Acknowledgment

We are pleased to present “Evaluate Empire” project.

We thank our college Birla Vishvakarma Mahavidyalaya for providing us with excellent facilities that helped us to complete and present this project.

We express our deepest gratitude towards our project guide Prof. Trushna Patel, Dr. Nilesh Prajapati and Dr. Keyur Brahmbhatt for their valuable and timely advice during the various phases in our project.

We would also like to thank her for providing us with all proper facilities and support as the project co-coordinator. We would like to thank her for support, patience and faith in our capabilities and for giving us flexibility in terms of working and reporting schedules.

List Of Figures

Table of Contents

Abstract

The project **Evaluate Empire** is made especially for builders and developers to estimate the raw materials and labor required to make a construction project (building, society, mall, etc.). The main difficulty arises during construction is to decide the quantity of raw materials, labors and resources required in future.

The Evaluate Empire works as follows: The system is fed with an estimate of the raw materials and other estimates that help a builder to estimate the amount of materials that are required to construct a building. The system is also fed with the cost of various raw materials, so it automatically calculates the cost of those materials. The system also consists of an estimate of the labor power needed to make the project. It is also capable of calculating the number of days needed in project completion. Evalaute Empire then calculates the labor per day cost with the number of days to calculate the labor cost estimate. Thus the system then gives a final excel sheet that helps the builder to estimate the total project cost within minutes.

Chapter 1: Introduction

1.1 Project Aim

The project Evaluate Empire is made especially for builders and developers to estimate the raw materials and labor required to make a construction project (building, society, mall, etc.). The main difficulty arises during construction is to decide the quantity of raw materials, labors and resources required in future.

1.2 Project Scope

- Developers can get a brief estimation of the materials and labor required instantly.
- It reduces confusion and doubt.
- Provides appropriate and accurate cost.
- Flexible to use and user-friendly.
- Saves money and resources.

1.3 Project Objective

The project **Evaluate Empire** is made especially for builders and developers to estimate the raw materials and labor required to make a construction project (building, society, mall, etc.). The main difficulty arises during construction is to decide the quantity of raw materials, labors and resources required in future.

The evaluate empire works as follows:

- The system is fed with an estimate of the raw materials and other estimates that help a builder to estimate the amount of materials that are required to construct a building.
- The system is also fed with the cost of various raw materials, so it automatically calculates the cost of those materials.
- The system also consists of an estimate of the labor power needed to make the project.
- It is also capable of calculating the number of days needed in project completion.
- Evaluate Empire then calculates the labor per day cost with the number of days to calculate the labor cost estimate.
- Thus the system then gives a final excel sheet that helps the builder to estimate the total project cost within minutes.

1.4 Project Modules

This system is having 6 Modules:

1. **Admin**
2. **Resource calculation**
3. **Labor calculation**
4. **Day calculation**
5. **Cost calculation**
6. **Generation of Excel sheet report**

Description:

1. Admin :

- The developers would be provided with system login. They can then access the system for finding out total expenses needed during construction. Admin has to provide some inputs into the system regarding building and premises information such as the number of floors, lifts, gym, swimming pool and other facilities that would be constructed.

2. Resource calculation:

- The system finds out the total raw materials required in construction with respect to the input provided by the admin.

3. Labor calculation:

- Based on the number of buildings to be constructed and in a specified time provided by admin, the system gives an estimated labor strength required.

4. Day calculation:

 The system even calculates the total number of days required to complete the construction.

5. Cost calculation:

 By considering the labors, resources, days required for construction, the system evaluates the total expense needed for construction.

6. Generation of Excel sheet report:

 At the end the system generates a brief and organized excel sheet report stating all the calculated things required in construction for developers convenience.

1.5 Project Basic Requirements(Hardware and Software)

❖ Hardware Requirement:-

- i7 Processor Based Computer
- 6GB-Ram

❖ Software Requirement:

- Windows 10(ultimate & enterprise)
- Visual Studio 2019
- Microsoft SQL Server Management Studio 2018

Chapter 2 :Analysis,Design Methodology and implementation Strategy

2.1 Comparison of Existing Applications with your Project

Literature Review

1. Estimating incremental cost and schedule growth for systems engineering and project management

Publisher: IEEE(2010)

By

Stephen Shinn; Lawrence Wolfarth; Meagan Hahn
This paper discusses an analysis of data collected by The Johns Hopkins University Applied Physics Laboratory (APL) from its recent missions, the NASA Cost Analysis Data Requirement mission, and the NASA Instrument Cost Model instrument databases to identify trends in PM and SE effort. As the systems engineering (SE) and project management (PM) disciplines have evolved in recent years, they have generated a more robust set of processes, activities, and expectations about mission success. These changes are particularly evident in the robotic aerospace mission environment. Recent APL projects have shown clear increases in both the estimated and realized costs for SE and PM activities but no definitive rationale to explain the upward trend. Analysis of other data has not been as definitive. At the same time, cost estimating relationships of the most widely used mission and instrument cost models provide little acknowledgement that PM/SE costs are driven by anything other than hardware (and software) costs nor how management and engineering initiatives, policy changes, or risk considerations are driving PM/SE cost growth. The reasons, we believe, are an absence of data from recent missions subject to the effects of NASA NPR 7120.5D and other policies, earned value and other initiatives, unreliable and inconsistent cost PM/SE data, and perhaps most critically a perceived lack of interest until recently in understanding PM/SE costs. Initial results indicate that future mission cost estimates will use a combination of project participant interviews, characterization of PM/SE initiatives, and better collection and analysis of PM/SE cost data to define models that predict future PM/SE cost increases, enabling more accurate future estimates. Understanding how much PM/SE effort is needed as well as more recent trends and cost estimating relationships (CERs) will ultimately allow more robust and accurate mission planning and tracking of cost and schedule

2. Using Cost-Risk to Connect Cost Estimating and Earned Value Management (EVM)

Publisher: IEEE(2007)

By

David R. Graham

NASA space vehicle acquisition cost management has come under close scrutiny in the past three years due to perceived and actual cost overruns. As a result of two reports, the 2004 GAO report entitled, "Lack of Disciplined Cost-Estimating Processes Hinders NASA's Ability to Effectively Manage Its Programs" and the 2004 "President's Commission on Implementation of United States Space Exploration Policy", NASA reengineered its cost management with an emphasis on risk and cost-risk management. The new cost management process involves the identification, assessment and quantification of risky WBS elements in the cost estimating process for reporting feedback using Earned Value Management (EVM). The project manager will be able to use the resulting performance measurement metrics from the EVM system to track high-risk element actual cost-risk behavior. Thus, through the synergy between the cost estimating and EVM processes the project manager will have the benefit of the highest quality cost information with which to manage his/her effort.

2.2Project Feasibility Study

Feasibility Study is a high level capsule version of the entire process intended to answer a number of questions like: What is the problem? Is there any feasible solution to the given problem? Is the problem even worth solving? Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system is Feasible by considering the technical, Operational, and Economical factors. By having a detailed feasibility study the management will have a clear-cut view of the proposed system.

The following feasibilities are considered for the project in order to ensure that the project is variable and it does not have any major obstructions. Feasibility study encompasses the following things:

- **Technical Feasibility**
- **Economic Feasibility**
- **Operational Feasibility**

In this phase, we study the feasibility of all proposed systems, and pick the best feasible solution for the problem. The feasibility is studied based on three main factors as follows.

❖ Technical Feasibility

In this step, we verify whether the proposed systems are technically feasible or not. i.e., all the technologies required to develop the system are available readily or not.

Technical Feasibility determines whether the organization has the technology and skills necessary to carry out the project and how this should be obtained. The system can be feasible because of the following grounds:

- All necessary technology exists to develop the system.
- This system is too flexible and it can be expanded further.
- This system can give guarantees of accuracy, ease of use, reliability and the data security.
- This system can give instant response to inquire.

Our project is technically feasible because, all the technology needed for our project is readily available.

Operating System	**:**	Windows 10
Languages	**:**	Asp.Net with C# (**.**Net 2008)
Database System	**:**	MS-SQL Server
Documentation Tool	**:**	MS - Word

❖ Economic Feasibility

Economically, this project is completely feasible because it requires no extra financial investment and with respect to time, it's completely possible to complete this project in 6 months.

In this step, we verify which proposal is more economical. We compare the financial benefits of the new system with the investment. The new system is economically feasible only when the financial benefits are more than the investments and expenditure. Economic Feasibility determines whether the project goal can be within the resource limits allocated to it or not. It must determine whether it is worthwhile to process with the entire project or whether the benefits obtained from the new system are not worth the costs. Financial benefits must be equal or exceed the costs. In this issue, we should consider:

- The cost to conduct a full system investigation.
- The cost of h/w and s/w for the class of application being considered.
- The development tool.
- The cost of maintenance etc...

Our project is economically feasible because the cost of development is very minimal when compared to financial benefits of the application.

❖ Operational Feasibility

In this step, we verify different operational factors of the proposed systems like man-power, time etc., whichever solution uses less operational resources, is the best operationally feasible solution. The solution should also be operationally possible to implement.
Operational Feasibility determines if the proposed system satisfied user objectives could be fitted into the current system operation.

- The methods of processing and presentation are completely accepted by the clients since they can meet all user requirements.
- The clients have been involved in the planning and development of the system.
- The proposed system will not cause any problem under any circumstances.

Our project is operationally feasible because the time requirements and personnel requirements are satisfied.

2.3 Project Timeline chart

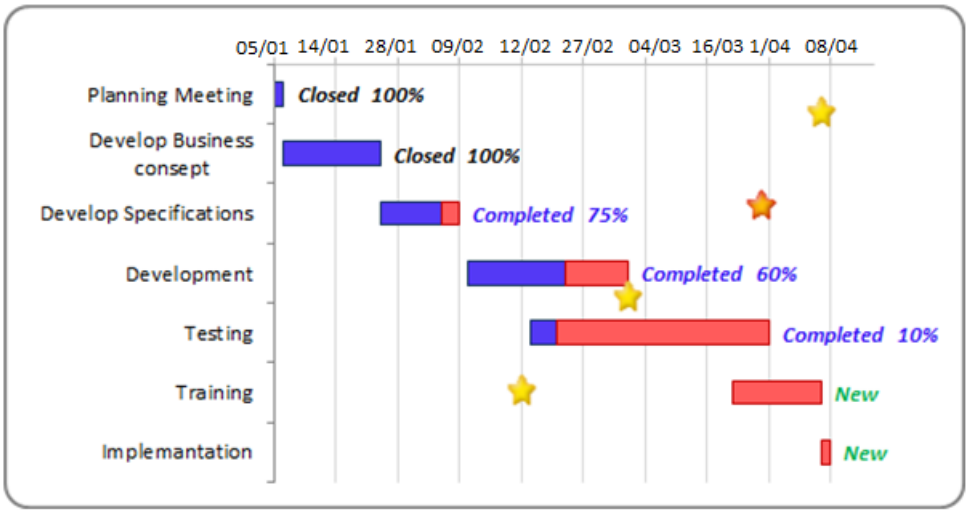


Figure 1

2.4 Detailed Modules Description

Existing System & Proposed System

- **House Cost Calculator**

It requires to enter builtup area and approximate cost(per sq ft).

It also provides quantity of cement,sand,aggregate,steel,paint and bricks required per sq ft.

- **Builders Mart**

It provides different options to calculate raw material, paint, and construction.

It also provides location option from which we can mention the project is in particular region(ie. Metro,urban,semi urban,district,rural,taluka).

Drawbacks of the existing system

- Maintenance of the system is very difficult.
- There is a possibility for getting inaccurate results.
- User friendliness is very less.
- It consumes more time for processing the activities.

PROPOSED SYSTEM

• Considering the anomalies in the existing system, proposed system is developed keeping all the anomalies in mind.

• The system provides accurate results and also overcomes the problem of redundancy of inserted data into the system.

The project Evaluate Empire is basically for builders and developers to estimate the raw materials and labor required to make a construction project (building, society with

apartments etc.). The main difficulty arises during construction is to decide the quantity of raw materials, labors and resources required in future.

The Evaluate Empire system works as follows:

• The system is fed with an estimate of the raw materials and other estimates that help a builder to estimate the amount of materials that are required to construct a building.

• The system is also fed with the cost of various raw materials, so it automatically calculates the cost of those materials.

• The system also consists of an estimate of the labor power needed to make the project.

• It is also capable of calculating the number of days needed in project completion.

• Evaluate Empire then calculates the labor per day cost with the number of days to calculate the labor cost estimate.

• Thus the system then gives a final excel sheet that helps the builder to estimate the total project cost within minutes.

2.5 Project SRS

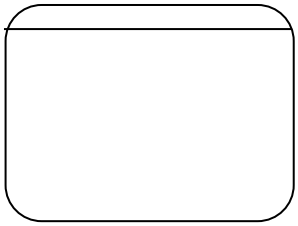
2.5.2 Data Flow Diagram

A data flow diagram is graphical tool used to describe and analyze movement of data through a system.

DFD SYMBOLS:

In the DFD, there are four symbols

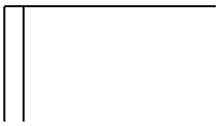
- A square defines a source(originator) or destination of system data
- An arrow identifies data flow. It is the pipeline through which the information flows
- A circle or a bubble represents a process that transforms incoming data flow into outgoing data flows.
- An open rectangle is a data store, data at rest or a temporary repository of data



Process that transforms data flow.

Source or Destination of data

Data flow



Data Store

Data Flow Diagrams

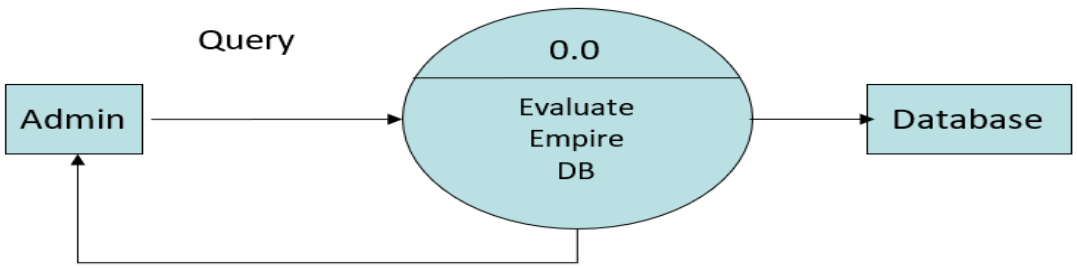
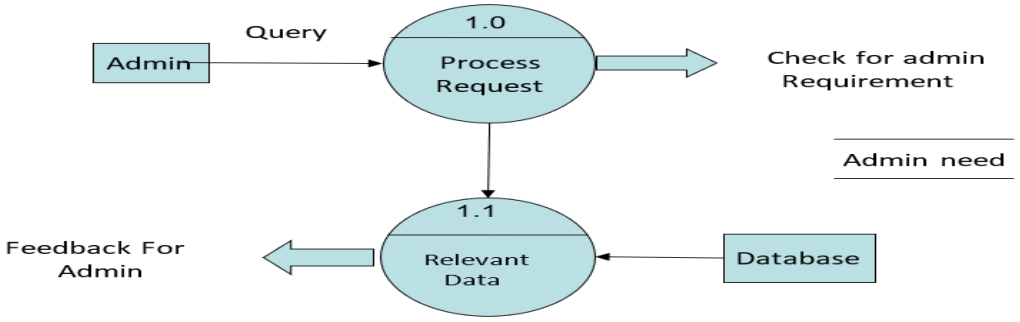
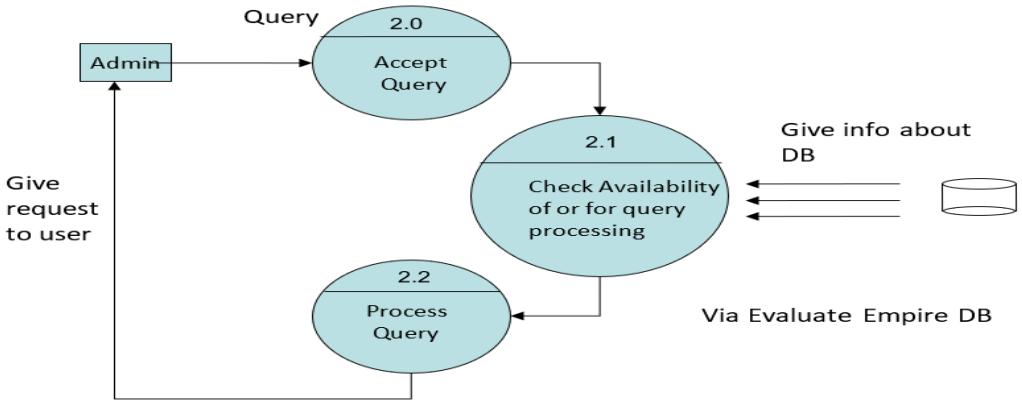


Figure 2



LEVEL 1 DFD

Figure 3



LEVEL 2 DFD: PREDICTION

Figure 4

2.5.3 Entity Relationship Diagrams

ER Diagram

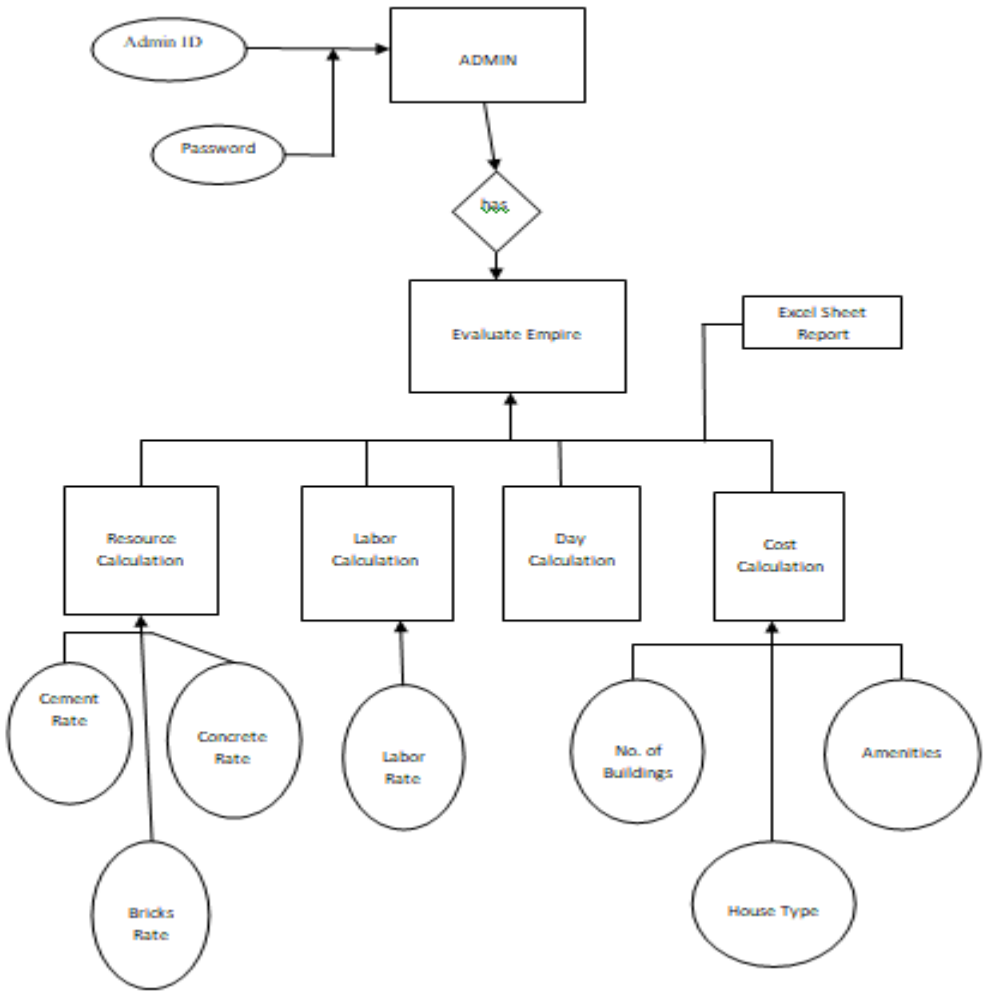
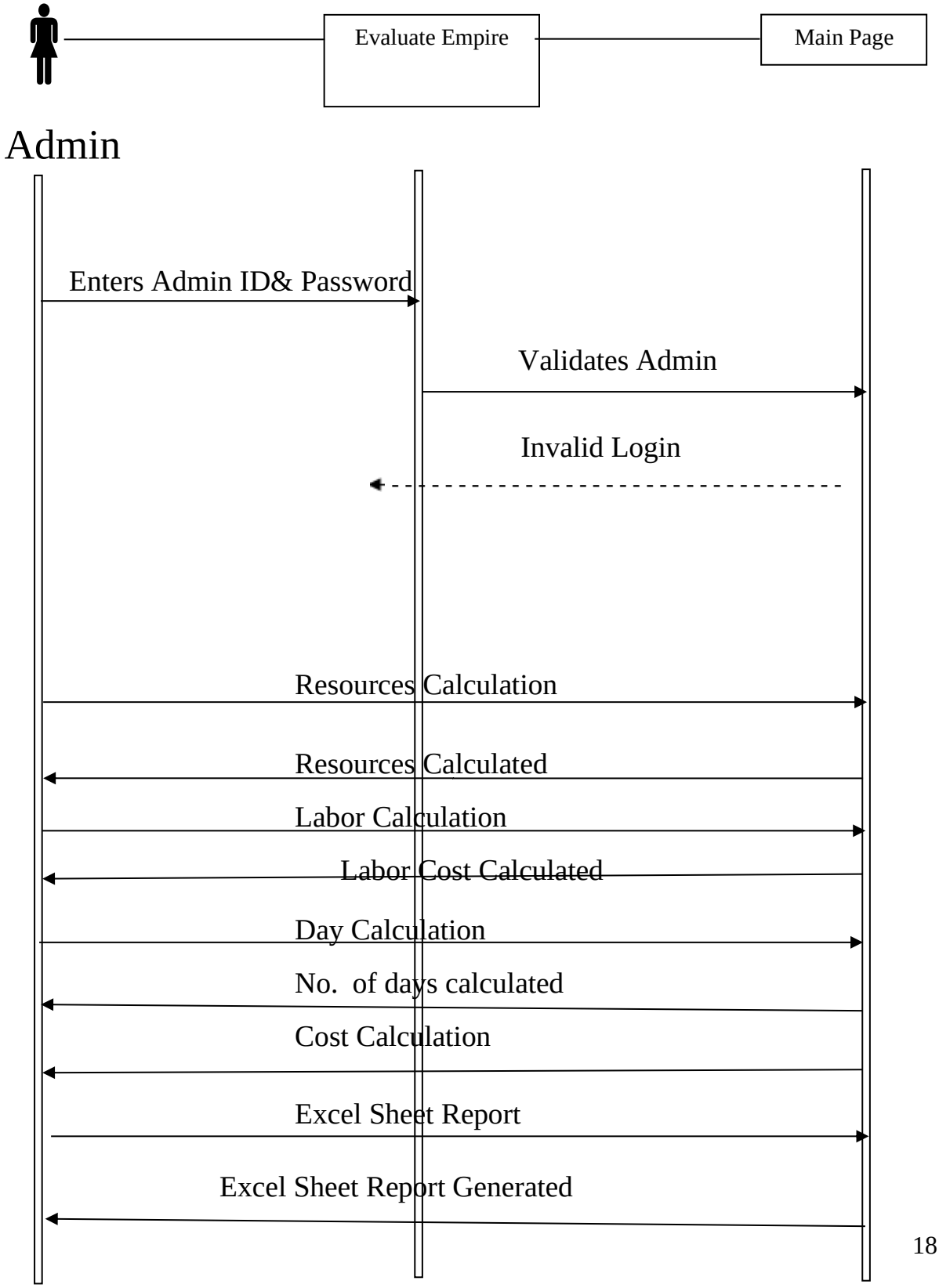


Figure 5

ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationship of entity sets stored in a database. In other words, ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic

concepts: entities, attributes and relationships.ER Diagrams contain different symbols that use rectangles to represent entities, ovals to define attributes and diamond shapes to represent relationships.

2.5.4 Event Trace Diagram(Sequence Diagram)



Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.

Purpose of a Sequence Diagram

- To model high-level interaction among active objects within a system.
- To model interaction among objects inside a collaboration realizing a use case.
- It either models generic interactions or some certain instances of interaction.

Notations of a Sequence Diagram

Lifeline: An individual participant in the sequence diagram is represented by a lifeline. It is positioned at the top of the diagram

Actor: A role played by an entity that interacts with the subject is called as an actor. It is out of the scope of the system. It represents the role, which involves human users and external hardware or subjects. An actor may or may not represent a physical entity, but it purely depicts the role of an entity. Several distinct roles can be played by an actor or vice versa.

Activation: It is represented by a thin rectangle on the lifeline. It describes that time period in which an operation is performed by an element, such that the top and the bottom of the rectangle is associated with the initiation and the completion time, each respectively.

Messages

The messages depict the interaction between the objects and are represented by arrows. They are in the sequential order on the lifeline. The core of the sequence diagram is formed by messages and lifelines.

Following are types of messages enlisted below:

Call Message: It defines a particular communication between the lifelines of an interaction, which represents that the target lifeline has invoked an operation.

Return Message: It defines a particular communication between the lifelines of interaction that represent the flow of information from the receiver of the corresponding caller message.

Self Message: It describes a communication, particularly between the lifelines of an interaction that represents a message of the same lifeline, has been invoked.

Recursive Message: A self message sent for recursive purpose is called a recursive message. In other words, it can be said that the recursive message is a special case of the self message as it represents the recursive calls.

Create Message: It describes a communication, particularly between the lifelines of an interaction describing that the target (lifeline) has been instantiated.

Destroy Message: It describes a communication, particularly between the lifelines of an interaction that depicts a request to destroy the lifecycle of the target.

2.5.5 State Diagram

Activity Diagram

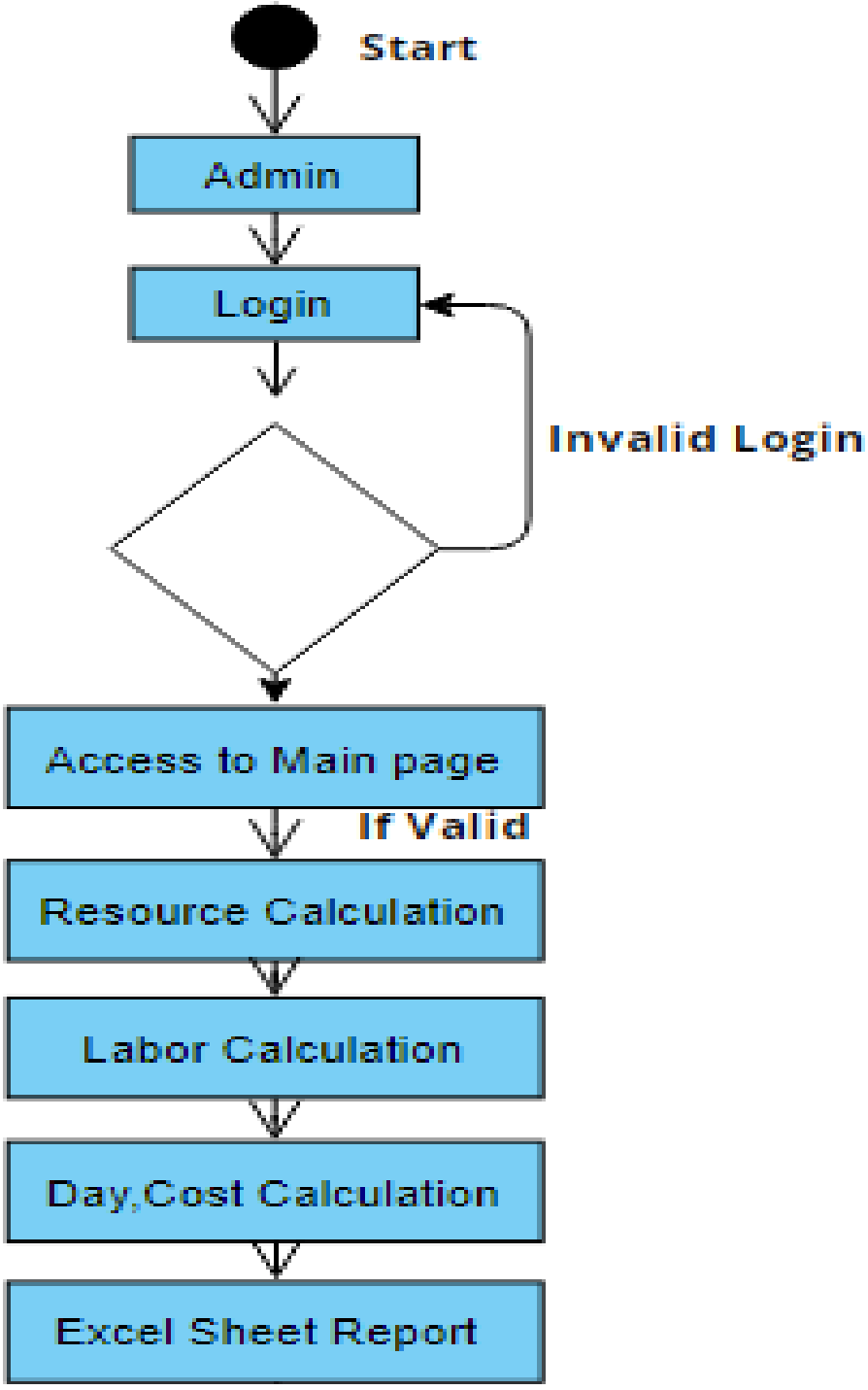


Figure 6

The activity diagram helps in envisioning the workflow from one activity to another. It put emphasis on the condition of flow and the order in which it occurs. The flow can be sequential, branched, or concurrent, and to deal with such kinds of flows, the activity diagram has come up with a fork, join, etc.

Following are the component of an activity diagram:

- Initial State: It depicts the initial stage or beginning of the set of actions.
- Final State: It is the stage where all the control flows and object flows end.
- Decision Box: It makes sure that the control flow or object flow will follow only one path.
- Action Box: It represents the set of actions that are to be performed.

An event is created as an activity diagram encompassing a group of nodes associated with edges. To model the behavior of activities, they can be attached to any modeling element. It can model use cases, classes, interfaces, components, and collaborations.

It mainly models processes and workflows. It envisions the dynamic behavior of the system as well as constructs a runnable system that incorporates forward and reverse engineering. It does not include the message part, which means message flow is not represented in an activity diagram.

It is the same as that of a flowchart but not exactly a flowchart itself. It is used to depict the flow between several activities.

2.5.6 Class Diagram

Is class diagram related to database?

In building a relational database, each class is first translated (mapped) into a relational model scheme. The scheme is identified by the plural form of the class name, and lists all of the attributes in the class diagram. ... These values are called the domain of the attribute.

Class Diagram

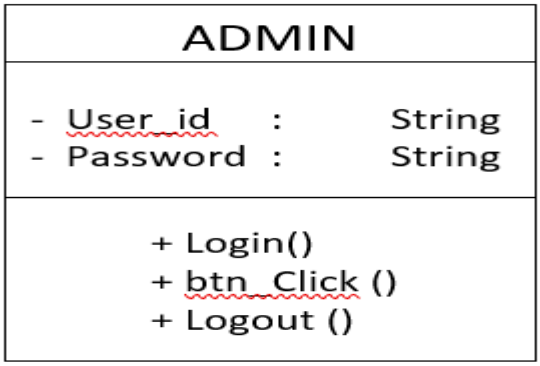
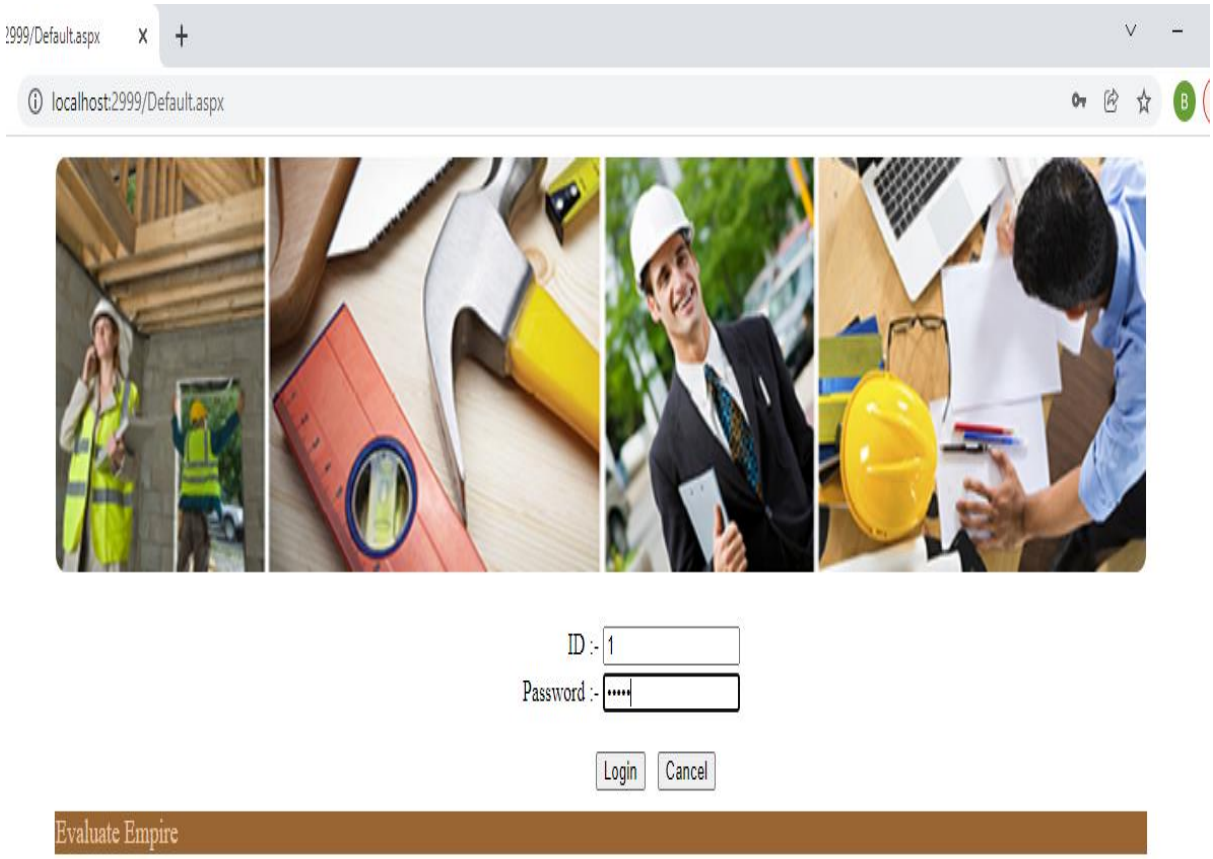


Figure 7

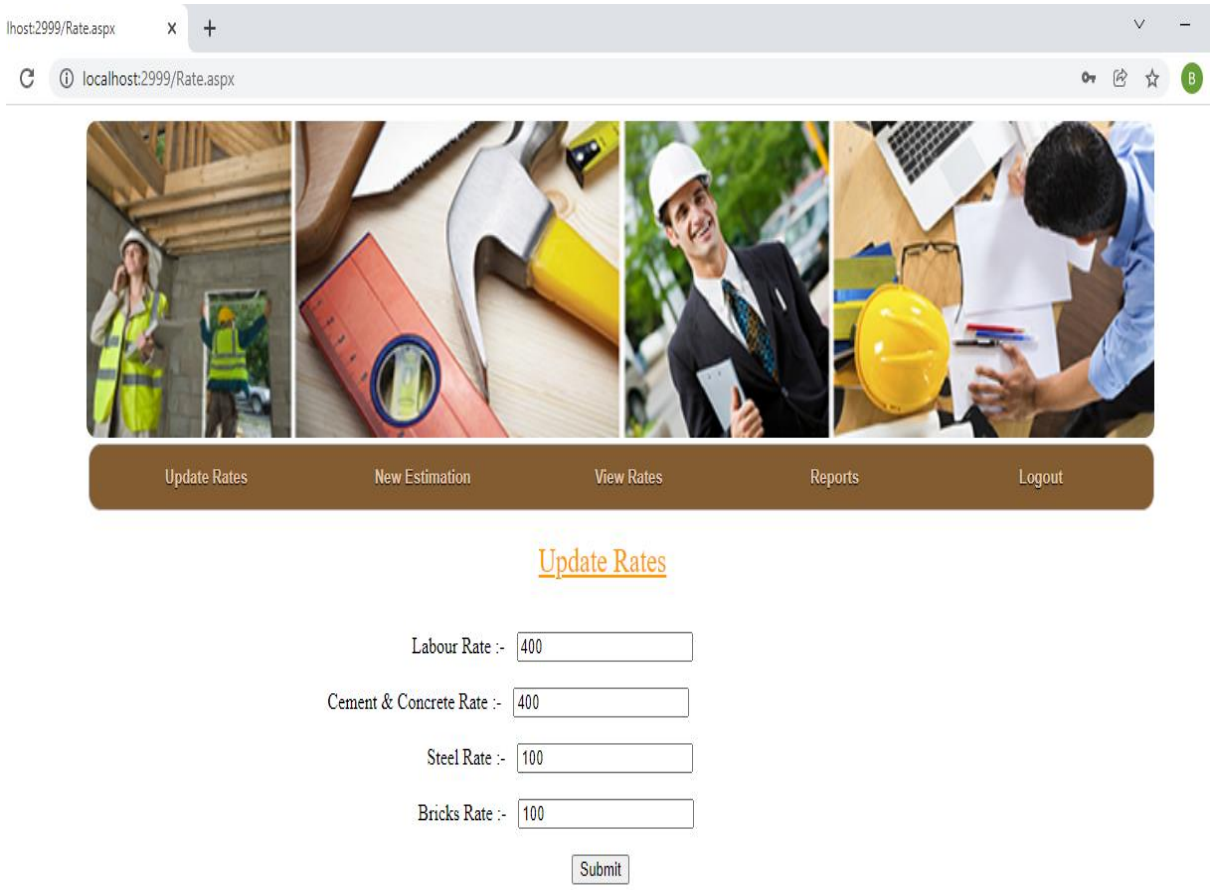
Chapter 3: Implementation And Testing

3.2 User Interface and Snapshot

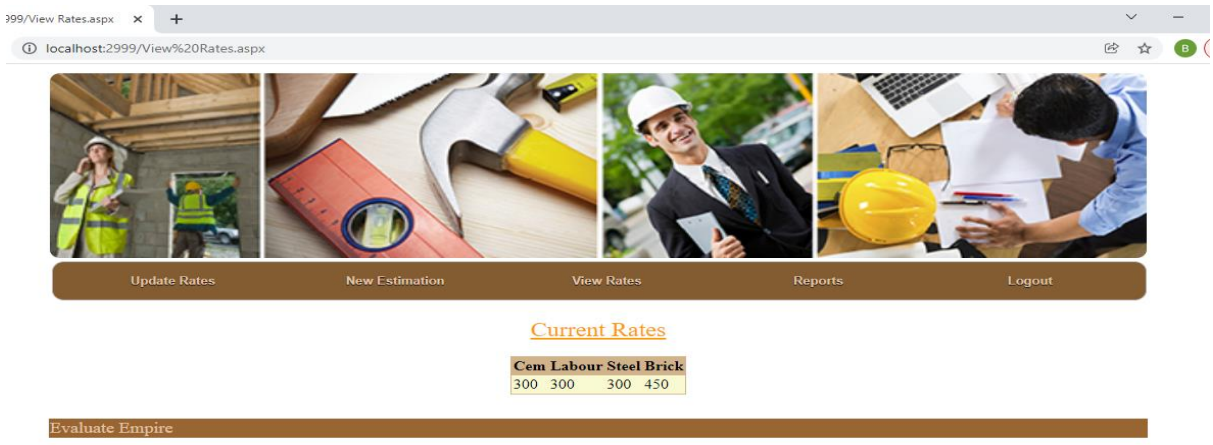
Default Page



Page to change the rates of the workers

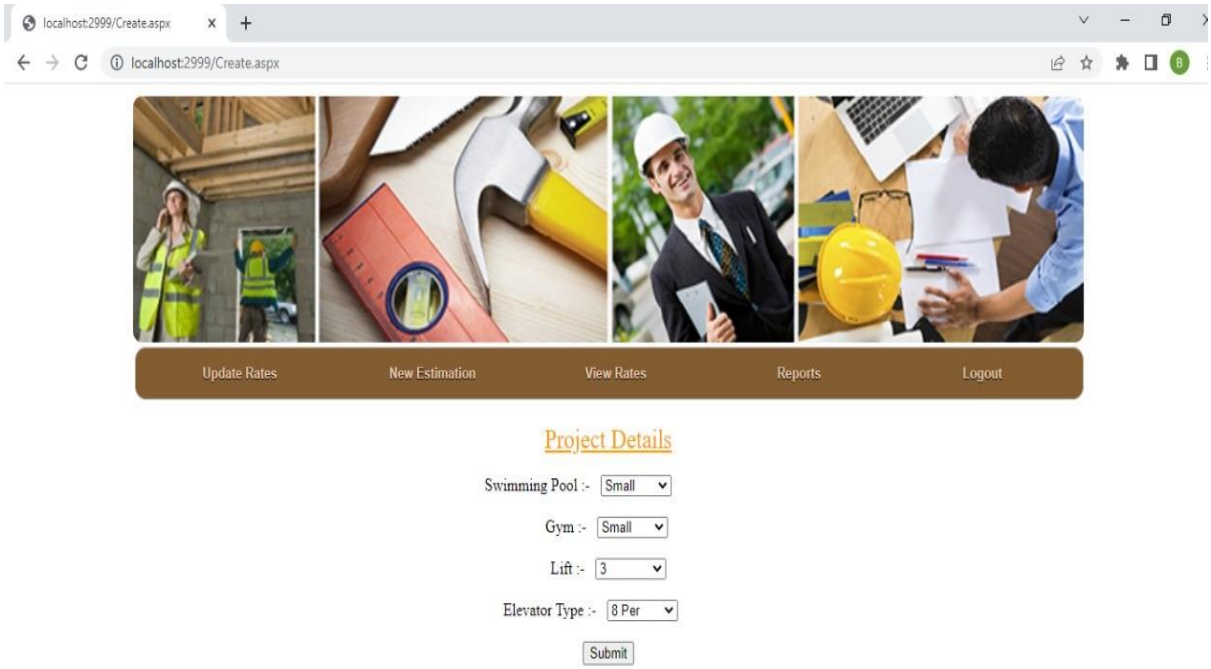


Page to check the changed rates



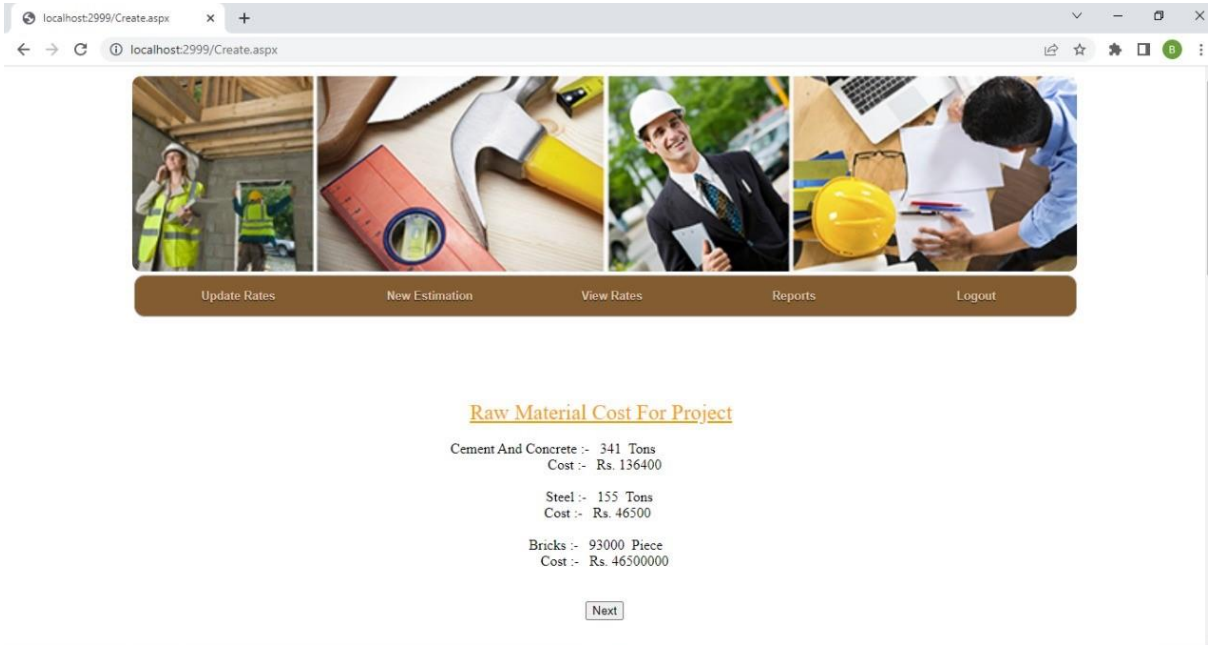
Page to add the Project Details

Input of information for Extra Amenities

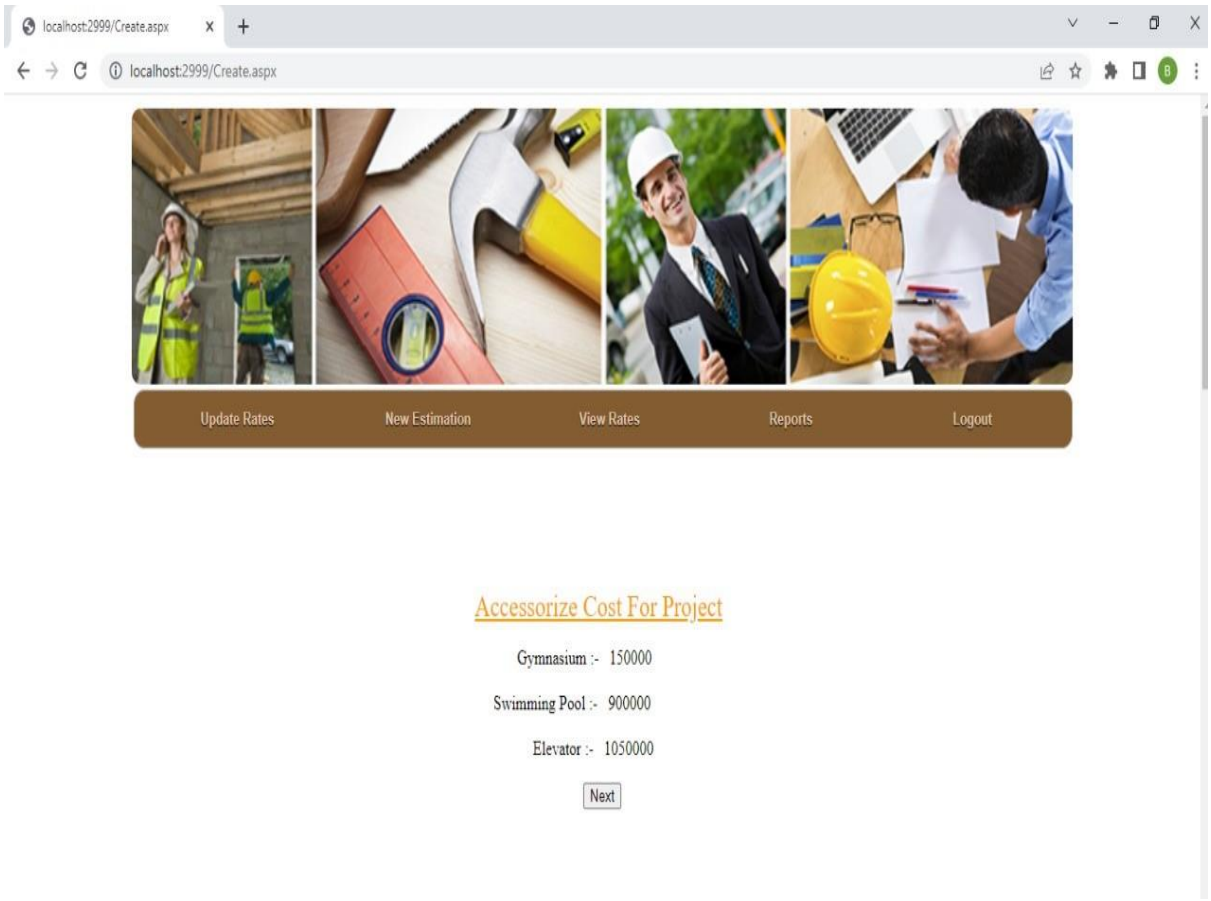


Calculation for number of labours

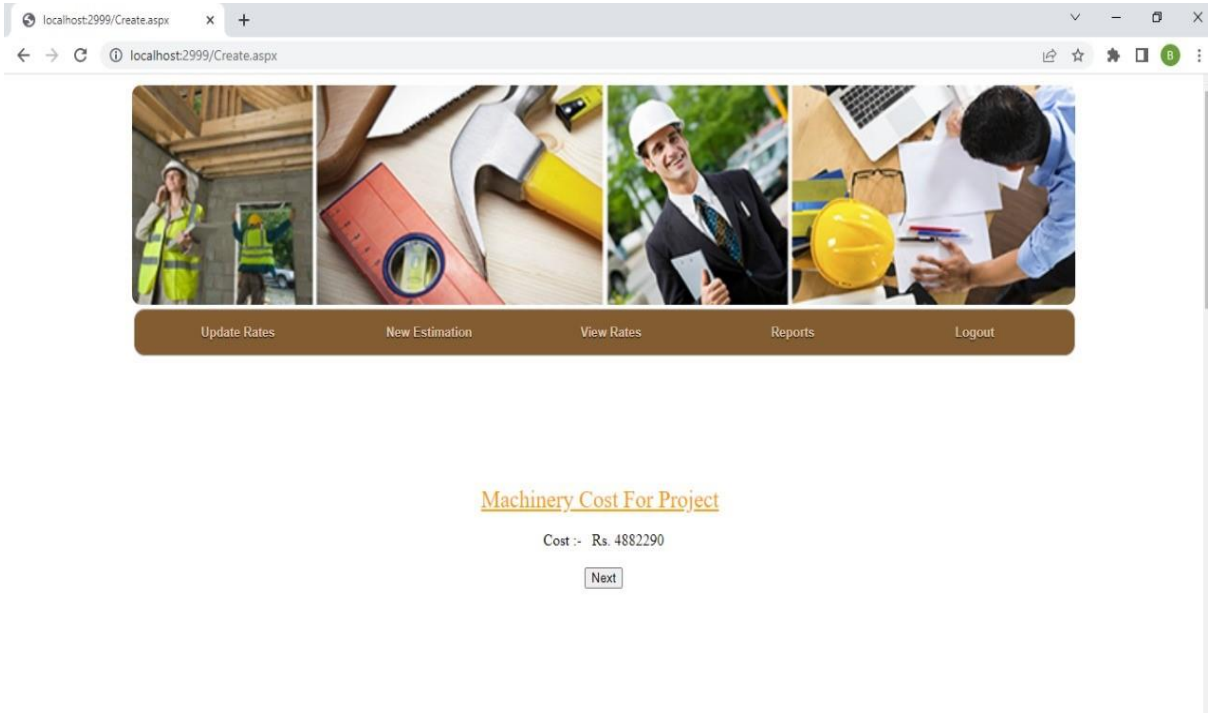
Raw Materials cost for the Project



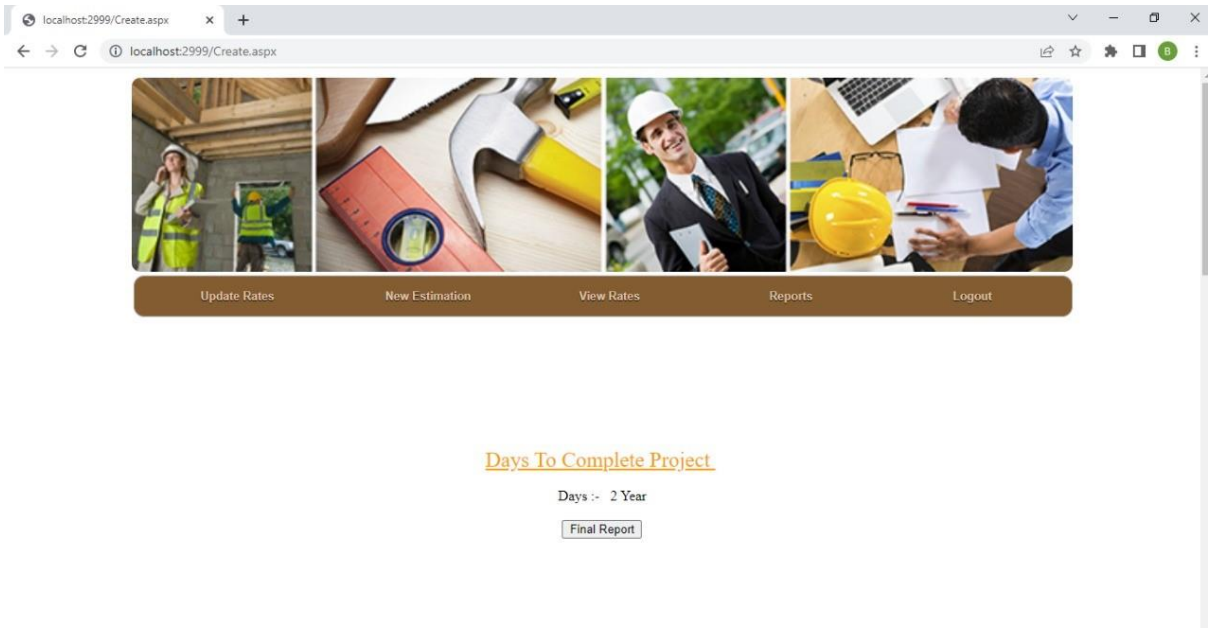
Cost for Additional Accessories



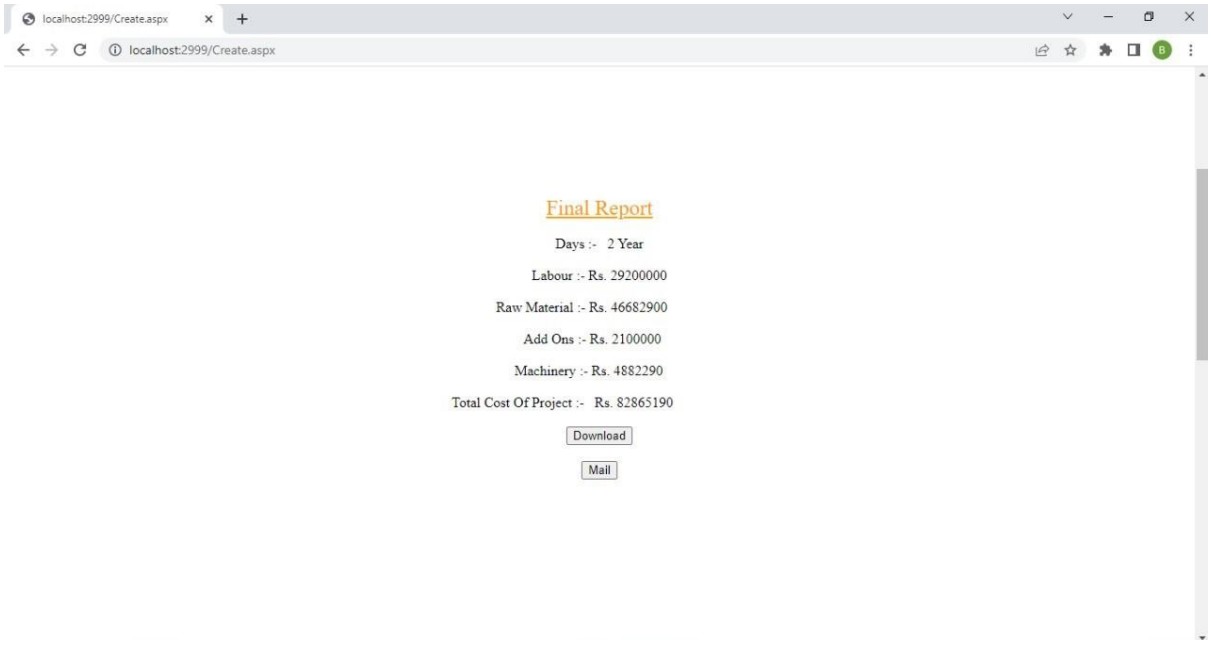
Total Machinery Cost



Days needed to complete the Project



Report for the final cost of the Project



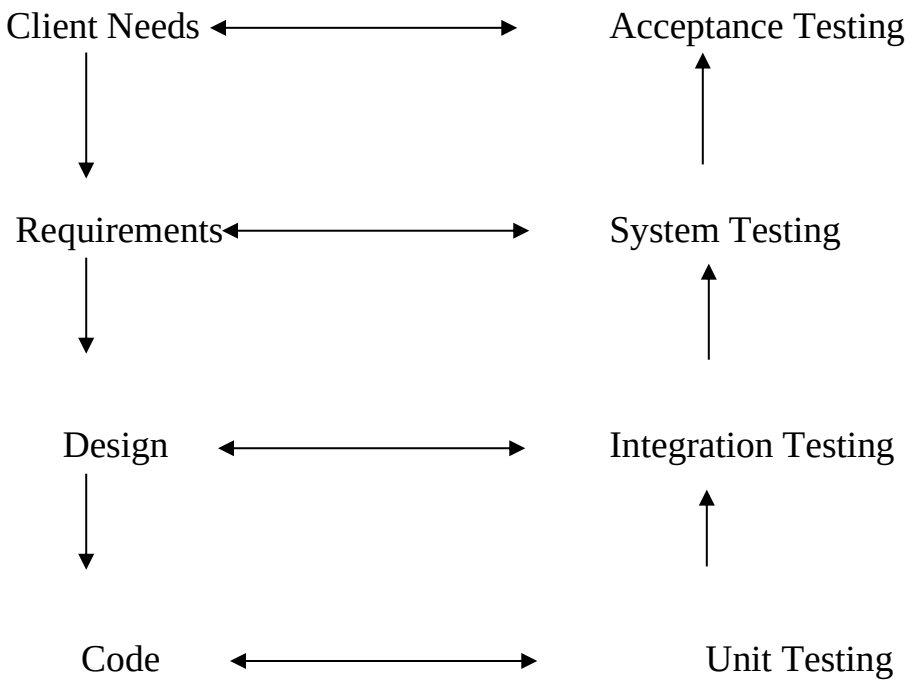
3.3 Testing Using Use Cases

As the project is on bit large scale, we always need testing to make it successful. If each components work properly in all respect and gives desired output for all kind of inputs then project is said to be successful. So the conclusion is-to make the project successful, it needs to be tested.

The testing done here was System Testing checking whether the user requirements were satisfied. The code for the new system has been written completely using ASP .NET with C# as the coding language, C# as the interface for front-end designing. The new system has been tested well with the help of the users and all the applications have been verified from every nook and corner of the user.

Levels of Testing

In order to uncover the errors present in different phases we have the concept of levels of testing. The basic levels of testing are:



A series of testing is done for the proposed system before the system is ready for the user acceptance testing.

The steps involved in Testing are:

- **Unit Testing**

Unit testing focuses verification efforts on the smallest unit of the software design**,** the module**.** This is also known as "Module Testing"**.** The modules are tested separately**.** This testing carried out during programming stage itself**.** In this testing each module is found to be working satisfactorily as regards to the expected output from the module**.**

- **Integration Testing**

Data can be grossed across an interface**;** one module can have adverse efforts on another**.** Integration testing is systematic testing for construction the program structure while at the same time conducting tests to uncover errors associated with in the interface. The objective is to take unit tested modules and build a program structure**.** All the modules are combined and tested as a whole**.** Here correction is difficult because the isolation of cause is complicate by the vast expense of the entire program. Thus in the integration testing stop**,** all the errors uncovered are corrected for the text testing steps**.**

- **System testing**

System testing is the stage of implementation that is aimed at ensuring that the system works accurately and efficiently for live operation commences. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, then goal will be successfully achieved.

- **Validation Testing**

At the conclusion of integration testing software is completely assembled as a package, interfacing errors have been uncovered and corrected and a final series of software tests begins**,** validation test begins**.** Validation test can be defined in many ways**.** But the simple definition is that validation succeeds when the software function in a manner that can reasonably expected by the customer. After validation test has been conducted one of two possible conditions exists.

One is the function or performance characteristics confirm to specifications and are accepted and the other is deviation from specification is uncovered and a deficiency list is

created. Proposed system under consideration has been tested by using validation testing and found to be working satisfactorily.

- **Output Testing**

After performing validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated by the system under consideration. Here the output format is considered in two ways, one is on the screen and other is the printed format. The output format on the screen is found to be correct as the format was designed in the system designed phase according to the user needs.

For the hard copy also the output comes as the specified requirements by the users. Hence output testing does not result any corrections in the system.

- **User Acceptance Testing**

User acceptance of a system is the key factor of the success of any system. The system under study is tested for the user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required.

Chapter 4: Conclusion and Future Work

4.1 Conclusion

Evaluate Empire offers the capability to develop project Construction estimation information with more accuracy throughout the entire building lifecycle. The key to successful use of evaluate empire-based costing will be the development of processes and methods within organizations. The level of detail required in a building model will vary depending on project phases, from preliminary (macro) estimation models to very detailed models required for micro estimation activities during the construction phase.

Data exchange between evaluate empire and estimation applications can be accomplished in several ways – APIs, ODBC and IFCs among them. The manner chosen will depend on the software developer's intent. Professionals using evaluate empire application will need to select a method depending on project phase and the detail required, and develop in-house standards and procedures for aligning their models with the estimating processes.

4.2 Future Work

The Disadvantage of our project is Developers have to provide accurate data into the system. If some details are not available then it may create problem.So in future we need to overcome this disadvantage and make sure that there are no disadvantages in our project.

References:

1) Construction Cost Estimator, House Cost Calculator, Cost per square feet (civil-engineering-calculators.com)
2) Cost Calculator –BuildersMART
3) https://www.techtarget.com/searchsoftwarequality/definition/unit-testing#:~:text=Unit%20testing%20is%20a%20software,developers%20and%20sometimes%20QA%20staff.
4) https://www.tutorialspoint.com/software_testing_dictionary/integration_testing.htm
5) https://www.geeksforgeeks.org/system-testing/
6) https://www.tutorialspoint.com/software_testing_dictionary/validation_testing.htm
7) https://www.itperfection.com/cissp/security-assessment-and-testing-domain/analyze-test-output-and-generate-a-report/
8) https://www.codecademy.com/resources/blog/what-is-user-acceptance-testing/#:~:text=%20Types%20of%20user%20acceptance%20tests%20%201,development%20is%20tested%20according%20to%20the...%20More%20