CYPRUS INTERNATIONAL UNIVERSITY

FACULTY OF ENGINEERING

COMPUTER ENGINEERING

CMPE300
TRAINING REPORT
14/11/2022

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1 INTRODUCTION

The main objective is to learn how to develop and manage multiple software platforms over a period of time using some software development methodologies. The term software development methodologies describe the systematic procedures used to complete a project. These methodologies helped to create and organize the used software platforms.

The most important parts that have been done and learnt during the training were time management, programming improvement, and teams collaborations. When it comes to software development, developers have a certain time to complete the software in the exact time, as a result, this part was essential for us because of the company's vision quote which is " fill the requirements and inadequacies of our clients and project users in a short time with the importance we attach ".

Explicitly, working with others improved our communication abilities, which had a positive impact on our ability to get creative ideas from experienced employees. Additionally, working with clients presented the possibility of combining the business and software worlds.

Additionally, expanding one's programming background was another thing that was learned and accomplished. Now, two different platforms are completely done, it has really aided us in developing a solid logic syntax and algorithm as well as a programming structure.

Throughout the training, Linasoft company provided me with an excellent tasks according to the company’s missions. Various approaches were used based on each platform. From Designing the user interfaces(UI), database design, cryptography, image processing, and email system, to testing and maintenance. Using multiple platforms was the interesting part and the core main of the training.

The difficulties faced throughout the training will be covered and explained throughout the upcoming sections.

The report contains seven sections and each section will be explained deeply starting with the company information, work done which is going to cover the main core, experience gained with training, and lastly a brief summary of the report.

2 INFORMATION ABOUT THE COMPANY

LINASOFT is a software development company that its main goal is to provide the best quality of software used by large companies. LINASOFT provides many services like delivering user-friendly software with simple-to-use features, handling all bills from a particular angle, integrating complete module operations with one another, offering automatic database backup, and more. The project that the trainee was supposed to work on is actually an invoicing management system that the organization is currently developing. The program is used by many companies in North Cyprus, including LCWakiki, Mardo Café, and Cailoppe, to help them manage their systems.

Figure 1 shows the company facade

Figure 1 Linasoft Company Facade

Figure 2 shows the company from outside

Figure 2 Linasoft Company

2.1 Aim and Establishment of the Company

The vision of the company is:

“During our project work, we work directly with the project owner in order to complete the requirements and deficiencies of our customers and project users in a short time
With the importance we attach to quality and our determination to succeed, we have made it our principle to bring the satisfaction of our customers to the fore”

LINASOFT company was established in 2013. It was the first company in the Turkish Republic of Northern Cyprus that has been using the cloud system. It is a software development company.

In addition to offering personal software solutions, LINASOFT also offers business software solutions. The commercial software is used by servers, shopping stores, cafes, and exchanges. These businesses use LINASOFT's services for system management purposes, such as the invoicing management system, which can be used on a variety of platforms, including smartphones, tablets, laptops, and web applications.

The company mainly concentrates on software commercial development, accounting software, site, enterprise software, and web design

The company's mission is to interact with clients via technology, streamline client workflow, and do its part to prevent brain drain by effective and economically local labor.

LINASOFT company offers all software related products and services:

- Web development: engineers with the highest levels of design and development expertise are creating desired unique solutions.

- Software products and services: the majority of services, including fully integrated modules, the use of numerous platforms, training, and the ability to handle all invoices from a single screen, are all available. Additionally, it offers software tutoring to customers to assist them in using the software in a proficient and simple manner.

- Database services: provides a secure database environment, automates backup and recovery processes, providing a secure database environment, and monitoring database performance to make sure that customer databases are safeguarded and kept under surveillance.

Moreover, the company has a significant impact on how students learn. Students from various schools come here to work as trainees in the company to obtain experience. The company has a large number of clients who trust it with their projects, and it has continued to keep giving clients the services they need.

2.2 Departments and Personnel of the Company

Linasoft company' vision is to quickly respond the needs and shortcomings of their clients and project users, it directly collaborates with the project owner during project development. Given the value it places on quality and their commitment to success, Linasoft company puts their clients' comfort first.

Linasoft company consists of different departments. it consists of software developers, software trainers, a finance department, e-marketing, and a sales department.

The staff and employees that are working currently are divided in terms of work experience, education, and skills

1. Betul Ozmen

    1) Work experience:
        - Software Engineer Manager · full-time · 2019-persent

    2) Education

        - Bachelor of Software Engineering at Hecettepe University

    3) Skills
        - AB design · Agile Project Management · Team Management · Product Development

2. Fatih Cevit

    1) Work experience:
        - Software Engineer Manager · full-time · persent

    2) Education
        - Bachelor of Software Engineering at Girne American University

    3) Skills
        - AB design · Agile Project Management · Product Development

3. Seydi Tingir

    1) Work experience:
        - Certified Accountant · full-time · present

    2) Education
        - Bachelor of Accounting at Eastern Mediterranean University

    3) Skills
        - Marketing · Team Manager

4. Yusuf Gonder

    1) Work experience:
        - Computer Programmer
        - IT Help Desk · full time · present

    2) Skills
        - IT help desk · Training

5. Abd Polat

    1) Work experience:
        - IT Help Desk · full time · present

    2) Skills
        - IT help desk · Training

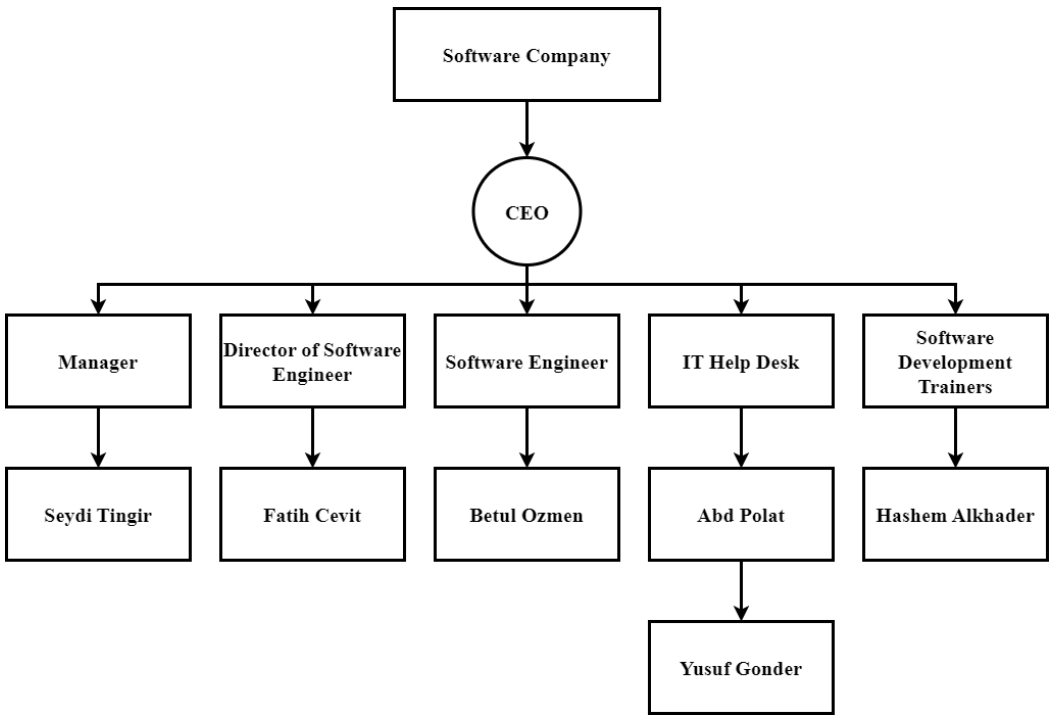


Figure 3 Company Chart

3 WORK EXPERIENCE

The main concept of the project is to build software for an invoice management system. This software will be used by the staff and employees to create, manage, and organize all clients' invoices.

Planning and analyzing the system's operation with the aid of various external tools was the first responsibility for the invoice management system. after this step, design the structure of the database. After completing this stage, the following responsibility is to implement authentication for all users and verify their access. Finally, implement the products and services that will be explained in details in the next subsections.

Now technically, This project was developed using two different platforms which are desktop application and web application. It was assigned by the supervisor to test the capability of the trainee to build software with two different platforms within a certain period. Software Development Life Cycle(SDLC) methodology is used. The first step is to plan and analyze all the requirement that needs to be available. The design stage is used for user interfaces(UI) for both platforms. The programming languages that are used for developing the application are C#, JavaScript, and PHP. For the desktop frameworks, the .NET framework is used, and for web frameworks, bootstrap was used. MYSQL is used for database systems.

3.1 Problem Definition

The department we were assigned to work in was software development field. To be more specific, during the training, the project that assigned was to build software in web and desktop platforms using the ideas and the logic from the company's ongoing project which is related to invoice management system. This system consists of creating staff, employees, customers, and customer activities, creating and updating invoices, printing documents, and sending mail. The tasks that are involved in the projects are:

- Draw a flowchart and use Entity Relationship Diagram(ERD)
- Write software requirement specification(SRS)
- Design the database structure for both platforms
- Design the user interfaces for desktop and web applications
- Use authentication for all users access
- Learn about different kinds of encryption for passwords
- Use image processing for barcode validation
- Use the email system for sending mails
- Learn to print the invoices as a pdf document
- Learn file configuration
- Testing and maintaining the whole system

All work above will be explained in details like definition, which technology or methods used, and how it was done.

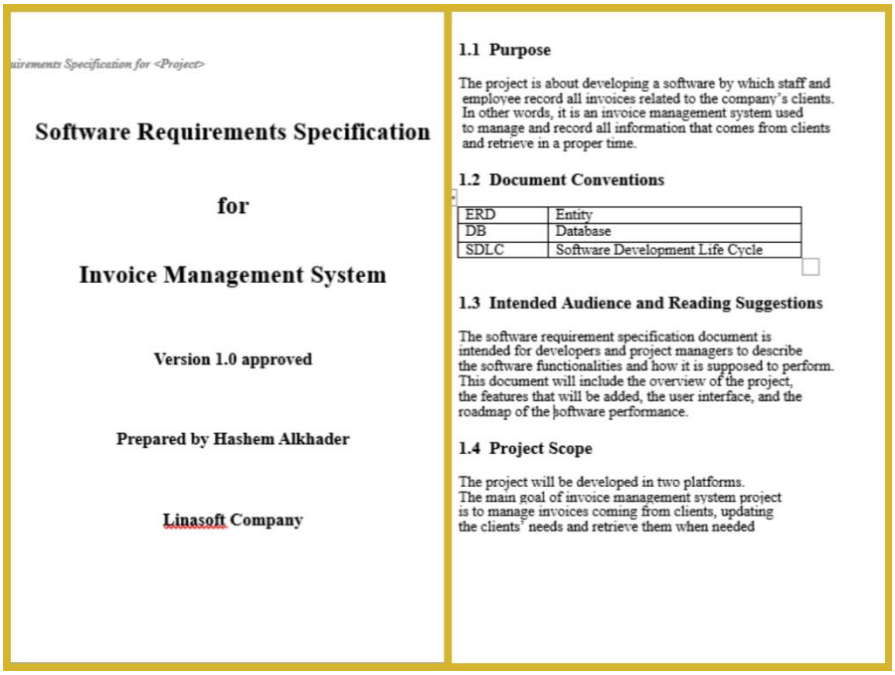
3.2 Work Done

In the beginning of the training. We were able to create software with the help of some useful algorithms and technologies. A widely used strategy throughout the planning stage considerably helped in having the logic of how the system will function. This tool is Flowchart diagram. Now, While designing the database structure, two methods were used which are Object Oriented database(OOD) method and Entity Relationship Diagram(ERD). The assigned tasks that were implemented and engaged in the training will be discussed deeply in order to finish the main core of the project.

3.2.1 SRS Documentation

The system's objective is to deliver software for an invoice management system (IMS) that can handle data (invoices), organize them, and provide intelligent analysis for use in subsequent business operations and intelligent analytics. To do this, we use documents called Software Requirement Specifications (SRS) [1].

Figure 4 below shows some software requirement specification(SRS) documentation pages.



uirements Specification for <Project>

Software Requirements Specification

for

Invoice Management System

Version 1.0 approved

Prepared by Hashem Alkhader

Linasoft Company

1.1 Purpose

The project is about developing a software by which staff and employee record all invoices related to the company's clients. In other words, it is an invoice management system used to manage and record all information that comes from clients and retrieve in a proper time.

1.2 Document Conventions

ERD	Entity
DB	Database
SDLC	Software Development Life Cycle

1.3 Intended Audience and Reading Suggestions

The software requirement specification document is intended for developers and project managers to describe the software functionalities and how it is supposed to perform. This document will include the overview of the project, the features that will be added, the user interface, and the roadmap of the software performance.

1.4 Project Scope

The project will be developed in two platforms. The main goal of invoice management system project is to manage invoices coming from clients, updating the clients' needs and retrieve them when needed

Figure 4 Software Requirement Specification

The significance of the Software Requirements Specification (SRS) is that it provides a comprehensive overview of the entire system. It genuinely outlines the project's scope. It walks us through every detail of the project, carefully outlining what is anticipated of the solution and the result they should produce. Additionally, it minimizes the time and effort required to complete the product.

Additionally, it guarantees open and honest communication between clients and developers, clearing up all misunderstandings and outlining all crucial information.

3.2.2 Planning and Analysis stages

The most crucial phase of creating any form of software is planning. It aids in defining and determining a project's need for either new or current software. The supervisor received and gathered these needs in order to be able to identify them and establish the project's structure. These specifications are provided to us by the supervisor so that we can identify them and develop the project's structure.

During the analysis phase, the software's feasibility and expenses are prioritized. The user needs are where the program examines all the requirements, functions, and features that need to be included as part of the product.

Figure 5 shows the Software Development Life Cycle(SDLC) [2].

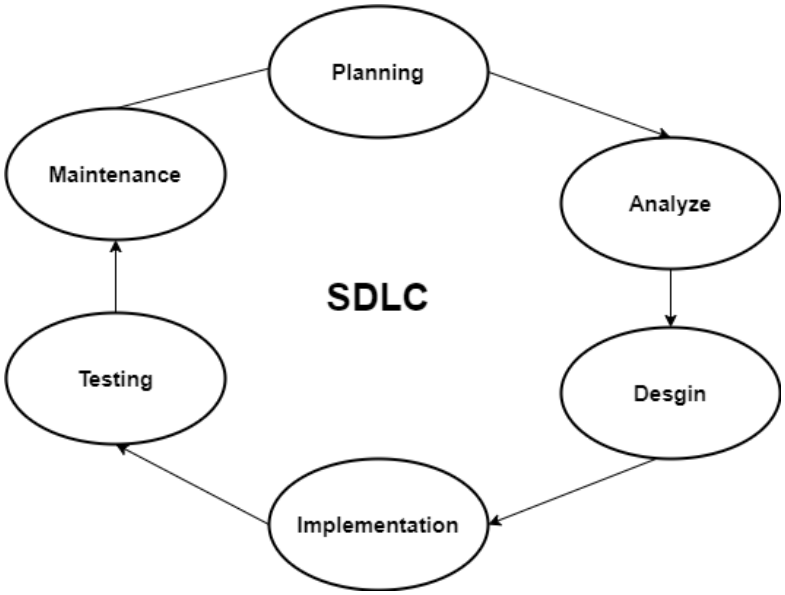


Figure 5 Software Development Life Cycle(SDLC)

Software Development Life Cycle(SDLC) is shown in Figure 3. The figure above explains all the steps required to build software using the SDLC methodology.

During the meeting with the supervisor, the planning stage started to be familiar by determining the main scope of the project, identifying the stockholders, defining the project objectives, and determining the time estimation.

After defining the planning stage methods. The analysis phase started to show up. In simple words, the analysis phase focuses on who will use the system. what are the features of the system, and when will it be used. The project team evaluates any existing system, spots areas for improvement, and creates a concept for the new system during this phase.

3.2.3 Database Structure

After gathering all the requirements and suggestions from the supervisor, it is the time for design stage where a database was designed for an invoice management system.

Figure 6 shows the Invoice Management System tables

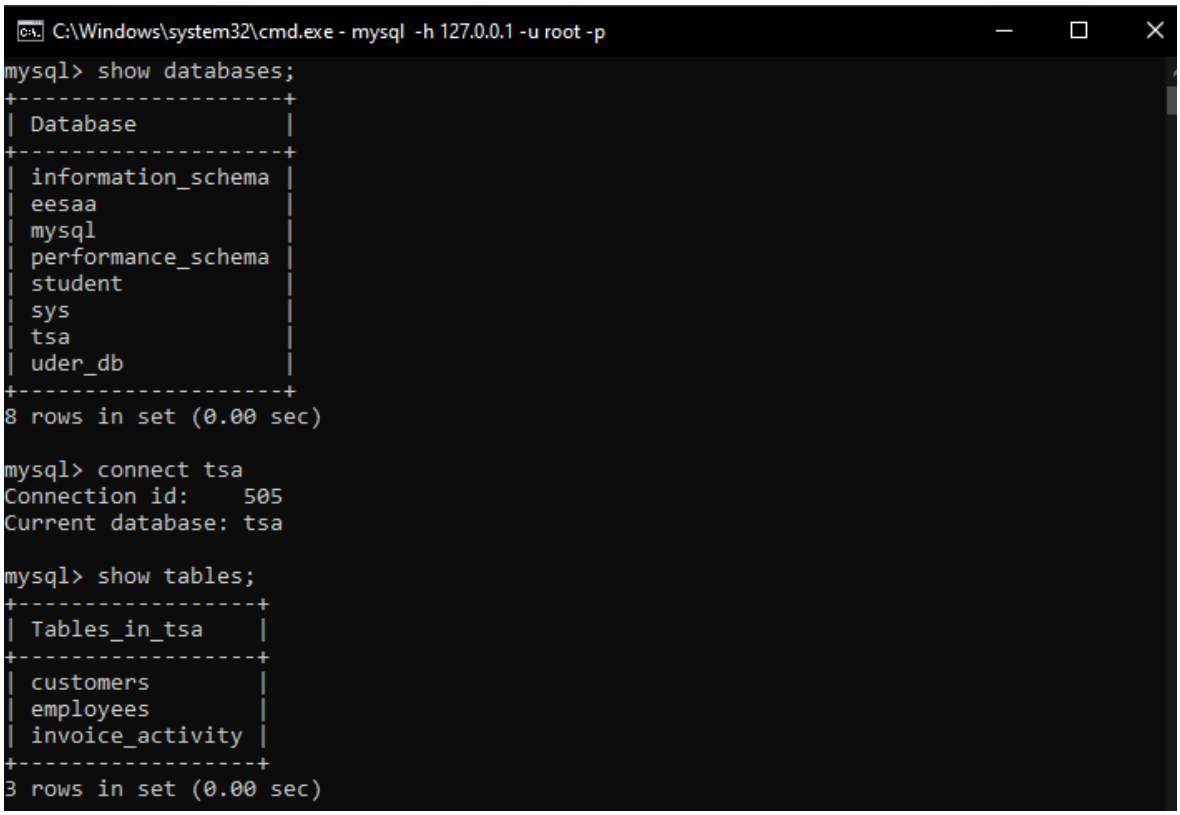


Figure 6 Database Structure

In the figure above, there are three tables in the database. One of them is for the staff and employees who can manage the whole system based on their access type. The customer table is for storing all personal information regarding the clients. And the last one is the invoice activity table which is for client requirements, needs, requests, etc.

3.2.4 Frameworks

The software was created using a number of different frameworks. This software was developed using the.NET framework, one of the primary frameworks, on a desktop application platform running the Windows operating system. Additionally, Windows Forms (WinForms) is a user interface (UI) framework used for creating Windows desktop applications based on the integrated development environment (IDE) provided by Visual Studio (IDE). Finally, a responsive development website that offers a selection of template designs is made possible by the use of Bootstrap [3].

3.2.5 Design Stage:

The fundamental design of the software, including the platforms to be used, the programming language, the templates, and the application security measures, and separated by the initial idea and vision.

The design step also entails drawing a flowchart illustrating how the application responds to user activities. The design phase is crucial because it serves as the transition point from an idea to a functional system. As soon as we received the supervisor's complete list of requirements, we began working on this step.

In the invoice management project, two platforms were used are desktop application platform and the web application platform. Each platform has a different design. The programming languages used were C#, PHP, and JavaScript.

Figure 7 shows the desktop application platform version

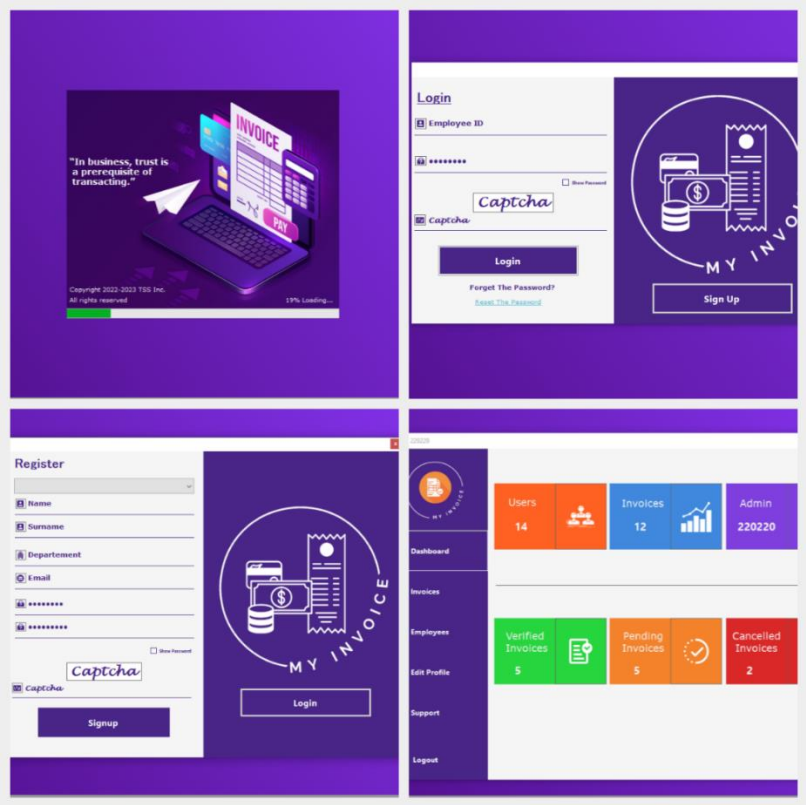


Figure 7 Desktop Application User Interface

The figure above shows the design of the desktop application platform. As a graphical class library, Windows form (WinForm) was utilized to offer one of the most effective methods for developing desktop applications. Additionally, it has features like drag-and-drop visual control placement that make it simple to create desktop applications [4].

The first thing that appears once the application is opened is the splash page which is the introduction to our invoice system management. Then login page appears where employees should fill in the information based on the database information. And in case there is no account, employees will be able to signup for the system. in addition, employees also can reset their password if they forgot their passwords.

Figure 8 shows the web application platform version

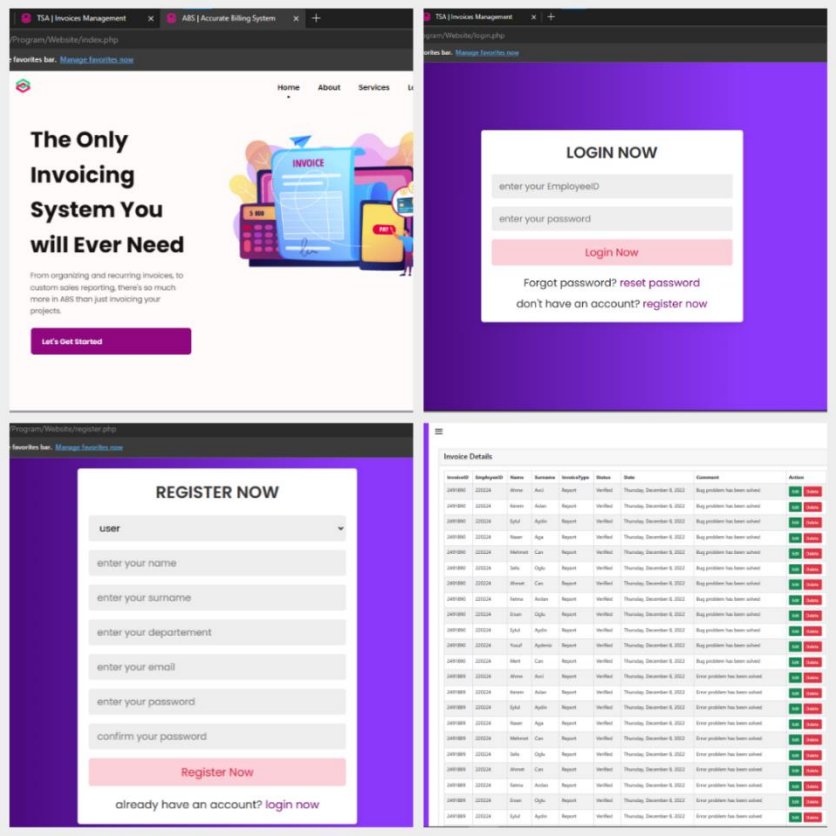


Figure 8 Web Application User Interface

The figure above shows the web application platform. The bootstrap framework was used to provide a collection of syntax for template designs, and also to reduce the code lines. Some toolkit was used for styling purpose like font-awesome, and box-icons [5].

The first thing we designed is the index page which contains the introduction to our service. Then we designed the access system. it can be done by login into the system using the employee id and its password. Once it is authenticated, the profile page will be shown. On the profile page, there are some features that are added. These are adding invoices, updating invoices, and deleting invoices.

3.2.6 Users Authentication

The implementation phase starts from this point. In this phase, users must be validated in terms of two parts: availability where the software checks for the existence of the users, and accessibility where each user will have different access privileges which either will be full access users(staff) where they will be able to use all the functionalities of the system including managing everything in the software, or semi access users(employees) where they only have specific functionalities and features to use.

Figure 9 shows the Desktop and web applications

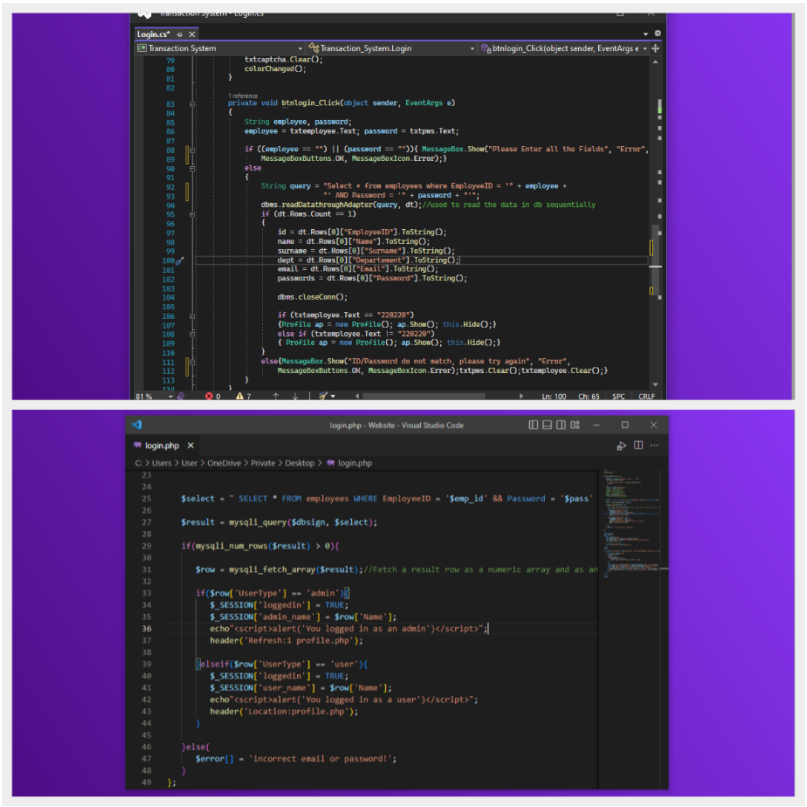


Figure 9 Desktop and Web Applications User Authentication

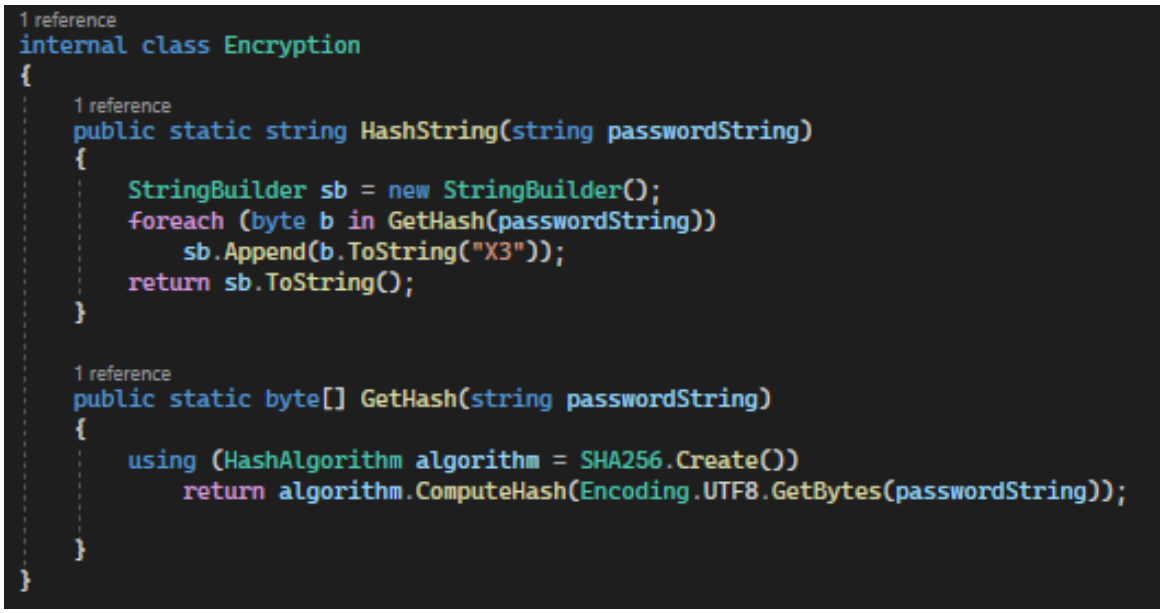
The figure above shows the authentication codes used in desktop and web applications to validate the users and verify their access types. All users must get authenticated to avoid unauthorized users accessing the system. while logging into the system, it will ask for the employee identification and password, and if it matches the information saved in the database, users will gain access to their profile.

To distinguish between computers and humans, there is also a Fully Automated Public Turing test (CAPTCHA). It generates random strings to fulfill its job.

3.2.7 Passwords Encryption

To prevent attacks or data theft, every software must have a very robust security structure. Encryption is a technique for changing a password from plain text to cipher text, that cannot be read or understood.

Figure 10 shows the type of the Password Encryption method used in the project.



```
1 reference
internal class Encryption
{
    1 reference
    public static string HashString(string passwordString)
    {
        StringBuilder sb = new StringBuilder();
        foreach (byte b in GetHash(passwordString))
            sb.Append(b.ToString("X3"));
        return sb.ToString();
    }

    1 reference
    public static byte[] GetHash(string passwordString)
    {
        using (HashAlgorithm algorithm = SHA256.Create())
            return algorithm.ComputeHash(Encoding.UTF8.GetBytes(passwordString));

    }
}
```

Figure 10 Secure Hashing Algorithm

The reason that we need to encrypt the password is to prevent any unauthorized users from accessing the system and protect the system users. In the figure above, Secure Hashing Algorithm(SHA-256). SHA-256 is an algorithm that takes an input of any length and uses it to create a 256-bit fixed-length hash value.

SHA-256 is used for many reasons. One of the reasons is a powerful secure hashing algorithm. Moreover, we used SHA-256 because we previously used SHA-256 in the second platform [6].

The last advantage of SHA-256 is that, unlike some other well-known hashing algorithms, it hasn't been broken and doesn't have any known security flaws.

3.2.8 System Services

System services are meant by the functionalities and features that a system provides. This task was the most challenging part because of its massive work effort and because it is the main concept of the project. There are some methods used in the system services.

Figure 11 shows the reset and dashboard features.

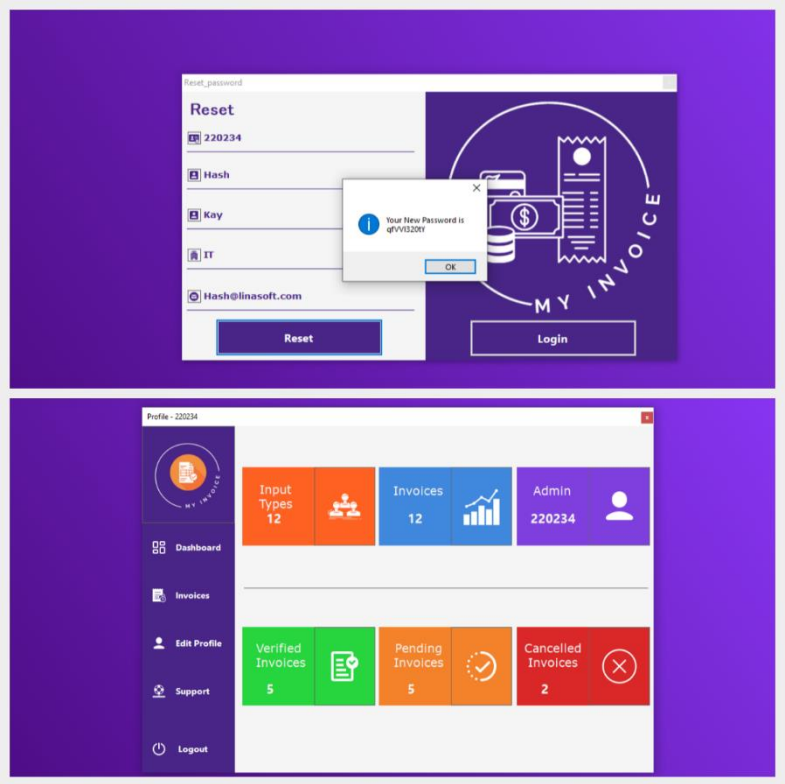


Figure 11 Reset and Dashboard pages

The figure above, there are reset and dashboard pages. In reset page, employees can reset their passwords if their entered information matches with the information in the database, and if it does, a temporary random password will be generated and then saved as a hashed password.

The dashboard page consists of statistical information about the invoices. It consists of brief information about the invoices. These invoices were fetched from the database tables.

Figure 12 shows the CRUD system for desktop and web applications

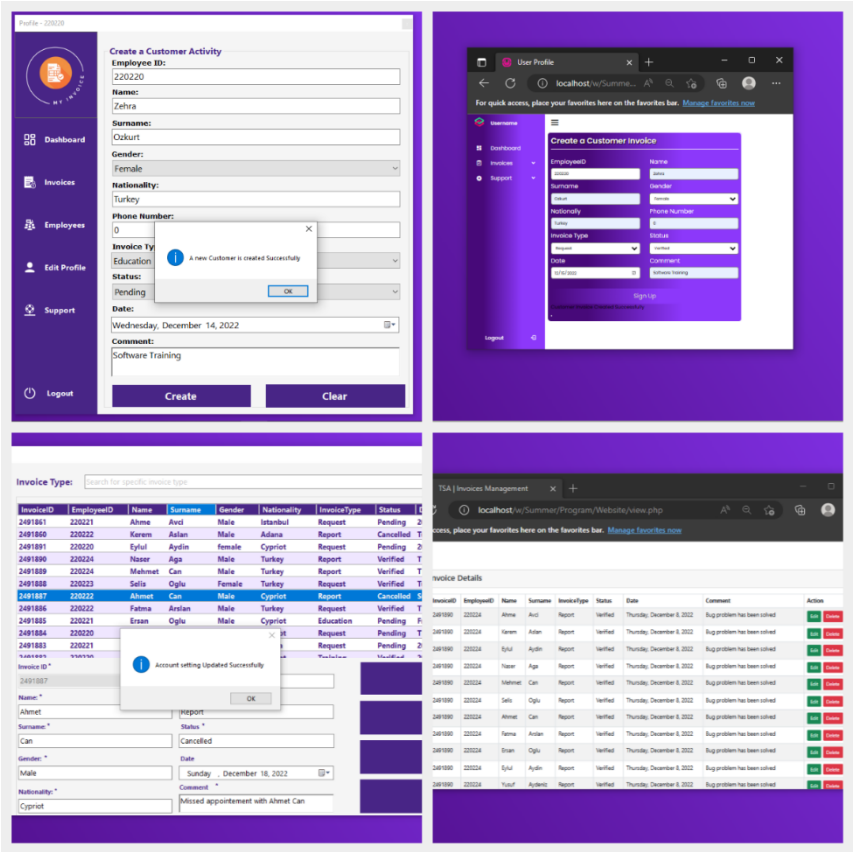


Figure 12 CRUD operations

The figure below shows all the details related to each customer invoice for desktop and web platforms. It clarifies the clients' creation details that include their personal details and their requests. Employees and staff can create invoices. The only difference is that staff has more privileges which are they can also assign invoices to employees. In addition, Staff users can apply all the CRUD methods. Also, they can assign/change invoices to/from employees. However, delete and assign features is available only for high access level which in this case is the staff.

The above figure shows the way of printing the document using the printing library to print the document as a pdf document. The printed information came from the row that was chosen to be printed. This information including the invoice ID, invoice type invoice status, date, comment, and barcode which will be covered in detail in the next section.

There is also another feature added which is for manipulating digital photographs known as image processing software. Particularly, it assisted in image capturing, conversion to a digital format, and execution of one or more modifications to the photographs. For purposes of data retrieval and validation, it was primarily used to scan barcodes.

3.2.9 Simple Mail Transfer Protocol(SMTP)

The Simple Mail Transfer Protocol is a widely used Internet communication protocol for sending electronic mail. Message transfer agents, such as mail servers, use SMTP to send and receive mail. SMTP is used in this project to deliver emails as a support tool for both staff and employees [7].

Figure 13 shows SMTP code

```
1 reference
private void btnSave_Click(object sender, EventArgs e)
{
    String to, from, pass, mail;
    to = (txtSend.Text).ToString();
    from = (txtFrom.Text).ToString();
    mail = (txtComment.Text).ToString();
    pass = (txtCpws.Text).ToString();

    MailMessage m = new MailMessage();
    m.To.Add(to);
    m.From = new MailAddress(from);
    m.Body = mail;
    m.Subject = txtSubject.Text;

    SmtpClient smtp = new SmtpClient("smtp.gmail.com");
    smtp.EnableSsl = true;
    smtp.Port = 25;
    smtp.DeliveryMethod = SmtpDeliveryMethod.Network;
    smtp.Credentials = new NetworkCredential(from, pass);
    try
    {
        smtp.Send(m);
        MessageBox.Show("Email has sent successfully", "Info", MessageBoxButtons.OK, MessageBoxIcon.Information);
    }
    catch (Exception ex)
    {
        MessageBox.Show(ex.Message);
    }
}
```

Figure 13 Simple Mail Transfer Protocol

The figure above shows the simple transfer protocol code to send emails. We used some classes/methods to build the email system. one of the most important ones is to include the main library. then we add the mail message class to construct the email messages for delivery. The Secure Socket layer(SSL) should be enabled to have a secure connection. Ultimately, to authenticate the processes in the SMTP, we used network credentials.

It can be done with less secure apps method which uses less security system. Unfortunately, while trying to test using the Gmail email service, the Gmail company disabled this feature for security purposes. For example, some webmail services like Hotmail, Yahoo, and others, allow sending mail via apps that have fewer security systems. These emails could be found in the spam section.

3.2.10 Configurations

Configuration plays a crucial part in better controlling the system and ensuring that it performs perfectly by assisting in the avoidance of potential problems or system complexity [8].

Figure 14 shows the configuration code

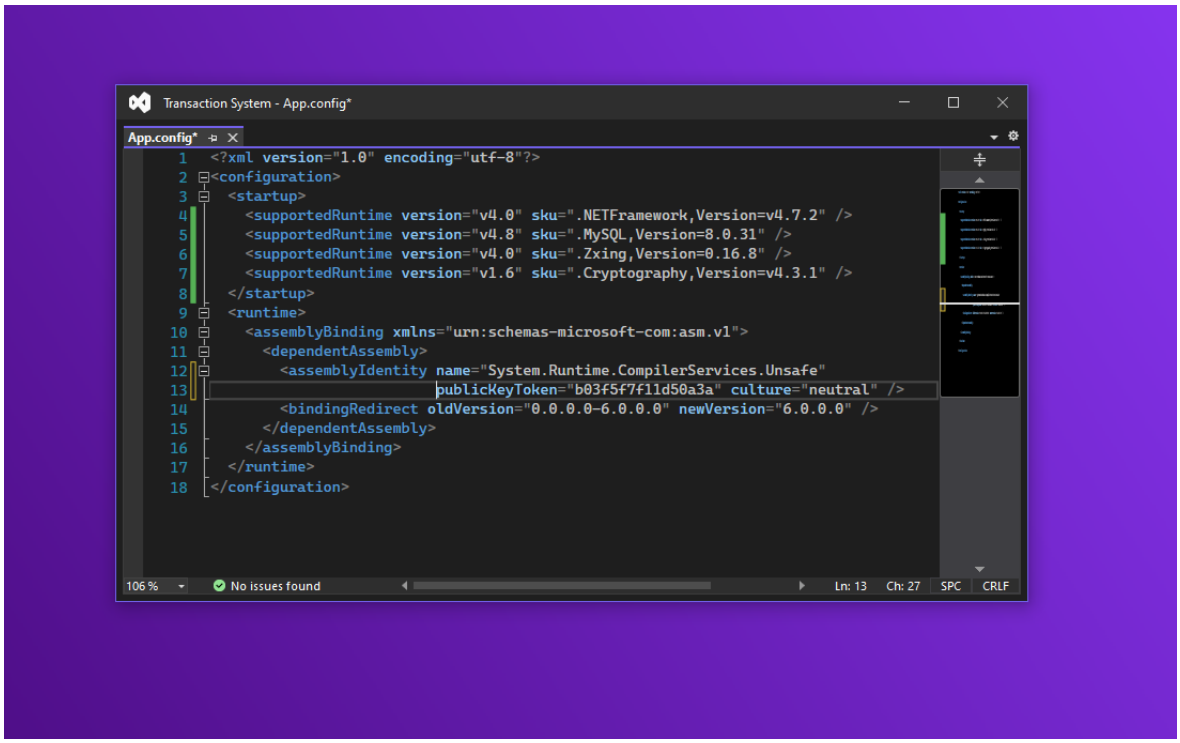


Figure 14 Config File

The figure above shows the configuration file which contains private data. These data is useful to modify how the common language runtime locates and loads assembly files.

3.2.11 Maintenance

Software maintenance is the process of changing, modifying, and updating software to keep up with clients' needs.

Maintenance is the next phase after implementation. The major goal of this stage is to make sure that the system we are currently using continues to work as intended and may be updated as necessary. The maintenance stage is the second longest phase after the design phase due to the problems that came up after implementation and also due to the changes to the system. One of the most crucial stages in the software development life cycle (SDLC) is the maintenance stage because it ensured that the invoice management system ran efficiently, handled a number of issues that would be covered, and helped identify the necessary adjustments to be made to the current system.

One of the problems faced is system crashing which means a system not working properly. system crash occurred because of the errors that kept showing up while testing the system for a while because it does not show what is the exact problem. it was solved by handling some exceptions to avoid the crashes and also to know what kind of crash happened.

Moreover, that and solved is system performance. Previously, the system was pretty slow while running because of the massive storage space. Therefore, we include the Don't Repeat Yourself method(DRY). This method is used to avoid duplicating the codes to have better performance when running and to avoid the project's codebase.

Finally, the system is needed to have some changes and updates. It required the supervisor to modify some parts of the system and also to add some features. This kind of change needs to go back to some phases to be able to do the supervisor's requests. By doing this, maintenance becomes the longest stage in the software development life cycle(SDLC)

3.3 Limitations and Experience Gained

Due to a lack of expertise and participation in such real-world programs, there are various issues that arise during summer training when designing the system. Additionally, the biggest challenge encountered throughout the internship was dependency on others, which meant that whenever becoming stuck in a difficulty, there was a need for assistance from either experienced people or endless YouTube videos.

The design phase was one of the hardest aspects. There are a few explanations for why this section was not simple. First of all, the primary issue with this project was that the design stage's exact structure was not followed throughout the software development life cycle (SDLC). There were also two different platforms. Every platform has a distinct layout. Therefore, having many versions of a system requires a lot of time and work. It just took two weeks to complete that portion.

Additionally, there was a significant error made when going on to the implementation phase; it turns out that a component was missed when constructing the database's tables. This error significantly misled the design phase. As a result, the design phase was repeated.

Another issue was creating an email system, which was caused, once more, by the lack of prior real-world projects. Before finding a method to send emails, this component continued to not operate for a very long time.

The task could have been done better if there were a prior experience available since this was the first time to work in real life projects. Additionally, the tasks should have been divided into sub tasks according to the given time.

In summary, the knowledge obtained and gained from this project are about how to create the software from scratch using a process and follow that methodology all the way through the creation of the product, time and effort estimation was yet another new skill acquired. It will be simple to finish the tasks in the allotted time if they have been divided into specified time periods.

As a university student, summer training is crucial since it is the first opportunity to participate in a real-world project. The first step to becoming a software developer is to complete this internship.

4 RECENT TOPICS IN THE CONTEXT OF WORK DONE

The course learning platform is from Udemy company. The course name was **"CRUD Application With PHP, MYSQL, and JQUERY**". the course was divided into section and subsections. the contexts of the course started from an introduction of the course going further to creating the client and server side. The course was started during the summer training and completed on **24 December 2022**. The course period is **13.5 hours**. It is divided into different topics [9].

These topics that are focused on are :

- Building a fully functional create, read, update, delete(CRUD) application.
- Creating custom server-side validations.
- Creating custom client-side validations.
- Creating user dashboard.
- Implementing password reset functionality.
- Password encryption.
- Using swift mailer.
- Implementing password reset functionality.
- Adding, reading, updating, and deleting data from MYSQL database.

The primary focus of this course was on building websites using the CRUD approach, which stands for create, read, update, and delete. The CRUD method was carried out using PHP as the programming language. There are several reasons why this course was chosen. One of the most crucial is that our project's CRUD methodology is its core component. Since each of the project's stockholders—including employees, invoices, and clients—needs their own data that is always current, the invoice management system project depends on the CRUD approach to carry out this activity. In addition, The ability to customize the server-side, perform user authentication, and validate incoming data are further reasons why this course was chosen. Secure Hashing Algorithm was also utilized during the course. It provides a very thorough description of how to use the encryption feature to protect users' passwords.

The course started with a short introduction about the contents of the course, and it moves to setup the database. then it jumps to the CRUD method. The first thing done is building the registration system. this section was the longest and most important part because in our project, the main idea is concentrating about management system which focuses in CRUD methodology. It started with designing the index page and user registration form. then it jumps to sitting up the database tables for signing up and sign-up script validation using PHP.

After finishing building the registration system and login. it jumps to user profile section. it becomes interesting part because it is focusing similar idea to our project scope. The first thing is done in this section is designing stage where bootstrap framework was used. then it adds the insert user data and fetch the data from the database table. Finally, it adds the update and delete functionality to the system.

5 CONCLUSION

The project's primary objective was to integrate corporate life with the environment of software development. It made a crucially strong sense that the company that the trainee worked for was actually engaged in a project that included these two essential components. The company's staff members perform an intriguing task by transforming a business logic concept from the real world to software development. Confidently, this internship was so useful for the trainee since it increased many aspects so greatly from time management, communication skills, and organizing, to technical aspects. There are still some aspects that need concentration and development, such gaining some experience with the logic syntax, which requires for applying it to real-world rather than just the development part because doing so will make the logic more comprehensive for software development. As a result, we learned that collaboration and a solid understanding of business logic are key components of software development. We also observed that time management could have been improved and that the task may have been finished sooner if it had been divided into smaller, more manageable pieces.

Finding out my strengths and weaknesses through the internship was also very beneficial in identifying the skills and knowledge that needed to be improved. We feel that after receiving this training, the internship has inspired us to pursue a career in the software development industry.

In brief, the summer training was the first station to gain experience and knowledge by practicing and communicating. The interesting part was having supervision to force and push and direct the trainee during the training.

It was a great opportunity to have an internship at Lina Soft company and learn many things not only related to software development but also in a business logic way.

I would definitely advise all students to concentrate more on their summer training because it is the first opportunity to learn about their academic subjects, push themselves, and engage in real-world initiatives. The introduction to this course demonstrates the knowledge of our university. I think everyone should enroll in this course to learn the foundational ideas behind the subjects they are studying.

Finally, I would like to express my sincere gratitude to Cyprus International University for giving the students this chance to apply what they have learned to a real-world project. The summer training's road mapping exercises and all the courses taken were useful.

6 References

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7 APPENDIX

The flowchart diagram is shown in **Figure 15**

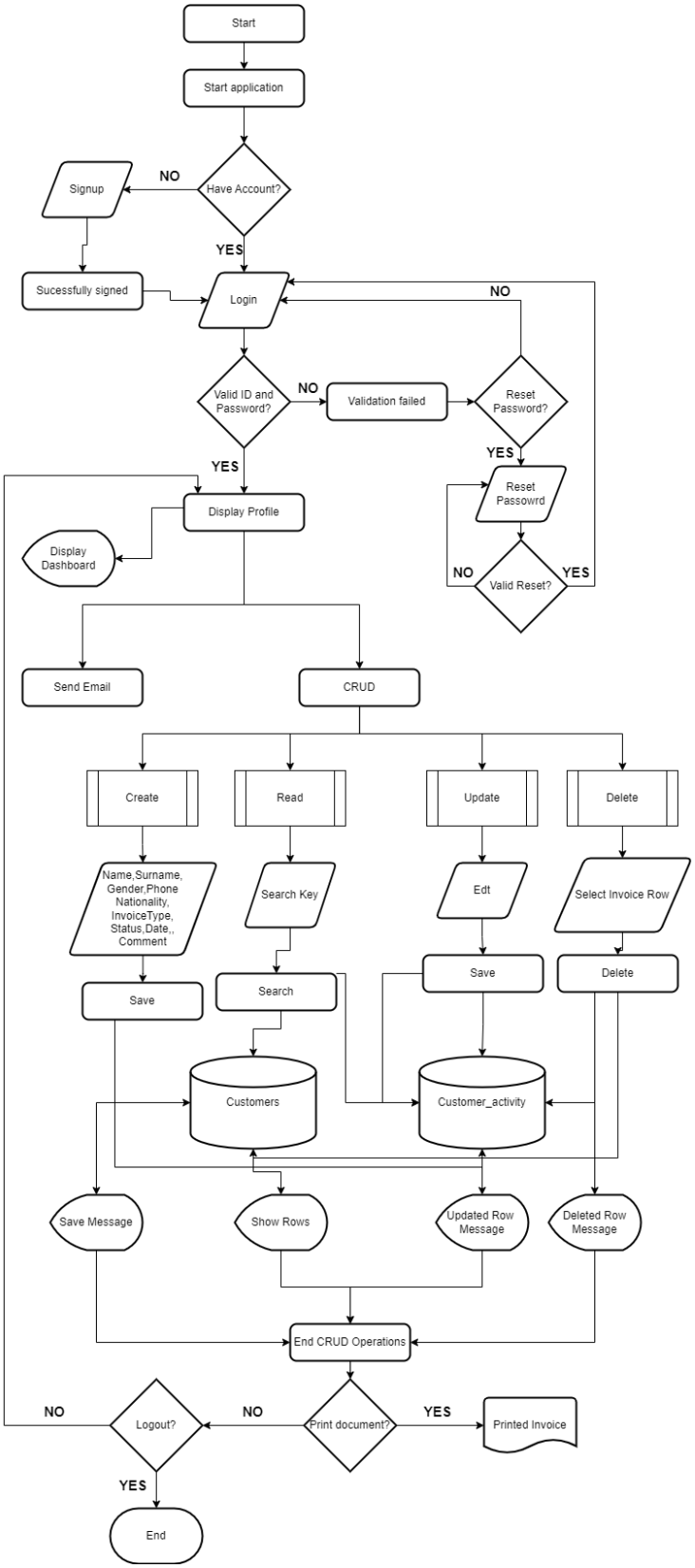


Figure 15 Flowchart Diagram

Entity Relationship Diagram is shown in **Figure 16**

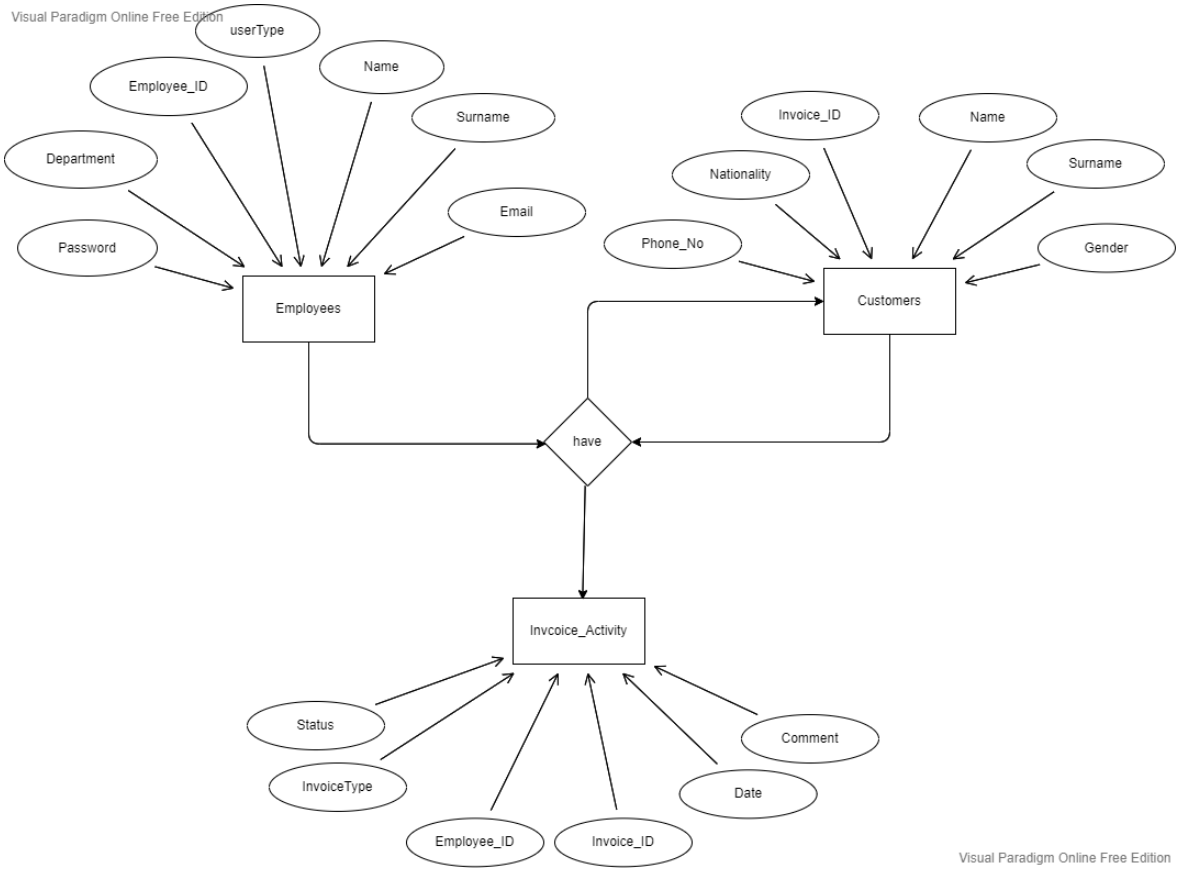
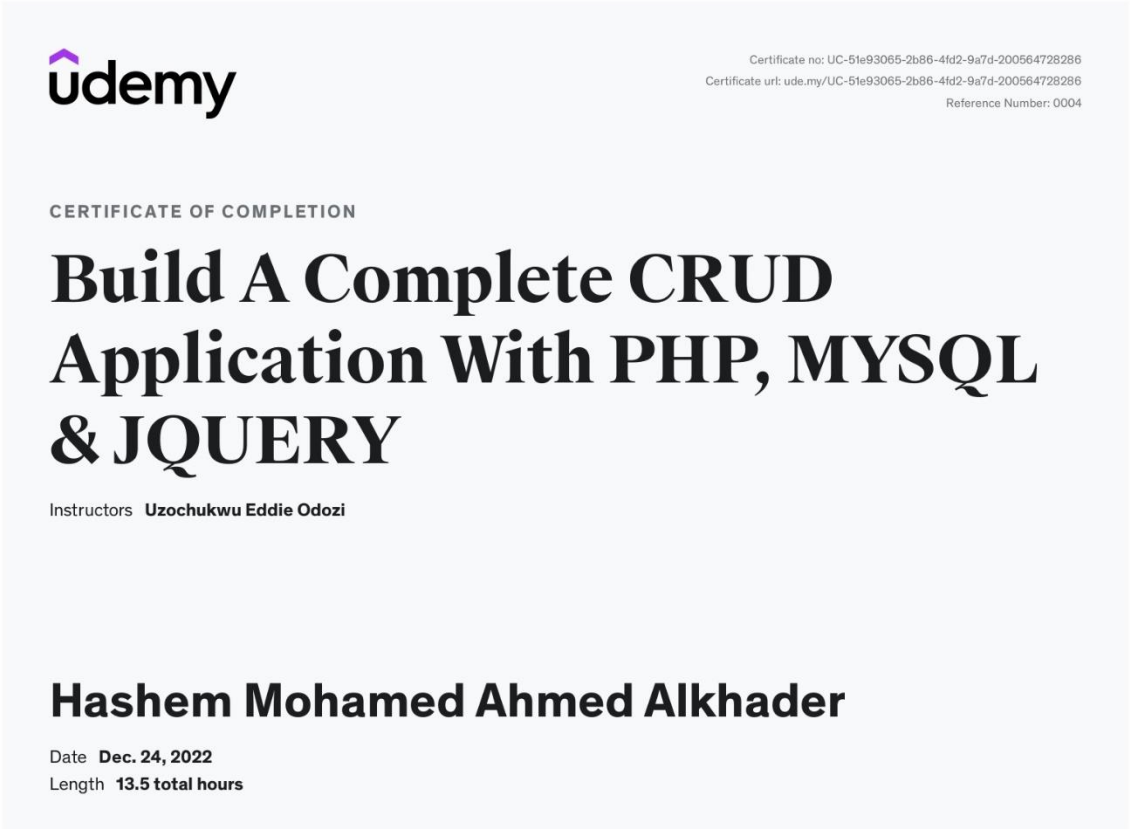


Figure 16 Entity Relationship Diagram

Udemy Certificate is shown in **Figure 17**

The course name is **"Build A Complete CRUD Application With PHP, MYSQL, and JQUERY"**. The length of this course is **13.5 hours** and ended at **24/12/2022.**


udemy

Certificate no: UC-51e93065-2b86-4fd2-9a7d-200564728286
Certificate url: ude.my/UC-51e93065-2b86-4fd2-9a7d-200564728286
Reference Number: 0004

CERTIFICATE OF COMPLETION

Build A Complete CRUD Application With PHP, MYSQL & JQUERY

Instructors **Uzochukwu Eddie Odozi**

Hashem Mohamed Ahmed Alkhader

Date **Dec. 24, 2022**
Length **13.5 total hours**

Figure 17 Udemy Certificate

MySQL codes in the desktop version are shown in **Figure 18, Figure 19, Figure 20,** and **Figure 21**

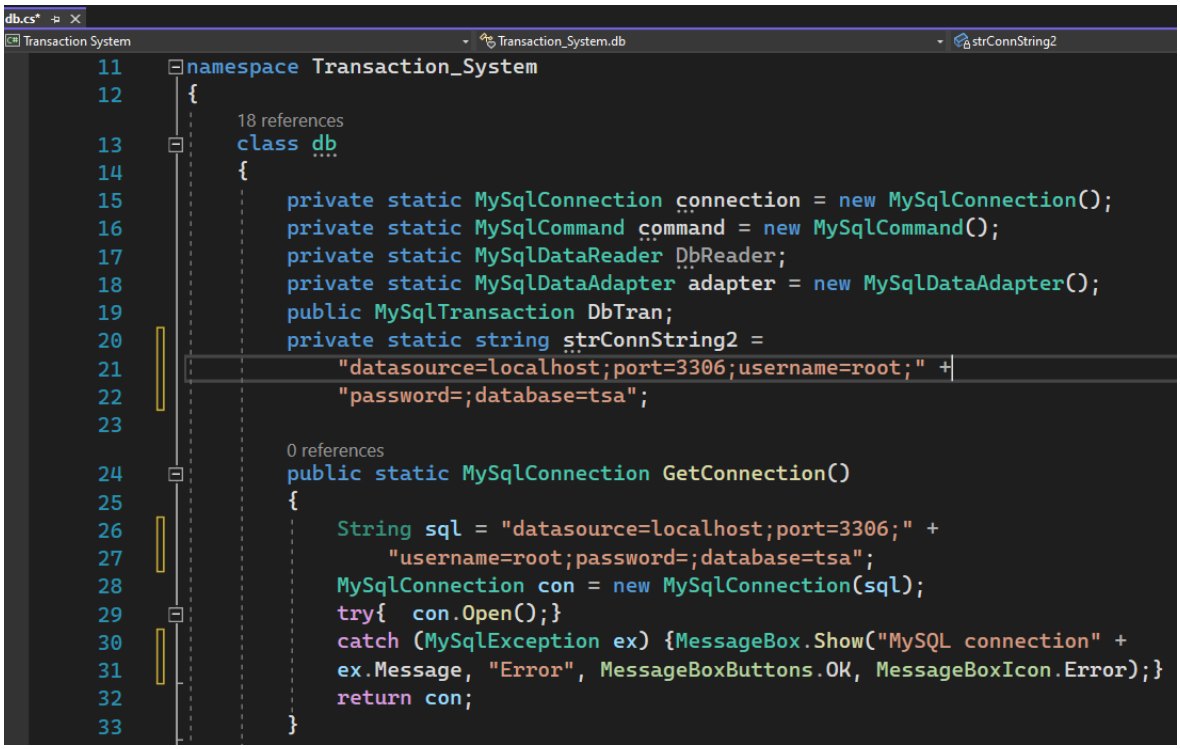


Figure 18 MySQL codes in the desktop version

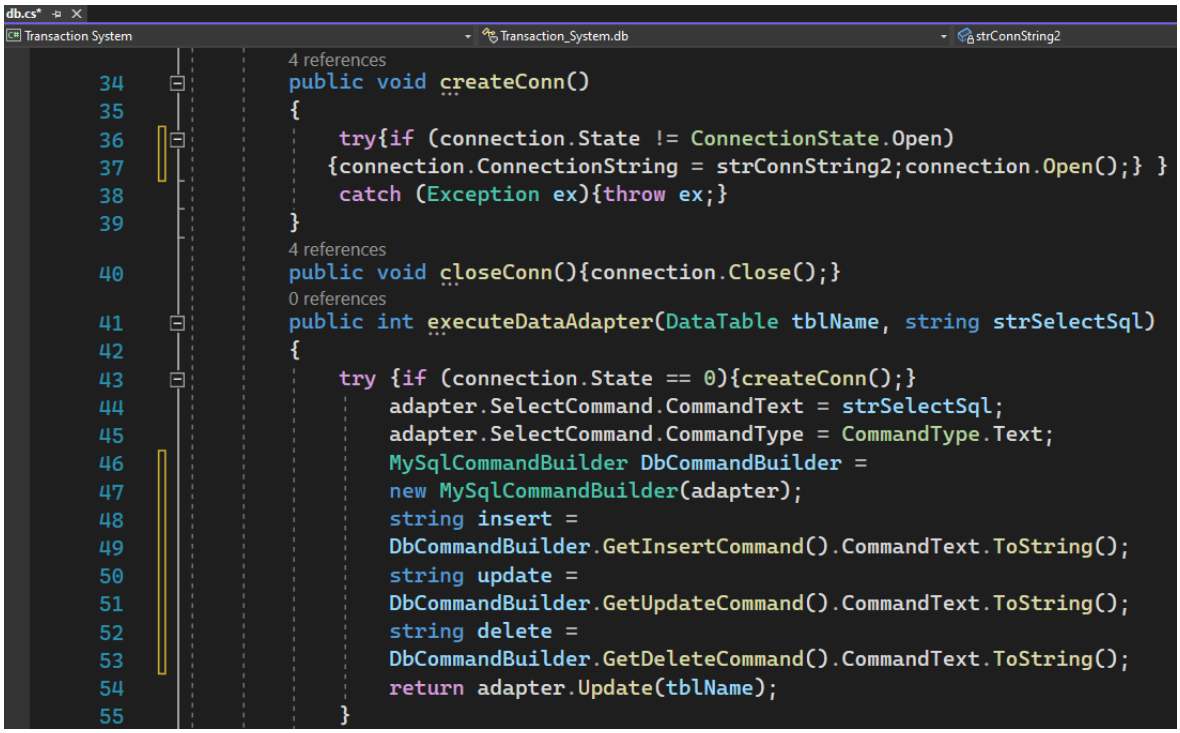
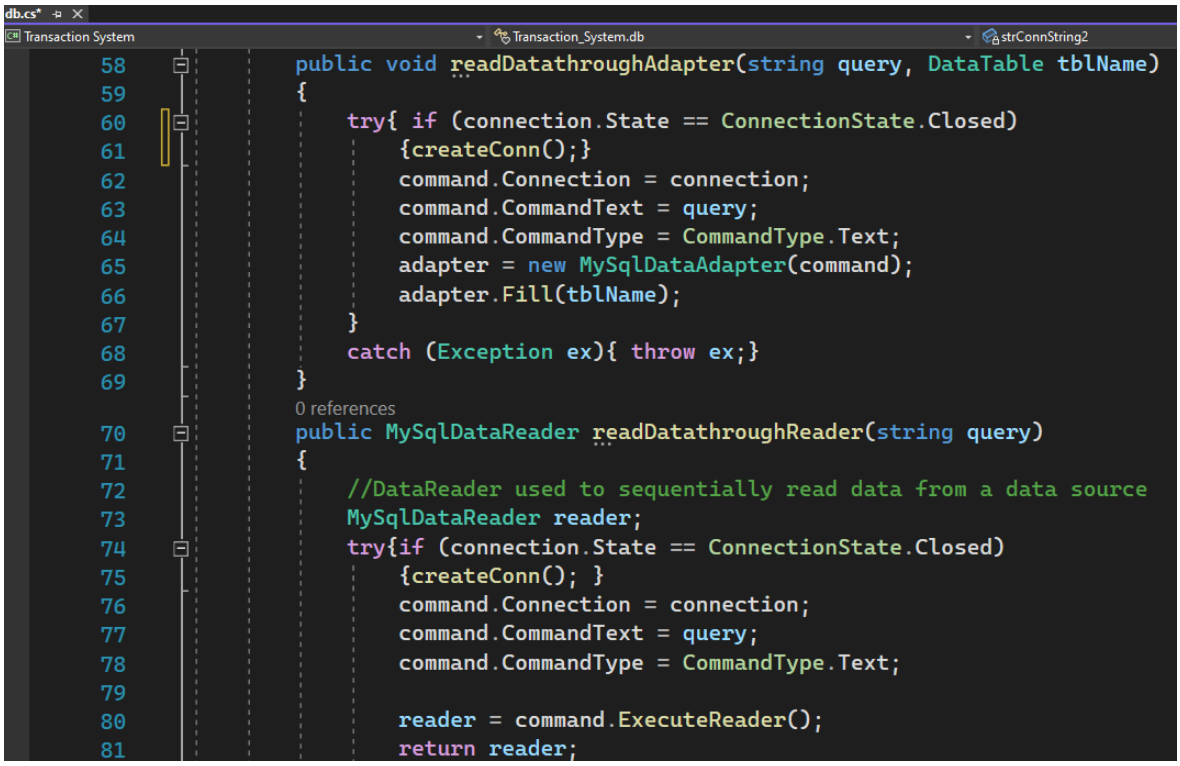
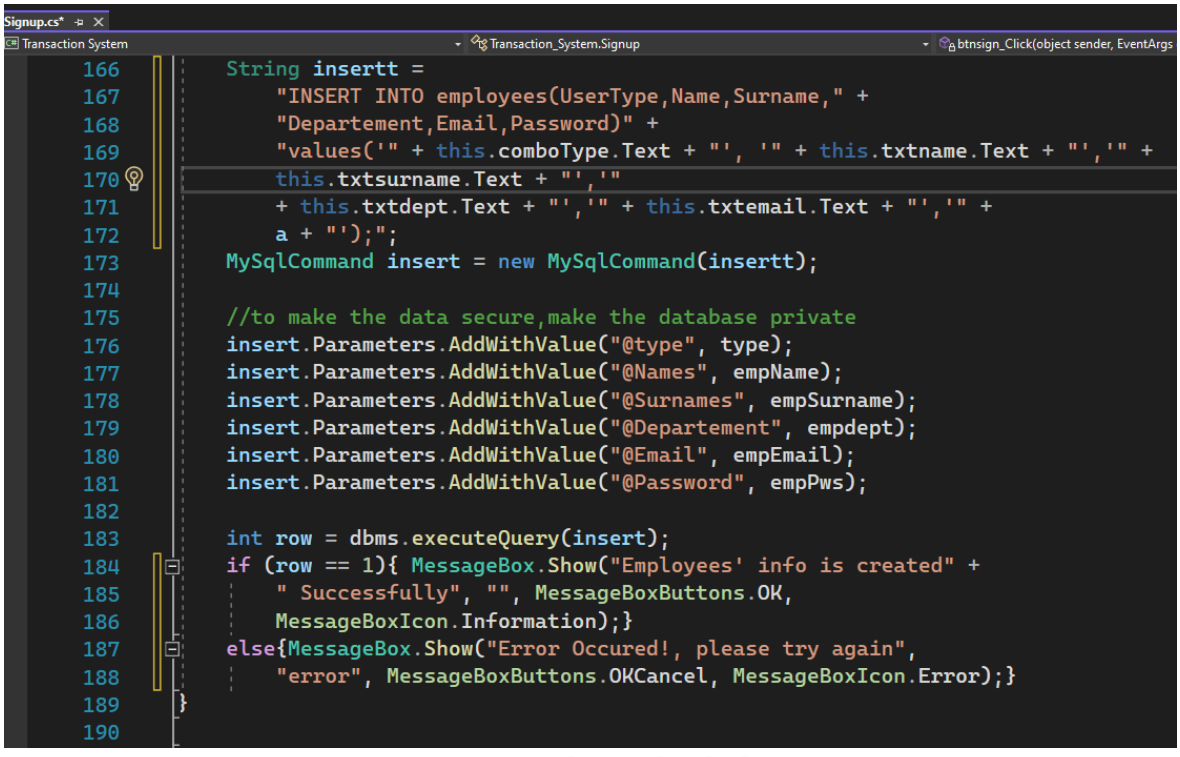


Figure 19 MySQL codes in the desktop version



```
db.cs*
Transaction System                    Transaction_System.db                    strConnString2
58      public void readDatathroughAdapter(string query, DataTable tblName)
59      {
60          try{ if (connection.State == ConnectionState.Closed)
61              {createConn();}
62              command.Connection = connection;
63              command.CommandText = query;
64              command.CommandType = CommandType.Text;
65              adapter = new MySqlDataAdapter(command);
66              adapter.Fill(tblName);
67          }
68          catch (Exception ex){ throw ex;}
69      }
        0 references
70      public MySqlDataReader readDatathroughReader(string query)
71      {
72          //DataReader used to sequentially read data from a data source
73          MySqlDataReader reader;
74          try{if (connection.State == ConnectionState.Closed)
75              {createConn(); }
76              command.Connection = connection;
77              command.CommandText = query;
78              command.CommandType = CommandType.Text;
79
80              reader = command.ExecuteReader();
81              return reader;
```

Figure 20 MySQL codes in the desktop version



```
Signup.cs*
Transaction System                    Transaction_System.Signup                    btnsign_Click(object sender, EventArgs
166     String insertt =
167         "INSERT INTO employees(UserType,Name,Surname," +
168         "Departement,Email,Password)" +
169         "values('" + this.comboType.Text + "', '" + this.txtname.Text + "','" +
170         this.txtsurname.Text + "','"
171         + this.txtdept.Text + "','" + this.txtemail.Text + "','" +
172         a + "');";
173     MySqlCommand insert = new MySqlCommand(insertt);
174
175     //to make the data secure,make the database private
176     insert.Parameters.AddWithValue("@type", type);
177     insert.Parameters.AddWithValue("@Names", empName);
178     insert.Parameters.AddWithValue("@Surnames", empSurname);
179     insert.Parameters.AddWithValue("@Departement", empdept);
180     insert.Parameters.AddWithValue("@Email", empEmail);
181     insert.Parameters.AddWithValue("@Password", empPws);
182
183     int row = dbms.executeQuery(insert);
184     if (row == 1){ MessageBox.Show("Employees' info is created" +
185         " Successfully", "", MessageBoxButtons.OK,
186         MessageBoxIcon.Information);}
187     else{MessageBox.Show("Error Occured!, please try again",
188         "error", MessageBoxButtons.OKCancel, MessageBoxIcon.Error);}
189 }
190
```

Figure 21 MySQL codes in the desktop version

MySQL codes in the web version are shown in **Figure 22, Figure 23, and Figure 24**

update.php code.php

code.php

```php
if(isset($_POST['save_invoice']))
{
    // mysqli_real_escape_string for protection
    $name = mysqli_real_escape_string($con, $_POST['name']);
    $surname = mysqli_real_escape_string($con, $_POST['surname']);
    $gender = mysqli_real_escape_string($con, $_POST['Gender']);
    $nationality = mysqli_real_escape_string($con, $_POST['nationality']);
    $phone_no = mysqli_real_escape_string($con, $_POST['Phone_Number']);

    //second table
    $emp_id = mysqli_real_escape_string($con, $_POST['employee_ID']);
    $invoiceType = mysqli_real_escape_string($con, $_POST['invoice_type']);
    $status = mysqli_real_escape_string($con, $_POST['status']);
    $date = mysqli_real_escape_string($con, $_POST['date']);
    $comment = mysqli_real_escape_string($con, $_POST['comment']);

    $query = "INSERT INTO customers (Name,Surname,Gender,Nationality, PhoneNumber)
     VALUES ('$name','$surname','$gender','$nationality',$phone_no)";
    $query2 = "INSERT INTO invoice_activity (EmployeeID,InvoiceType,Status,Date, Comment)
     VALUES ('$emp_id','$invoiceType','$status','$date','$comment')";

    $query_run = mysqli_query($con, $query);
    $query_run2 = mysqli_query($con, $query2);
```

Figure 22 MySQL codes in the web version

update.php code.php

code.php

```php
}
// Update invoices
if(isset($_POST['update_invoices']))
{
    $emp_id = mysqli_real_escape_string($con, $_POST['emp_id']);
    $invoice_id= mysqli_real_escape_string($con, $_POST['invoice_id']);
    $name = mysqli_real_escape_string($con, $_POST['name']);
    $surname = mysqli_real_escape_string($con, $_POST['surname']);
    $invoice_type = mysqli_real_escape_string($con, $_POST['invoice_types']);
    $status = mysqli_real_escape_string($con, $_POST['status']);
    $date = mysqli_real_escape_string($con, $_POST['date']);
    $comment = mysqli_real_escape_string($con, $_POST['comment']);
    $query = "UPDATE invoice_activity SET InvoiceType='$invoice_type',
    Status='$status', Date='$date', Comment='$comment' WHERE EmployeeID='$emp_id' ";
    $query = "UPDATE customers SET Name='$name',Surname='$surname' WHERE InvoiceID='$invoice_id' ";
    $query_run = mysqli_query($con, $query);

    if($query_run){ $_SESSION['message'] = "Invoice Updated Successfully";
        header("Location: update.php"); exit(0);
    }
    else{ $_SESSION['message'] = "Invoice Not Updated";header("Location: update.php"); exit(0); }

}
```

Figure 23 MySQL codes in the web version

```php
// Delete Invoice
if(isset($_POST['delete_invoice']))
{
    $invoice_id = mysqli_real_escape_string($con, $_POST['delete_invoice']);

    $query = "DELETE FROM invoice_activity WHERE InvoiceID='$invoice_id' ";
    $query_run = mysqli_query($con, $query);

    if($query_run)
    {
        $_SESSION['message'] = "Invoice Deleted Successfully";
        header("Location: view.php");
        exit(0);
    }
    else
    {
        $_SESSION['message'] = "Invoice Not Deleted";
        header("Location: view.php");
        exit(0);
    }
}
```

Figure 24 MySQL codes in the web version

The printing documents feature that included the information a printed document including the barcode that identifies the exact invoice is shown in **Figure 25**

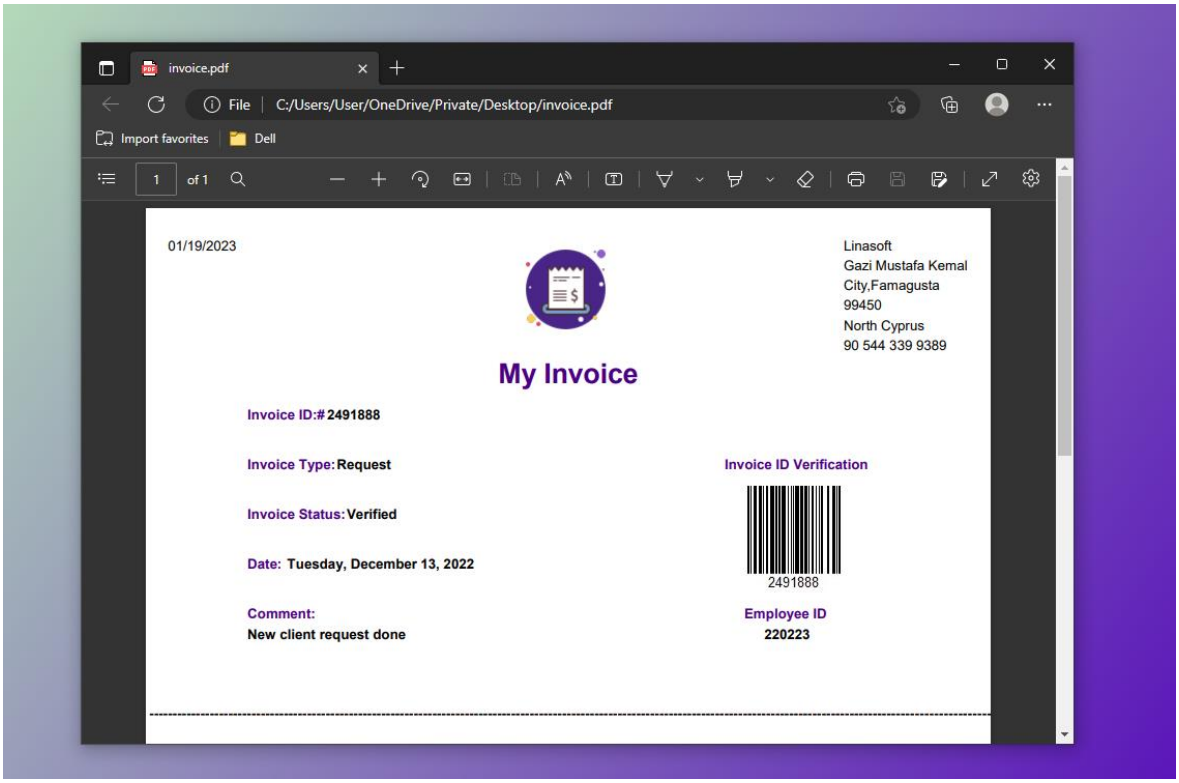


Figure 25 PDF printing document feature