Fayoum University
Faculty of Science
Mathematics Department
Math and Computer Science Branch

CHEMICAL INVENTORY MANAGEMENT SYSTEM.

a graduation project document submitted to the Dep. of Mathematics as partial fulfillment for the Requirement for the Degree of Bachelor in Mathematics and Computer Science

By

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DEDICATION

this work is dedicated to our families with all of love and appreciation, without your generous love and endless support we wouldn’t be here.

ACKNOWLEDGMENT

We are thankful to and fortunate enough to get constant encouragement, support and guidance from all Teaching staffs of Mathematics and Computer Science branch which helped us in successfully completing our project work. Also, we would like to extend our sincere esteems to our supervisor Dr. Salah Ahmed, who took keen interest on our project work and guided us all along, till the completion of our project work.

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ABSTRACT

Digital transform is considered as a must in our time due to its importance as doing the procedures in a digital form can save a lot of time and effort specially in the inventory management field As the digital transformation will reduce the percentage of wasted resources and increase Clarity of work.
It also improves organizational performance, which benefit the institution as a whole.
One of the advantages of digital transformation is the presenting of the collected data in an accurate and organized manner, which ease the reading and using it by analyzing it and discovering mistakes and treating it.

يعتبر التحول الرقمي في عصرنا الحالي امر ضروري ومهم للغاية حيث ان القيام بالاجراءات بشكل رقمي يوفر الكثير من الوقت والمجهود وخصوصا في مجال مثل ادارة المخازن حيث ان التحول الرقمي سيقلل نسبة الاهدار فالموارد ويزيد من الشفافية فالعمل وايضا تحسين الاداء التنظيمي مما يصب في مصلحة المؤسسة ككل. ومن مميزات التحول الرقمي هو تقديم البينات المجمعة بشكل دقيق ومنظم مما يسهل من قرائتها والاستفادة منها عن طريق تحليلها ويسهل معرفة الاخطاء ومعالجتها.

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CHAPTER ONE

1.1 Introduction

Managing inventories contains many problems, the biggest one which is the waste of resources by increasing inventory. Lack of appreciation of needs and other problems such as:

- The lack of information present and quickly
- The inability to analyze data, as it is not available in an organized and accurate manner
- It costs a lot of time and effort which increases the human error factor

So this is what makes the digital transformation, as warehouses are the best solution that many institutions take to solve these problems.

And they use a computer program which is “Inventory management system”.

What Is an Inventory Management System?

An inventory management system helps organizations account for all incoming and outgoing stock to better meet customer demand and avoid the expense of overstock or loss of business with stock outs. The system impacts every essential business function including accounting, production, warehouse management, customer service.

What Are the Major Specifications of Inventory Management Systems?

The key inventory management system specifications involve providing a way to store, organize, manage and analyze inventory data. Systems requirements include:

- An easy-to-use interface that doesn’t require advanced training, support or documentation.
- Automation for eliminating manual processes of business functions related to inventory management.
- A reliable, secure database that provides accurate, real-time data.
- Software integrations and automated features that minimize manual inventory updates or inputs.

1.2 Chemical Inventory Management System Impact

As we shown the problems of the old way of inventory management

The lack of information, the inability to analyze data, it costs a lot of time and effort and also the human error factor.

Let's talk the about the impact of using inventory management system

1.2.1 the information impact:

It will provide the information about the products and its date and expiry date and how much of it, so you won't worry about the overstock problem or even the shortage of stock. And it will do the accounts automatically and so you won't have to do it manually and that's mean you will avoid the human error.

1.2.2 the analyzing impact

You can make the most benefit of the data you collected by analyzing it, when you analyze the numbers you will understand the most demanded and the lowest demanded item/stock.

1.2.3 The impact on user:

It will reduce the effort and time significantly and that's will increase his work efficiency and reduces his mistakes.

1.3 Problem definition

1.3.1 Information Gathering

"Information is power," as the saying goes. In this phase we aim to determine the requirements of our system, information must be gathered from all relevant sources. Ideally, the information obtained will enable a well-defined, accurate, and complete description of how the software functions as well as the people, functions and data involved.

User Interviews

DR. fathia / The Head of the chemistry labs.

Do you have a problem with the chemistry inventory?

We have waste and overstock on our chemical warehouse and we want solve this problem.

How you deal with this problem?

We try to solve it manually but it takes a lot of effort and time.

So you need a management system for you chemical warehouse?

Yes, Sure and I'm waiting for it.

Mr. Ahmed / working in the chemical warehouse

do you face a problem managing the inventory?

Yes, we have a problem dealing with overstock the chemicals we have, which consider as a waste of money and chemicals as after a period of time chemicals be damaged and less efficiency.

Why you do have overstock problem?

The warehouse is big and it's very hard to know every chemical stock and its amount as there are some chemicals exists from 10 years ago, so every time there's a supply order for the warehouse it already contains an existed chemicals.

1.3.2 Problem Statement

Problem: there's overstock problem which waste money, chemical and even effort and time. This overstock problem comes exits because no clear data or numbers about the items in the warehouse. So every time there's a supply order for the warehouse it already contains an existed chemicals.

Solution: We will build a specific program for the chemical warehouse which can give a full report for the user. This report contains the chemical stocks which has run out of the warehouse and also the stocks that's going to be run out soon and also report for the supply and demand orders and its date so the user has a full review of the warehouse, then for every time there's a supply order it will contain the required chemicals only and that's will eliminate the overstock problem.

1.3.3 System Development Life Cycle

System Development Life Cycle (SDLC) is a conceptual model which includes policies and procedures for developing or altering systems throughout their life cycles.

SDLC is used by analysis to develop an information system. SDLC includes the following activities:

- requirements
- design
- implementation
- testing
- deployment
- operations
- maintenance

Systems Development Life Cycle is a systematic approach which explicitly breaks down the work into phases that are required to implement either new or modified Information System.

Phases of SDLC

Requirement gathering and analysis this is the first phase of Software Development Life Cycle. In this phase, the requirement is given by Clients or customer analytics and business requirements accumulate in this phase.

Design the "Design" phase is the second phase of Software Development Life Cycle (SDLC). From the requirement specifications, the system and software design prepare in this phase as it concludes in the first phase that is Requirement gathering and analysis. The prepared system and software design help in coding during development.

Implementation OR Coding In implementation or coding phase, database admins build the required data in the database, and the front-end developers build the required interfaces and GUI to collaborate with the back-end as all based on guidelines and procedures introduced by the company.

Testing the testing phase of the software development lifecycle (SDLC) is where you focus on examination and discovery. In this phase, developers find out whether the programming and code written by them, are working according to customer requirements. And also it is not possible to solve all the faults you might find during the testing phase, it is possible to use the results from this phase to reduce the number of errors within the software program.

Deployment after successful testing, the developed product delivers or deploy at the customer's end for their use. Once the software has been completely transforming into bug-free product or application, and no high priority bugs persist in the software, now it is time to deploy to production where customers or end users will use the product. When the deployment phase is running, then all the bugs present in above phase that is in "Testing" phase are fixes.

Maintenance this is the phase which comes just after the deployment phase. Maintenance team will look after any post-production issues or bugs, once a version of the software releases to the production environment. The post-production bugs may introduce the software releases to the production environment. The maintenance of any application needs time to time so that the application can respond properly.

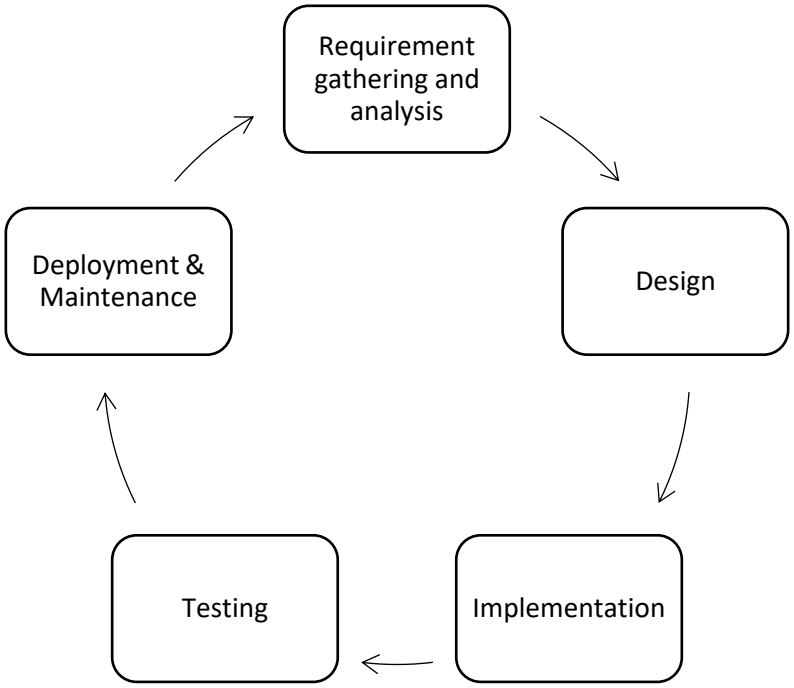

Fig 1.1: System Development Life Cycle

CHAPTER TWO

2.1 System Architecture

The purpose of this phase is to visualize the software program using a collection of diagrams and studying the system and its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

These diagrams are organized into two distinct groups: structural diagrams and behavioral or interaction diagrams.
Structural UML diagrams

- Data Flow Diagram

Behavioral UML diagrams

- Use case diagram
- Class Diagram
- Activity diagram

2.1.1 Data flow diagram (context level):

A data flow diagram (DFD) illustrates how data is processed by a system in terms of inputs and outputs. As its name indicates its focus is on the flow of information, where data comes from, where it goes and how it gets stored.

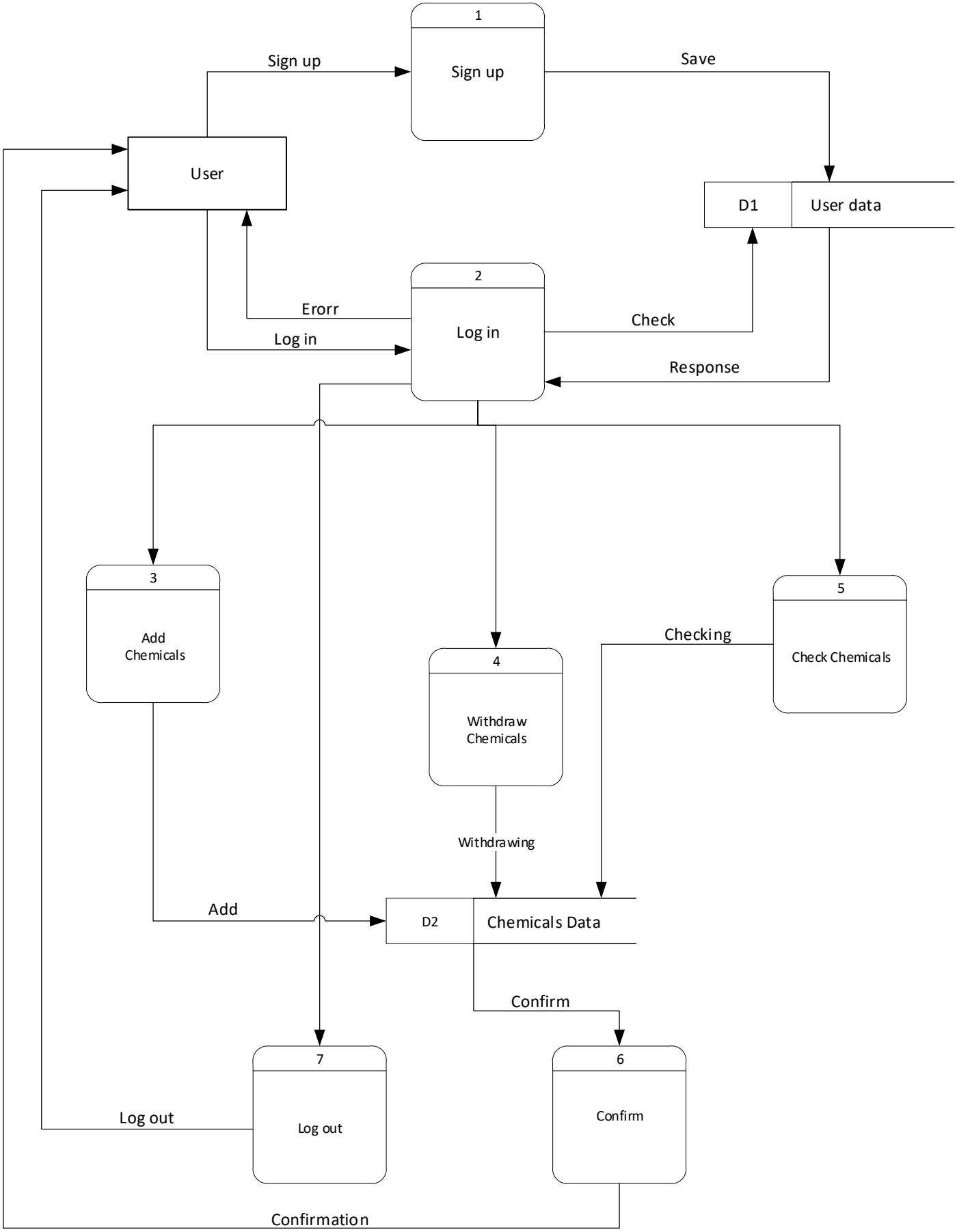

Fig 2.1: Data Flow Diagram

2.1.2 Context diagram (Context-Level Data-Flow Diagram):

The Context Diagram Another name for a Context Diagram is a “Context-Level Data-Flow Diagram” shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities (systems, organizational groups, external data stores, etc.).

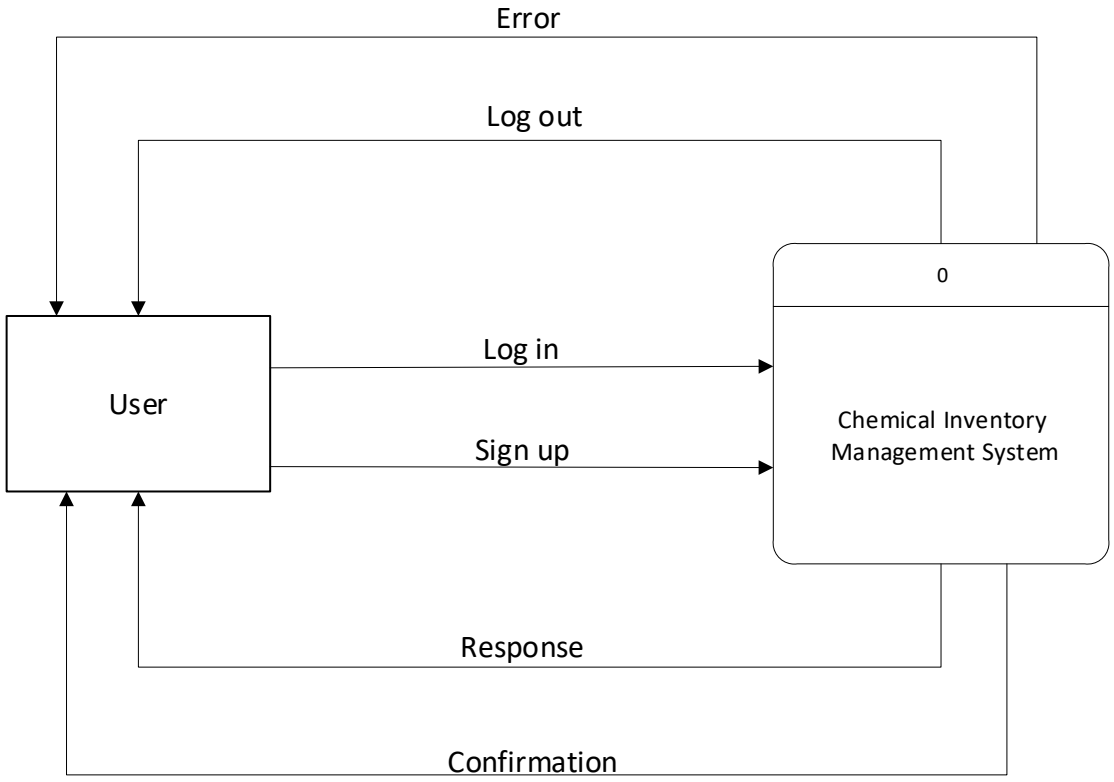

Fig 2.2: Context Diagram

2.1.3 Entity Relationship Diagram (ERD)

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.

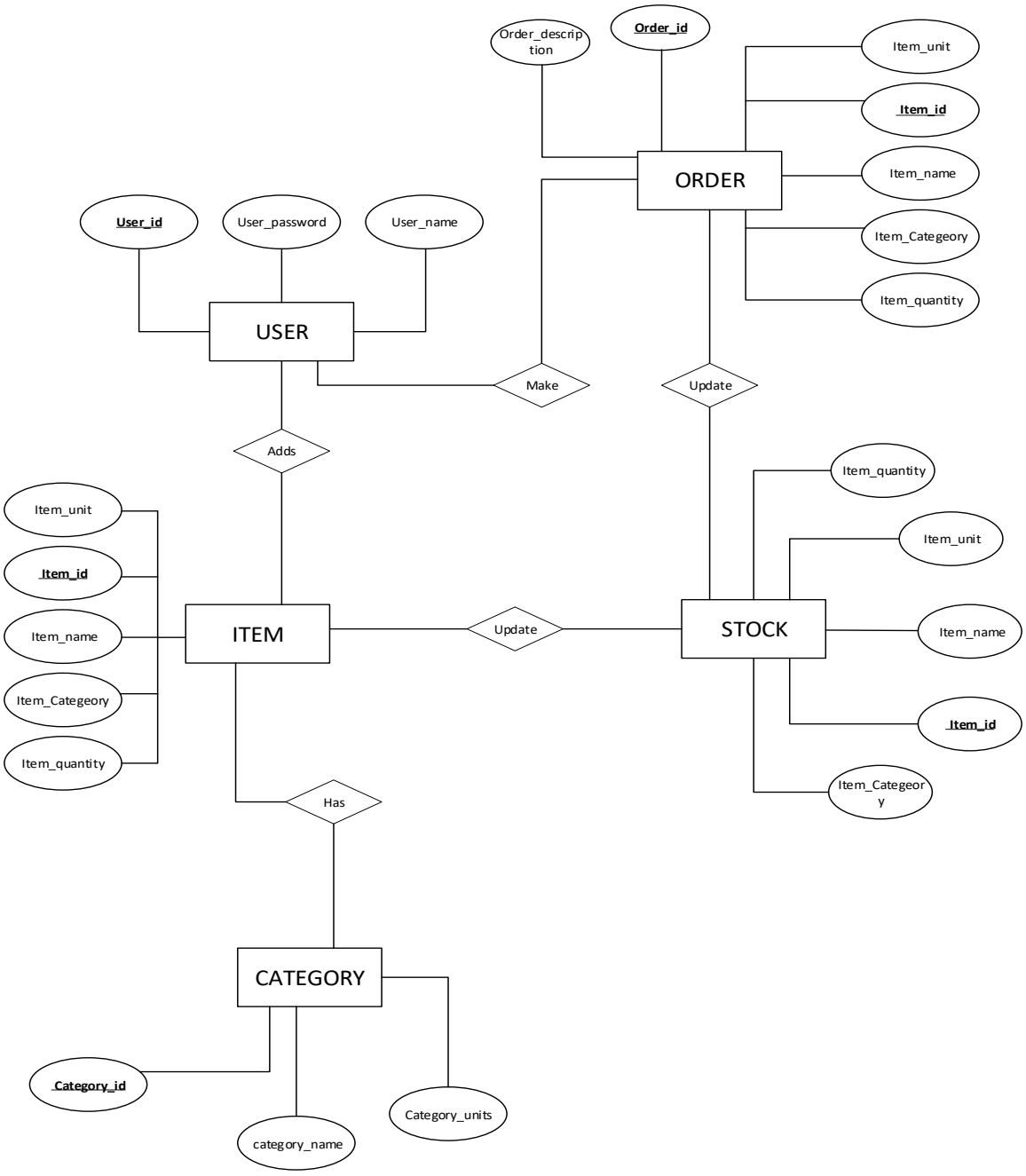

Fig 2.3: Entity Relationship Diagram (ERD)

2.1.3 Use Case Diagram:

Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform. In this context, a "system" is something being developed or operated, such as a web site. The "actors" are people or entities operating under defined roles within the system.

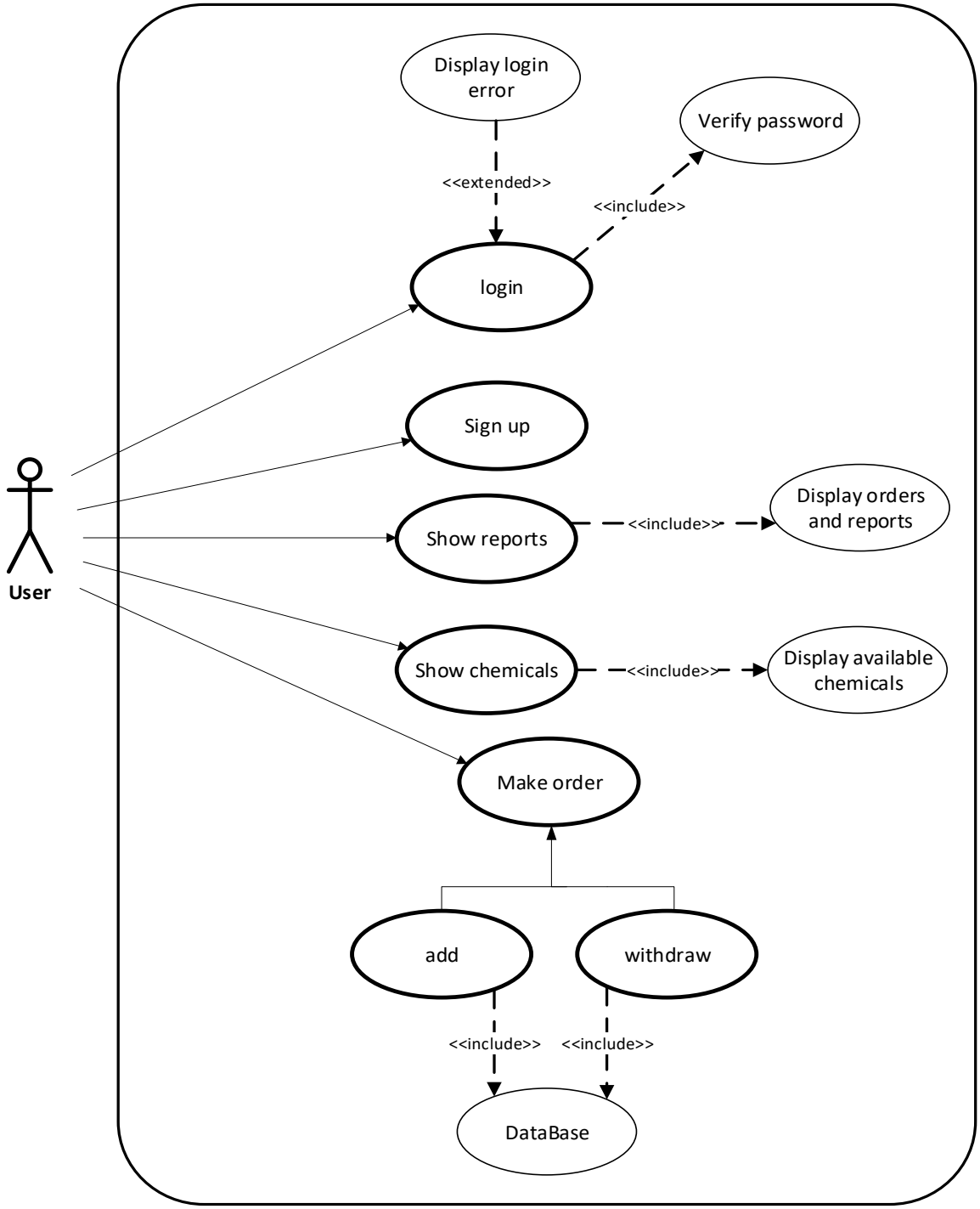

Fig 2.4: Use Case Diagram