



ONLINE TENDERING SYSTEM

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Abstract:

The basic function of this system is to available the tender documents online to the customers and download the application forms. Daily many tenders will be released and the new tenders are updated so that customers can view them and if they are interested they can download the tender form. Customers will have to register themselves and will get a permanent user ID and password. By this ID and password he can download the tender forms in future also. The tender documents will be supplied to the user. This system can also handle multiple tender documents at one time i.e. the user can access various tenders from the company at onetime and can download the required forms. The user can submit the details along with quotation to the department through online. Then the department people evaluate all the tenders submitted by users on evaluation date and they allocate that work to the user who is eligible and quoted for less amount.

Introduction:

A tender notification is an online service, which in more recent times is provided as Software as a Service. Historically, the service would be provided by basic coding techniques in java code, when a new tender had been published. Since then, the industry has grown to provide fully automated systems that deliver various forms of communication to notify users of tendering opportunities. Typically, services are delivered in the form of an e-mail and are commonly for open tenders, which allow any potential supplier to register interest in a tender opportunity. Some may argue that notification services have become integral to open tenders and the process. Notification services are often the main form of communication to the client that a new tender is available. People closely linked with the providing end user, may receive communication directly, but with the growth of the notification industry, this is becoming unlikely. Procurement software sometimes incorporates the tendering data into packages to make the information more accessible for suppliers interested in various tenders. Many of the direct notification packages often have a targeted market or segment, often from one or two providers, for example a county council or large government institution. Repacks allow for greater numbers of tenders and often cover multiple countries, segments and markets.

Types of Notification:

Direct:

These are normally opportunities that are sent direct from the system they were created on. For example if a government institution used a certain brand of tendering software, then this brand would also offer a tender service to notify the user of tenders on that specific system.

Repacks:

Repacks are normally provided by external organizations and software as a service providers. Feeds from multiple sources are combined, collated and then sent out. The aim of repacks is normally to give the supplier as many opportunities as possible on a daily basis. Normally where feeds from multiple sources are combined,

collated and then sent out. The aim is obvious here, to give the supplier as many opportunities as possible on a daily basis. However, due to the information often being second or third hand, some data can be lost in the process, or may become inaccurate as it is passed down the line. The collated information tends include a range of sectors, from construction to healthcare tenders.

Similar Processes:

A request for tender and request for quotation is a closed tender where people are invited by a buyer to quote for specific work. A tender notification alerts potential suppliers of open tenders that they then have to register interest in before entering the tendering process. Invitation to tender is also a similar process to a tender notification. The major difference is the institution or organization that created the tender chooses who to invite, often in the form of a closed tender. Tender notification services provide a vast array of people and companies about an open tender that anyone can apply for.

Benefits:

Tender notifications (sometimes called tender alerts), provide the client with given tender information that they desire. This is often delivered in the form of an email notification, saving the client visiting multiple websites to check for updates on potential clients. Most repacks provide both private and public sector tender opportunities. The idea is that tender notification systems deliver tender opportunities to the company; dramatically reducing the amount of time spent looking for these tenders. An internet based process wherein the complete tendering process; from advertising to receiving and submitting tender-related information are one online. This enables firms to be more efficient as paper-based transactions are reduced or eliminated, facilitating for a more speedy exchange of information. Tender is an offer in writing to execute specified work or to supply some specified articles at certain rates within a fixed time under certain conditions of contract and agreement between the contractor and the department. The construction of work is usually done by contractor. The term contractor means a person or firm to do any work undertakes any type of contract. Contract is an undertaking by a person or firm to do any work under terms and conditions. In the existing system all the tenders are processed manually through documents. This tendering system is called open documentation system. In this the department people publish the tender notice in newspapers, then the contractors buy the tender forms from the specified department by paying tender fee.

If the contractors are interested to do the particular work, they have to submit quotation along with their eligibility details by post or by hand in sealed covers. Finally the department people open the sealed covers on tender evaluation date and evaluate the submitted quotations in presence of all contractors. Due to this, there is wastage of manpower, money, and time. It tends to form tender ring. To avoid all the above pitfalls the system proposed is "Online Tender Handling". In this all the tenders processed through online. This system saves money, manpower, time and it reduces the chances for tendering. It provides security compared to existing system.

Some E-tendering systems are relatively simple technical solution based around e-mail and electronic document management. It involves uploading tender documents on to a secure website with secure login, authentication and viewing rules. Tools available in the current market offer varying levels of sophistication.

A simple e-tendering solution may be a space on a web server where electronic documents are posted with basic viewing rules. This type of solution is unlikely to provide automated evaluation tools; instead users are able to download tenders to

spreadsheet and compare manually, but in an electronic format. Such solutions can offer valuable improvements to paper-based tendering.

More sophisticated e-tendering systems, like Tender Tailor, may include more complex collaboration functionality, allowing numbers of users in different locations to view and edit electronic documents. They may also include e-mail trigger process control which alerts users for example of a colleague having made changes to a collaborative tender, or a supplier having posted a tender.

The most sophisticated systems may use evaluation functionality to streamline the tender process from start to finish, so that initial tender documents are very specific and require responses from vendors to be in a particular format. These tools then enable evaluation on strict criteria which can be completely automated.

E-procurement is gradually emerging as the desired method of doing procurement by Government organizations in various countries. Typically, 10% to 20% of a country's GDP can be attributed to Public Procurement (Source: The World Bank). The value of Government procurement globally is of the order of trillions of US dollars. The World Bank and other international bodies have been advocating e-procurement/e-tendering bidding for over 14 years now to enhance transparency and efficiency in public procurement.

The emerging market-size and potential for internet-based software & services for public procurement is therefore huge. While a number of initiatives have taken place globally in the area of e-procurement, their focus has been primarily on e-Marketplaces, e-Catalogue Purchasing, Reverse-Auction and its adaptations. Government tendering or bid-invitation process has peculiar characteristics, with requirements of 'transparency and security', which can be addressed only by software designed especially for this purpose.

However, based on available information, most of these procurements initiatives offer 'limited functionality', and 'do not comprehensively address the requirements of security and transparency' for public-procurement. The current sites for Government tendering are either merely Tender-Notice sites (e- Publishing sites), or are doing bidding with 'rudimentary and restricted' features, without appropriate security and transparency. Furthermore, many of these initiatives have come up in response to some specific Government project and therefore cannot be readily supplanted/ deployed in other organizations and countries.

Requirement Analysis:

The electronic tendering system was selected because of its ease of use, the fact that it was free to use for suppliers (i.e. there are no annual subscription or document download costs incurred). Users do not have to keep updating software and any applications needed to read documents are provided on the site in a read-only format. Another major consideration was that the system had been proven over a number of years in a similar environment.

The Electronics Tendering System also provides a high level of transparency and accountability and makes available information relating to the Council's tendering activities via the website. There are three major activities in this phase are,

- ✓ Tender Publication
- ✓ Tender Submission
- ✓ Tender Evaluation

The requirement document must specify all the functional and performance requirements, the formats of inputs and outputs and all design constraints that exist due to political, economic, environment and security reasons.

Problem Analysis:

In this we discuss about what is the current system, problems in the current system and what the proposed system is.

Current System:

In the current tender handling system all the tenders are processed through documents. It is a manual system. This system is called open document system. In this first of all tender notices are given in news papers with the details about work. Then the contractors read the tender notification and buy the tender schedule by paying the tender fee if they are interested to do that particular work. In that schedule all the details of the work are available to the contractors. Then the contractors send submission details which include quotation of the tender before tender submission closing date through post or by hand. On evaluation date the department people evaluate all the tender details submitted by the contractors. The department people give that work to the contractor who is eligible and quoted for fewer amounts.

Problems with the Current System:

- ✓ It is more time consuming.
- ✓ It includes wastage of man power
- ✓ It leads to tender ring
- ✓ It includes wastage of money

So in order to overcome all these limitations and to meet all their requirements the current process is replaced with this application.

Purpose:

The purpose of this document is to display all the external requirements for the “Tender Handling System”. The main objective of preparing this document is to give a detailed description of the analysis and requirements for the system to be automated and this will be a guide in the other phase. The purpose of “E-Procurement System” to provide the traditional tendering process in an electronic form, using the Internet. Using E-tendering the Departments can publish the tenders and users submit the tenders then finally the departments evaluate the tenders.

Scope:

This document is one that describes the requirements of the system. It is meant for use by the department people and contractors will be the basis for this system. The department people responsible for publish & evaluation of tenders. The contractors are responsible for downloading & submission of tenders.

Proposed System:

In this we discuss about the proposed online tender handling system.

General Description of Inputs & Outputs:

The system will be getting input from the departments from various locations. The output also given by the departments depending on input given by the contractors. The system provides an easy way of selecting a particular Tender Details and also it is very easy to know the tender granted Details. There should be no difficulty for the suppliers to bid the amount for the invited tenders. The system is also able to access the information from the database.

Using this system, services can be provided by the organization in the absence of personal throughout the year, round the clock. The system is tailored in such a way to integrate and centralize all the various indent information and tenders information, so that minimum effort is needed to get all the jobs done. The centralize system makes sure that data consistency is maintained.

The Modules in This Application Are: Administrator, Employee, Purchase department & Supplier

Administrator: This administrator will maintain all the master information like items information, supplier's information and employee information.

Employee: He is going to prepare the indent for the required product to the purchase department and also he checks indent status.

Purchase Department: Displaying indent information from different departments. Preparation of tenders for the indents, Invitation to the supplier for the tender.

Supplier: Supplier is going to bid the amount for tender within the stipulated time, and will know the final status of the tender once it is closed.

Software Requirement Specification

Software requirement specification (SRS) is the starting point of the software development activity. The SRS means translating the ideas in the minds of the clients (the input), into a formal document (the output of the requirements phase). Thus the output of the phase is a set of formally specified requirements, which hopefully are complete and consistent, while the input has none of these properties. A procedure for identifying requirements can there for is at best set of guidelines. The requirements specification phase consists of two basic activities.

- ✓ Problem or requirement analysis
- ✓ Requirement specification

The requirement specification phase terminates with the production of the validation software requirement specification document.

Role of SRS:

There are three major parties interested in a new system – the client, the users, and the developer. There is a communication gap between these person. A basic purpose of SRS is to bridge this communication gap. SRS is the medium through which the client and user needs are accurately specified; indeed SRS forms the basis of software development.

An important purpose of the process of developing an SRS is helping the client to understand his or her own needs. A good SRS provides many benefits. Some of the goals it accomplishes are:

- ✓ Establishing the basis for agreement between the client and supplier on what the software product will be reducing the development cost.
- ✓ The preparation of the SRS forces rigorous specification of the requirements before the design begins. Careful development of an SRS can reveal omissions, inconsistencies and misunderstanding early in the development cycle, which can considerably reduce cost.
- ✓ Providing a reference for validation of the final product .The SRS assists in
- ✓ Determining if the software meets the requirements.

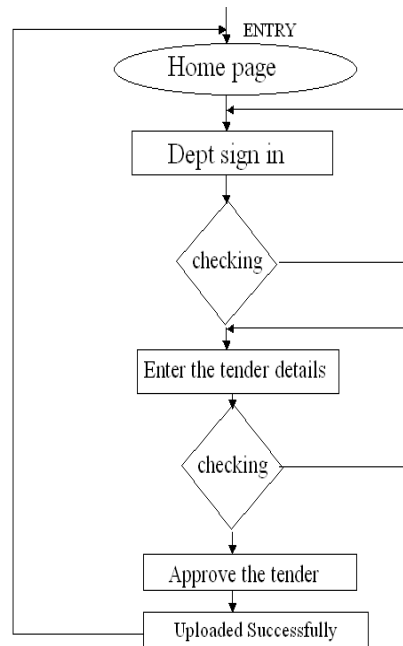
Software Design:

It is a process of planning the new or modified system. Analysis specifies what a new or modified system does. Design specifies how to accomplish the same. Design is essentially a bridge between requirements specification and the final solution satisfying the requirements. The design of a system is essentially a blue print or a plan for a solution for the system.

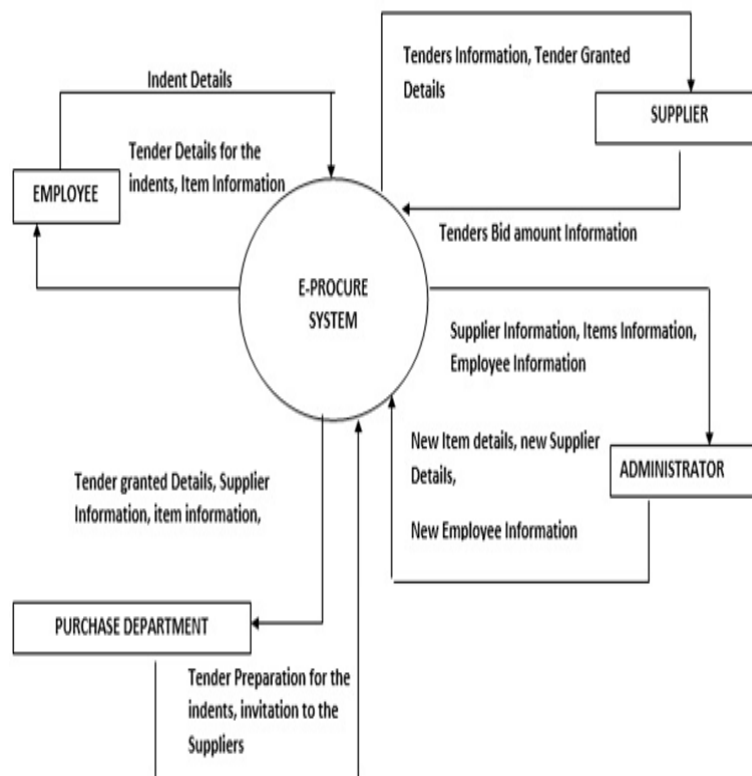
The Design process for software systems has two levels. At the first level the focus is on depending which modules are needed for the system, the specifications of the of these modules and how the modules should be interconnected.

This is what is called system design or top-level design. In the second level, the internal design of the modules, or how the specifications of the module can be satisfied is described upon. This design level is often called detailed design or logic design. The First level produces the system design, which defines the components needed for the system, how the components interact with each other. It focus is on depending which modules are needed for the system, the specifications of the of these modules and how the modules should be interconnected.

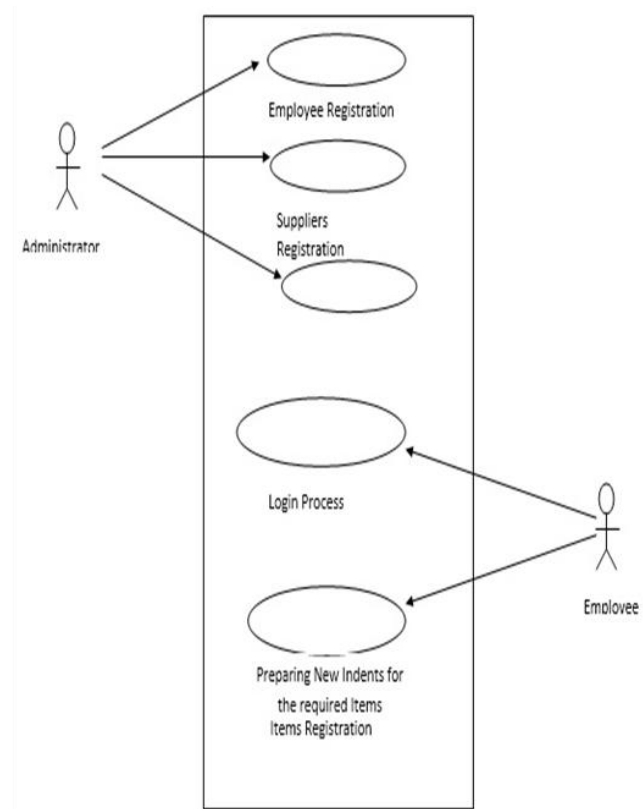
Flow Charts: Tender



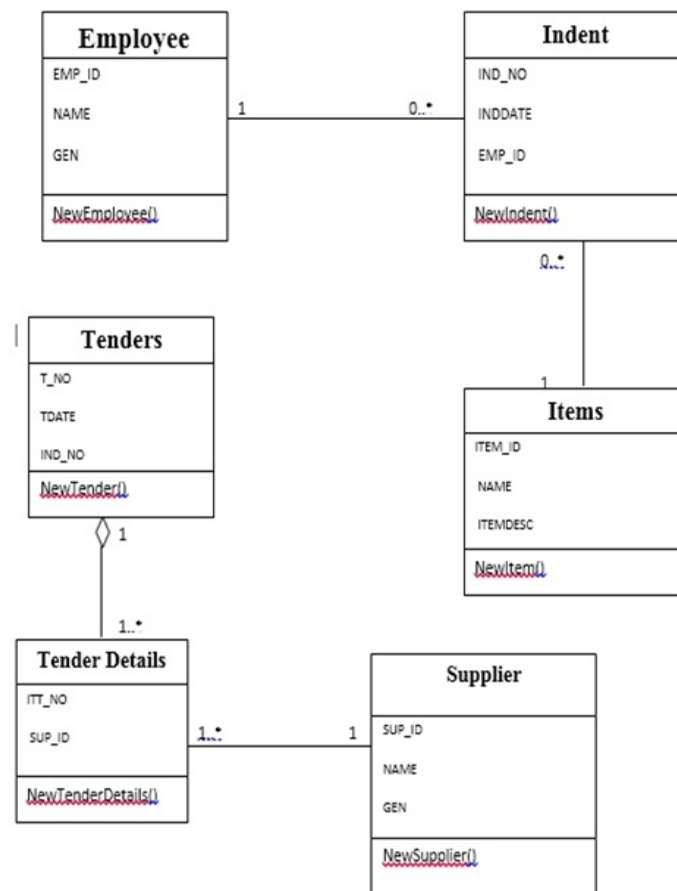
Data Flow Diagram: Content Level



Top Level Diagram:



Class Diagram:



Database Design:

In this we discuss about database, table scenarios etc.

Data Base:

A database is a collection of data with some inherent meaning, designed, built and populated with data for a specific purpose. A database management system provides flexibility in the storage and retrieval of data. The DBMS is a bridge between the application program, which determines what data are needed and how they are processed, and the operating system of the computer, which is responsible for placing data on the magnetic storage devices. A schema defines the database and a subschema defines the portion of the database that a specific program will use.

Characteristics:

- ✓ Represents complex relationships between data.
- ✓ Keeps control on data redundancy.
- ✓ Keeps a centralized data dictionary for the storage of retaining to data and its manipulation information
- ✓ Enforces data access authorization.
- ✓ Has automatic intelligent backup and recovery Procedure for data.

Database Administrator:

A database administrator is a block of code loaded into memory, which organizes all information (database) between the users.

The **DBA** takes care of the following things:

- ✓ Updating database
- ✓ Retrieving the data
- ✓ Accepting the queries
- ✓ Enforces security
- ✓ Enforces data integrity specifications
- ✓ Managing data sharing
- ✓ Optimizing queries
- ✓ Managing system catalogs

Insert, Update, Delete:

Any operand that describes the results of a single retrieval operation is capable of being changes to be made to application program.

Normal Forms Implemented:

Normalization: It is the process of splitting the database into some more desirable form by reducing the redundancy.

Advantages of normalization:

- ✓ To reduce the redundancy
- ✓ To increase the access specification and storage structure.

First Normal Form: A relation or a table is said to be in first normal form if and only if all the underlying domains contain at least atomic values.

Second Normal Form: A relation or a table is said to be in second normal form if and only if it is in first normal form and every non-key attribute is fully dependent on the primary key of the relation.

Third normal Form: A relation or a table is said to be in third Normal form if it is in second normal form and every non key attribute is transitively dependent on the primary key of the relation. A table is in BCNF if the only determinants are candidate keys. A table is in BCNF iff every non trivial left irreducible FD has a candidate key as its determinant.

From the above considered definitions, on thorough study of our project we acquired that it has reduced and we eliminated the redundancy up to 2nd normal form.

Software and Hardware Specifications:

Hardware Specification:

- ✓ Intel processor
- ✓ Minimum 512 MB Ram
- ✓ Hard disk minimum 40 GB
- ✓ Microsoft Compatible 101 or more Key Board

Software Specification:

- ✓ Operating System: Windows
- ✓ Front End: JAVA
- ✓ Back End: MYSQL

Software Descriptions:

System Analysis is the process of gathering and interpreting facts, diagnosing problems, and using the information or recommend improvements to the system. This is the job of the system analyst. In the case of systems analysis, the substance is the business system under investigation and the parts are the various sub-systems, which work together to support the business. Before designing a computer system, which will satisfy the information requirements of a company, it is important that the nature of the business and the way it currently operates are clearly understood. The detailed examination will then provide the design teams with the specific data they require in order to ensure that all the client's requirements are fully met. The investigation or study conducted during the analysis phase may build on the results of an initial feasibility study and will result the Production of a document, which specifies the requirements for a new system. This document is usually called the requirements specification or functional specification, and it is also described as a 'target document' because it establishes goals for the rest of the project.

JAVA - JDK 1. 6.1:

Java is a high-level, third generation programming language, like C, Fortran, Smalltalk, Perl, and many others. You can use Java to write computer applications that crunch numbers, process words, play games, store data or do any of the thousands of other things computer software can do. Compared to other programming languages, Java is most similar to C. However although Java shares much of C's syntax, it is not C. Knowing how to program in C or, better yet, C++, will certainly help you to learn Java more quickly, but you don't need to know C to learn Java. Unlike C++ Java is not a superset of C. A Java compiler won't compile C code, and most large C programs need to be changed substantially before they can become Java programs.

What's most special about Java in relation to other programming languages is that it lets you write special programs called applets that can be downloaded from the Internet and played safely within a web browser. Traditional computer programs have far too much access to your system to be downloaded and executed willy-nilly. Although you generally trust the maintainers of various ftp archives and bulletin boards to do basic virus checking and not to post destructive software, a lot still slips through the cracks. Even more dangerous software would be promulgated if any web page you visited could run programs on your system.

Java solves this problem by severely restricting what an applet can do. A Java applet cannot write to your hard disk without your permission. It cannot write to

arbitrary addresses in memory and thereby introduce a virus into your computer. It should not crash your system.

Object oriented programming is the catch phrase of computer programming in the 1990's. Although object oriented programming has been around in one form or another since the Simulate language was invented in the 1960's, it's really begun to take hold in modern GUI environments like Windows, Motif and the Mac. In object-oriented programs data is represented by objects. Objects have two sections, fields (instance variables) and methods. Fields tell you what an object is. Methods tell you what an object does. These fields and methods are closely tied to the object's real world characteristics and behavior. When a program is run messages are passed back and forth between objects. When an object receives a message it responds accordingly as defined by its methods.

Object oriented programming is alleged to have a number of advantages including:

- ✓ Simpler, easier to read programs
- ✓ More efficient reuse of code
- ✓ Faster time to market
- ✓ More robust, error-free code

Java is inherently multi-threaded. A single Java program can have many different threads executing independently and continuously. Three Java applets on the same page can run together with each getting equal time from the CPU with very little extra effort on the part of the programmer.

This makes Java very responsive to user input. It also helps to contribute to Java's robustness and provides a mechanism whereby the Java environment can ensure that a malicious applet doesn't steal all of the host's CPU cycles. Fortunately multithreading is so tightly integrated with Java, that it makes Java rather difficult to port to architectures like Windows 3.1 or the PowerMac that don't natively support preemptive multi-threading.

There is a cost associated with multi-threading. Multi-threading is to Java what pointer arithmetic is to C, that is, a source of devilishly hard to find bugs. Nonetheless, in simple programs it's possible to leave multi-threading alone and normally be OK. You do not need to explicitly allocate or deallocate memory in Java. Memory is allocated as needed, both on the stack and the heap, and reclaimed by the garbage collector when it is no longer needed. There's no `malloc()`, `free()`, or destructor methods. There are constructors and these do allocate memory on the heap, but this is transparent to the programmer.

The exact algorithm used for garbage collection varies from one virtual machine to the next. The most common approach in modern VMs is generational garbage collection for short-lived objects, followed by mark and sweep for longer lived objects. I have never encountered a Java VM that used reference counting.

Java Platform:

One characteristic of Java is portability, which means that computer programs written in the Java language must run similarly on any supported hardware/operating-system platform. This is achieved by compiling the Java language code to an intermediate representation called Java byte code, instead of directly to platform-specific machine code. Java byte code instructions are analogous to machine code, but are intended to be interpreted by a virtual machine (VM) written specifically for the host hardware. End-users commonly use a Java Runtime Environment (JRE) installed on their own machine for standalone Java applications, or in a Web browser for Java

applets. Standardized libraries provide a generic way to access host-specific features such as graphics, threading, and networking

A major benefit of using byte code is porting. However, the overhead of interpretation means that interpreted programs almost always run more slowly than programs compiled to native executable would. Just-in-Time compilers were introduced from an early stage that compiles byte codes to machine code during runtime. Over the years, this JVM built-in feature has been optimized to a point where the JVM's performance competes with natively compiled C code.

MySQL Database Management System:

These core values direct how MySQL works with the MySQL server software

- ✓ To be the best and the most widely used database in the world.
- ✓ To be available and affordable by all.
- ✓ To be easy to use.
- ✓ To be continuously improved while remaining fast and safe
- ✓ MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by MYSQL.MYSQL is a database management system.
- ✓ A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access and process data stored in a computer database, you need a database management system such as MySQL Server. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as standalone utilities or as parts of other applications.
- ✓ MySQL is relational database management system. MySQL software is Open Source.
- ✓ The MySQL Database Server is very fast, reliable, and easy to use.
- ✓ MySQL Server was originally developed to handle large databases much faster than existing solutions and has been successfully used in highly demanding production environment for several years.
- ✓ Although under constant development, MySQL Server today offers a rich and useful set of functions. Its connectivity, speed, and security make MySQL Server highly suited for accessing databases on the Internet. MySQL Server works in client/server or embedded systems.
- ✓ The MySQL Database Software is a client/server system that consists of a multi-threaded SQL server that supports different back ends, several different client programs and libraries, administrative tools, and a wide range of application programming interfaces.
- ✓ We also provide MySQL Server as an embedded multi-threaded library that you can link into your application to get a smaller, faster, easier-to-manage product. A large amount of contributed MySQL software is available.

The Main Features of MySQL:

The following list describes some of the important characteristics of the MySQL Database Software.

- ✓ Tested with a broad range of different compilers.
- ✓ Works on many different platforms.
- ✓ APIs for C, C++, Eiffel, Java, Perl, PHP, Python, Ruby, and Tcl are available.
- ✓ Fully multi-threaded using kernel threads. It can easily use multiple CPUs if they are available.

- ✓ Provider's transactional and non-transactional storage engines.
- ✓ Uses very fast B-tree disk tables (MyISAM) with index compression.
- ✓ Relatively easy to add another storage engine.
- ✓ This is useful if you want to add an SQL interface to an in-house database.
- ✓ A very fast thread-based memory allocation system.
- ✓ Very fast joins using an optimized one-sweep multi-join.
- ✓ N-memory hash tables, which are implemented using a highly optimized class library and should be as fast as possible. Usually there is no memory allocation at all after query initialization.
- ✓ The MySQL code is tested with Purify.
- ✓ The server is available as a separate program for use in a client/server networked environment.

Security:

A privilege and password system that is very flexible and secure, and that allows host-based verification. Passwords are secure because all password traffic is encrypted when you connect to a server.

System Testing:

Software testing is an important element of S/W quality assurance and represents the ultimate review of specification, design and coding. The increasing visibility of S/W as a system element and the costs associated with an S/W failure are motivating forces for well planned, thorough testing. Thus a series of testing are performed for the proposed system before the system is ready for user acceptance testing.

Testing Methodologies:

Testing is a set of activities that can be planned in advance and conducted systematically. Testing is a very important stage of a software include Unit Testing, Integration Testing and Deployment testing.

Unit Testing: Unit testing focuses verification effort on the smallest unit of S/W design i.e., the module. The unit testing is always white-box oriented and the step can be conducted in parallel for modules. In Online examination system, unit testing is done to uncover the following errors: The module interfaces are tested to ensure that information flows properly into and out of the program and is equal to the number of arguments in stored procedure checking the parameter and argument attributes matching the stored procedures.

Integration Testing: Integration testing is a systematic technique for constructing the program structure while at the same time conducting test to uncover errors associated with interfacing. The objective is to take unit-tested modules and build a program structure that has been dictated by design. In online examination system, the programs in various modules that are interfacing with other modules are tested thoroughly. Here we followed Top-Down integration and modules are integrated by moving downward through the control hierarchy, beginning with the Project related process, then activity related process and report generation process.

Deployment Testing: In deployment testing we basically check for hard coded links. For smooth transfer of data from one page to another page in the system, we had to be sure there were no hard coded links. The scope of the objects and data was tested when they were transferred to another place.

Validation Testing: At the end of Integration testing, software is completely assembled as a package, interfacing errors have been uncovered and correction testing begins.

System Implementation and Maintenance:

System Implementation:

System implementation is the process of making the newly designed systems fully operational. The system is implemented after careful testing. The primary goal of product implementation is development of source code that is easy to read and easy to understand. The term implementation has different meanings, ranging from the conversion of a basic application to a compatible replacement of a computer system. Implementation is used here to mean the process converting a new or a revised system design in to an operational one. During the implementation stage we convert the detailed code in a programming language. Clarity of source code eases debugging, testing and modification of a software product. The difficulties encountered during implementation are caused by inadequate analysis and design. The major milestone for project implementation is successful integration of source code components into a functioning system. Before a routine can be placed in the evolving system, it may be required that the routine be inspected by an inspection team, or reviewed or tested to a given level of test coverage.

Goals for Implementation Stage:

The first goal of implementation is to provide a faithful translation of design. The choice of a language should be pragmatic, governed by mixture theoretical needs and practical constraints. Good software should avoid any gap between design and code. This is particularly important for reuse of a component or for maintenance work that will require tracing the connection of design to code.

Characteristics of Implementation

Abstraction: Abstraction deals with the ability of an implementation to allow the programmer to ignore the portion of detail that is not important at the current level of consideration. Each of the three kinds of abstraction-control, data, process should present in the code.

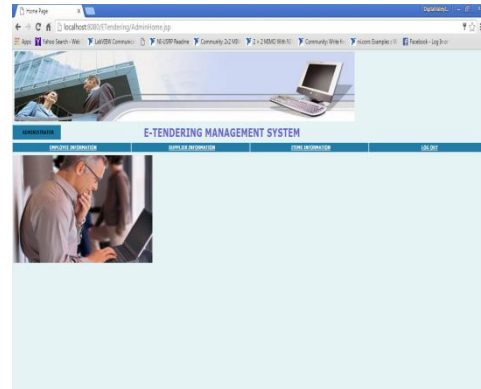
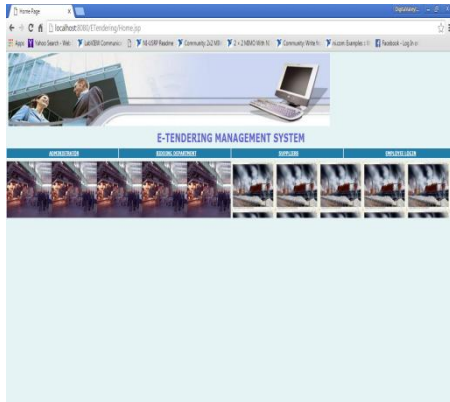
Modularization: Modularization requires as partitioning the implementation, with each abstraction occupying its own separate and identifiable unit.

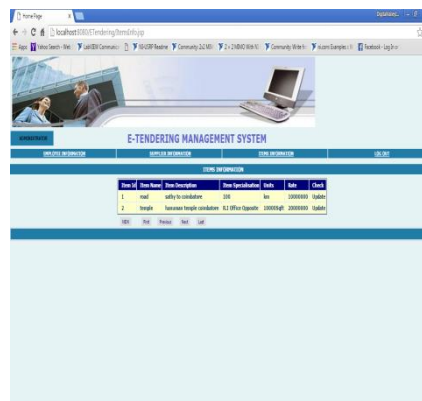
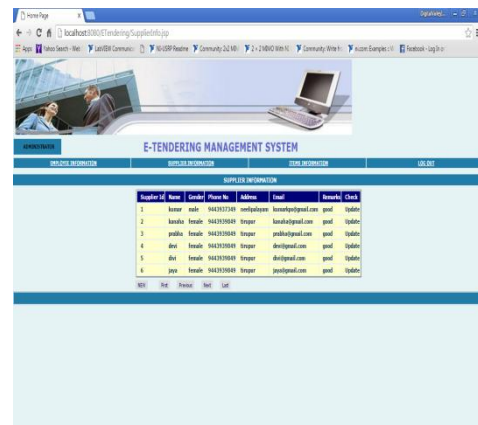
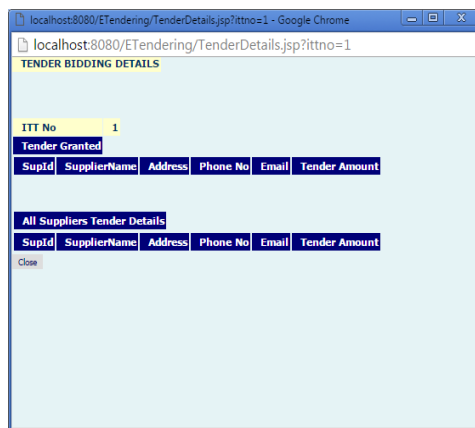
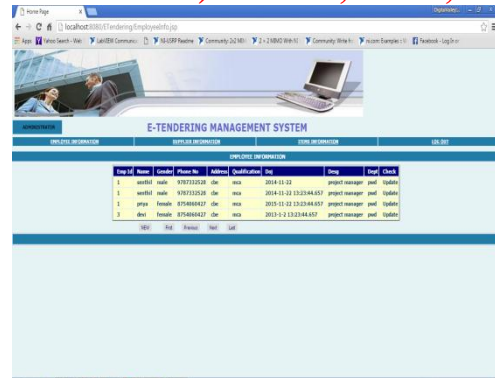
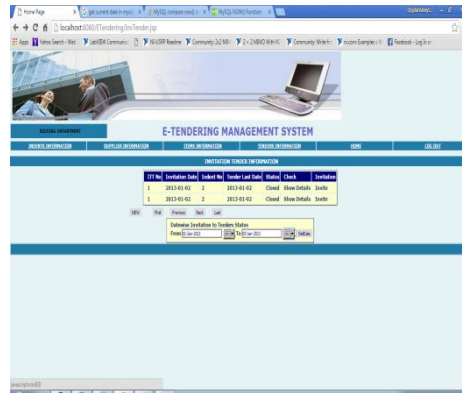
Verification: Assertions used during formal verification of the detailed design should be included as comments in the source code. Implementation is the stage of the project when theoretical design is turned into a working system.

System Maintenance:

Maintenance of the software is one of the major steps in the computer automation. Software, which is developed by the engineer, should undergo maintenance process in a regular interval of time goes on new problems arise and it must be corrected accordingly. Maintenance and enhancements are a long-term process. If the problem is diverted or upgraded, then also the software should be changed.

Screenshot:





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