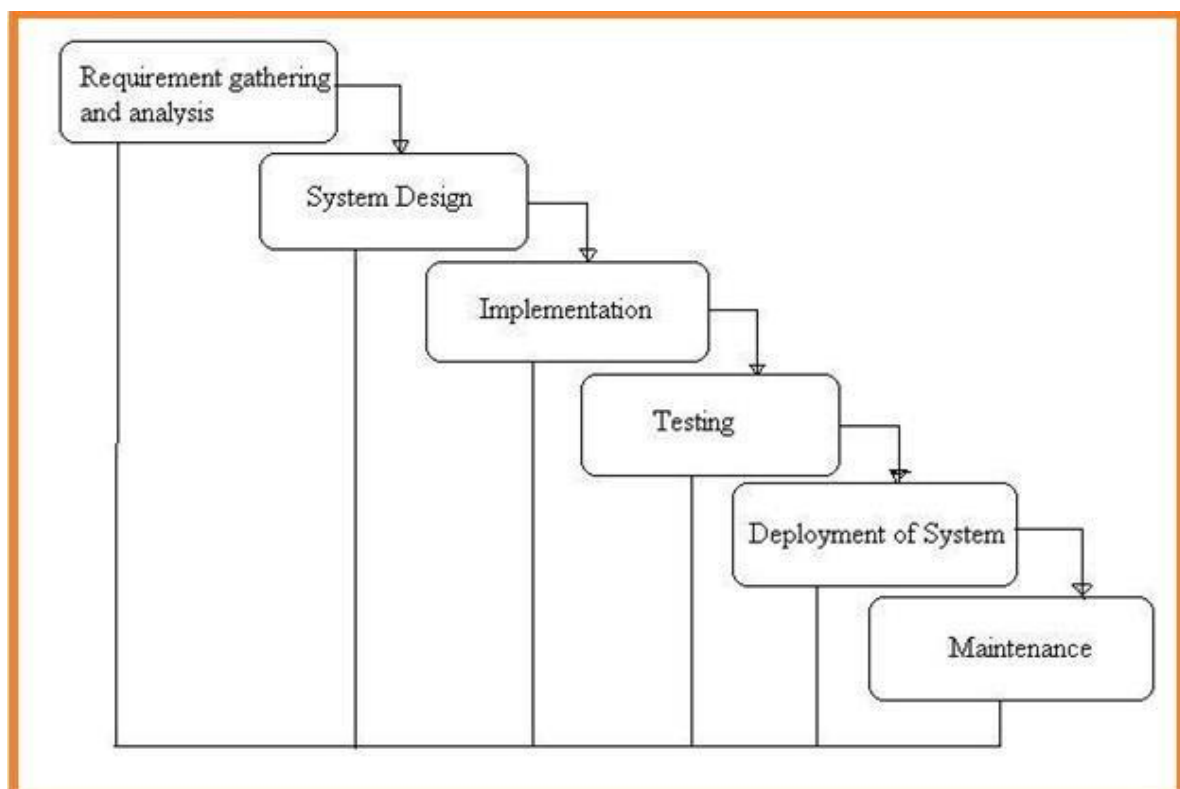
. Today, there are many benefits e-commerce draws from cloud computing. In e-commerce cloud computing helps the company to digitally look large. Business processes of enterprises. with cloud computing, enterprises can obtain fast, efficient, secure and reliable cloud services at a lower cost, which allows enterprises to have great flexibility and powerful data processing capabilities. However, compared with the traditional internet environment, the information security risks in the cloud computing environment are more complicated, and many security risks are emerged. When a customer uses cloud computing, he cannot know exactly where his data is stored or even in which country



#### 4. LIMITATIONS OF PROJECT

However, compared with the traditional internet environment, the information security risks in the cloud computing environment are more complicated, and many security risks are emerged. When a customer uses cloud computing, he cannot know exactly where his data is stored or even in which country. The form of data stored in cloud computing is usually all customer data sharing methods, and there is a risk of isolation between customer data. When catastrophic events occur, customer data and services will be more difficult to protect and recover.

#### STRUCTURE OF PROJECT (SYSTEM ANALYSIS)



**Fig: 1 Project SDLC**

- Project Requisites Accumulating and Analysis
- Application System Design
- Practical Implementation
- Manual Testing of My Application
- Application Deployment of System
- Maintenance of the Project

## **1. REQUISITES ACCUMULATING AND ANALYSIS**

It's the as a matter of first importance phase of the any task as our is a scholarly leave for essentials accumulating we followed of IEEE Journals and Amassed so numerous IEEE Relegated papers and last separated a Paper assigned "Singular web revisitation by setting and substance significance input and for investigation stage we took refs from the paper and did writing review of certain papers and amassed every one of the Requisites of the venture in this stage.

## **2. SYSTEM DESIGN**

In System Design has separated into three sorts like GUI Designing, UML Designing with benefits being developed of venture in effortless manner with various entertainer and its utilizer case by utilizer case outline, stream of the task using arrangement, Class chart gives data about various class in the undertaking with techniques that must be used in the venture if goes to our task our UML Will utilizable in this manner The third and post import for the undertaking in framework configuration is Data base plan where we attempt to plan information base predicated on the quantity of modules in our task.

## **3. IMPLEMENTATION**

The Implementation is Phase where we endeavor to give the practical output of the work done in designing stage and most of Coding in Business logic lay comes into action in this stage its main and crucial part of the project

## **1.6.TESTING**

### **UNIT TESTING**

It is done by the developer itself in every stage of the project and fine-tuning the bug and module predicated additionally done by the developer only here we are going to solve all the runtime errors

### **MANUAL TESTING**

As our Project is academic Leave, we can do any automatic testing so we follow manual testing by endeavor and error methods

### **1. DEPLOYMENT OF SYSTEM AND MAINTENANCE**

When the undertaking is absolute yare, we will come to sending of customer framework in truly world as its scholastic leave we did organization I our school lab just with all need Software's with having Windows OS .

The Maintenance of our Project is one-time process only

## **7. FUNCTIONAL REQUIREMENTS**

1. Data Collection
- 2.Data Preprocessing
- 3.Training and Testing
- 4.Modiling
- 5.Predicting

## **8. NON FUNCTIONAL REQUIREMENTS**

NON-FUNCTIONAL REQUIREMENT (NFR) specifies the quality attribute of a software system. They judge the software system based on Responsiveness, Usability, Security, Portability and other non-functional standards that are critical to the success of the software system. Example of nonfunctional requirement, “how fast does the website load?” Failing to meet non-functional requirements can result in systems that fail to satisfy user needs. Non- functional Requirements allows you to impose constraints or restrictions on the design of the system across the various agile backlogs. Example, the site should load in 3 seconds when the number of simultaneous users are > 10000. Description of non-functional requirements is just as critical as a functional requirement.

- Usability requirement
- Serviceability requirement
- Manageability requirement
- Recoverability requirement
- Security requirement
- Data Integrity requirement
- Capacity requirement
- Availability requirement
- Scalability requirement
- Interoperability requirement
- Reliability requirement
- Maintainability requirement
- Regulatory requirement
- Environmental requirement

## **EXAMPLES OF NON-FUNCTIONAL REQUIREMENTS**

Here, are some examples of non-functional requirement:

Users must upload dataset

The software should be portable. So moving from one OS to other OS does not create any problem.

Privacy of information, the export of restricted technologies, intellectual property rights, etc. should be audited.

## **ADVANTAGES OF NON-FUNCTIONAL REQUIREMENT**

Benefits/pros of Non-functional testing are:

- The nonfunctional requirements ensure the software system follow legal and compliance rules.
- They ensure the reliability, availability, and performance of the software system
- They ensure good user experience and ease of operating the software.
- They help in formulating security policy of the software system.

## **DISADVANTAGES OF NON-FUNCTIONAL REQUIREMENT**

Cons/drawbacks of Non-function requirement are:

- None functional requirement may affect the various high-level software subsystem
- They require special consideration during the software architecture/high-level design phase which increases costs.
- Their implementation does not usually map to the specific software subsystem,
- It is tough to modify non-functional once you pass the architecture phase.

## **4. KEY LEARNING**

Experimental results demonstrate that the accuracy of the proposed method can outperform most of the state-of-art methods.

## **2. LITERATURE SURVEY**

### **CLOUD COMPUTING IN E-COMMERCE**

**AUTHORS:** ARYA M NAIR

**ABSTRACT:** - Cloud computing impacts numerous industries, including: e-learning, e-commerce, and healthcare. It offers high-efficiency and low-cost online services which provide a high economic value. This is definitely also the next revolution in the internet and business world. More e-commerce enterprises are currently moving to cloud computing to attain high practical value. It provides an overview of cloud computing in e-commerce by addressing various meanings for both terms, highlighting the advantages and drawbacks of implementing cloud computing in e-commerce, and addressing a proposed E-commerce system for cloud computing. Cloud computing is a computing model, where a broad pool of systems is connected in private or public networks to provide dynamically scalable application, data, and file storage infrastructure. With the advent of this technology, the costs of processing, hosting software, storing information, and distribution are greatly reduced. Cloud computing is a general term for something that includes the delivery of services hosted over the Internet. Ecommerce, also known as ecommerce or internet trade, refers to the purchase and sale of goods or services using the internet, and the transfer of money and data to execute such transactions. Ecommerce is often used to refer to the online sale of physical products, but it can also describe any type of commercial transaction facilitated via the internet.

**Information Security Risk Management Framework for the Cloud Computing Environments**

**AUTHORS:** Xuan Zhang,Nattapong Wuwong

**ABSTRACT:** The security risks associated with each cloud delivery model vary and are dependent on a wide range of factors including the sensitivity of information assets, cloud architectures and security controls involved in a particular cloud environment.Over time, organizations tend to relax their security posture. To combat a relaxation of security, the cloud provider should perform regular security assessments. Risk management framework is one of security assessment tool to reduction of threats and vulnerabilities and mitigates security risks. The goal of this paper is to present information risk management framework for better understanding critical areas of focus in cloud computing environment, to identifying a threat and identifying vulnerability. This framework is covering all of cloud service models and cloud deployment models. Cloud provider can be applied this framework to organizations to do risk mitigation.

### **Cloud Computing for E-commerce**

**AUTHORS:** Tamara Almarabeh

**ABSTRACT:** Cloud computing affects on different sectors, including: E-learning, health care, and E-commerce. It offers online services in highefficiency and minimal cost which provide a high economic value. It is undoubtedly the next revolution in the Internet world as well as the business world. Currently, more E-commerce enterprises move to Cloud Computing to achieve high practical value. This paper introduces an overview for Cloud computing in E-commerce through discussing various definitions for both concepts, highlighting the benefits and challenges for applying Cloud Computing in E-commerce, and discussing a suggested cloud computing E-commerce framework.

### **Proposed E-Commerce Framework Using Cloud Computing**

## **Technology**

**AUTHORS:** Raphael Olufemi Akinyede

**ABSTRACT:** The existing e-commerce systems are faced with the problems of environmental cost among others but with the introduction of cloud computing, most of the problems will be solved. Therefore, this paper has examined, analysed and discussed the current state of e-commerce and as a result, proposed e-commerce application framework based on the concepts, the origins and development trend of cloud computing which copes with the problem of e-commerce and the storage of resources. As it is on record that cloud computing is widely known for its robust and strong support for data storage and mining. It also offers a most reliable platform for safe, secure and speedy data transaction at very manageable cost and high level of privacy. Therefore, the proposed system is expected to function on state-of-the-art hardware and software resources as well as trusted management, server and business components.



### **3.ANALYSIS**

#### **EXISTING SYSTEM:**

The security risks associated with each cloud delivery model vary and are dependent on a wide range of factors including the sensitivity of information assets, cloud architectures and security controls involved in a particular cloud environment. Over time, organizations tend to relax their security posture. To combat a relaxation of security, the cloud provider should perform regular security assessments. Risk management framework is one of security assessment tool to reduction of threats and vulnerabilities and mitigates security risks. The goal of this paper is to present information risk management framework for better understanding critical areas of focus in cloud computing environment, to identifying a threat and identifying vulnerability. This framework is covering all of cloud service models and cloud deployment models. Cloud provider can be applied this framework to organizations to do risk mitigation.

#### **DISADVANTAGES OF EXISTING SYSTEM:**

- The system's DAA (Designated Approving Authority) must determine whether corrective actions are still required of decide to accept the risk.

#### **2. PROPOSED SYSTEM:**

This proposed work uses cloud computing as the entry point to analyze the security of e-commerce in the financial field. This paper uses cloud computing as the entry point to analyze the security of e-commerce in cloud computing environment in detail. It also proposes relevant solutions to how e-commerce can ensure the security of its own data in context of cloud computing.

## **ADVANTAGES OF PROPOSED SYSTEM:**

At the same time, it also pays attention to reducing the user's perception of information security risks from the users perspective, and improving the user's trust, satisfaction and loyalty to the information system.

## **SOFTWARE AND HARDWARE REQUIREMENTS**

### **SOFTWARE REQUIREMENTS**

The functional requirements or the overall description documents include the product perspective and features, operating system and operating environment, graphics requirements, design constraints and user documentation.

The appropriation of requirements and implementation constraints gives the general overview of the project in regards to what the areas of strength and deficit are and how to tackle them.

- **Python idel 3.7 version (or)**
- **Anaconda 3.7 ( or)**
- **Jupyter (or)**
- **Google colab**

### **HARDWARE REQUIREMENTS**

Minimum hardware requirements are very dependent on the particular software being developed by a given Enthought Python / Canopy / VS Code user.

Applications that need to store large arrays/objects in memory will require more RAM, whereas applications that need to perform numerous calculations or tasks more quickly will require a faster processor.

- **Operating system** : windows, linux
- **Processor** : minimum intel i3
- **Ram** : minimum 4 gb
- **Hard disk** : minimum 250gb

### **3. SYSTEM STUDY**

#### **FEASIBILITY STUDY**

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ◆ **ECONOMICAL FEASIBILITY**
- ◆ **TECHNICAL FEASIBILITY**
- ◆ **SOCIAL FEASIBILITY**

## **ECONOMICAL FEASIBILITY**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

## **TECHNICAL FEASIBILITY**

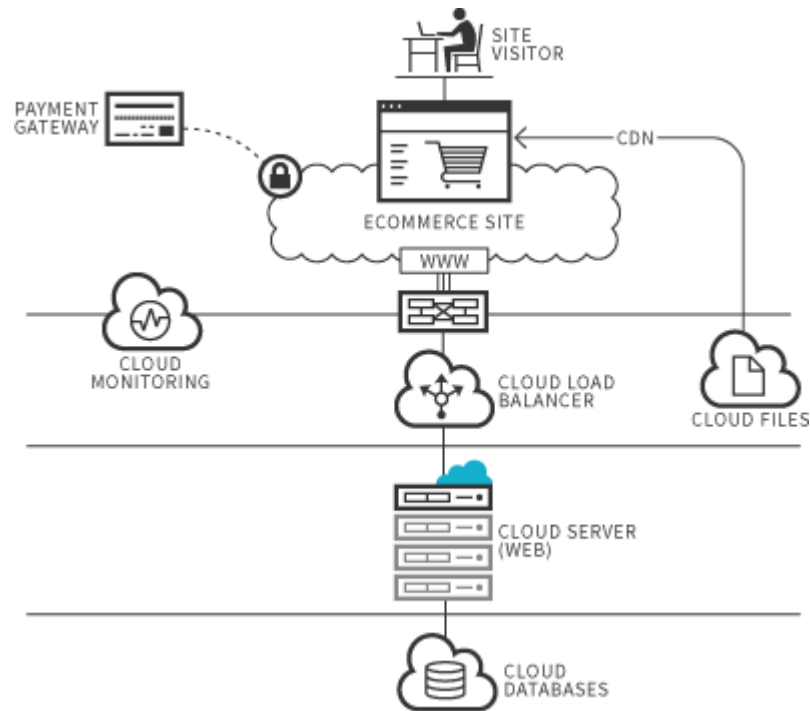
This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

## **SOCIAL FEASIBILITY**

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

## 4. SYSTEM DESIGN

### SYSTEM ARCHITECTURE DIAGRAM



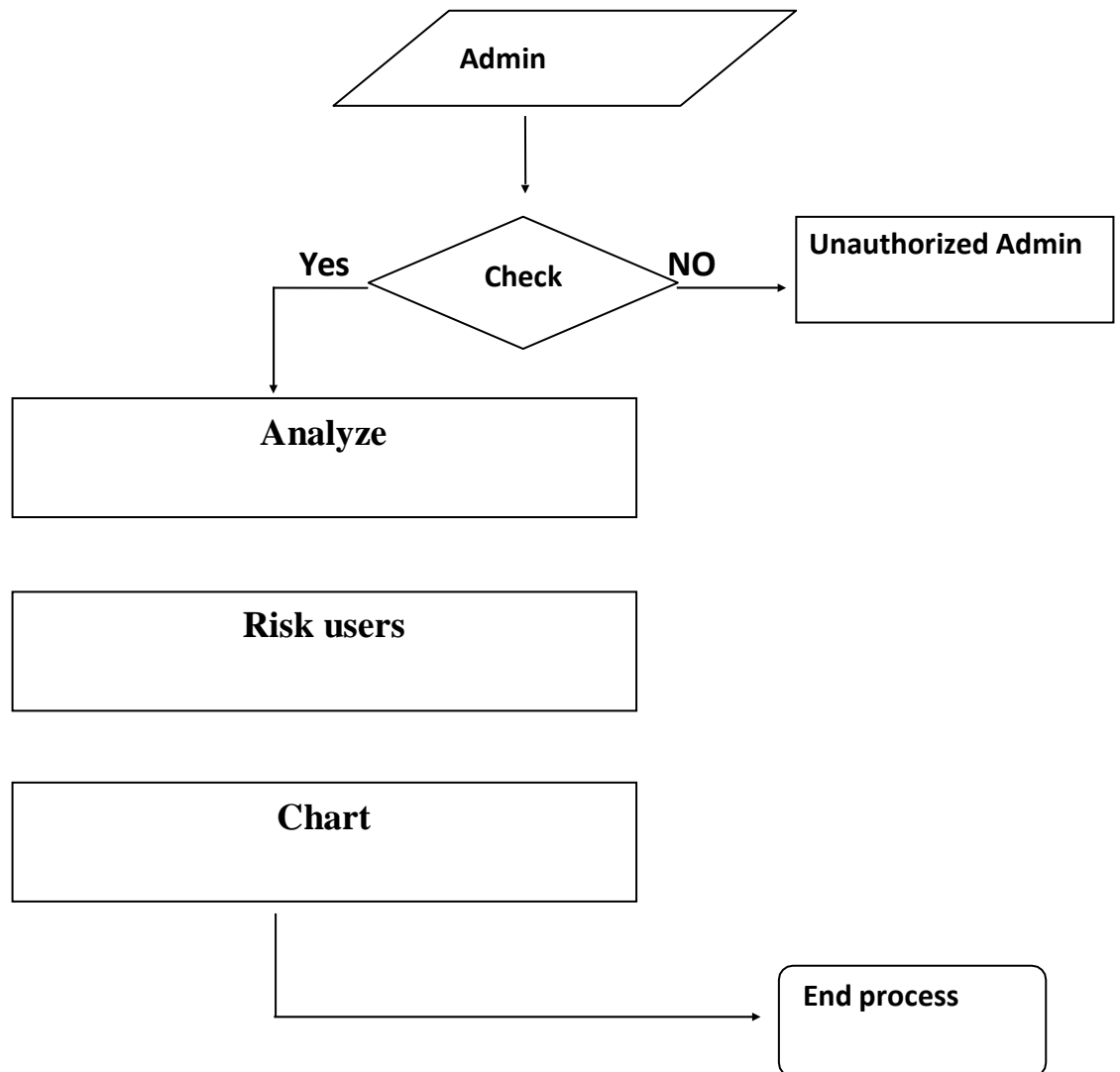
### DATA FLOW DIAGRAM:

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.

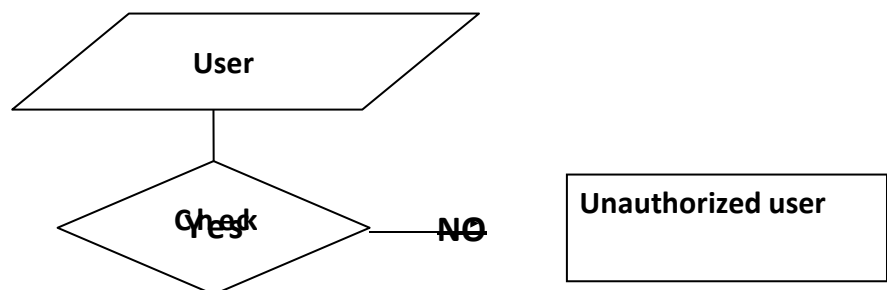
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

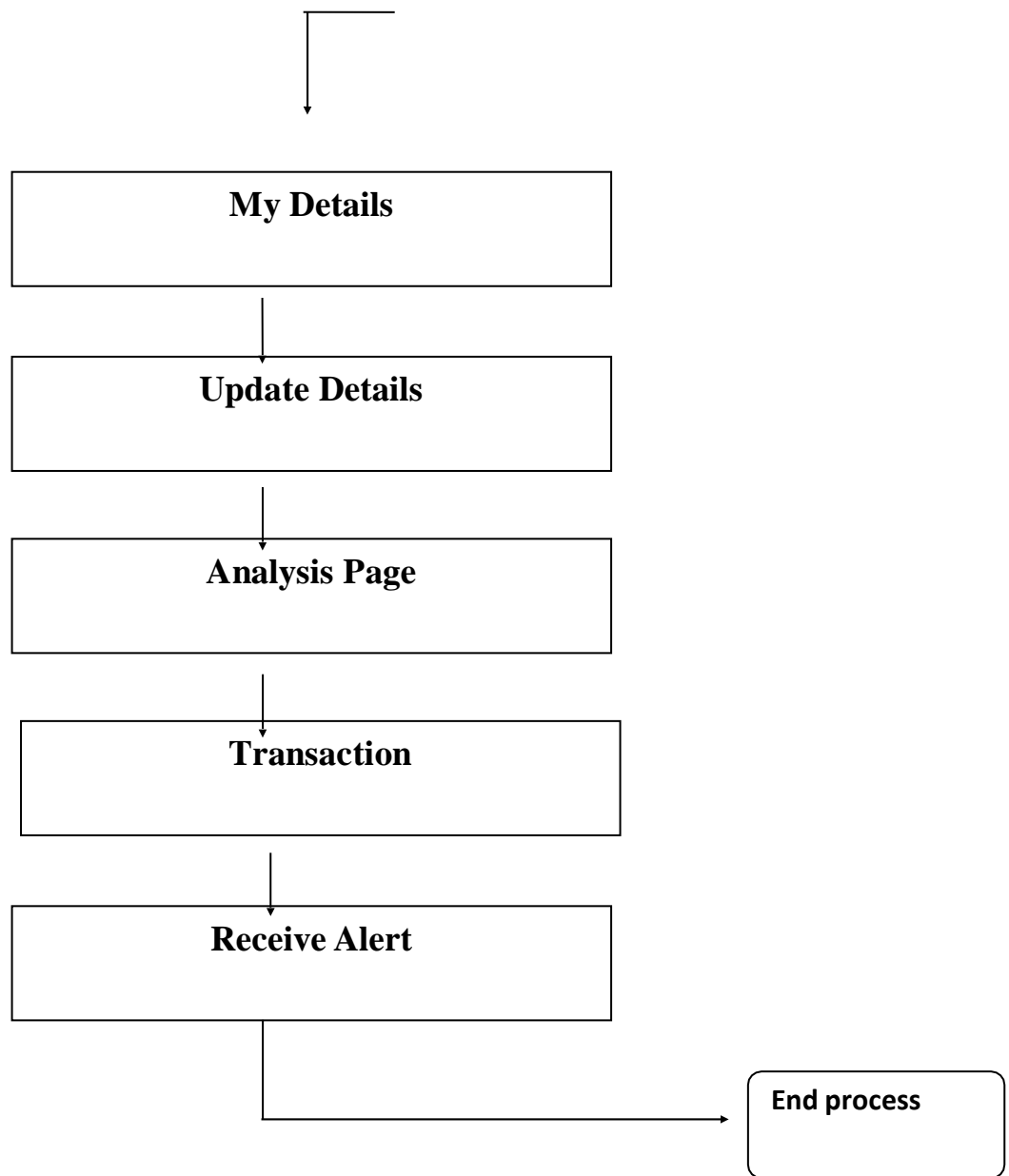


**Admin:**



**User:**





## UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of



two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

## **GOALS:**

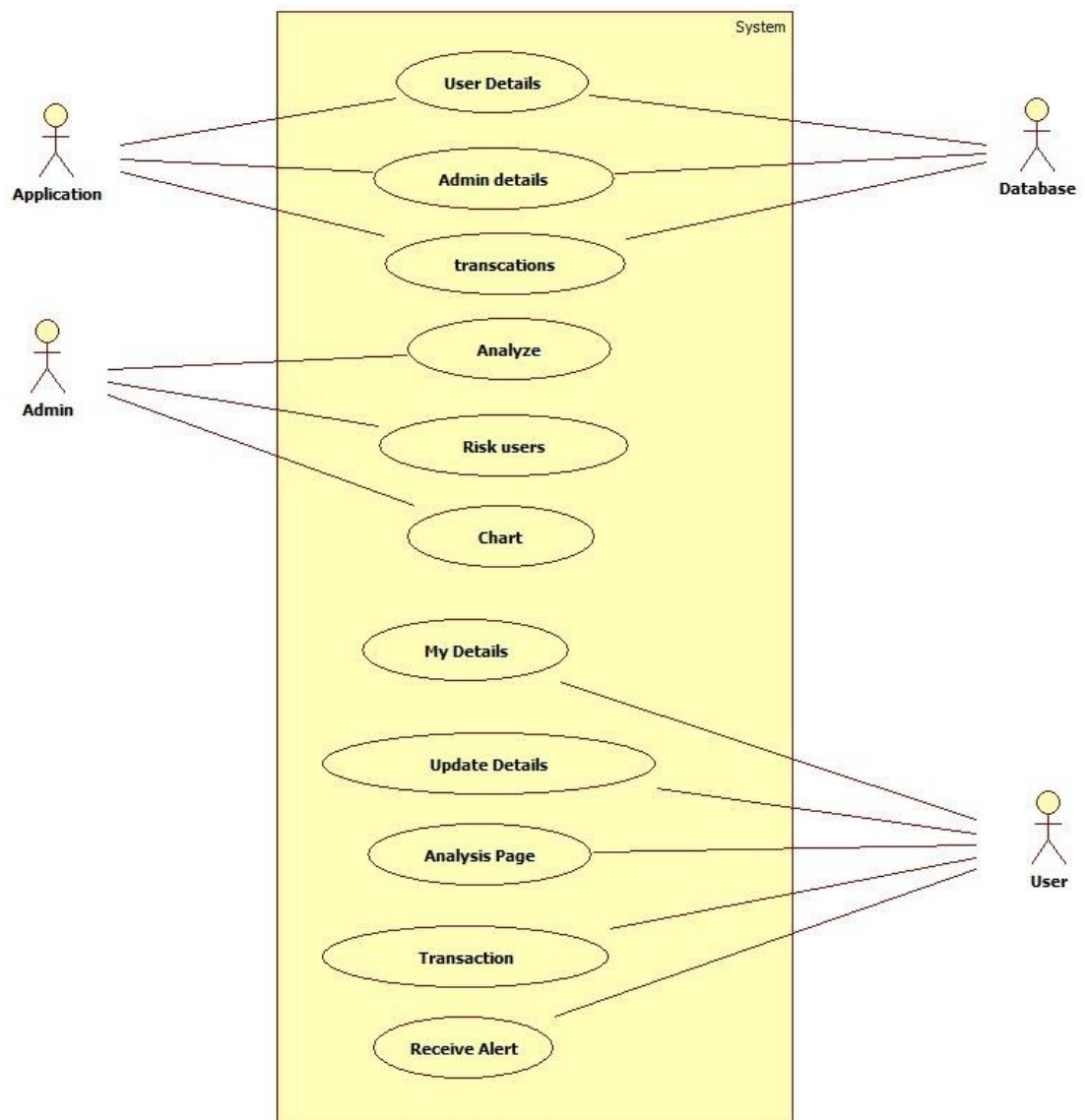
The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modeling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

## **Use case diagram:**

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a

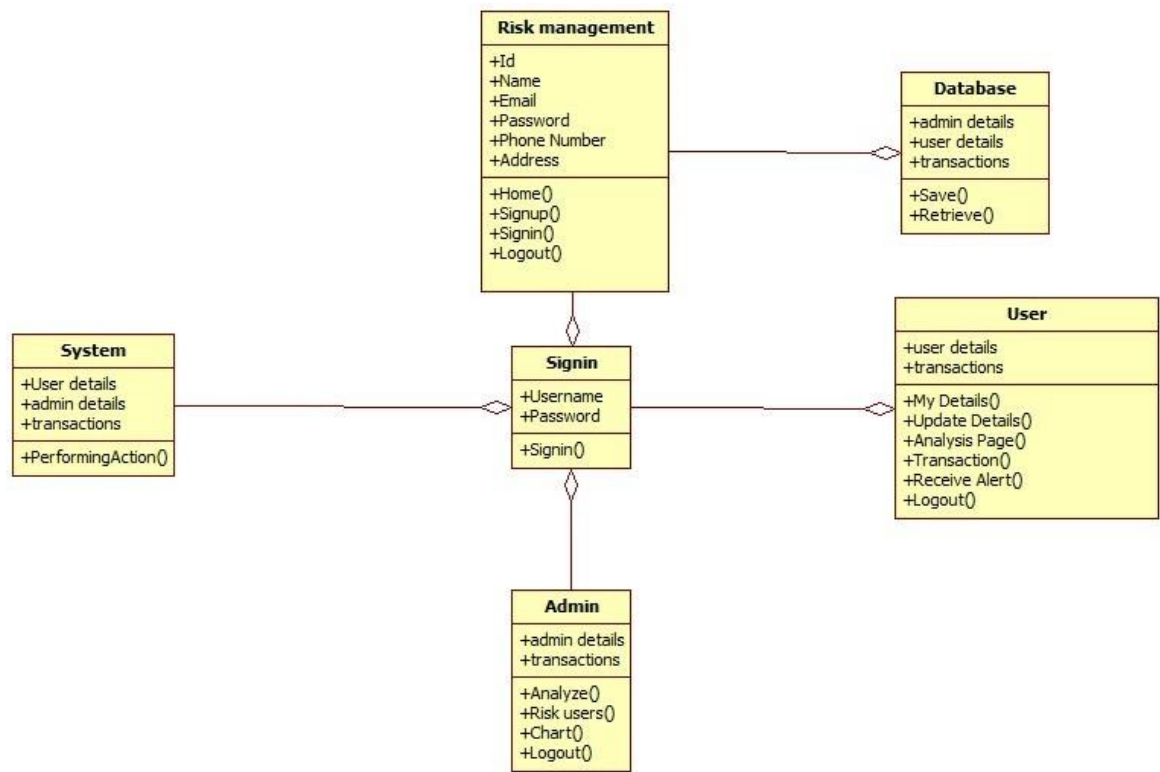
system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



### **Class diagram:**

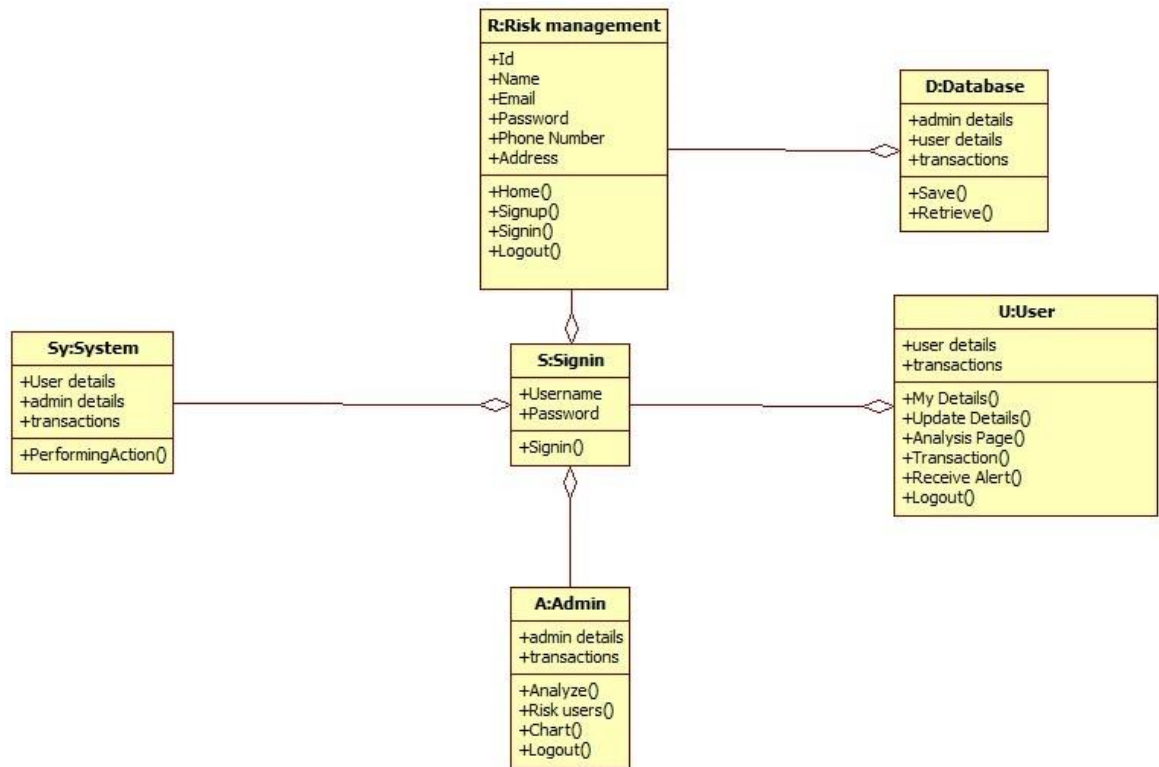
The class diagram is used to refine the use case diagram and define a detailed design of the system. The class diagram classifies the actors defined in the use case diagram into a set of interrelated classes. The relationship or association between the classes can be either an "is-a" or "has-a" relationship. Each class in the class diagram may be capable of providing

certain functionalities. These functionalities provided by the class are termed "methods" of the class. Apart from this, each class may have certain "attributes" that uniquely identify the class.



## Object diagram:

The object diagram is a special kind of class diagram. An object is an instance of a class. This essentially means that an object represents the state of a class at a given point of time while the system is running. The object diagram captures the state of different classes in the system and their relationships or associations at a given point of time.

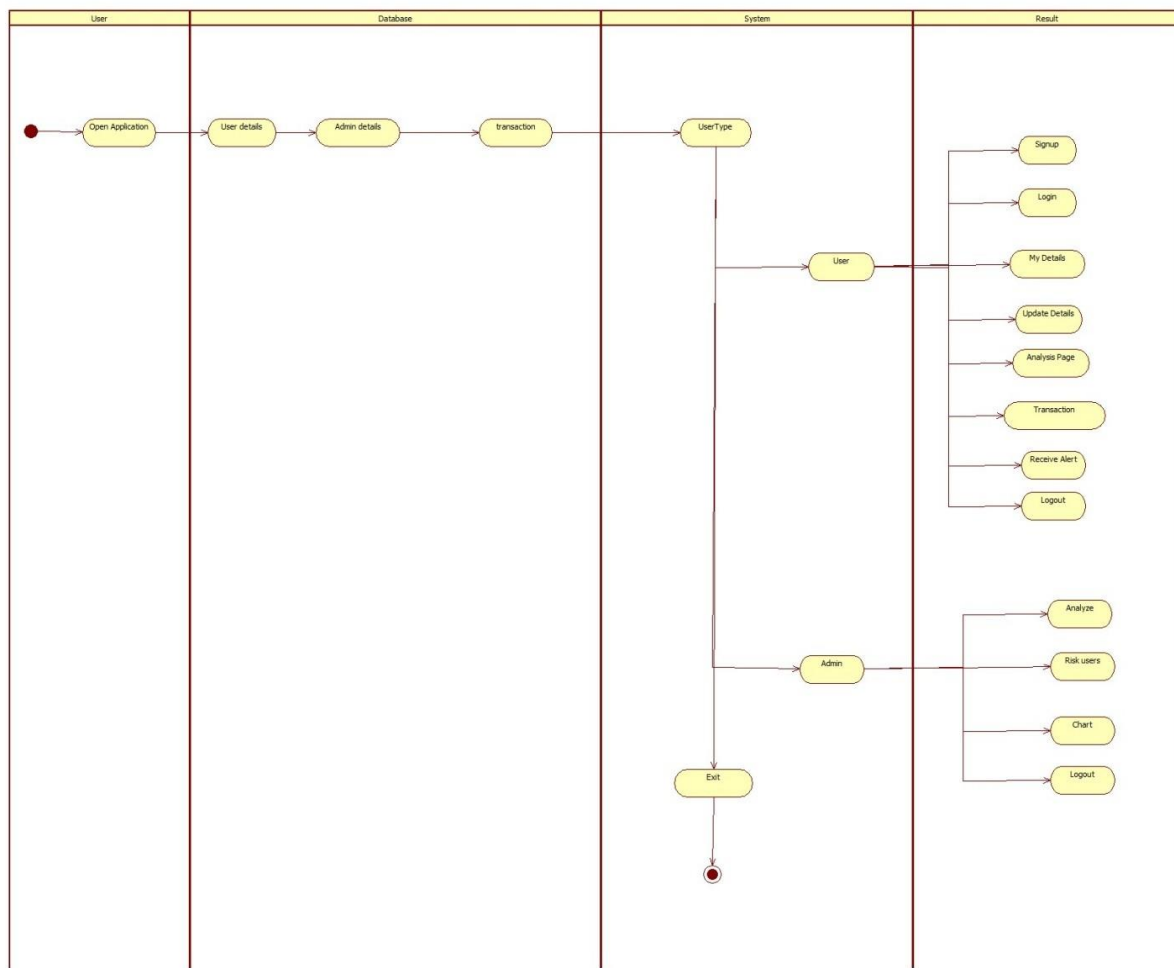


### State diagram:

A state diagram, as the name suggests, represents the different states that objects in the system undergo during their life cycle. Objects in the system change states in response to events. In addition to this, a state diagram also captures the transition of the object's state from an initial state to a final state in response to events affecting the system.

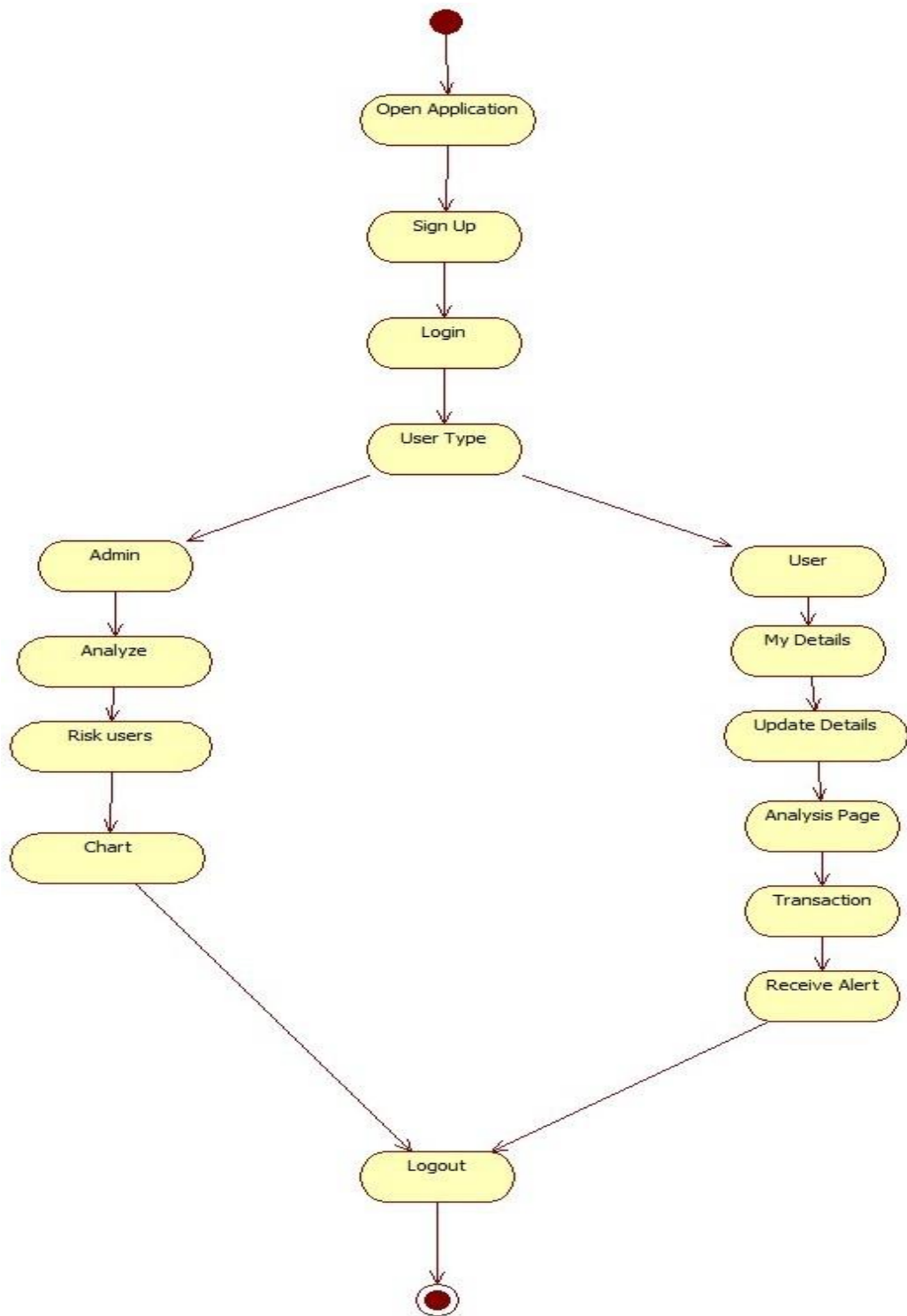
### Activity diagram:

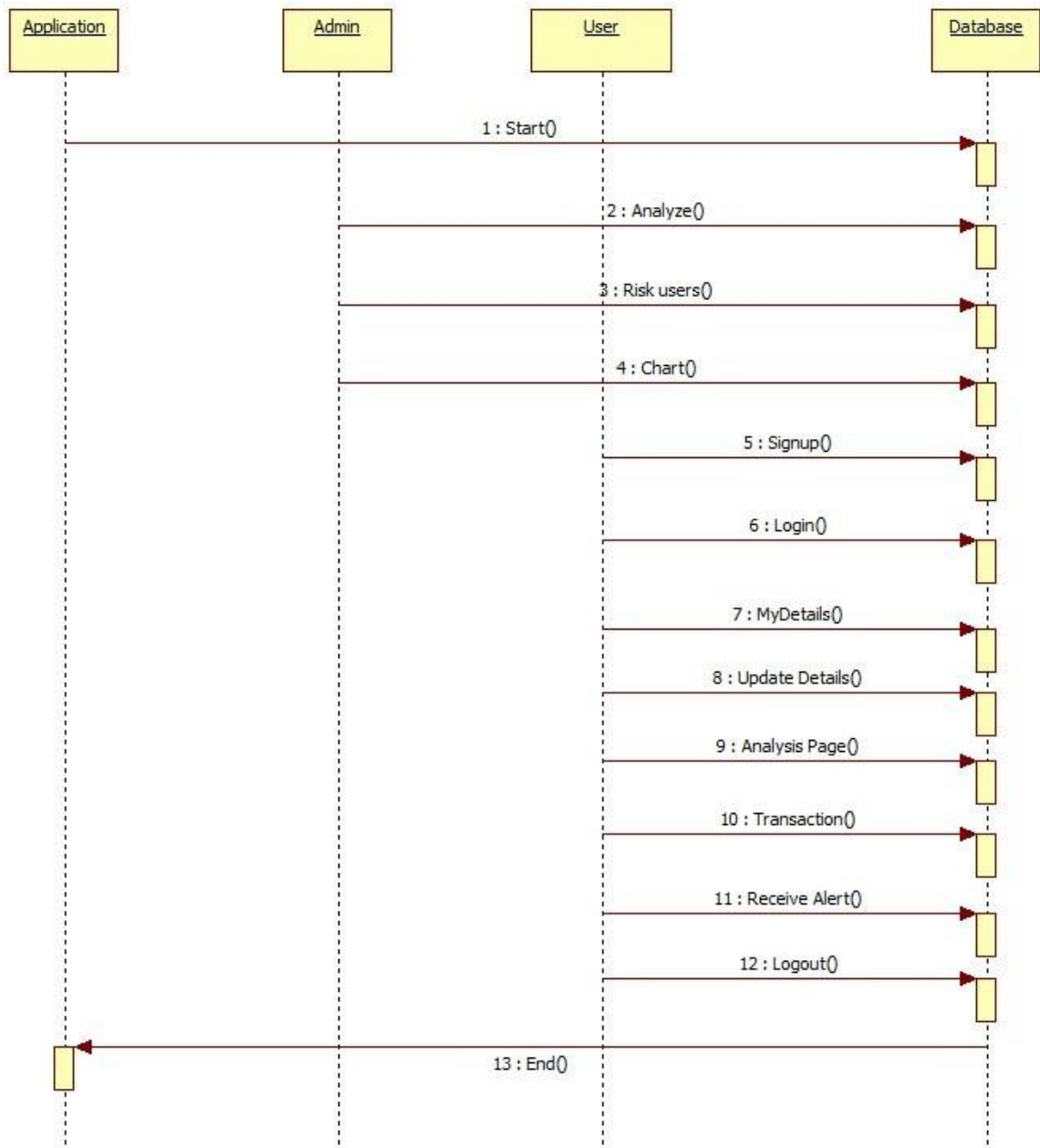
The process flows in the system are captured in the activity diagram. Similar to a state diagram, an activity diagram also consists of activities, actions, transitions, initial and final states, and guard conditions.



### Sequence diagram:

A sequence diagram represents the interaction between different objects in the system. The important aspect of a sequence diagram is that it is time-ordered. This means that the exact sequence of the interactions between the objects is represented step by step. Different objects in the sequence diagram interact with each other by passing "messages".

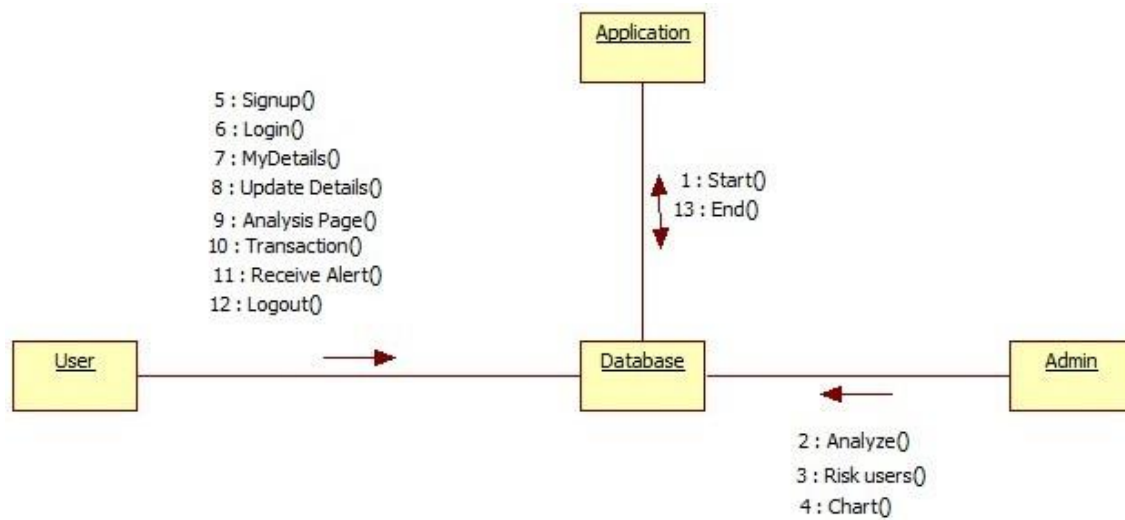




### Collaboration diagram:

A collaboration diagram groups together the interactions between different objects. The interactions are listed as numbered interactions that help to trace the sequence of the

interactions. The collaboration diagram helps to identify all the possible interactions that each object has with other objects.





## **6.TESTING & VALIDATION**

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

### **TYPES OF TESTS**

#### **Unit testing**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

#### **Integration testing**

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

## **Functional test**

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

- Valid Input : identified classes of valid input must be accepted.
- Invalid Input : identified classes of invalid input must be rejected.
- Functions : identified functions must be exercised.
- Output : identified classes of application outputs must be exercised.
- Systems/Procedures : interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

## **System Test**

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

## **White Box Testing**

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

## **Black Box Testing**

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

## **Unit Testing**

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

## **Test strategy and approach**

Field testing will be performed manually and functional tests will be written in detail.

### **Test objectives**

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

### **Features to be tested**

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

## **Integration Testing**

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

**Test Results:** All the test cases mentioned above passed successfully. No defects encountered.

### **Acceptance Testing**

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

**Test Results:** All the test cases mentioned above passed successfully. No defects encountered.

## Test Cases:

Test Case ID	Test Name	Test Case Description	Test Steps			Test Case Status	Test Priority
			Step	Expected	Actual		
01	Start Application	Host the application and test if it starts making sure the required software is available	If it doesn't Start	We cannot run the Application.	The application hosts success.	High	High
02	Home Page	Check the deployment environment for properly loading the application.	If it doesn' load.	We cannot access the Application.	The applicatio is running successfully .	High	High
03	User Mode	Verify the working of the application in freestyle mode	If it doesn' Respond	We cannot use the Freestyle mode.	The applicatio displays the Freestyle Page	High	High

04	Data Input	Verify if the  application  takes input  and updates	If it fails  to take the input or store in The Datab ase	We  cannot  proceed  further	The  applicatio n  updates the input to applicatio	High	High
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## 7.CONCLUSION

In the cloud computing environment the user's perception of information security risk is also changing and deepening gradually, and the user's perception of information security risk has become an important factor in the users willingness to use the information system. The research of this paper emphasizes that enterprises should combined information security risk analysis with information security awareness when carrying out information security risk management and study the model of information security risk assessment and risk decision making. In view of mutual impact of information security risk factors, the paper puts forward the information security risk assessment model based on network analysis method which is not only beneficial to enterprises to grasp the size of internal information security risk, and reduce the loss of enterprise information security risk.

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