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## "Project and implementation of Holiday Booking System for a medium size company in C#, ASP.NET, SQL Server technologies."

BACHELOR THESIS

WRITTEN UNDER THE SUPERVISION OF

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## Abstract

Holiday Booking system is the application which works for the employees of organization as to plan the holidays online and meet their expectation, respectively. The present report is about the firm Crown Education Limited, which is facing many issues related to the holidays of their staff members as they are offering the holidays on per year basis. The main issue which has been faced by firm is operating the business effectively when more employees are on holiday and with regard to this issue, the firm has decided to develop such a system which will manage all the leaves of employees and booked the holiday respectively. The proposed system will be going to allow the firm to run and effectively operate an organisation as the holidays are to be booked by the online system as per the request of a staff member for leave. The system has developed and designed on C# and ASP.NET languages as this allow them to develop dynamic and rich applications and websites. This system work as desktop and web application. The database of developed system is to be store on SQL server and Oracle as this allows to create, retrieve and maintain the relational databases. The present report is going to give a brief introduction about the holiday booking system along with the proper literature review in which the information has been gathered using the qualitative and quantitative research methodology. The data collection methods are also used to gather the authentic information. Various UML diagrams along with the blueprints of proposed system are also stated in existing reports so that the functioning of system can be explained effectively. Apart from this, in the end suggestions are recommended for the betterment of booking system along with the complete summarization of report in conclusion part.

## Preface

This project has been carried on as a solution for a small type company which is dealing with holiday issues for couple of years. A holiday booking system has been developed as a solution for this issue. This solution has been developed in the academic year 2020 -2021.

The information presented in this project were gathered from credible sources, Journal, related textbooks, and other literature.

## Acknowledgement

First, I want to thank my family friends and supervisor for their cooperation and support, the completion of this course would not have been possible without their support and trust.
Thank you, DR. Piotr Zaremba.

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# 1. Introduction

Holiday booking system tends to be vital for the different organisations. Most of the organisations work on yearly basis and their activity is not stopping even in different time of the year. From the business point of view the organisation cannot afford losing clients because of missing staff which claimed holiday. This makes the need of a holiday booking system in place to track the employees that are going in holidays which will help to replace them with other staff that is not going in holiday. There is a need of a holiday booking system as the departments should be running without any discrepancy of staff. This will guarantee both employees guaranteed 30 days of holiday per year (as per company policy) and this will help the company to run their business without any disturbances. The system will help HR Manager to log in with their ID or Email and look at the list of the outstanding holidays. The HR Manager can also add up employees in the system, can delete employees and manage their request. The system will also show the dates from when to when a holiday was requested, and the HR Manager will be able to approve it or decline.

This report will present a desktop application for holiday booking along with a web application running through Asp.net which will offer a user-friendly interface for the company staff. The purpose of this system is to offer staff to book their own holiday by selecting the dates convenient for them and wait for the request to be either approved or rejected by the HR Manager.

Human resources are most valuable assets of any organization. Human resources play an important role in the success of an organization therefore, it is very crucial to manage the human resources in order to run our organization efficiently and capably. If any organization cannot be able to manage their valuable human resources, then it is impossible for the organization to grown and compete with the competitors. In this report, we proposed a system to solve the problems and issues faced by Crown Education Ltd organization due to poor management of annual leaves of their human resources. The organization provides the number of days of holiday entitlement per year to their employees. Due to manual and poor leave management system, the organization is facing as the performance of the organization gets effects when most of the people from same department simultaneously goes to annual holidays. In other word "it is difficult for an organization to work efficiently and continue all functioning properly on time when the mostly staff of the organization are on leave at the same time". Therefore, there is a need to develop a system of holiday booking for the employees of Crown Education Ltd organization.

Leave management of the employees of an organization is critical to get successful and to gain high reputation in the market. Leave management keeps record of leaves taken by everyone according to each department. It plays an important role in managing the human resources efficiently and assists the manager to utilize his employees in best possible way. Leave management system is an automated system that enables the organization to manage all kind of leave records of the company automatically. It is easily accessible by using the Internet technology and managers can retrieve all the leave records.

This report provides the details of the development of a system of holiday booking; this system of holiday booking develops mainly work as a desktop application and web application. Our holiday booking system will help the Crown Education Ltd organization to manage the request of a holiday by employees. It also helps the organization to work effectively by managing leave requests of employees from same department in such a way that employees from same domain or working on same project will not be on leave simultaneously. It will streamline all the leave procedures and automate related workflow.

## 1.1 Problem Statement

The Crown Education Ltd organization provide approximate 30 holidays to their employees per year. All the employees can go on leave to enjoy holidays, but the main problem with the organization is "it is difficult to work in an efficient way and continue all functioning properly on time when the mostly staff of the organization are on leave at the same time". Therefore, it become difficult for the organization to handle or manage all the organizational operations properly and effectively. In the Crown Education Ltd organization, there are five different departments to perform different tasks and handle the work; these are admission, marketing, IT, teachers, and the assistants. So, the main objective of this research is enabling the organization to manage the holidays of employees according to the workload. The entire approval for the employee's holidays can easily handle and manage by the proposed holiday booking system.

## 1.2 Company Background

The holiday booking system at the recruitment agency is currently done over the words of mouth and the record for each person's holiday is currently held on Excel Spreadsheet which is usually at the access of the HR Manager only, another problem which company faced is the amount of staff going on holiday both from management and employees in busy periods of time. Busy periods of time usually it represents the time before the main holidays which are (Easter, Christmas and Bank holidays). The system would store all the requests of the employees and thereafter the HR Manager, along with the Director of the company would be able to approve the request or deny it, based on certain criteria which are: Job Title, Amount of days taken previously of holiday, reason for holiday (if there is an emergency – the request would be approved on priority basis), department status (busy or not busy).

With online booking system the HR Manager can see previous request of the employer and decide if it can be approved or not. Also the HR manager can be able to approve or reject the request and the employer can receive a feedback of request status straight away once the decision was set, without being necessary to email the HR department or to wait for an update. The manual handling of the holiday requests can cost the company more money and can cause trouble if the excel file is being corrupted, or the request is not being saved into the spreadsheet and the HR Manager will have to be paid for extra hours worked.

Currently Crown Education Ltd organization, an educational recruitment company, is using manual system to manage the leave records of everyone. Employees send leave application through email to HR manager for approval. If application for leave approves then data is manually typed into Excel spreadsheets. The need for this is to manage the human resources, leave records and efficient human resource utilization by the manager and utilization of annual leaves by each employee.

The HR manager of the organization is responsible for the management of the records of leaves of everyone. He enters record of approved leave application of everyone into Excel sheet and manages these records. Every employee sends leave application through email to the HR manager. HR Manager is responsible for approval and disapproval of leave based on the previous record and discussion with the Director of Company. He then sends the feedback to employee regarding. However, it is a very lengthy, time consuming and inconvenient procedure especially for the employees and HR manager.

The company faces main issue before start of the main holidays such as Easter, Christmas etc. Many employees start applying for the holidays just before the main holidays. Due to lack of systemized and automatic system, company face several issues such as employees working on same project get holidays at the same time. Current manual system does not have the ability to anticipate this aspect, as it has no visual outputs and interactive interface for the manager to check the employee details,

corresponding departments and number of employees already on leave of corresponding department that effects the overall performance of the organization.

With online booking system, the HR manager can be able to approve or reject the leave requests of employees based on their previous leave records and impact of employee's holiday on company especially during peak work months. The employees can receive a feedback of request status straight away once the decision is set, without being necessary to send an email to the HR department and wait for next procedure. It will not only facailitate and streamline the work of HR manager but also give relief to employees. It will enhance the performance of the company that gets affected before major holidays and every employee will be beneficiated by their annual holidays equally.

## 1.3 Current Situation

The office is operating on 7 days out of 7. The office is being operative from 10:00 to 19:00. Per year, every single employee is entitled to 30 days for holiday plus bank holidays. Usually every employee is entitled to take holidays as follows - 2 weeks of 7 days and 2 weeks of 8 days. These weeks are currently allocated per year. Every single employee can take one holiday per season usually (winter, spring, summer and autumn).

A lot of people are usually book their holiday close to big holidays such as Easter time or Christmas (old type) and during the summertime when usually the flow of clients in the company is higher than usual. This makes the HR department to be more requested than usual as everybody wants to book their holidays. First problem that comes up is the HR Manager that needs to deal with all the requests. Second problem that the company faces is the staff importance in the company.

Managers and senior members of the management team need to be in the company when the peak time is but they also need to take a holiday as because they have a family and it have been a long time since they did not requested a holiday. All these make the booking of holidays a real problem for the company, as there are tremendous number of requests pending. The work load of data entry operator and HR manager increases and they needs to check when the employee took last the holiday, how busy the department is and if the employee already took a holiday recently and wants to request another one, what is the reason behind this etc. that is a very difficult task due to manual work.

The organization start operating from 9:00 am to 5:00 pm. The organization remains open for 5 days in a week. Per year, every single employee is entitled to 30 days for holiday plus bank holidays. Usually every employee is entitled to take holidays as follows - 2 weeks of 7 days and 2 weeks of 8 days. These weeks are currently allocated per year. Every single employee can take one holiday per season usually (winter, spring, summer and autumn).

Employees send written application for leave to the Manager's assistant who in turn send all the applications to the manager after lunch for approval or disapproval. The HR Manager approve or disapprove the application by checking in-depth the record managed in the Excel sheet by the data entry operator. Then he makes the decision, send it back to his assistant who then send it to the data entry operator for record entry, and informs the employees about the decision before closing of the company.

## 1.4 Aims

To create a desktop application and a web application which will help both employees and HR Manager to book, manage and edit holiday requests in the company. To create a desktop application and a web application, which will help employees to request for holidays, view their leave history, number of holidays left, updates about sent requests and will also help HR Manager to manage, approval/disapproval employee request and edit holiday requests in the company.

## 1.5 Objectives

**1.5.1 Literature Review chapter will demonstrate reviewing of the related prevailing systems and literature based on the topic area (Employee Management) and how the holiday requests work in Europe.**

1.5.1.1 Effective UI/UX based Desktop and Web Application

1.5.1.2 Develop system that helps employees and HR manager to request for holiday and to manage leave record respectively while considering effect of leaves on organization.

1.5.1.3 Investigate how leave request and record system is managed.

1.5.1.4 Analysis of existing technique.

1.5.1.5 Provide a convenient way of leave request and management for both employees and HR manager.

1.5.1.6 Designing and developing a system for employee holiday booking.

1.5.1.7 Ensure easier, consistent and more rapid employee holiday booking facility.

1.5.1.8 Give HR manager an easy way in managing the employees holiday requests, their previous record and departmental leave information, this gives him the ability to be more responsive to his employees leave requests.

**1.5.2 To examine a novel methodology that will improve the management of holiday booking by using online system**

1.5.2.1 To recognize valuable information from different technique.

1.5.2.2 To recognize the available data that can be useful in our research.

1.5.2.3 To test plan for assurance of bug free execution of system.

1.5.2.4 To analysis the previous methodologies to anticipate essential features in our new system.

1.5.2.5 To investigate the interfaces by using User persons, Axure, SQL-Server, (ASP.Net interface/ Web Part Interfaces / InfoPath forms).

**1.5.3 New System Evaluation**

1.5.3.1 Organizes leave requests, manages leaves record and different views to employees and HR manager. It enables the HR manager and employees to approve/disapprove and send leave requests from any electronic device such a computer, laptop, mobile and tablet.

1.5.3.2 Provide online holiday booking interface to the employees to send request for leave. Another web page is displayed to the HR manager that shows all the received requests from employees with Approval/Disapproval button. A feedback response is sent to the corresponding employee according to HR manager response.

**1.5.4 To create the desktop application enabling the employees and employees to manage their practice system**

1.5.4.1 Implementation of the back-end functionality of the system.

1.5.4.2 Establishing connection between database and back end functionality of system.

1.5.4.3 Implementation Front End User Interface using selected software.

1.5.4.4 Design user manual for the desktop application.

1.5.4.5 Data backup and recovery options

**1.5.5 To create the practice website.**

1.5.5.1 Implementation of the practice website

1.5.5.2 Implementation of User Experience based User Interface the GUI within the chosen tool.

## 2. Approach

In this section, we will describe the methodology and techniques elected to achieve the defined aims and objectives. We will also refer to the data collection approaches utilized to gather information necessary for our research work.

We will use literature review to acquire our objectives related to our system, designing of questionnaire, analysis and design of system, and data modelling. Various software such as C#, ASP.NET, CSS, HTML, and SQL-Server etc. will be utilized for the designing and development of the proposed system.

We will use Dynamic Systems Development Method (DSDM), agile methodology, for the development of our newly proposed system. There are many reasons for using this methodology instead of other possible techniques. One main reason is that it allows developing system in increments and allowing the development team to execute the testing phase in parallel. Another reason is that we can get feedback from the client based on prototypes. It will help in improving the quality of the system and make it more user friendly. Bug and errors can be easily identified in these small patches. It also allows to adjust changes easily at any stage unlike traditional software development models.

Following are eight main rules of Dynamic Systems Development Method (DSDM). DSDM has eight principles, they are:

### a) Focus on the business need.

This principle means that we must have clear understanding of the business priorities. We must develop a business case for better understanding of the project and priorities of the project. Every decision made should support the goals and developers must make sure that the project must be delivered on time.

### b) On-time delivery

On-time delivery of project is very crucial for the development team and for the project itself. If the project gets late, it will not only increase the cost but also cause legal issues. Therefore, we will set deadlines for each milestone in order to remain on safe side by meeting with Crown Education Ltd organization.

### c) Collaborate

Collaboration between Crown Education Ltd organization stakeholders, development team and testing team is very signification for the success of the project. All the Crown Education Ltd organization stakeholders will be involved at right time in the entire development process. The project manager will also involve subject matters, domain experts and other related professionals to gain knowledge and collaborate with each other and work as a "one team".

### d) No compromise on quality

Quality level set by the Crown Education Ltd organization should be achieved in order to meet the defined business goals.

### e) Build incrementally

Incremental development of system will allow the developer to send the corresponding prototype to the Crown Education Ltd organization to get the feedback. It will also increase the confidence level of both researcher and Crown Education Ltd organization stakeholders. It will also enable the completion project within time.

### f) Develop iteratively

In DSDM it is easy to integrate change and repeat the process again that enables the researcher to deliver accurate and correct solution to the Crown Education Ltd organization.

### g) Constant Communication

Constant communication is crucial for the success of the project. Bad communication can cause failure of the project. DSDM practices has such techniques that helps to improve the communication between the researcher and the Crown Education Ltd organization. The researcher will constantly communicate with the client and involve them in each phase.

### h) Demonstrate control

The researcher will make plans for each task and show it publicly so that stakeholders can see the progress. The progress of the project will be measured with respect to the number of products delivered instead of number of completed tasks. The researcher must have a firm control on the project all the time.

## 2.1     Approach to literature searching

A thorough research into literature searching was made. Journals, textbooks and other materials from credible sources were gathered, through which the information used in this project was found. Also, an Ethnographic observation was carried out through the following process:

1. Preparation:
    i.   Understanding the Annual holiday policy of the company by analysis of the documents provided.
    ii.  Understanding the current system's operation
    iii. Preparing questionnaire for requirement gathering
    iv.  Gain approval for observation of the current system and asking questionnaire from organization's staff.


2. Field study:
    i.   Establishment of relationship between manager and employees
    ii.  Acquire quantitative or qualitative data by perceiving or interviewing employees


3. Analysis:
    i.   Assemble the collected data
    ii.  Enumerate data and bring together the statistics.
    iii. Estimate the collected data and combine them to get useful information
    iv.  Clean irrelevant data for clear requirements
    v.   Enhance the goals and methodology used

4. Reporting:
    i.   Deliberate all audience and their goals
    ii.  Prepare the report to provide the results


## 2.2     Identifying the problem

| Issues | Proposed Solution |
|---|---|
| Manager does not have any control to visualize and analyse the previous leave records | The manager can deeply analyse the previous records and how company will get affected by new holidays by using the newly proposed system |
| Mostly employees do not have knowledge about computer usage | The proposed system using ASP.NET allows design of the UX based user interfaces for better and easily usage by the employees having low knowledge about computer. The newly proposed system is acting as a supplement of the current system. |
| Employees do not know about the holiday request update and their previous record | By using the new system, all employees can apply for leave by just one click and can view update about the sent requests. They can view their previous records too. It is efficient and effective for every employee. |

| | |
|---|---|
| Manager does not have any control to analyse the effect of holidays of employees from same department on organization | By using the new system, the manager will visually analyse the number of employees currently on leave or requesting for holiday from the same department. He will be able to analyse the effect of holidays from employees of same department on the performance of the organization. |

# 3. Need of Holiday Booking System

One of the fundamental units for achieving the success in business is "people". Unapproved holidays by employees, absence of majority of employees on peak working months, inappropriate planning of employees' holidays and lack of previous holiday record impact badly on the performance of the company. As a result, organization faces huge financial loss and decrease in the number of customers. The confidence and motivation level will be affected from these issues. Therefore, there must be consistent leave policies, proper mechanism for employee's holiday tracking etc., in the organization in order to increase the satisfaction level of the employees and efficiently use of the human resources by the organization. It allows the organization to better utilize their employees and take maximum output from all employees. The implementation of an efficient and effective holiday booking system will make sure that each employee empowers his or her organization for planning of his holiday in better way. It will assist in reducing the distortion in work due to employees' holidays and consume less time, less resource and less human effort in managing and planning of the holidays. It provides accurate results and better management of all records.

## 3.1    Security Issues

The design of a locker application is very necessary as computer users/client are facing problems in providing the structure of security to a folder. The purpose of security designing of this application by using C# and .NET is that it can be used in the window operating system. For this design, it makes the use of rapid planning methods, which can help it to make Rapid application development (RAD). This system makes the use of C# which enhances the performance of its. By using the C#, it makes the designing of the splash screen, login page, and main screen.
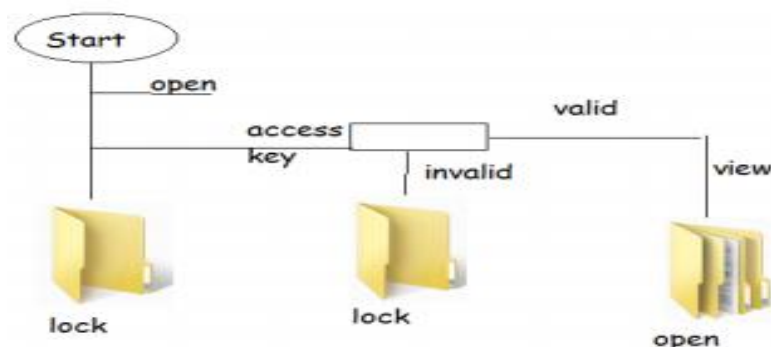


**Figure 1: Sequence diagram**

This above figure 7 represents the sequence diagram of the UML standard which makes the use of presenting objects which are very helpful in interacting with each other. This sequence diagram shows each procedure of interacting with each other. This shows how the user is going to have interacted with the user for filling the need of the customer. From this design, a properly designed folder is there which is said to be the encrypted folder. The locking process gives permission to make the key access

and this way this application is going to be a successful. By using the sequence flow diagram during the designing of the Holiday booking system all, the interfaces are going to be checked properly. RAD can be used in the designing or during the development of the system for holiday booking by using the C#, .NET and SQL Server.

SQL is a high-quality server to manage the database model in the application. Through the support of the SQL failure rate of data model should be reduced and increase the performance of application for web. When the server of SQL is used in the system then availability of database level must be very high. Log shipping and mirroring of database are the main factors that are followed in the protocol of SQL. Server of SQL is very effective for recover the database and provides the complete backup model for the application in web. In the model of SQL information is stored in the server and use for further assistance. Mirroring of database is the model that is performed in the protocol of SQL for providing the availability for data. In the mirroring of database use the two types of asynchronous and synchronous mode for store the information model.

For proper information and data backup use the model of SQL. Configure security protocol is used in the server of SQL for protecting the data. In the server of SQL provide the authentication protocol for increasing the security concern. Group availability is also part of server of SQL. Through the support of the group availability protocol increase the connection of database model. In the server of SQL use the virtual and physical server to increase the security concept. Model of SQL is very effective in the system of holiday booking to increase the security structure. This system provides the proper authentication model to increase the security concept and manage the entire work activity. Through the support of the virtual and physical server increase the storage capacity of the system.

Vulnerability of security is very important in the system of preventing the external/internal damage. Language of ASP.net is very effective tool for increasing the probability of work system. For the system of holiday booking use the ASP.net application of web to manage the security model. Concept of security is very important in the system of holiday booking to protect the client/user information. Language of ASP.net provides a path function through the rate of security concept in application must be increased. The security model provides an effective authentication protocol to justify the work activity that is perform in application. Vulnerability of security is the model through which the rate of work access is secure and protect from the external attacks. Security of web applications is a necessary part of the web structure to increase the rate of work protection.

Technique of C# is very effective to determine the errors in the application. Using the language of C# detect the errors in the application of web server. Application of C# provides a path function through analysing the lactation of the errors and provides a platform to remove the work error. In the language of C# use the open field source to detect the errors from the server. When the error should be reduced from the work application then the cost of the application must be reduced. Error-free web application increases the work efficiency and protection from the external attacks. The entire database information that is used in the application should be justified through the language of C# for manage the security protocol. Through the cause of the less error in the application of web quality of the information must be high. Technique of C# is to work on the Linux platform for increasing the security model. Technique of Linux is simple for application implementation and economic for use in open source. Cost reduction and process maintain is the main aim of C# for increase the life cycle of software. For recovery of the error use the language of C# to reduce the errors from the application. For built the system of holiday booking uses the C# desktop language. This language is very effective for determine the errors from the application and increase the system efficiency. When the language of C# is used in system of holiday booking that time storage range of server should be increased and the entire information that is stored in the server is error-free. Through the support of the language of C# increase the quality of system and recover from the entire work errors.

# 4.Technological Review

This report analyses the system of holiday booking for Crown Education Ltd. For developing the system use the ASP.net for application of web, C# for application of web and use the SQL server to handle the entire work activity. The aim of this report is to manage the holiday entitlement/year. Through the support of this system work function or task activity cannot hamper when staff/employee is on leave. The purpose of this system is balancing the work on peak time. ASP.net, C# and SQL server play a vital role to make the system of holiday booking.

## 4.1 C#

C# is the object-oriented, modern and general language for program. C# language is designed for CLI infrastructure and executed with high-level code. C# is the desktop application through the support of them develops application for holiday booking. Through the support of the C# language determines the processing requirement and improves the performance of the application. For the application development C# is a very effective language for complete the requirement. For user define work applications use this type of language. Through the support of the override and virtual modifiers separate the work application and increase the work activity.



**Figure 2: Smart Work system**

## 4.2 ASP.net

ASP.net is the web application through the support of them provides the solution for work activity. Web page of ASP.net provides the information on the client browser or device. Secure access work systematic and project requirement is the major part that is analysis in the language of ASP.net. Work library of .net follows the different programming languages for increasing the environment of software. For the web development application use the ASP.net with an effective access model. For generating the content of web use the ASP.net protocol. ASP.net is the server side, robust and semi-open language. This language is very flexible to increase the learning concept. This language follows the cross-platform and open source for .net modern. Application of access and browser send a request for server of web is the major life cycle of ASP.net. Initialization, restoration, maintains and code executions are the main phase that is followed in the language of ASP.net.

### 4.3 SQL Server

A server of SQL is very effective to increase the security risk. When the coding secure technique is less than through the support of the SQL protocol prevails the web application. Through the support of the server of SQL create the encryption situation for database model. For manage, the data encryption rate in web application uses the server of SQL. In this type of server store the information/data and then use it for any other function. For send data encryption uses the application of SQL server and creates the safeguard for database model. The entire database layer should be pass thorough the SQL query and increase the work application. Server of SQL is very effective for creating the system of holiday booking for mange the entire work activity. The entire data set that is used in the system should follow the base rate SQL model to increase the application of web service.

## 5. Use of technology in Holiday Booking System

- C# in Holiday Booking System: During the designing of the System for holiday booking C# is used. It makes this system for the desktop version as well as the mobile app version. C# provides many of the features to this system to perform several tasks such as delete/edit/ update top the employees. C# helps to develop this system as iOS native as well as for the android users. It provides much powerful programming to build this system. For this system, it also provides the ability to allocate the department to each employee as per their role. It helps to make this application or the system user-controllable and provides the required component and features to the system as per the requirement.
- ASP.net in Holiday Booking System: For the designing of the Holiday booking system ASP.net is used which provides the cross-platform to this system to enhance its performance. In this web-based application, it provides many of the features such as login, submitting holiday requests, a listing of holiday requests, approval or rejection of requests are the features which added in this application. For making this system cloud-based configuration ASP.net is used which gives the powerful coding algorithm. The holiday is designed as a cloud-based and internet-connected application so it can be used by the employees anywhere or at anyplace.
- SQL Server in Holiday Booking System: This system makes use of a relational database like SQL Server for making this application by fulfilling requirements and with full accuracy. In this, data definition language is used for defining all the requirements and then the structure of the application is set according to that requirement. SQL applications make the use of an oracle, IBM and Microsoft that can be used in developing web-based applications to make this application implemented. This language makes a simple & easy way of making the algorithm for the application. In a holiday booking system designing this language helps to retrieve the data for the coding purpose in a very easy way. In this system feature of log-in is provided at first using the ANSI & ISO standard language of the SQL server.

## 5. Legal, Social, Ethical and Professional Issues and Considerations

All the collected data during this research are confidential and nobody can access this data except the manager. Proper user manual and guidelines will be given to the users so that they can properly use the system to achieve their tasks. No data will be used commercially without the permission of the individual. Online Holiday Booking System deals with the employees and the HR manager so information transfer between them and within the organization, therefore General Data Protection Regulation (GDPR) will be strictly followed. The employees have the right to register complaint according to General Data Protection Regulation (GDPR).

### 5.1 Legal

According to Data protection Act-1998:

a) All confidential data will be used for fairly, safely and legitimately
b) Confidential data will be stored for a defined time period
c) Confidential data will be used the predefined purpose
d) No data will be sold to any third party or transferred to other device
e) All data will be up to data on regular basis.

### 5.2 Social

According to Data protection Act-1998:

a) Each confidential data will be carefully considered.
b) Consultation rights will be established that will give the right to the individual to be consulted before making any decision.
c) Terms and conditions will be properly written
d) Internal policies ensure the proper procedure of information release to public authorities.
e) Record and analyse data on regular basis.
f) Consider assigning Freedom of Information (FOI) responsibility to an individual staff member or team.
g) The staff on FOI requirements, data protection and the potential risk of information disclosure will be trained

### 5.3 Ethical

a) Organization will not keep any irrelevant data without employee's consent such as credit card number.
b) Organization will not store the user account details

### 5.4 Professional

a) Must discuss holiday's reason and their impact on organization with the employees.
b) Must provide opportunity to the employees to discuss their problems related to holidays.
c) Should try to manage the personal's vacation need and handle it with compassion
d) Must justify the trust of your employees and provide them better facilities.
e) Must explain the reasons of each decision to the employees
f) Must inform the employees about all the decisions

## 6. Requirement Analysis

Functional and non-functional requirements are gathered by using different approaches of requirement analysis. Online Holiday Booking System developed by using Visual Studio, SQL-Server and HTML. We used C# for the development and coding purposes.

### 6.1 Questionnaire

Questionnaire is the best and commonly used methodology to gather requirements from different groups of people. It allows us to gather both functional and non-functional requirements. We sample 30 employees and HR manager to fill up the questionnaire and find the requirement. We take care of data protection act and regulatory standards Participant Information sheets and consent forms were completed and submitted to the relevant department for approval. After carefully analysing the data gathered, it was possible to put the findings into relevant context to estimate the applicable requirements of users based on the outcomes of the questionnaire.

## 6.2 Description of the existing system

Crown Education Organization Ltd is currently managing and booking the holiday of the employees by using manual means that is Excel and Email that is a time-consuming task and require a lot of work effort by the manager and the employees. The employees send the email to the manager for holiday approval and manager must look over the excel sheet for decision-making.

## 6.3 Description of the proposed system

The proposed Online Holiday booking system will provide ease to the manager to manage and make decisions easily based on visual display of the previous record of leaves. It provides user interface to the employees to apply for the holiday by filling few relevant fields. Manager will user his interface to manage these requests and analyse the previous records. It will also allow the manager to analyse the impact of holidays on organization's performance in this way it allows to use the human resources efficiently.

## 6.4 Requirement Specification Analysis

The collected data will be evaluated to analysis the software and hardware-based requirements and attributes.

## 6.5 User Requirement

The employees described some user requirement during interviews and questionnaires such as add, update about sent requests, send holiday request.

## 6.6 Functional Requirement

The users explicitly define these requirements and these requirements must be fulfilled in order to make the successful project. Our proposed system has following non-functional requirements:

- The system shall allow the HR manager to register new employees
- The system shall allow the employees to get registered and use their account to apply for holidays and other related information
- The data management feature must allow the database administrator to perform databased related tasks and to keep backup of all data

## 6.7 Non-functional requirements

These requirements specify the metrics for the evaluation of the overall performance of the system that are not explicitly defined by the users instead of module.

### 6.7.1 Performance Requirements
- The system shall support concurrent users
- The system shall process user requests efficiently
- The system must respond to user requests within a second
- The system shall conform to the Microsoft Accessibility guidelines.

### 6.7.2 Maintainability
- The system must have backup of all data

### 6.7.3 Reliability
- The system must have the ability to recover

- The system shall be provided reliable data

### 6.7.4 Availability
- The system must be available 24/7

### 6.7.5 Security
- Employees with Login ID and Password must be able to use the system
- HR Manager shall be responsible for the modification, synchronization and storage of data
- HR Manager shall be able to access all the information stored in the system
- New Employees shall be able to register but do not have access to all the data.

### 6.7.6 Back-up
SQL-Server is used to store all the data of the employees and managers. In case of crash or failure, it can be easily recovered. All the data shall be uploaded on the server for backup.

### 6.7.7 Classes of Users
There are two main users in the proposed system that are employees and HR Manager.

### 6.7.8 Database Design
Design of the database is a crucial part in the development of the software. Firstly, we develop the conceptual and physical model of the database. We created multiple tables and added the link between them that is shown by the ER diagram. We linked the tables by "Employees ID" in this system.

## 7. Research Methodology
We used several research methods to complete our project. We conducted surveys and collected qualitative research interviews. Before starting our project, we read several research papers, articles, performed web research and journals on holiday booking system. These activities helped us to perform the literature review. Then it allows us to move to the next step that is descriptive research design to understand the problem and then properly do implementation.

## 8. Implementation
For the development of the online holiday booking system, we used Visual Studio 2013 for coding of the programs. It improves the performance of the system and provide vast variety of error handling. Visual Studio is the best tool for software development and still it is growing well. C# is used for programming purposes along with HTML and PHP. The main goal of the project is to satisfy the requirements of the Crown Education Organization Ltd. It also provides user manuals for guidance of the users so that they can understand the system and can use it efficiently to fulfil their need. The management team will be trained to be able to maintain and update the system. Training will allow the users to accept the new system and increase the productivity and performance. Black box and White Box testing is performed to find out all the errors and bugs before delivering the system to the Crown Education Organization Ltd. Proper user Authentication system is implemented to ensure that no unauthorized user will get access to the system.

## 9. Project Design
The proposed system can satisfy all the functional, non-functional and user requirements. It has the ability to keep tracking of the holiday records of the employees and enable the HR manager to visually analyse each employee record and how organization's record is affected when many employees from the same department applies for the holiday. The HR manager can effectively manage the human

resource that allows to maintain the performance of the system in an efficient way. Employees can apply for holiday at any time by using our proposed system by using any electronic device. Our proposed web application is responsive and can automatically adjust the layout according to the screen size. It improves and enhances the user experience that plays a vital role in the success of the project or software.

The interface will allow the users to login to the system and access the data according to their user type. Manager's interface allows them to manage the employee's leave requests and their past record. The front-end is designed by using HTML, Bootstrap and ASP .NET. C# is used for the development of the back end and SQL is used for the management of the Database queries. Our system has two main stakeholders that is "Employees" and "HR Manager". Employees uses the system to apply for the holidays and HR manager uses it to manage these requests.

Different UML diagrams are used to show every aspect of the proposed system. We used Use-case diagram, ER diagram and Activity diagrams to analyse the user requirements and assists to satisfy these requirements. The employees should be able to apply for the holidays and to get updates about it directly on their user interface at any time. The system design is for making decision, for the system operation for the software, hardware and for network infrastructure. The first phase of system design is to create the design strategy. The interface design determines the navigation mechanism of the system. Database design specifies how the data will be stored and retrieved from the database and displayed on the interfaces.

## 10.    System Development
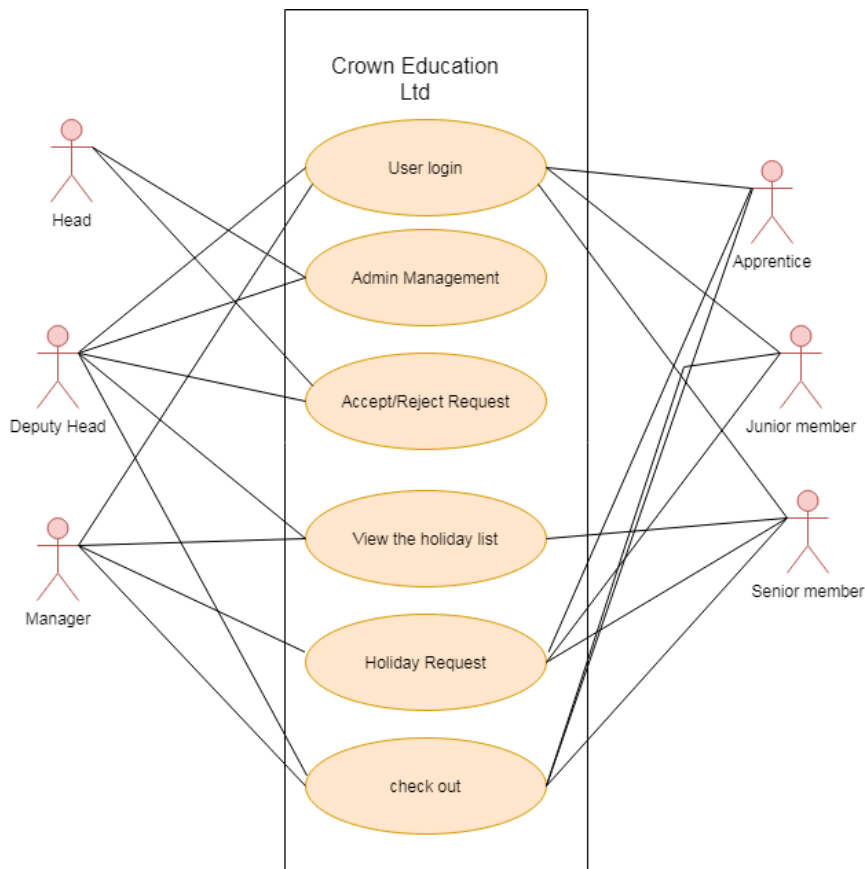
### 10.1    Use Case Diagram

**Figure 3: Use case System**

Through the support of the diagram of use case identify the work activity of the system. This system is very helpful for determining the task model that is perform in the system. In this system user login, admin management, Accept/reject request, view holiday list, request for holiday and check out are the major activity that is perform by the different entities.
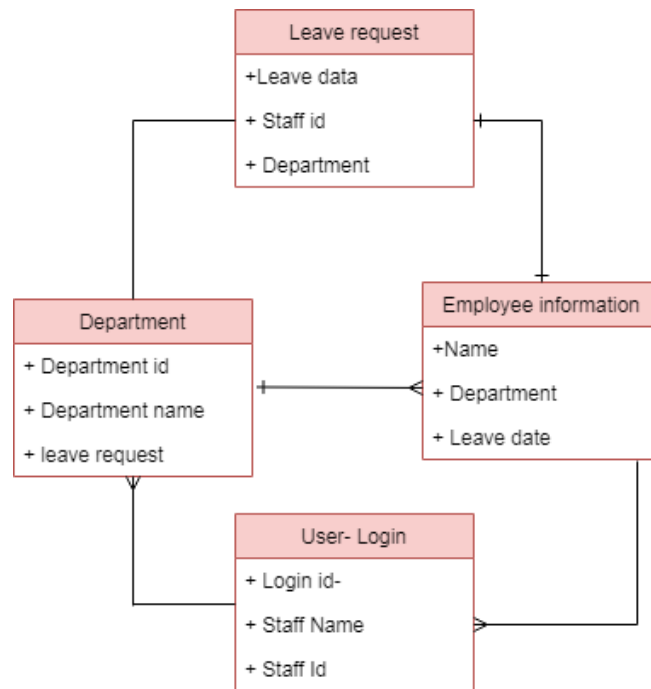
## 10.2      ER diagram



**Figure 4: ER Diagram**

Through the support of the ER diagram determine the primary and secondary key structure of system. Through the support of them find out the relation between main activity and sub-activity that is performed in the system. For this system use the different entities like user log in, department, employee information and leave request for analysis of the activity relation.
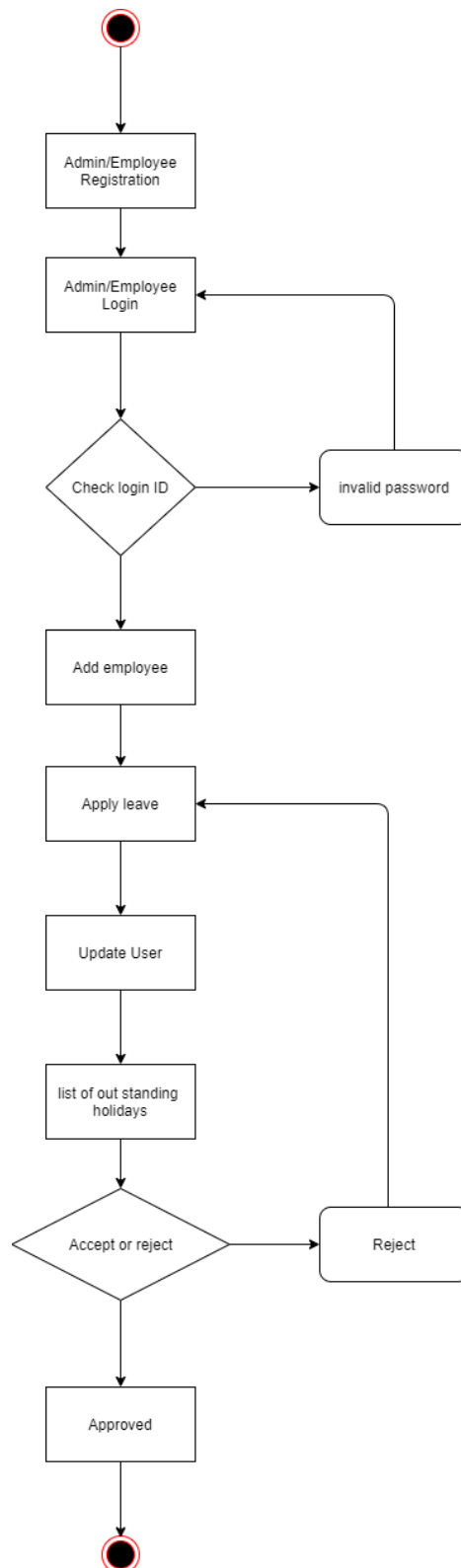
## 10.3 Activity Diagram



**Figure 5: Activity Diagram**

The activity diagram provides a path function through analysis of the flow of activity that is performed in the system. In this system firstly use the admin/employee registration. Through the support of the

login function employee check the details of holiday list and apply for holiday. Using activity diagram also find out the status of leave accepted or rejected from higher authority.

## 11.     Practical Implementation
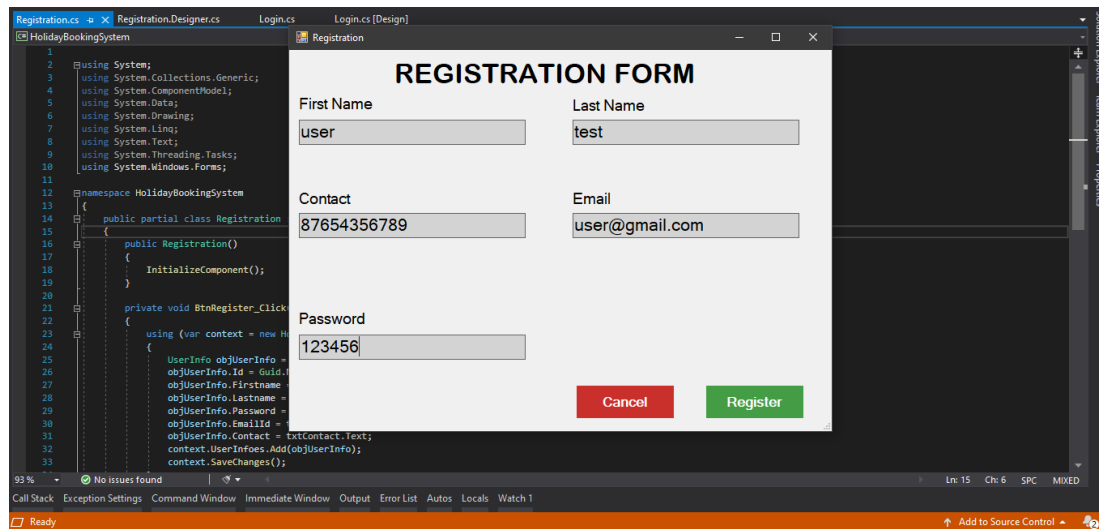
### 11.1     Desktop Application



**Figure 6:Registration Form**

In the above image, the registration page of the desktop application system of holiday booking is shown, the user can register themselves by entering their first name and last name, contact number, e-mail ID and password. The register button is used to confirm the model of registration.
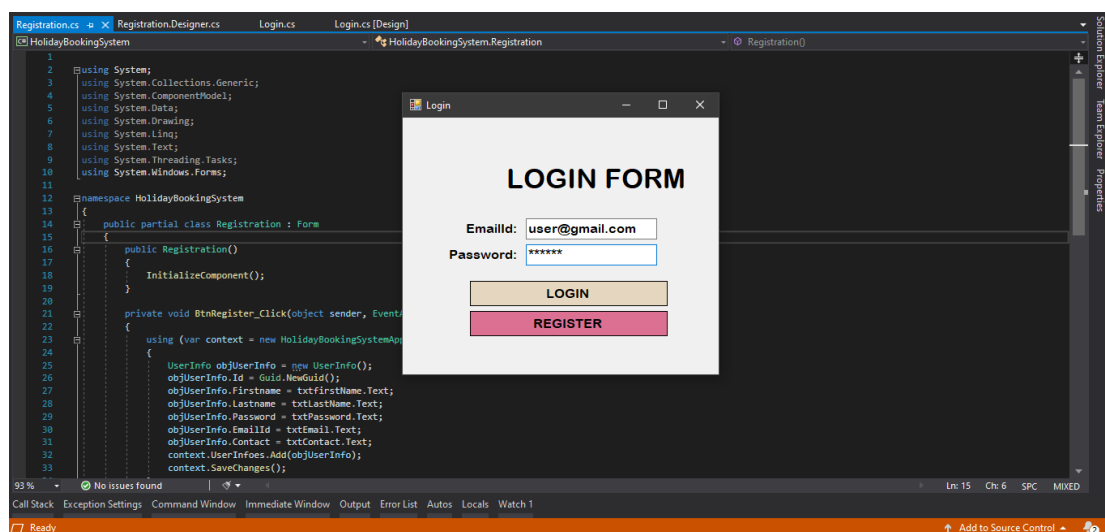


**Figure 7: Login Form**

In the above image, the Login page of the desktop application system of holiday booking is shown, the user can log in into the system after completing the registration. To login to the model system, the user must fill the e-mail ID and their password that has been created at the time of registration.
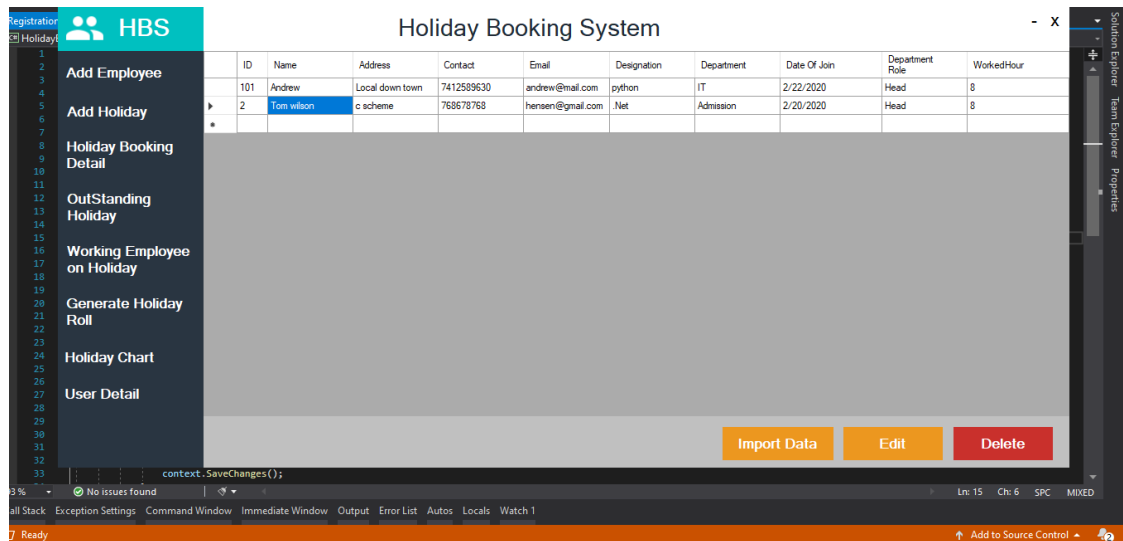


**Figure 8: Add Employee**

In the above image, the add employee page of the desktop application system of holiday booking is shown, the admin user can add the employees and fill the details of that employee.
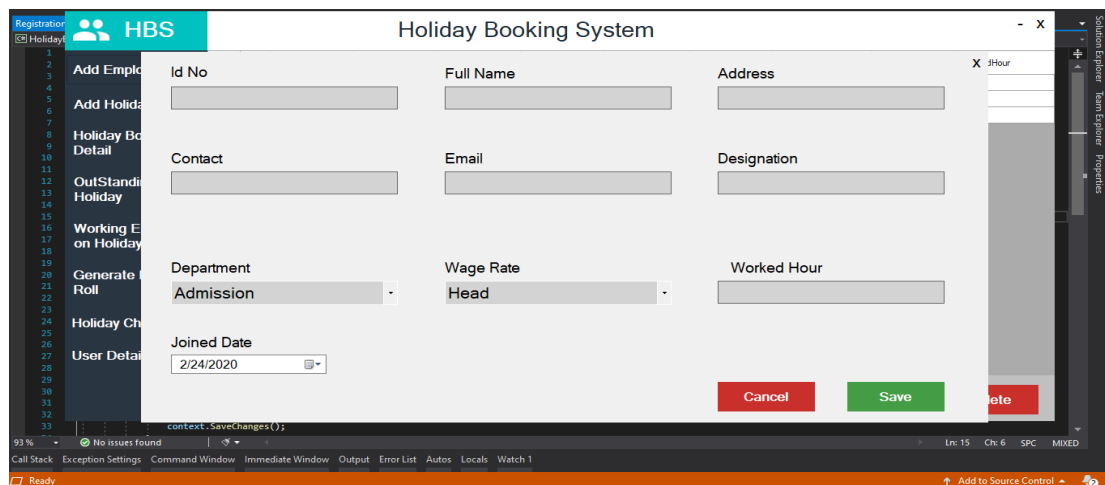


**Figure 9: Employee Details**

In the above image, the employee details page of the desktop application system of holiday booking is shown, the admin user can see the details of every employee or staff member by search for them. This page will show the ID no., full name, address, contact, e-mail, designation, department, wage rate, working hours, and the date of joining.
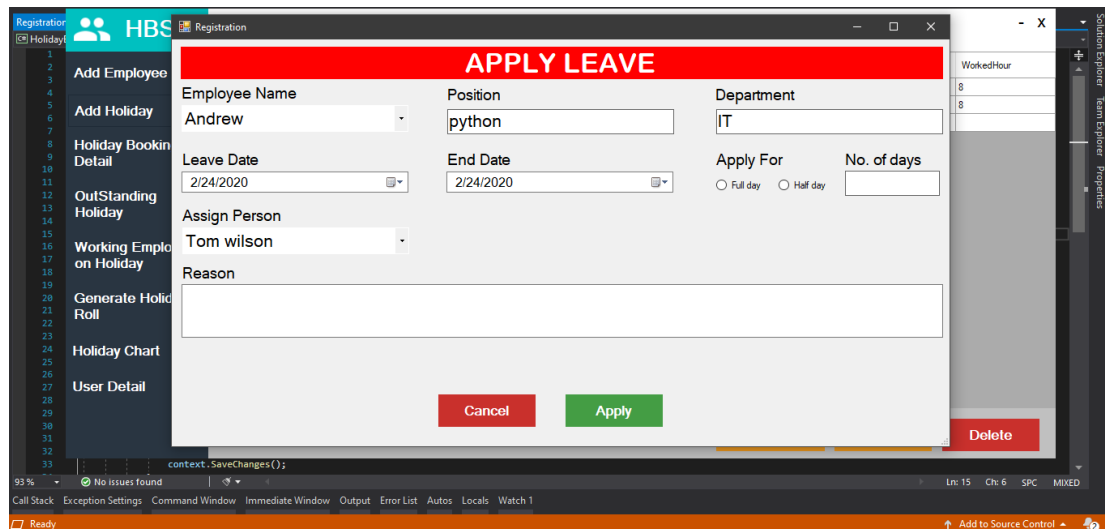
**Figure 10: Apply Leave**

In the above image, the Apply leave page of the desktop application system of holiday booking is shown, the employee can submit their request of leave by filling the details such as name, position, department, leave date, end date. At the bottom of the page by clicking on the apply button the request for leave can be submitted.



**Figure 11: List of Employee**

In the above image, the List of Employee page of the desktop application system of holiday booking is shown, in this list employees can select to get the details, also can edit the details by selection one employee or the particular employee can delete from the database of the system.
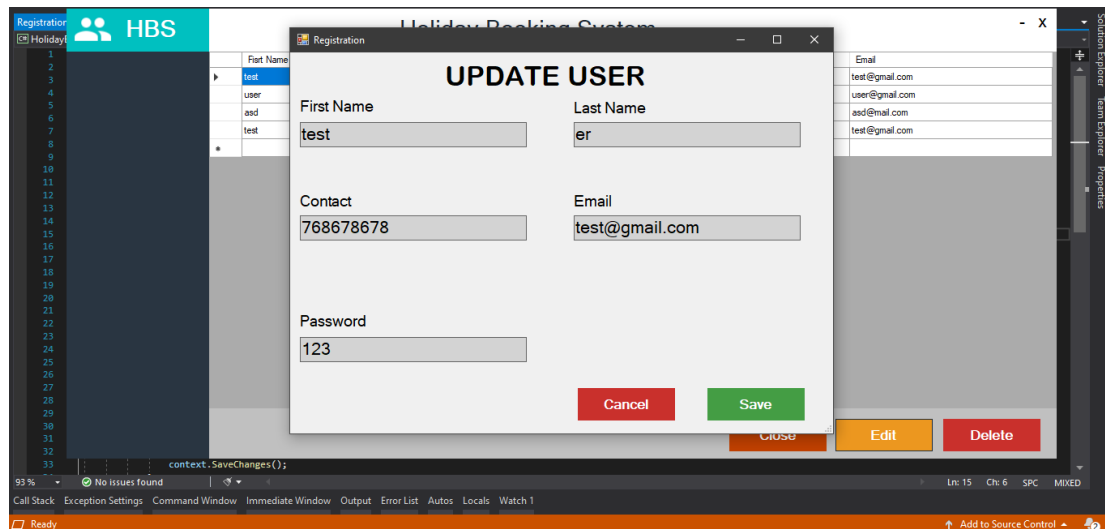
**Figure 12: Update User**

In the above image, the update user page of the desktop application system of holiday booking is shown, employees and the admin user can update their details such as password, name, contact number and e-mail ID in the database of the system of holiday booking.
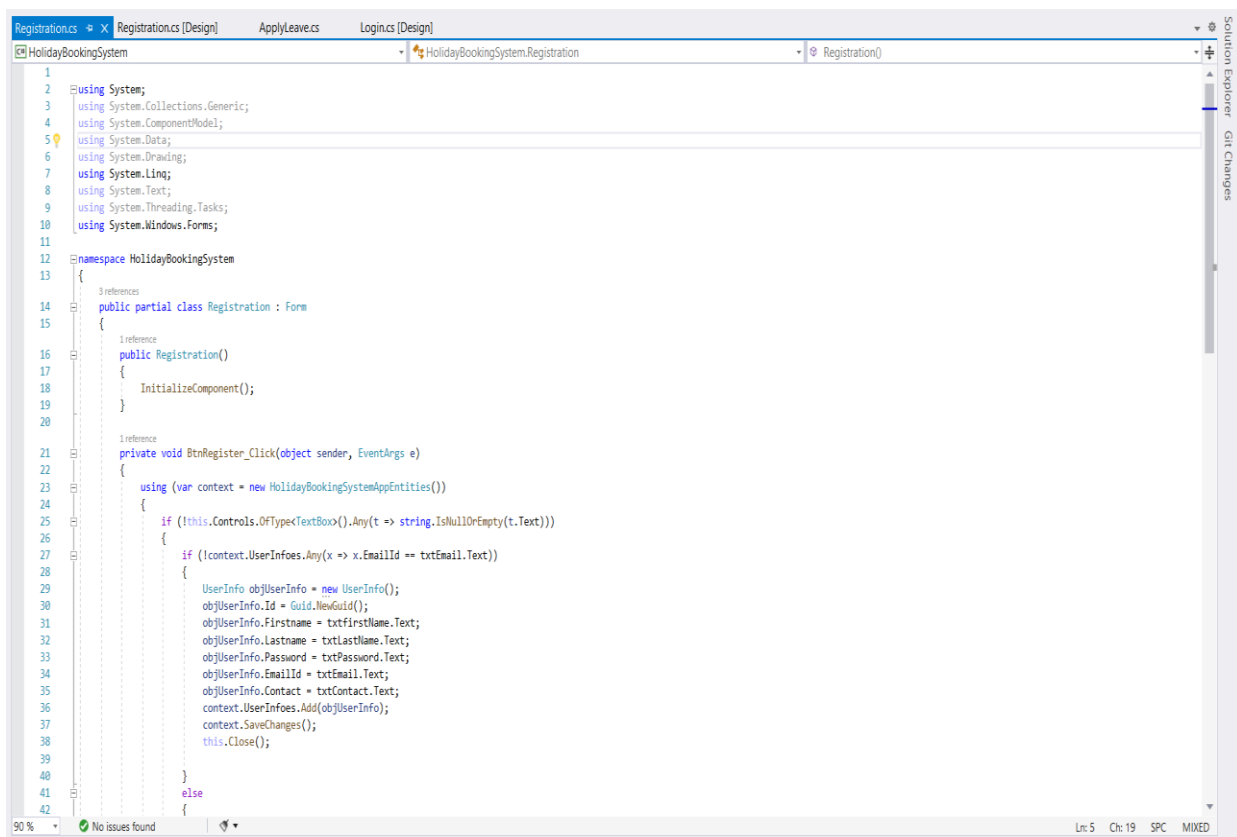


**Figure 13: Code**

In the above image, the code of the registration page of the desktop application system of holiday booking is shown, in the code, there is a class name as registration. The method of this class is a registration and it is specified as public.

```
4       {
5           /// <summary>
6           /// Required designer variable.
7           /// </summary>
8           private System.ComponentModel.IContainer components = null;
9
10          /// <summary>
11          /// Clean up any resources being used.
12          /// </summary>
13          /// <param name="disposing">true if managed resources should be disposed; otherwise, false.</param>
            2 references
14          protected override void Dispose(bool disposing)...
22
23          #region Windows Form Designer generated code
24
25          /// <summary>
26          /// Required method for Designer support - do not modify
27          /// the contents of this method with the code editor.
28          /// </summary>
            0 references
29          private void InitializeComponent()...
363
364         #endregion
365
366         private System.Windows.Forms.Label label1;
367         private System.Windows.Forms.TextBox txtDepartment;
368         private System.Windows.Forms.TextBox txtPosition;
369         private System.Windows.Forms.Label lblPosition;
370         private System.Windows.Forms.Label lblLeavedate;
371         private System.Windows.Forms.Label lblContact;
372         private System.Windows.Forms.Label lblEmployeeName;
373         private System.Windows.Forms.Button btnApply;
374         private System.Windows.Forms.Button btnCancel;
375         private System.Windows.Forms.ComboBox cmbEmployeelist;
376         private System.Windows.Forms.DateTimePicker dtpLeaveDate;
377         private System.Windows.Forms.DateTimePicker dtpEndDate;
378         private System.Windows.Forms.Label label2;
379         private System.Windows.Forms.Label label3;
380         private System.Windows.Forms.RadioButton rbFullDay;
381         private System.Windows.Forms.RadioButton rbHalfDay;
382         private System.Windows.Forms.TextBox txtReason;
383         private System.Windows.Forms.Label label4;
384         private System.Windows.Forms.Label lblError;
385         private System.Windows.Forms.Label label5;
386         private System.Windows.Forms.TextBox txtLeaveDays;
```
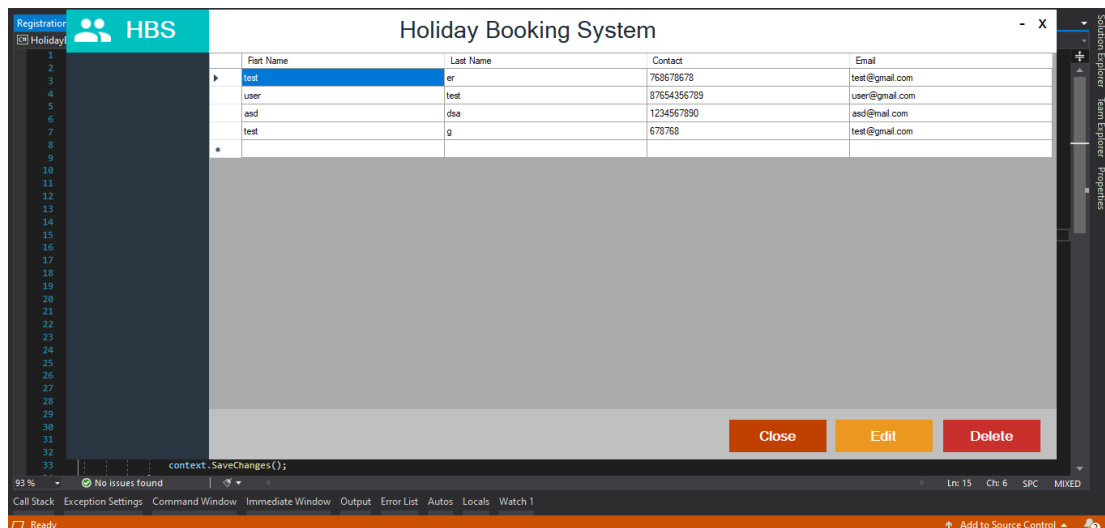
**Figure 14: Code 2**

In the above image, the code of apply leave page of the desktop application system of holiday booking is shown, in this image code of design of apply leave page is present.

IdentityUserUpdate.cs   ApplyLeave.Designer.cs   Registration.cs   Registration.cs [Design]   ApplyLeave.cs   Login.cs [Design]

HolidayBookingSystem    HolidayBookingSystem.IdentityUserUpdate    IdentityUserUpdate(Guid id, string firstname, string lastname, string emailId, string con

```
1   using System;
2   using System.Collections.Generic;
3   using System.Linq;
4   using System.Text;
5   using System.Threading.Tasks;
6
7   namespace HolidayBookingSystem
8   {
        4 references
9       public class IdentityUserUpdate : EventArgs
10      {
            0 references
11          public IdentityUserUpdate(Guid id, string firstname, string lastname, string emailId, string contacts, string password)
12          {
13              this.Id = id;
14              this.Firstname = firstname;
15              this.Lastname = lastname;
16              this.Contact = contacts;
17              this.EmailId = emailId;
18              this.Password = password;
19          }
20
            3 references
21          public Guid Id { get; set; }
            3 references
22          public string Firstname { get; set; }
            3 references
23          public string Lastname { get; set; }
            3 references
24          public string EmailId { get; set; }
            3 references
25          public string Contact { get; set; }
            3 references
26          public string Password { get; set; }
27      }
28  }
29
```

90 %    No issues found     Ln: 1   Ch: 1   SPC   MIXED

**Figure 15: Code 3**

In the above image, the code of update user page of the desktop application system of holiday booking is shown, there is a required code of the update user page. All the variables are string data types.



**Figure 16: Code 4**

In the above image, the code of remaining leave page of the desktop application system of holiday booking is shown, the class is named as outstanding holiday details and different methods are created to get the details of the employees.

## 9.2 Web Application



**Figure 17: Registration**

In the above image, the registration page of the website application system of holiday booking is shown, the employees or staff members can register themselves by filling their details in the text box. The main information that is needed for registration are first name, last name, e-mail, contact number, password, and to confirm the password there is one more field for confirm password, by clicking on the register button the registration process will complete.
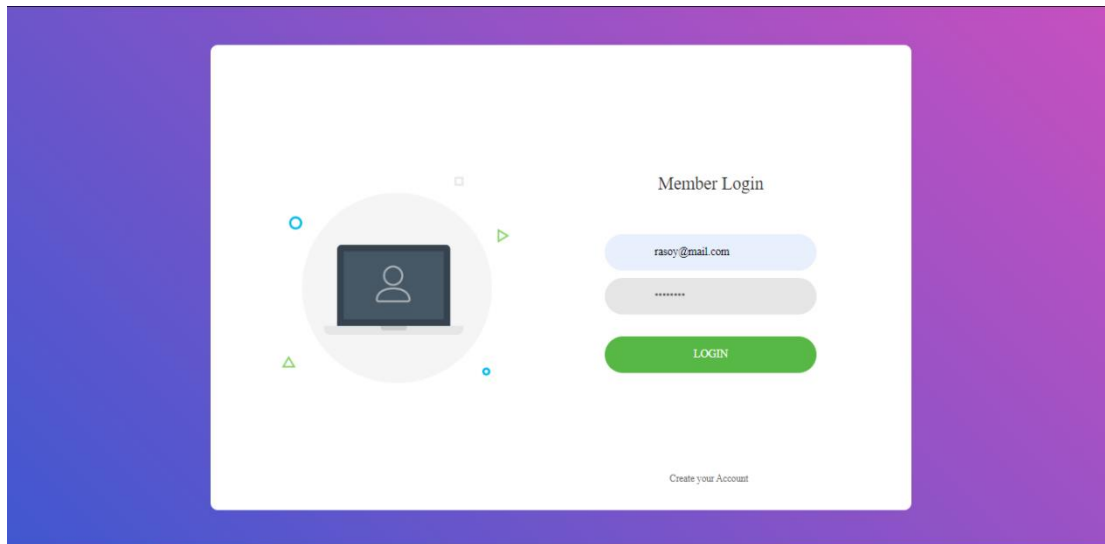


**Figure 18: Login**

In the above image, the login page of the website application system of holiday booking is shown, after complete or successful registration the user or member can login to a website application. The login page consists of text fields one for e-mail ID and another is for a password that was created by the same user at the time of registration. By clicking on the login button, the user will login to the website application of the holiday booking system.
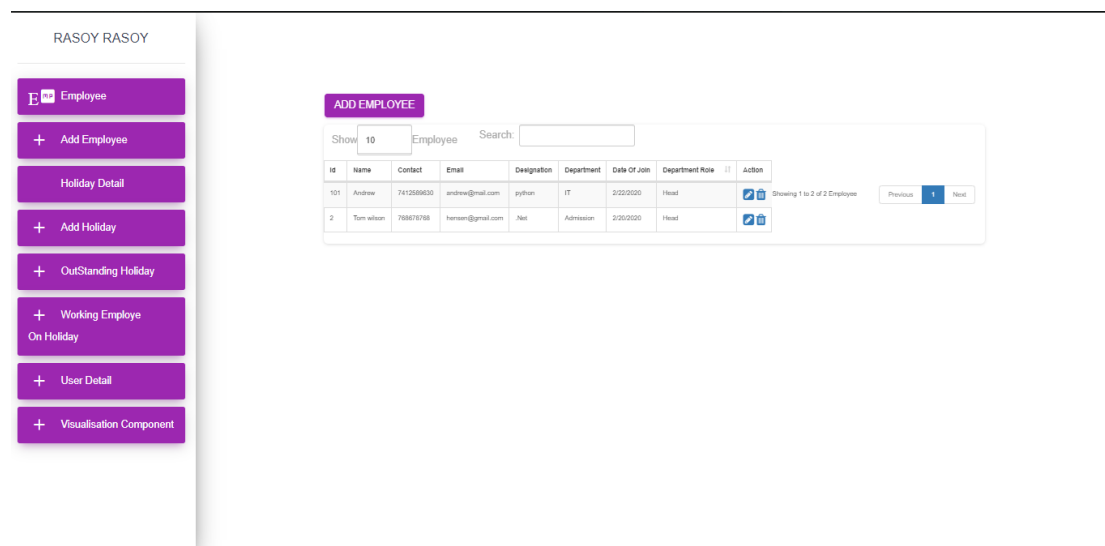


**Figure 19: Add Employee**

In the above image, the list of employee page of the website application system of holiday booking is shown, in this page user can see all the employees in those are added in the database. It will show the details such as ID, name, e-mail, contact, designation, department, date of joining, department role.

**Figure 20: Add Employee Field**

In the above image, the add employee page of the website application system of holiday booking is shown, in this page admin user can add more employees of  Crown Education Ltd organization by filling their personal details such as ID, name, e-mail, contact, designation, department, date of joining, department role.



**Figure 21: Add Holidays**

In the above image, the add holiday page of the website application system of holiday booking is shown, the employees or staff members of the organization can submit the request for holiday by giving some details such as name, position, department, leave date, end date. Employee also can select the option for full day leave or half-day leave.
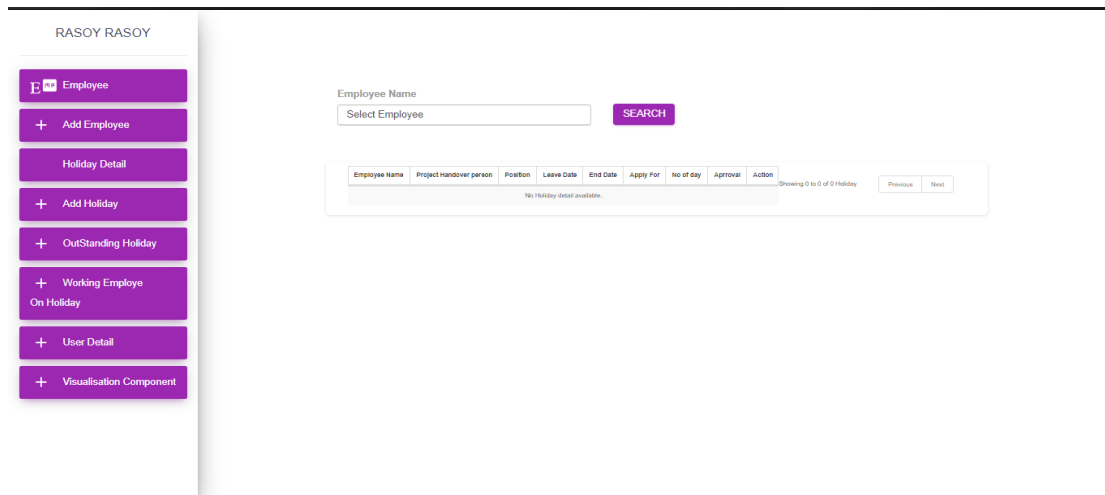
**Figure 22: Search**

In the above image, the search page of the website application system of holiday booking is shown, the admin user can search the employees by their ID from the database. This option can also work with the date.
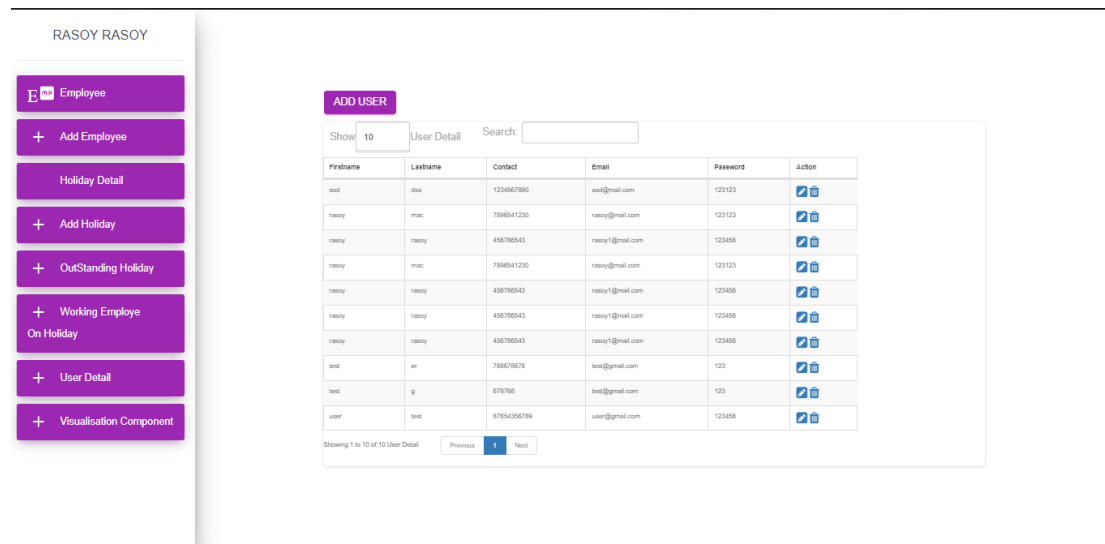


**Figure 23: List of Employees**

In the above image, the List of an employee in the database page of the website application system of holiday booking is shown, the admin can see all the details of multiple employees by this list. This list is shown according to the database tables in the SQL database.

**Figure 24: User Manage**

In the above image, the user management page of the website application system of holiday booking is shown, on this page of holiday booking system website application the admin user can manage all the employees by add or update their details in the database, the name, contact, e-mail, password, etc. can update.
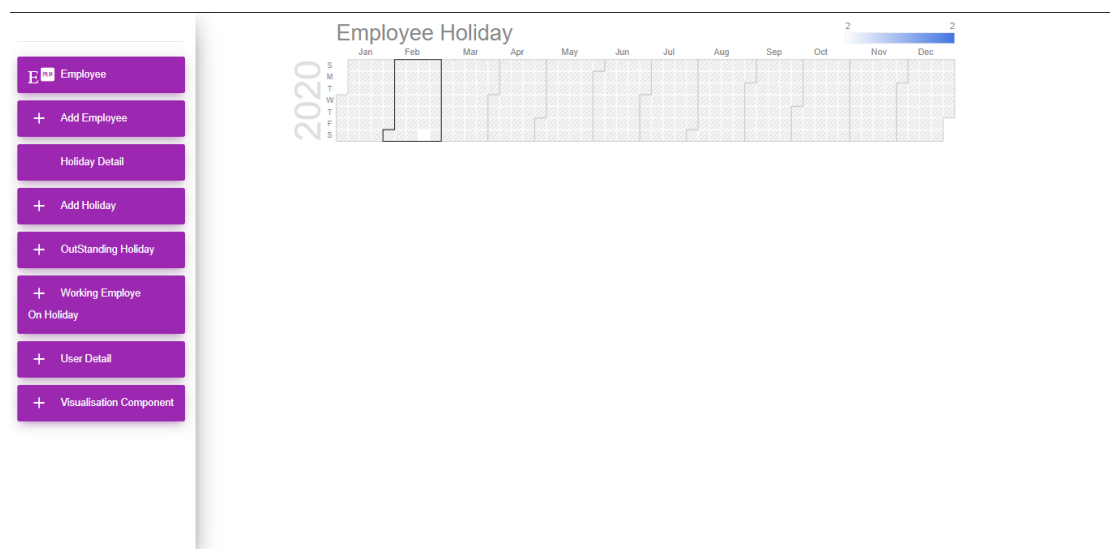


**Figure 25: Visualization**

In the above image, the visualization page of the website application system of holiday booking is shown; this page will show the visualization of the holidays of employees and staff members.

# 12.    Evaluation

The evaluation of developed system of holiday booking for Crown Education Ltd organization can be done based on the performance of the desktop application. The login and sign up page of the application can evaluate based on authentication or the staff members and employees.

Evaluation can be done based on the accuracy of the desktop application functioning. How much accurate information and result application system of holiday booking is providing. The system first checks the joining date of the employees, all personal details, remaining holidays, date of start and end of the holiday period, number of holiday employees requested and more information for sending the approval or rejection for the particular holiday requests from the particular employee.

Evaluation of performance is also important for the developed system of holiday booking because weak performance is not good to achieve the desired goal. The system should respond fast and process the holiday request submitted by employees. The connectivity of the SQL server must be good so the system can easily and faster fetch the details related to the employees. The desktop application system of holiday booking can easily run in a desktop or computer with a visual studio and other supportive software. When the internet connection is good then the SQL server also can connect easily, and it also responds with a short time to make the performance of the entire system better.

The impact of this desktop application system of holiday booking in the Crown Education Ltd organization will be good to manage the workload and all the functions of the organization in an effective and efficient manner. The system processes all the details and then priorities the smaller number or holidays to approve by fetching the employee's details from the SQL server or database. The registration of user can be done with the user's first name, last name, e-mail, phone number, and password to protect the system information. After registration users can log in into the desktop application system of holiday booking with their e-mail ID and password that has been entered at the time of registration. The option of add employees is also working properly and add the employees with their date of joining and personal details of the employees. Employee details include their ID, name, address, contact, e-mail, designation, department, date of joining, department role, working hours. The employees can apply or submit the request for leave by providing the start date and end date. With good internet connectivity, the search option can easily provide the search result. The system of holiday booking also provides the list of all the employees working with Crown Education Ltd organization and the list of those employees who are already on leave. In the database users also can update the details of an employee. The searching for holidays can be done with a calendar by selecting a date.

# 13.     Conclusion

In today's' world, the use of online applications is increasing the efficiency of the organization as well as reduces human efforts. This is the reason in this report the design and implementation of the "Holiday Booking System" are going to be done. This application is going to be developed for a marketing company named "Crown Education Ltd".

This report concludes that the HBS system is designed by making the use of C# language, ASP.NET, and server like SQL. Because C# language is used, to develop the window client application which can able to use by the android mobile user also (Chand, 2020). Due to these advantages of the C# language, the HBS system is going to be more effectively designed. As various applications of C#, ASP.net, SQL is studied in this report with the help of which designing, and implementation process is done in a simple way. To understand the proper implementation and designing of this system various methodologies of C#, ASP.net, SQL are studied in this report.

Practical implementation indicates the clear vision of designing and implementation of the system. So, from this, it can be said that practical implementation is a very necessary part to do. As in this report study about the proper system development with its evaluation is done. From which it can be concluded that evaluation is a very important part that provides a clear vision of user requirements as they are fulfilled or not. From this report, it also can be concluded that C#, ASP.net, SQL Server are the main reason because of which this system is going to fulfil all user requirements. Hence, the HBS system is going to be successfully implemented. It also is concluded from this report that this system is going to reduces the efforts of company employees.

# 14. Recommendations and Future Work

## 14.1 Recommendations

The main recommendation for the developing system and the Crown Education Ltd organization is that the employees are also using this application system of holiday booking for requesting the holidays. In the developed system the database also can be implemented with the oracle, MySQL, and with Java database. Another main recommendation and future work in the developed system of holiday booking is that the same system also can be developed with other technologies to make the desktop application and web application of the holiday booking system a mobile application. Android technology can be used for developing the same system of holiday booking as a mobile application without affecting the functionality of the existing system. So, the employees and staff of the Crown Education Ltd organization can use it to request holidays and can get the notification of approval or rejection of their request. In the mobile application of the holiday booking system the employees can log in and sign up with their ID or the phone number and this system can also show the remaining and used holidays by the employees with acceptance criteria for holidays.

## 14.2 Future Work

In future, this application system can re-implement to also show the employee details by adding the feature of creating personal account, and the details can show on the employees' mobile application such as their date of joining, salary slip, holidays used and remaining, workload, peak time like 15th of July to 31st of September, 15th of December to 22nd of December, etc. The system is developed with C# and ASP.NET these technologies are good, but it can also develop with Java language and Python. The technology of Python and Java language also helps to create the desktop and web application with effectiveness and efficient working also the user interfaces can create more effective and easier to understand the system by the employees and other staff of the Crown Education Ltd organization.

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