

## Development of Employees Leave Database Management System

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### **Abstract**

*The Employee Leave Database Management system is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like email notifications, termination of leave, automatic approval of leave, report generators etc. in this Tool. The project has been planned to be having the view of distributed architecture, with centralized storage of the database. The application for the storage of the data has been planned. Using the constructs of MS-SQL Server and all the user interfaces has been designed using the ASP.Net technologies. The database connectivity is planned using the "SQL Connection" methodology. The standards of security and data protective mechanism have been given a big choice for proper usage. The application takes care of different modules and their associated reports, which are produced as per the applicable strategies and standards that are put forwarded by the administrative staff. The entire project has been developed keeping in view of the distributed client server computing technology, in mind. The specification has been normalized up to 3NF to eliminate all the anomalies that may arise due to the database transaction that are executed by the general users and the organizational administration. The user interfaces are browser specific to give distributed accessibility for the overall system. The internal database has been selected as MS-SQL server 200. The basic constructs of table spaces, clusters and indexes have been exploited to provide higher consistency and reliability for the data storage. The MS-SQL server 200 was a choice as it provides the constructs of high-level reliability and security. The total front end was dominated using the ASP.Net technologies. At all proper levels high care was taken to check that the system manages the data consistency with proper business rules or validations. The database connectivity was planned using the latest "SQL Connection" technology provided by Microsoft Corporation. The authentication and authorization was crosschecked at all the relevant stages. The user level accessibility has been restricted into two zones.*

**Keywords:** *Data Base, Employee Leaves Database, Management System*

### **I. INTRODUCTION**

Development of a leave database system to support the work of the Human Resource Department of Home Finance Company (HFC) Bank Ghana Limited. As the need to ensure that they are keeping staff happy but maintaining the right personnel to do the work for themselves and customers by companies over some long period of years—usually a time with high precedence's on safeguarding and measures for the year ahead, we have determined to intend a leave database management system for HR department of HFC Bank Limited. Systems designed for such a motive have be on the demand to abolish rules and regulations and cuts setback by enabling employees and supervisors to action time-off applications simply by inflowing specific data in the database to enable retrieval of information.

Normally in some companies in Ghana, this connect a large amount of time cycles and rules and regulations thereby taking some sufficient time of both employees and employers which could help the developments of the companies mainly in cases where large amounts of staff skill is concerned. It is of immense significance noting some profits recorded from companies using such computerized employees leave database management systems. A database is a joint collection of reasonable solid data and a report of this data which is used by institutes to develop its domestic development of storage. Databases are maybe intended to assist institutions to store large amount of data. The database idea has developed since the 1960s to relieve growing complexities in designing, building, and maintaining compound information systems (usually with many simultaneous end-users, and with a large amount of varied data). It has developed collectively with database management systems which allow the useful usage of databases. However the terms database and DBMS define different entities, they are indivisible: a database's properties are resolute by its sustaining DBMS.

The Oxford English dictionary cites a 1962 technical report as the first to use the term "data-base." With the growth in technology in the areas of processors, computer memory, computer storage and computer networks, the

sizes, capabilities, and performance of databases and their own DBMSs have grown in orders of magnitudes. For decades it has been doubtful that a compound information system can be built efficiently lacking a suitable database sustained by a DBMS. The use of databases is now increase to such a wide degree that almost every technology and product relies on databases and DBMSs for its development and commercialization, or even may have such set in it. Also, institutions and companies, from small to large, heavily depend on databases for their operations. No widely accepted precise definition survives for DBMS. However, a system requests to give substantial functionality to succeed as a DBMS.

Accordingly its sustained data collection requests to meet particular usability requirements (broadly defined by the requirements below) to qualify as a database. Therefore, a database and its sustaining DBMS are defined here by a locate of general necessities listed below. Almost all obtainable mature DBMS products meet these necessities to a great extent, while less mature either meet them or converge to meet This section of the project details a common outline of the HR database of HFC BANK (GHANA) Limited's HR Department operates on staff leave management. It then outlines the intends and ideas for this planned project recognizing deliverables to be produced at the end of the project. In addition, it gives a sign of importance to the student. The re-engineering of business processes by the uprising of computer systems and information technology have become an original agent enabling better options to performing business processes across almost every industry sector.

This project aims to computerize and introduce an intranet based database of the HR department of HFC BANK (GHANA) Limited, which now keeps records of staff, customers, department etc. it wishes to increase to meet other such demand of ease from its branches and subsidiaries nationwide, its ease is limited to the few branches and subsidiaries closer to its head office in the southern part country. Although very reasonably, like in any other bank, this paper system of management cannot be dumped completely in HFC BANK (GHANA) Limited, this project tries to remove or limit its use and set up an intranet application that will serve such principles to improve connect and perform the obtainable and competent plan of HFC BANK (GHANA) Limited.

#### *A. The Problem Statement*

Information is sustenance of HFC BANK (GHANA) Limited. Data and records about staff leave records are very vital to its operations. This information is kept to track, manage and provide entitlement and record on staffs and other members of the institutions. The institution is faced with many branches (23) and a number of subsidiaries (3) with large volumes of staff at the respective branches and subsidiaries. The bank is coupled with huge official procedure coming from branches far and near, this sometimes result in loss of official procedure due to high volume of records transported and kept. The main confront in using the manual or physical system of keeping records includes the financial demands of the current system in providing the official procedure. An additional difficulty has to do with loss of data particularly when back up of daily actions are not taking. It formulates it difficult to recover such information. A intend of a complete database that will be executed to keep records of HR department. This study seeks to attend to such difficulty of inconveniences in the institutions which has to do with employees seeking to go for leave.

## **II. LITERATURE REVIEW AND STUDY AREA**

According to Fisher (2007) Literature Review is the provision or an overview and a critical evaluation of a body of literature relating to a research topic or a research problem. This kind of research gives student the broad perspectives on the subject area and how different methodology were adopted in the SDLC (Software Development Life Cycle), the approaches to testing, the way project activities were schedule and many more.

This research work also probed into article, journals on the internet relating to the subject matter and broadened into application software developed for employee's database management system.

**HFC BANK LTD GHANA** also review the selected approach or methodology used in this system detail.

#### *A. About Bank Pertanian Malaysia*

Leave Management System is the important system in administration department in all company. However, the management is different for each company. Some company still comfort with the manual system and the other make changes to the system from manual to computerize to make the management more effective. "The employee is considered absent if he or she did not come to work in daily working day. This involve certain time that the

employee have privilege to time such as public holiday ,annual leave that have been approve by the employers. The absent types that brings problem are absent that cause of sick (medical certificate) and leave without permission and strong reason “(Maimunah Aminuddin, 1992). Refer to Workteach in their website, leave time is a comprehensive and flexible leave management system enabling us to enter and manage leave requests according to company rules. Mantract Pty Ltd is one of Software Company that develops Leave Management System. Base on their experience, this time of the year, many employers face a formidable task of juggling and approving leaves applications.

Employer need to ensure they are keeping staff happy but retaining the right workforce to do the job for themselves and customers over Christmas-New Year - , traditionally a time with high priorities on maintenance and preparations for the year ahead. This company develop outsourced automated payroll and leave management systems which offers an on-line leave management system designed to radically simplify for employees and employers like the process of planning, applying for and approving leave. This system eliminates paperwork and cuts delay by enabling employees and supervisors to action time-off applications simply by entering the dates and type of leave being sought after the employee has viewed his or her entitlements online.

Managers can in turn view the applications on a graphical leave planner where they can see the overall pattern of leave applications and personnel availability, helping them to make prompt informed decisions on approvals and staffing levels. Employees used a personal ID code to get immediate access to their entitlements, while managers can at a glance see all employees' leave history, leave balances, pending leave applications, authorizations, authorizations awaited and statutory holidays. The benefit of the system is saves time by eliminating paperwork, enhances employee satisfaction by speeding up the process and helps managers by ensuring compliance with company policies. Their system is a web-based, there is no software to install or support and no additional hardware required to operate the system.

#### *B. Problem In Existing System*

- Cannot Upload and Download the latest updates.
- No use of Web Services and Remoting.
- Risk of mismanagement and of data when the project is under development.
- Less Security.
- No proper coordination between different Applications and Users.
- Fewer Users - Friendly

#### *C. Solution Of These Problems*

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication.

#### *D. Conclusion*

Employee Leave Management System for **HFC BANK LTD** covers two type of leave, which are annual leave (recorded leave) and unrecorded leave. The target users of this system are the branch manager, staffs and clerk. Each of these users has a different access to this system. The system believe to upgrade manual system and simplify the process in apply and record leave information. The system can record all the information about leave management system in one database. This project can improve the leave management in this organization.

### **III. FACT FINDING METHODS (DATA COLLECTION TOOLS)**

As indicated by Weller (2008), data collection basically involves careful selection of sample unit so as to make observation with primary goals of avoiding bias. The following fact finding techniques were considered for collecting the data.

### ***Interview***

Team members (Analyst) used interview to gather information about how leave management help employees in their organization especially **HFC BANK LTD**. Here the team member discovered the misunderstanding, unrealistic exception and description of activities and problem along with resistance to the new system. Interviews are time consuming, so we engaged 50 respondents in the bank.

### ***Questionnaire***

The analyst can collect data from large groups with use of questionnaires. Questionnaires could be open-ended or closed-ended. Open-ended questionnaire are used to learn feeling, opinion, general expression on process details or problem. In it questions are answered in their own words. In closed questionnaires a set of prescribe answers are used and specific response have to be selected. This is a costly affair as the question should be printed out.

### ***Observation***

This is a skill which the analyst has to develop. The analyst has to identify the right information and choose the right person and look at the right place to achieve his objectives. He should have a clear vision of how employees filled their application for leave and know their balance of report for the year. However, our research restricts us to interview, questionnaire, observation and visit to certain websites.

#### ***A. Feasibility Studies***

Preliminary investigation examine project feasibility, the likelihood the system will be useful to the organization. The main objective of the feasibility study is to test the Technical, Operational and Economical feasibility for adding new modules and debugging old running system. All system is feasible if they are unlimited resources and infinite time. There are aspects in the feasibility study portion of the preliminary investigation:

- Technical Feasibility
- Operation Feasibility
- Economical Feasibility

#### ***B. Technical Feasibility***

The technical issue usually raised during the feasibility stage of the investigation includes the following:

- Does the necessary technology exist to do what is suggested?
- Do the proposed equipment's have the technical capacity to hold the data required to use the new system?
- Will the proposed system provide adequate response to inquiries, regardless of the number or location of users?
- Can the system be upgraded if developed?
- Are there technical guarantees of accuracy, reliability, ease of access and data security?

Earlier no system existed to cater to the needs of 'Secure Infrastructure Implementation System'. The current system developed is technically feasible. It is a web based user interface. Thus it provides an easy access to the users. The database's purpose is to create, establish and maintain a workflow among various entities in order to facilitate all concerned users in their various capacities or roles. Permission to the users would be granted based on the roles specified. Therefore, it provides the technical guarantee of accuracy, reliability and security. The software and hardware requirements for the development of this project are not many and are available as free as open source. The work for the project is done with the current equipment and existing software technology. Necessary bandwidth exists for providing a fast feedback to the users irrespective of the number of users using the system.

#### ***a. Operational Feasibility***

Proposed projects are beneficial only if they can be turned out into information system. That will meet the organization's operating requirements. Operational feasibility aspects of the project are to be taken as an important

part of the project implementation. Some of the important issues raised are to test the operational feasibility of a project includes the following: -

- Is there sufficient support for the management from the users?
- Will the system be used and work properly if it is being developed and implemented?
- Will there be any resistance from the user that will undermine the possible application benefits?

This system is targeted to be in accordance with the above-mentioned issues. Beforehand, the management issues and user requirements have been taken into consideration. So there is no question of resistance from the users that can undermine the possible application benefits.

The well-planned design would ensure the optimal utilization of the computer resources and would help in the improvement of performance status.

#### *b. Economic Feasibility*

A system can be developed technically and that will be used if installed must still be a good investment for the organization. In the economical feasibility, the development cost in creating the system is evaluated against the ultimate benefit derived from the new systems. Financial benefits must equal or exceed the costs.

The system is economically feasible. It does not require any addition hardware or software. Since the interface for this system is developed using the existing resources and technologies. There is nominal expenditure and economical feasibility for certain.

#### *C. System Methodology*

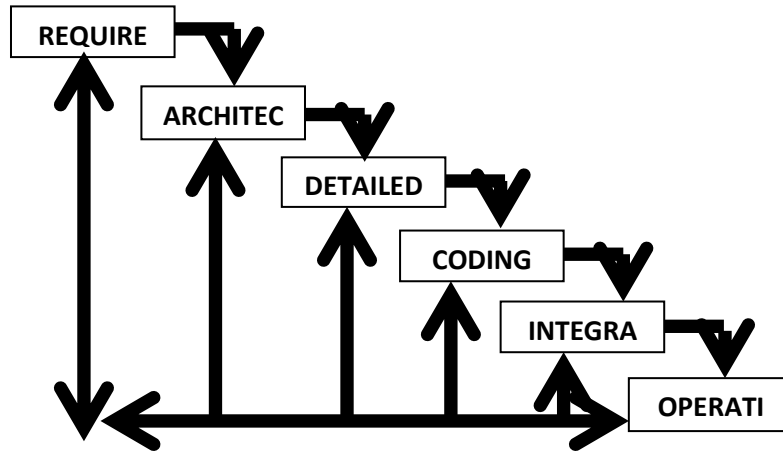
This is a development of a solid online web based architecture that will provide a logical, consistent plan of activities and comprehensive coordination that will lead your business application and infrastructure from their current state to the final goal. This also portrays the research design and the method used for data collection and analysis. The main research tool adopted under this study was interview, questionnaires and observation.

Project plan are required to assist with the effective management of project to ensure that components of the project are completed in the right order. The plan should set out what is to be done in series of interrelated steps, the deadlines and critical path for the achievement of the component part, resources for the project and the project management process plan should be formulated in consultation with group members

- **Project Plan:** A project plan typically identifies the specific outcome of the project completion of which represent major project milestone. At the beginning of every project, it is imperative to identify the key element of the project start up (Lewis 2003). Firstly you deal with what is to be carried out, the business case that is to be carry and so on. The following generic software process model have been identified which we intend to use.
- **Rapid Application Development (RAD):** Rapid Application development refers to a type of software methodology that uses minimal planning in favour of rapid prototyping. The “planning” of the software developed using (RAD) is interrelated with writing the software itself. The lack of extensive pre-planning generally allows software to be written much faster and makes it easier to change requirements. This is a prototype that provides a first-hand feel of exactly how the site will operate. Here user will be heavily involved in the development. This is in the pages that is designed to stimulate the actual functionality of the software product but does not do processing.
- **Waterfall Model:** This is a technology which is stable, well-structured and involves a lot of documentation for easy maintenance. A disadvantage of this model is that user’s involvement is minimal and it is at sign off stage that a mandate can be given to carry on. As a matter of fact, waterfall model development process has distinct goals for each phase of development, where each phase is completed and signed off before the commencement of other phases and there is no tuning or revisiting a previous phase. A special characteristic advantage of waterfall model is that, it allows for departmentalization and managerial control. A schedule is typically set with deadlines for each phase of development and a product can proceed through the development process theory and this process leads to the project being

delivered on time, because each phase has been planned in details. We will use the waterfall model for this project because of the relevance to the project as well as the above mentioned advantages.

Below is the waterfall model for system development.



The Waterfall Model

*D. Work Break Down Structure (WBS)*

A work breakdown structure is how the whole project was broken down into smaller chunks was developed. This was to help in identifying project milestone and finds the appropriate methods of achieving them. This is shown below

Number of Weeks	1-2	2-4	4-6	6-8	8-10
Requirement Definition	█				
Design	█		█		
Development		█		█	
Integration and testing			█		█
Installation and acceptance				█	

Work Break down Structure

*E. Functional Requirements*

**Output Design:** Outputs from computer systems are required primarily to communicate the results of processing to users. They are also used to provide a permanent copy of the results for later consultation. The various types of outputs in general are:

- External Outputs, whose destination is outside the organization.
- Internal Outputs whose destination is with in organization and they are the
- User's main interface with the computer.
- Operational outputs whose use is purely with in the computer department.
- Interface outputs, which involve the user in communicating directly with

**Output Definition:** The outputs should be defined in terms of the following points:

- Type of the output
- Content of the output
- Format of the output
- Location of the output
- Frequency of the output
- Volume of the output
- Sequence of the output

It is not always desirable to print or display data as it is held on a computer. It should be decided as which form of the output is the most suitable.

For Example

- Will decimal points need to be inserted
- Should leading zeros be suppressed.

**Output Media:** In the next stage it is to be decided that which medium is the most appropriate for the output. The main considerations when deciding about the output media are:

- The suitability for the device to the particular application.
- The need for a hard copy.
- The response time required.
- The location of the users
- The software and hardware available.

Keeping in view the above description in the project is to have outputs mainly coming under the category of internal outputs. The main outputs desired according to the requirement specification are: The outputs were needed to be generated as a hot copy and as well as queries to be viewed on the screen. Keeping in view these outputs, the format for the output is taken from the outputs, which are currently being obtained after manual processing. The standard printer is to be used as output media for hard copies.

**Input Design:** Input design is a part of overall system design. The main objective during the input design is as given below:

- To produce a cost-effective method of input.
- To archive the highest possible level of accuracy.
- To ensure that the input is acceptable and understood by the user.

**Input Stages:** The main input stages can be listed as below:

- Data recording
- Data transcription
- Data conversion
- Data verification
- Data control
- Data transmission
- Data validation
- Data correction

**Input Types:** It is necessary to determine the various types of inputs. Inputs can be categorized as follows:

- External inputs, which are prime inputs for the system.

- Internal inputs, which are user communications with the system.
- Operational, which are computer department's communications to the system?
- Interactive, which are inputs entered during a dialogue.

**Input Media:** At this stage choice has to be made about the input media. To conclude about the input media consideration has to be given to;

- Type of input
- Flexibility of format
- Speed
- Accuracy
- Verification methods
- Rejection rates
- Ease of correction
- Storage and handling requirements
- Security
- Easy to use
- Portability

Keeping in view the above description of the input types and input media, it can be said that most of the inputs are of the form of internal and interactive. As

Input data is to be the directly keyed in by the user, the keyboard can be considered to be the most suitable input device.

- **Error Avoidance:** At this stage care is to be taken to ensure that input data remains accurate from the stage at which it is recorded up to the stage in which the data is accepted by the system. This can be achieved only by means of careful control each time the data is handled.
- **Error Detection:** Even though every effort is made to avoid the occurrence of errors, still a small proportion of errors is always likely to occur, these types of errors can be discovered by using validations to check the input data.
- **Data Validation:** Procedures are designed to detect errors in data at a lower level of detail. Data validations have been included in the system in almost every area where there is a possibility for the user to commit errors. The system will not accept invalid data. Whenever an invalid data is keyed in, the system immediately prompts the user and the user has to again key in the data and the system will accept the data only if the data is correct. Validations have been included where necessary.

The system is designed to be a user friendly one. In other words the system has been designed to communicate effectively with the user. The system has been designed with pop-up menus

#### *E. User Interface Design*

It is essential to consult the system users and discuss their needs while designing the user interface:

#### **User Interface Systems Can Be Broadly Classified As:**

1. User initiated interface the user is in charge, controlling the progress of the user/computer dialogue. In the computer-initiated interface, the computer selects the next stage in the interaction.
2. Computer initiated interfaces

In the computer initiated interfaces the computer guides the progress of the user/computer dialogue. Information is displayed and the user response of the computer takes action or displays further information.

- **User Initiated Interfaces:** User initiated interfaces fall into two approximate classes:
  1. Command driven interfaces: In this type of interface the user inputs commands or queries which are interpreted by the computer.



2. Forms oriented interface: The user calls up an image of the form to his/her screen and fills in the form. The forms oriented interface is chosen because it is the best choice.
- **Computer-Initiated Interfaces:** The following computer – initiated interfaces were used:
    1. The menu system for the user is presented with a list of alternatives and the user chooses one; of alternatives.
    2. Questions – answer type dialog system where the computer asks question and takes action based on the basis of the users reply.

Right from the start the system is going to be menu driven, the opening menu displays the available options. Choosing one option gives another popup menu with more options. In this way every option leads the users to data entry form where the user can key in the data.

- **Error Message Design:** The design of error messages is an important part of the user interface design. As user is bound to commit some errors or other while designing a system the system should be designed to be helpful by providing the user with information regarding the error he/she has committed. This application must be able to produce output at different modules for different inputs.

#### *F. Non Functional Requirements*

Nonfunctional requirement is a description of the features, characteristics and attribute of the system as well as constraint that may limit the proposed solution (Whitten et al 2002). Such constraints usually narrow down the selection of programming language, operating system platform or implementation techniques.

The employees leave database management system must ensure web application qualities such as ease of use, user friendliness, correctness, response time etc. The following are the list of non-functional requirement of the system.

- **Ease of Use:** The system should be simple and easy to use. Documentation and user manual should be provided to users, to ensure that the users are able to use and operate the system by themselves. Help sections or user instructions should be provided throughout the system in order to guide the user when they encounter a problem.
- **User Friendliness:** A user-friendly interface enables the users who are with or without technical background be able to operate the system. A user-friendly system will satisfy users and allow interaction with this website and enable utilization of the system to maximum.
- **Response Time/Speed:** The system should be able to process any transaction at the highest speed and avoid unnecessary interaction. At a low response time, the uses may feel frustrated and decide not to use the system again.
- **Functionality:** The most important function stressed in this system is the searching and retrieving capability. This is because the web application deals with retrieval from the existing database. Besides, manipulation and browsing features as well as application domain released feature is also taken into account.

## **IV. DESIGN OF THE PROPOSED SYSTEM**

Software design sits at the technical kernel of the software engineering process and is applied regardless of the development paradigm and area of application. Design is the first step in the development phase for any engineered product or system. The designer's goal is to produce a model or representation of an entity that will later be built. Beginning, once system requirement have been specified and analyzed, system design is the first of the three technical activities -design, code and test that is required to build and verify software.

The importance can be stated with a single word "Quality". Design is the place where quality is fostered in software development. Design provides us with representations of software that can assess for quality. Design is

the only way that we can accurately translate a customer's view into a finished software product or system. Software design serves as a foundation for all the software engineering steps that follow. Without a strong design we risk building an unstable system – one that will be difficult to test, one whose quality cannot be assessed until the last stage.

During design, progressive refinement of data structure, program structure, and procedural details are developed reviewed and documented. System design can be viewed from either technical or project management perspective. From the technical point of view, design is comprised of four activities – architectural design, data structure design, interface design and procedural design.

#### *A. Design Of The Proposed System*

This chapter will describe the design and analysis of the proposed system which will allow users to apply for leave at their own convenience. The new system will therefore take into consideration the existing software's on employees leave database management software's in order to enhance efficiency and also build a user friendly site such that users can easily apply or cancel a leave with little or no difficulty. Entity Relationship Diagram and Data Flow Diagrams will be used to describe the proposed system and how it will work. We will also look at the various component of the proposed system that is undergoing design and implementation.

#### *B. Entity Relationship Diagram Of The Proposed System*

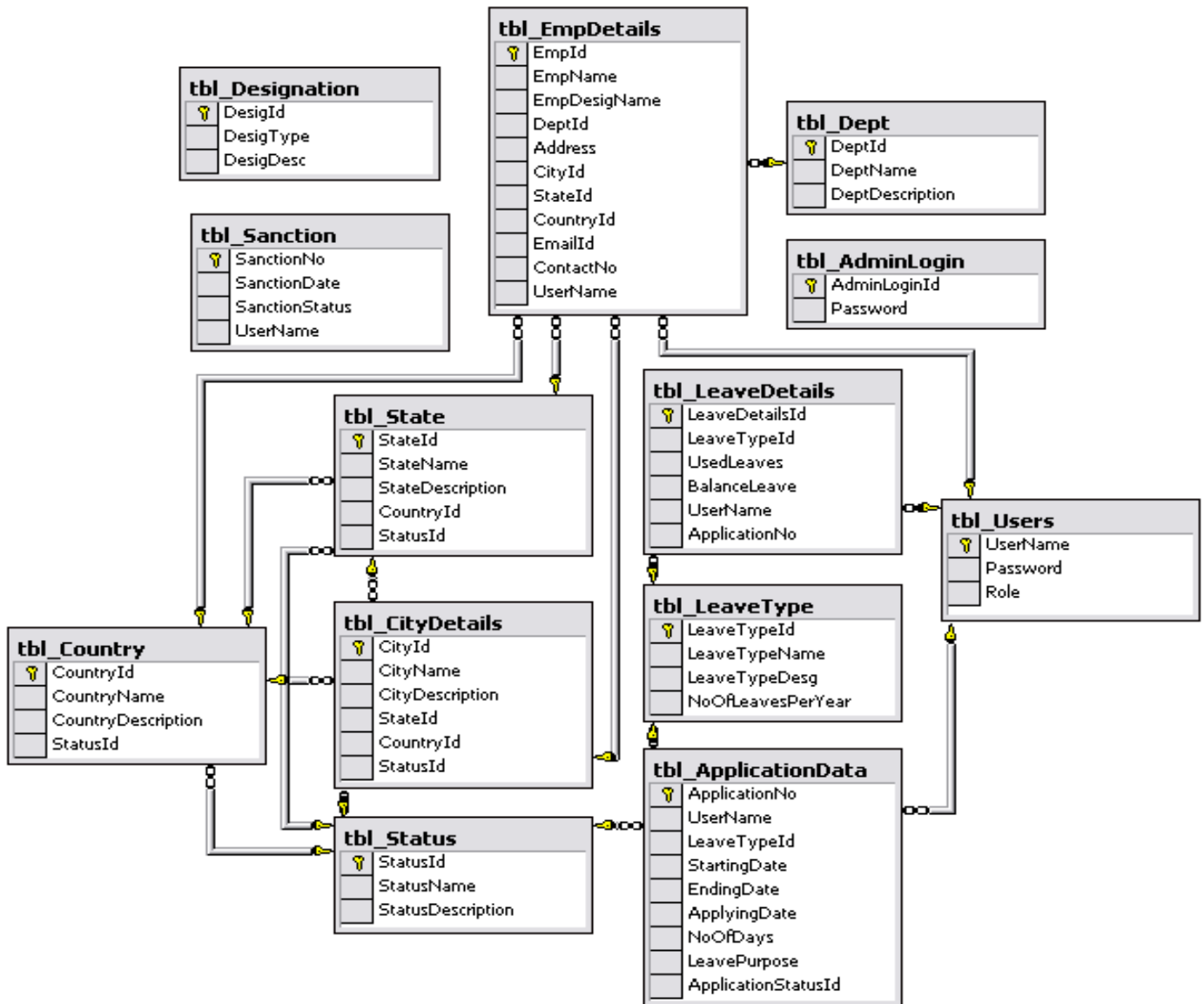
The relation upon the system is structure through a conceptual ER-Diagram, which not only specifies the existential entities but also the standard relations through which the system exists and the cardinalities that are necessary for the system state to continue. The entity Relationship Diagram (ERD) depicts the relationship between the data objects. The ERD is the notation that is used to conduct the data modeling activity the attributes of each data object noted in the ERD can be described as data object descriptions.

The set of primary components that are identified by the ERD are

- Data object
- Relationships
- Attributes
- Various types of indicators.

The primary purpose of the ERD is to represent data objects and their relationships.

**Figure 4.1 Entity Relationship Diagram of the Proposed System**



**C. Context Diagram Of The Proposed System**

A context diagram provides the general view of an information system. Emphasis is on the relationship between the system and its environment. A context diagram is a top level data flow diagram. (See Figure 4.2). It only contains one process node (process 0) that generalizes the function of the entire system in relationship to external entities. It provides a general idea of the data flow in the system under consideration. Entities in the system include the Administrator, employees: The Administrator provides application on the employees form and sends it for approval. In the proposed system the employees fills the leave application form and submit it for approval by management. The Administrator also generates report on employees leave balance and gives other important details to the employee. The figure below depicts the context diagram of the proposed system.

**D. Data Flow Diagram**

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data

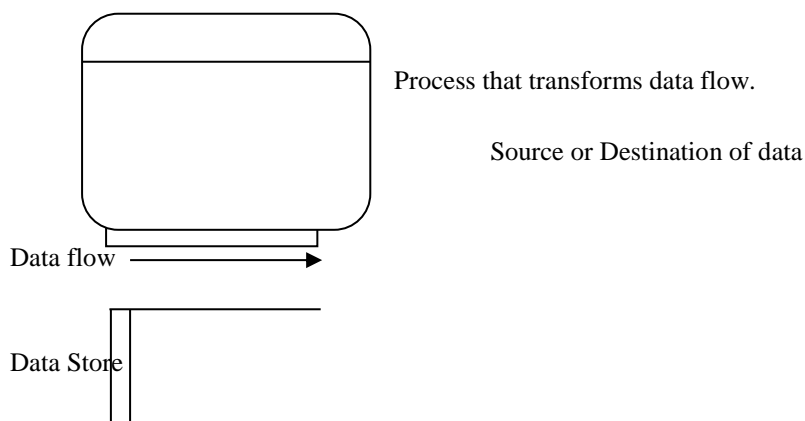
from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams.

Using two familiar notations Yourdon, Gane and Sarson notation develops the data flow diagrams. Each component in a DFD is labeled with a descriptive name. Process is further identified with a number that will be used for identification purpose. The development of DFD'S is done in several levels. Each process in lower level diagrams can be broken down into a more detailed DFD in the next level. The lop-level diagram is often called context diagram. It consists a single process bit, which plays vital role in studying the current system. The process in the context level diagram is exploded into other process at the first level DFD.

The idea behind the explosion of a process into more process is that understanding at one level of detail is exploded into greater detail at the next level. This is done until further explosion is necessary and an adequate amount of detail is described for analyst to understand the process. Larry Constantine first developed the DFD as a way of expressing system requirements in a graphical from, this lead to the modular design. A DFD is also known as a "bubble Chart" has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design. So it is the starting point of the design to the lowest level of detail. A DFD consists of a series of bubbles joined by data flows in the system.

**a. 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



**b. CONSTRUCTING A DFD:** Several rules of thumb are used in drawing DFD'S:

- Process should be named and numbered for an easy reference. Each name should be representative of the process.
- The direction of flow is from top to bottom and from left to right. Data traditionally flow from source to the destination although they may flow back to the source. One way to indicate this is to draw long flow line back to a source. An alternative way is to repeat the source symbol as a destination. Since it is used more than once in the DFD it is marked with a short diagonal.

- When a process is exploded into lower level details, they are numbered.
- The names of data stores and destinations are written in capital letters. Process and dataflow names have the first letter of each word capitalized

A DFD typically shows the minimum contents of data store. Each data store should contain all the data elements that flow in and out. Questionnaires should contain all the data elements that flow in and out. Missing interfaces redundancies and like is then accounted for often through interviews.

**c. SAILENT FEATURES OF DFD'S**

1. The DFD shows flow of data, not of control loops and decision are controlled considerations do not appear on a DFD.
2. The DFD does not indicate the time factor involved in any process whether the dataflow take place daily, weekly, monthly or yearly.
3. The sequence of events is not brought out on the DFD.

**d. TYPES OF DATA FLOW DIAGRAMS**

1. Current Physical
2. Current Logical
3. New Logical
4. New Physical

**Current Physical:** In Current Physical DFD process label include the name of people or their positions or the names of computer systems that might provide some of the overall system-processing label includes an identification of the technology used to process the data. Similarly data flows and data stores are often labels with the names of the actual physical media on which data are stored such as file folders, computer files, business forms or computer tapes.

**Current Logical:** The physical aspects at the system are removed as much as possible so that the current system is reduced to its essence to the data and the processors that transforms them regardless of actual physical form.

**New Logical:** This is exactly like a current logical model if the user were completely happy with the user were completely happy with the functionality of the current system but had problems with how it was implemented typically through the new logical model will differ from current logical model while having additional functions, absolute function removal and inefficient flows recognized.

**New Physical:** The new physical represents only the physical implementation of the new system.

**e. RULES GOVERNING THE DFD'S PROCESS**

- 1) No process can have only outputs.
- 2) No process can have only inputs. If an object has only inputs than it must be a sink.
- 3) A process has a verb phrase label.

**Data Store**

- Data cannot move directly from one data store to another data store, a process must move data.
- Data cannot move directly from an outside source to a data store, a process, which receives, must move data from the source and place the data into data store
- A data store has a noun phrase label.

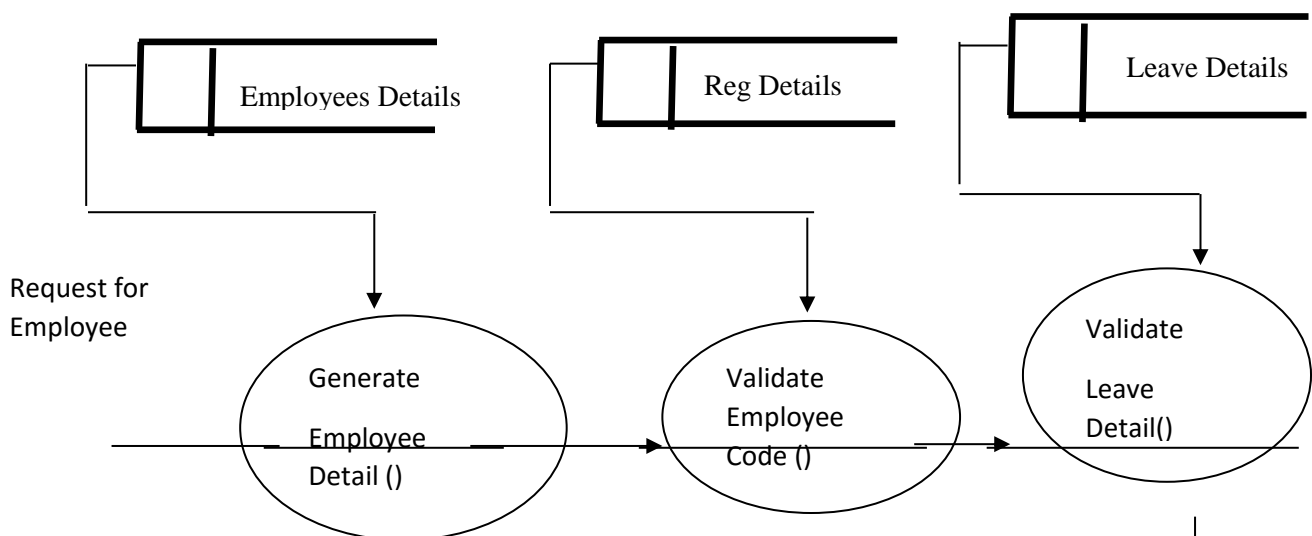
**Source or Sink:** The origin and /or destination of data.

- Data cannot move direly from a source to sink it must be moved by a process
- A source and /or sink has a noun phrase land

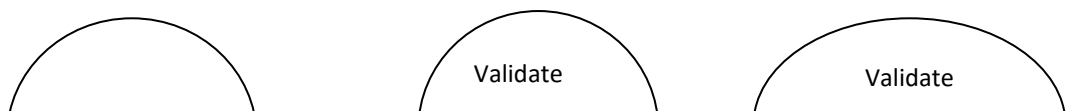
**DATA FLOW**

- A Data Flow has only one direction of flow between symbols. It may flow in both directions between a process and a data store to show a read before an update. The latter is usually indicated however by two separate arrows since these happen at different type.
- A join in DFD means that exactly the same data comes from any of two or more different processes data store or sink to a common location.
- A data flow cannot go directly back to the same process it leads. There must be at least one other process that handles the data flow produce some other data flow returns the original data into the beginning process.
- A Data flow to a data store means update (delete or change).
- A data Flow from a data store means retrieve or use.

A data flow has a noun phrase label more than one data flow noun phrase can appear on a single arrow as long as all of the flows on the same arrow move together as one package.



**Figure 4.3: Data Flow Diagram for Employee Taking Leave**

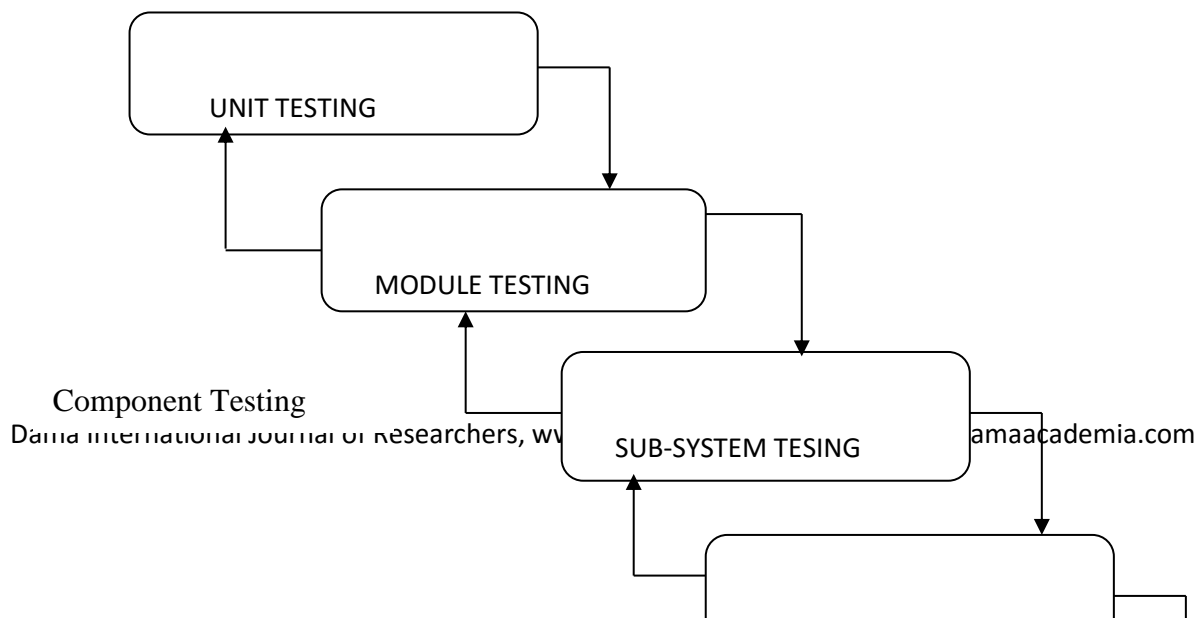


## V. SYSTEM TESTING AND IMPLEMENTATION

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. In fact, testing is the one step in the software engineering process that could be viewed as destructive rather than constructive. A strategy for software testing integrates software test case design methods into a well-planned series of steps that result in the successful construction of software. Testing is the set of activities that can be planned in advance and conducted systematically. The underlying motivation of program testing is to affirm software quality with methods that can economically and effectively apply to both strategic to both large and small-scale systems.

### A. Strategic Approach To Software Testing

The software engineering process can be viewed as a spiral. Initially system engineering defines the role of software and leads to software requirement analysis where the information domain, functions, behavior, performance, constraints and validation criteria for software are established. Moving inward along the spiral, we come to design and finally to coding. To develop computer software we spiral in along streamlines that decrease the level of abstraction on each turn. A strategy for software testing may also be viewed in the context of the spiral. Unit testing begins at the vertex of the spiral and concentrates on each unit of the software as implemented in source code. Testing progress by moving outward along the spiral to integration testing, where the focus is on the design and the construction of the software architecture. Talking another turn on outward on the spiral we encounter validation testing where requirements established as part of software requirements analysis are validated against the software that has been constructed. Finally we arrive at system testing, where the software and other system elements are tested as a whole.



### **Figure 5.1 System Testing**

#### *B. Unit Testing*

Unit testing focuses verification effort on the smallest unit of software design, the module. The unit testing we have is white box oriented and some modules the steps are conducted in parallel.

#### **WHITE BOX TESTING**

This type of testing ensures that

- All independent paths have been exercised at least once
- All logical decisions have been exercised on their true and false sides
- All loops are executed at their boundaries and within their operational bounds
- All internal data structures have been exercised to assure their validity.



## **VI. CONCLUSION AND RECOMMENDATION**

### *A. Conclusion*

It has been a great pleasure for me to work on this exciting and challenging project. This project proved good for me as it provided practical knowledge of not only programming and Windows Application and SQL Server, but also about all handling procedure related with employees leave database management system. It also provides knowledge about the latest technology used in developing web enabled application and client server technology that will be great demand in future. This will provide better opportunities and guidance in future in developing projects independently.

### *B. Benefits*

The project is identified by the merits of the system offered to the user. The merits of this project are as follows:

- It's a web-enabled project.
- This project offers user to enter the data through simple and interactive forms. This is very helpful for the client to enter the desired information through so much simplicity.
- The user is mainly more concerned about the validity of the data, whatever he is entering. There are checks on every stages of any new creation, data entry or updating so that the user cannot enter the invalid data, which can create problems at later date.
- Sometimes the user finds in the later stages of using project that he needs to update some of the information that he entered earlier. There are options for him by which he can update the records. Moreover there is restriction for his that he cannot change the primary data field. This keeps the validity of the data to longer extent.
- User is provided the option of monitoring the records he entered earlier. He can see the desired records with the variety of options provided by him.
- From every part of the project the user is provided with the links through framing so that he can go from one option of the project to other as per the requirement. This is bound to be simple and very friendly as per the user is concerned. That is, we can say that the project is user friendly which is one of the primary concerns of any good project.
- Data storage and retrieval will become faster and easier to maintain because data is stored in a systematic manner and in a single database.
- Decision making process would be greatly enhanced because of faster processing of information since data collection from information available on computer takes much less time than manual system.
- Allocating of sample results becomes much faster because at a time the user can see the records of last years.
- Easier and faster data transfer through latest technology associated with the computer and communication.
- Through these features it will increase the efficiency, accuracy and transparency,

### *C. Limitations*

- The size of the database increases day-by-day, increasing the load on the database back up and data maintenance activity.

- Training for simple computer operations is necessary for the users working on the system.

#### *D. Recommendation*

Computerization has become a basic need of every organization. The manual system of information gathering and retrieval has not been very efficient as compared to the computerized one. The advent of the World Wide Web and the internet has drowned the populace into the world of computing. This includes commerce, online payment and even online reservation.

Arguably the web and the internet are the most important development in the history of computerizing. The ability of organizations to take advantage of it therefore contributes to the success of the organization. We therefore recommend that, information employees leave database management system should be updated frequently.

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