OBJECT-ORIENTED DATABASE REPRESENTATION THORUGH UML

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Abstract— Due to the lack of database representation through a well-known object oriented modeling language i.e. Unified Modeling Language (UML), the present work is an attempt to represent the database through UML. In the paper, a case study of Life Insurance Corporation of India is considered to represent the databases of different ongoing policies in the form of object orientation. This will enhance the functioning of the developed software designed on the basis of presented approach. UML Class and Sequence diagrams are designed and then implemented through the SQL Server.

Keywords- Object Orientaion; UML;Class Diagram;Sequence Diagram and SQL Server.

1.1. INTRODUCTION

The Unified Modeling Language (UML) is a visual language for producing the software designs. From the literature, it is observed that object orientation in the databases of the various software projects are not done even before by the use of object oriented languages. A lot of research papers are available on the UML but not confined towards the databases. Due to evolution of the distributed databases, it is necessary to design the database by the use of object oriented technology which increases the efficiency and quality of the software projects. In the current scenario, slowly-slowly, software designers are converting the software projects based upon the structured design methodology in the form of object oriented technology. For this purpose, Object Management Group (OMG) has released the Unified Modeling Language (UML) in year of 1997 [1]. Greedy Booch described all the types of diagrams used for the visual UML language also he described the purpose and advantages of UML for producing the stable software designs. In the year 2005, Zivkovic, et al. [2] described the function point estimation techniques especially for the arrangement of databases by the use of UML and produced the various UML models for computation of the automated software sizes. Abello et al. [3] developed a conceptual model for the multidimensional databases through UML in which they described the three dimensional arrangement of database representation technique. Ghislain and Valery [4] also estimated the software sizes through UML. Zubcoff [5] described the data mining techniques with a concept of the time series for faster searching of the databases. Entity Relationship (ER) diagrams are also explained by the well known scientist James Rambugh [6] and observed that still databases are not designed by the use of UML in the current scenario; therefore, there is a lot of scope to develop the databases through UML. Michael [7] described the various notations used for the data modeling education.

In the present paper, a domain of the Life Insurance Corporation (LIC) of India is considered to develop the object oriented database by the use of the Unified Modeling Language. A UML model is designed through the UML Class & UML sequence diagrams. A database is generated in the UML Class diagram and the same database is implemented by the use of SQL Server. For testing purpose, some queries have been performed to justify the performance of designed data base.

1.2 UML MODEL FOR LIC OF INDIA

A. UML CLASS DIAGRAM

The UML class diagram shows the structural behavior of the system, in which attributes and operations are designed for the complete software project. Different properties like association, aggregation, inheritances in the form of sub classes are also designed in the UML class diagram. In the present work, the complete process of issuing a policy number along with the policy bond is explained in the form of UML class diagram. The UML model contains the major classes like Customer, Agent, New_Business, Policy_Bond, Main_Branch, Bank, Bank_Account, Branch_1, Branch_2... Branch_N Classes. The UML class diagram is represented in figure 1.

The New_Business class has a single association with every Branch of LIC and multiple associations with the Agent Class and Customer Class. The Policy_Bond Class has a multiple associations with Customer and Single Association with the Main_Branch Class. The New_Business Class Checks the received applications of Customer and sends the correct applications to the Main_Branch of LIC to issue the policy number. In Customer class the customer wants to open a policy in the LIC's Branch. The New_Business Officer who handles all the activities related to Policy checking like eligibility of customer for Policy and if the Customer is not eligible then inform to the Customer for not fulfilling the requirement of the Policy, only eligible Customer can get the application form for opening the policy account. After getting the application form from the Customer, application checked by the New_Business officer for completeness, verification of signature, behavior of Policy and also the New_Business officer confirms the latest address which is filled by the Customer and creates a separate file with the serial number. After this the application is approved by the branch manager. The Branch Manager associated in different branches provides a Policy_No. along with an Account_No in which the amount of premium is deposited every monthly, quarterly, half yearly and annually. The premium amount of the policy is auto deducted by the Main_Branch through the Bank which is linked to the every LIC's Branch. The entry of the applications should be done by using the interface software provided at the branch. The Customer's data should be uploaded to the online through the same software and stored in the LIC's database. The entry of the applications should be done by using the interface software provided at the branch. The Customer's data should be uploaded to the online through the same software and stored in the LIC's database.

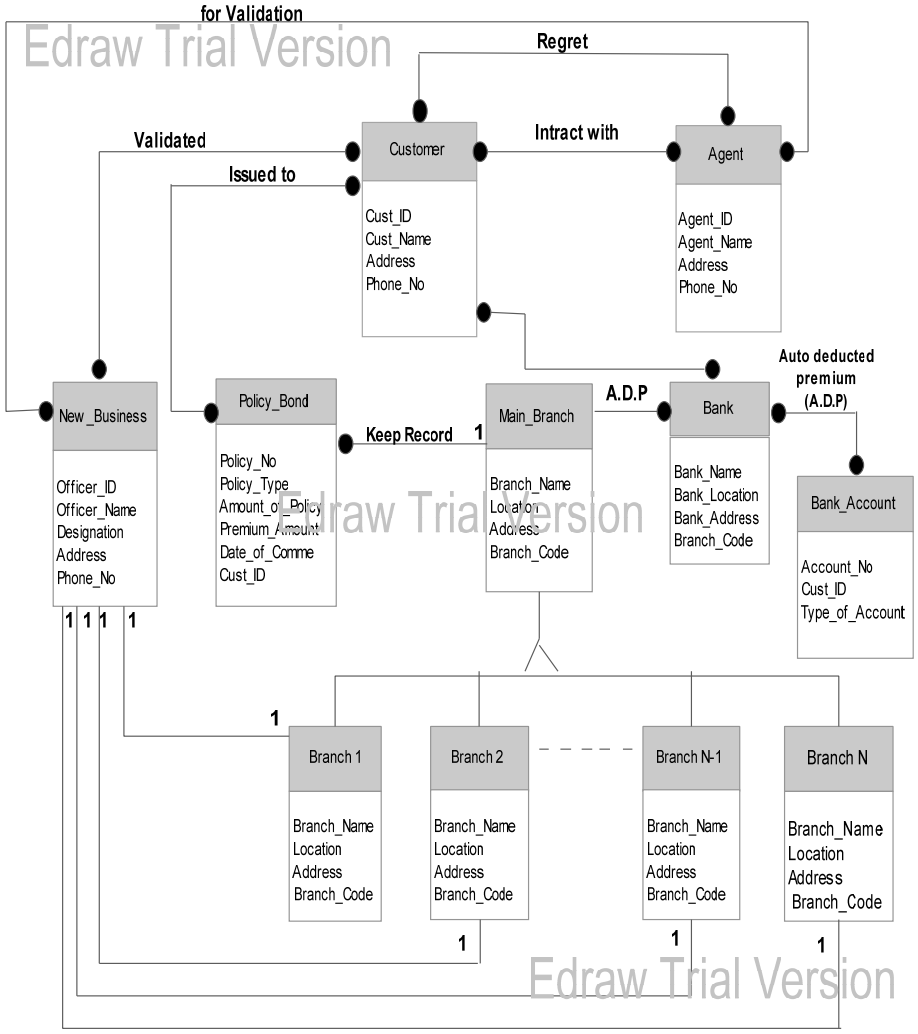

Figure1. UML Class Model for Life Insurance Corporation (LIC) of INDIA

The details of the policy can be viewed via online by entering the policy number or manually through the policy docket. The entire policy dockets are reviewed by the Main_Branch time to time for its maturity. When the policy has matured then the amount of policy has been given to the policy holder and closes the policy account from the LIC_Branch.

B. UML SEQUENCE DIAGRAM

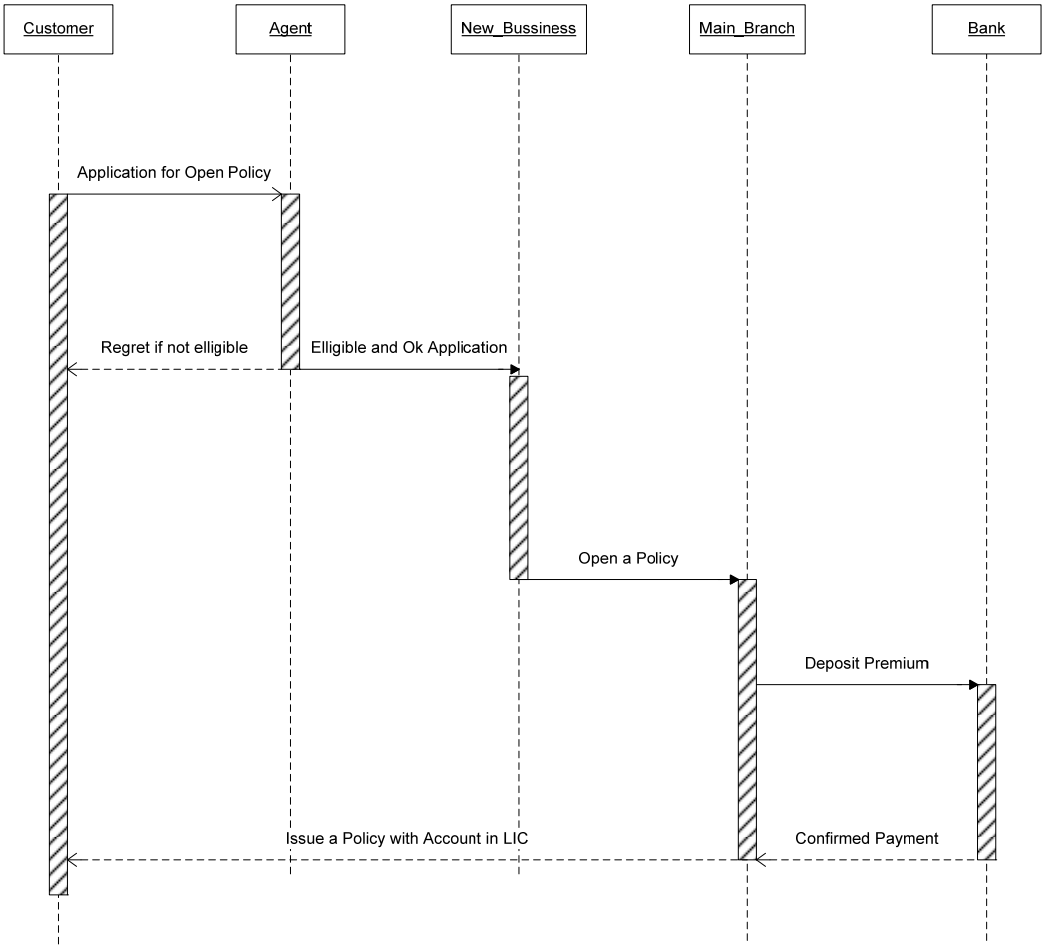

Figure2. UML Sequence Diagram for Life Insurance Corporation (LIC) of INDIA

The UML Sequence Diagram shows the dynamic behavior of the system. For the above, a UML sequence diagram is also designed and given in the Figure 2. As shown above this diagram shows that how a new Customer applies for the Policy in the LIC of India. The sequence diagram shows the complete issuing process of a Policy. The five main objects are represented at the top of diagram. The communications between two objects are shown by an arrow along with communication message. The vertical line shows the life line of the object. The customer applies for opening a policy with a request application through an agent to the Main_Branch via New_Business department and the object New_Business officer checks the application whether customer fulfill all the eligibility criteria or not then New_Business officer informs to customer regarding the rejection of the application request along with the reason. If the application is complete in all respect then New_Business officer sends the application to the Main_Branch of Life Insurance Corporation. The Main_Branch issues the policy and sends the information about the policy to the customer. The main purpose of this diagram is to represent the execution of the policy system and to check whether it is working properly or not.

1.3 DESIGN OF OBJECT ORIENTED DATABASE FROM UML CLASS DIAGRAM

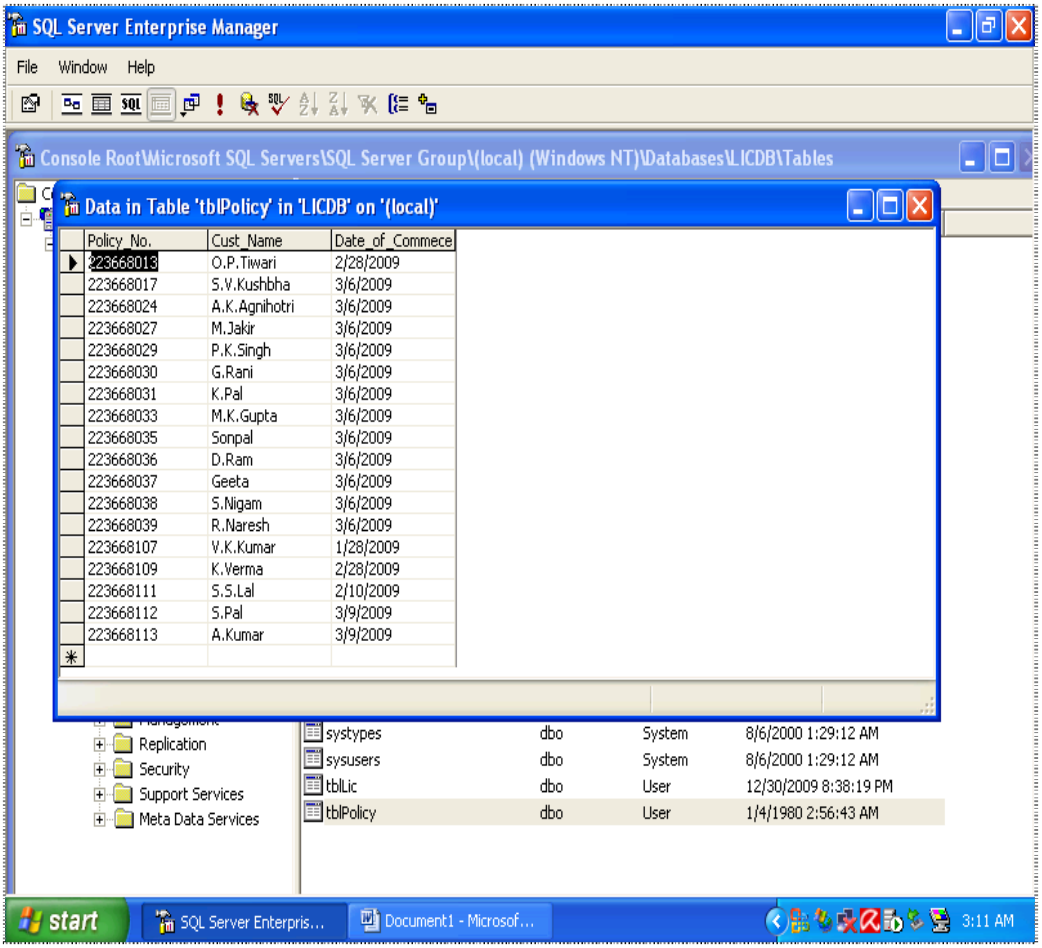

Figure3. Database Design for Life Insurance Corporation (LIC) of INDIA

For designing the database, we have used the SQL Server 2005. Using Enterprise Manager or Query Analyzer, a Database table is designed which is represented in Figure 3. This diagram shows the three major fields like Policy-No., Cust_Name and Date_of_Commencement of the policy. The purpose of this table is to take a brief look of all the records available in the LIC of India. On the above table sample queries have been performed and corresponding results are given below:

Sample Query 1:

Select Cust_Name, Date_of_Commece from tblPolicy where Policy_no = “223668013”;

The output of the above query is shown in the data table as Policy_No ‘223668013’.

Sample Query 2:

Select Cust_Name from tblPolicy where Date_of_Commece = “3/6/2009” Having Policy_no = “223668017”;

The output of the above query is shown in the data table as Policy_No ‘223668017’.

Sample Query 3:

Select Policy_No from tblPolicy whee Date_of_Commece = “3/6/2009” Having = Cust_Name = “A.K.Agnihotri”

The output of the above query is shown in the data table as Customer Name = “A.K.Agnihotri”.

1.4 CONCLUSIONS & FUTURE SCOPE OF WORK

From the above presented work, it is concluded that the UML can be easily applied in the domain of the database. An attempt is made to represent the LIC of India database through UML. The present work can be easily extended by designing of the data cubes for the three major fields shown in the sample database and one can easily extract the faster information about the customers and their policy numbers alongwith the date of commencement and date of premium due. The same work can also be extended for the hand held devices like mobile system, PDA, etc.

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