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Title

HANDLING OF SYNCHRONIZED DATA USING JAVA/J2EE

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ABSTRACT:

This paper proposes use of a Vector Data Structure mechanism for Human Resource Management System over the Web Application. Array is the static memory allocation. It allocates the memory for the same data type in sequence. The limitation with Arrays is that they have defined size and hence user cannot modify the array at run time according to their ease. In this study a new container has been used which will store its elements in an array, but the array will be resized when necessary to accommodate the new elements. An array that may be resized at run time is called a dynamic array, and any data structure that exhibits such dynamic behavior is said to be a dynamic data structure. We will deploy data structures that are dynamic but do not store their elements in dynamic arrays. In other words, the term dynamic data structure does not imply the use of a dynamic array but instead refers to run-time resizing. This application runs on any Web Server or Application Server.

Keywords: Synchronized, Data Structure, Vector, Tomcat 6, Java, persistent.

1. INTRODUCTION:

A Data Structure [(1)] is an arrangement of data in a computer's memory or even disk storage. It has a different way of storing and organizing data in a computer so that it can be used efficiently. Different kind of Data structure is used in different applications. Usually, efficient data structures are a key to designing efficient algorithms. Vector is one of the key component of data structure .vector data model are divided into two kinds one is object oriented data organized model ,the other is selection set based data model[(9)] . with the help of vector we develop simple systematic ,and effective technique for making slinked data structure persistent[(6).] Vector is also used for spatial features in computers [(7).]Vector implements a dynamic array. It is similar to ArrayList, but with two differences: Vector is synchronized, and it contains many legacy methods that are not part of the collections framework. Vector [(2)] class extends AbstractList and implements List, Random Access, Cloneable, Serializable. The size of a vector increase and decrease according to the program.

Vectors (the java.util.Vector class) are commonly used instead of arrays [3], because they expand automatically when new data is added to them. Vectors can hold only Objects and not primitive types (eg, int). If one wants to put a primitive type in a Vector, put it inside an object (eg, to save an integer value use the Integer class or define your own class). If one uses the Integer wrapper, one will not be able to change the integer value, so it is sometimes useful to define your own class.

Vector creation needs importing either import java.util.Vector; or import java.util.*;. Vectors are implemented with an array[4], and when that array is full and an additional element is added, a new array must be allocated. Because it takes time to create a bigger array and copy the elements from the old array to the new array, it is a little faster to create a Vector with a size that it will commonly be when full. Of course, if you knew the final size, you could simply use an array. However, for non-critical sections of code programmers typically don't specify an initial size.

In this study a Human Resource Management System using web application with database as backend is developed. As Vector [5] is a synchronized method it takes little longer to fetch database values but its multithread environment and security makes it popular.

Advantages of using vectors are as follows:

1. Vector Data Structure is expandable and shrinkable.
2. Vector Data Structure is implemented from List interface.
3. Vector Data Structure is synchronized.
4. Vector Data Structure is used for best performance.
5. Vectors Data Structure is extremely easy to use, and implements the Enumeration interface which makes traversing the contents of a Vector extremely easy.
6. Creating a Vector Data Structure is easy. One needs to simply define a variable of type Vector, and call the vector constructor.
7. Vector class can be used to create a generic dynamic array that can hold objects of any type
8. Vector component can be accessed using an integer index.
9. Vector data structure can be used in heterogeneous collection that is capable of storing data of different types, while providing for look-up, iteration [8].

Table 1: Common Vector Methods:

Method	*Description*
v.add(o)	adds Object o to Vector v
v.add(i, o)	Inserts Object o at index i, shifting elements up as necessary.
v.clear()	removes all elements from Vector v
v.contains(o)	Returns true if Vector v contains Object o
v.firstElement(i)	Returns the first element.
v.get(i)	Returns the object at int index i.
v.lastElement(i)	Returns the last element.
v.listIterator()	Returns a ListIterator that can be used to go over the Vector. This is a useful alternative to the for loop.
v.remove(i)	Removes the element at position i, and shifts all following elements down.
v.set(i,o)	Sets the element at index i to o.
v.size()	Returns the number of elements in Vector v.
v.toArray(Object[])	The array parameter can be any Object subclass (eg, String). This returns the vector values in that array (or a larger array if necessary). This is useful when you need the generality of a Vector for input, but need the speed of arrays when processing the data.

2. BASICS OF HRM:

It is a web based Solution for the industry to manage company details and which can assist organization in meeting their HR needs. The proposed solution named as "Human Resource

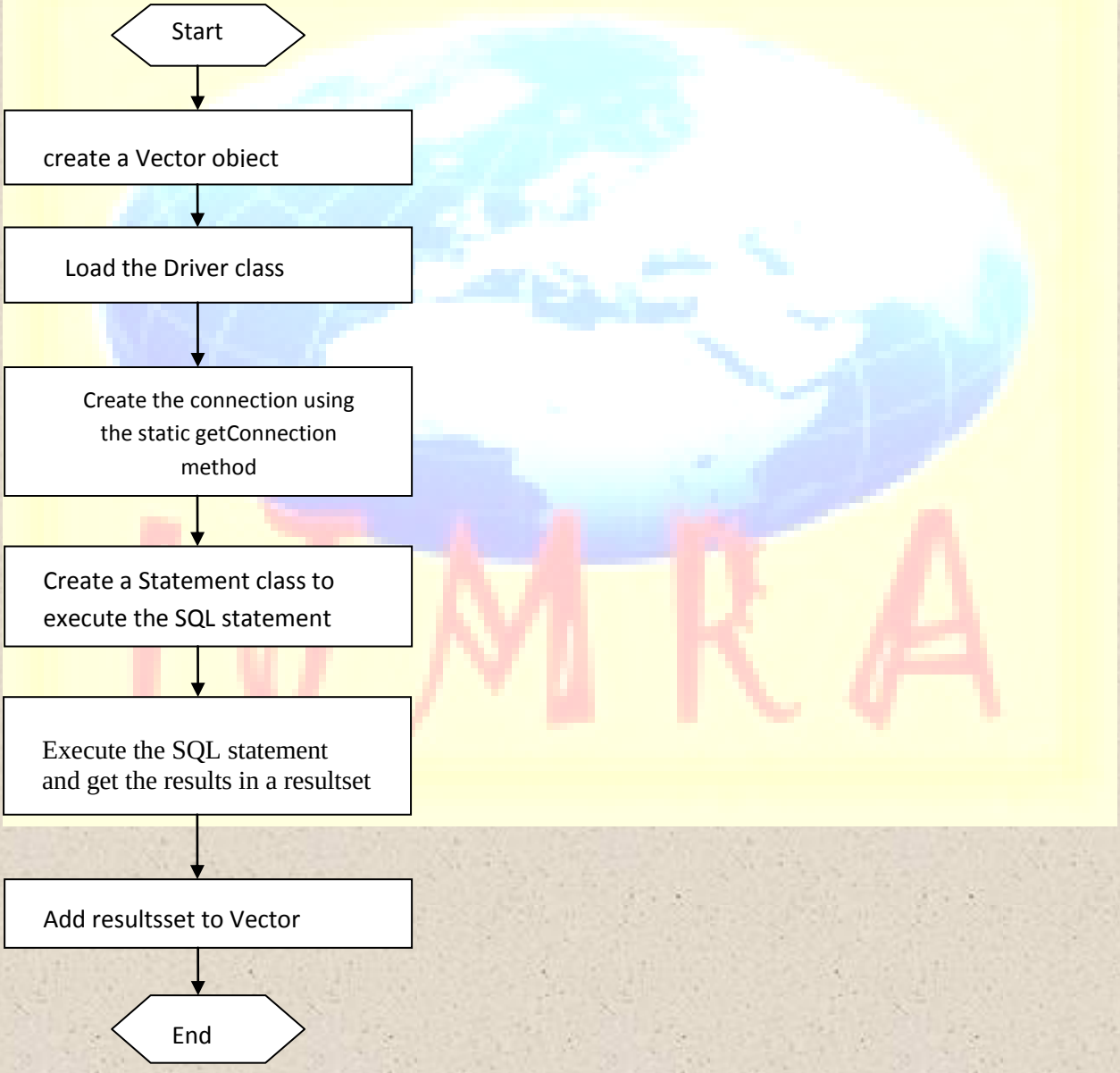
Management System" is a comprehensive software package using vector data structure with Java, which provides the following features**.**

- **Manage Employee and Company Details -** This would include the following:
  - Capture details of the company and all its employees.
  - Define number of locations.
  - Categorize employees.
- **Manage Loans and Advances –** The proposed module would cover the following:
  - Define any number of loans and advances against employee.
  - Define parameters for loans.
  - Automatic monthly deductions with/without interest.
  - Facility to reschedule loan repayment.
- **Manage Attendance, Multiple Shifts & Over Time –**
  - Provision for integrating to time attendance system.
  - Define number of shifts.
  - Validate time attendance for each employee, depending on status and profile of the employee.
  - Define rules for above mentioned validations.
- **Company Policy Database –** The module would assist define the policies for various activities. Like min/max limit for leaves etc.
- **Reporting –** This module would assist in following:
  - Select from a range of readymade reports.
  - Take the report on-screen or in print.
  - Get customized reports.
- System admin module would assist in user definable passwords etc.
- Manage Employee and Company Detailed.

- Manage Loans and Advance.
- Manage Attendance, Multiple Shifts & Over Time.
- Company Policy and Database.

3. MEHODOLOGY:

The Legends of Workflow are as follows:



3.1 HUMAN RESOURCE MANAGEMENT ARCHITECTURE

HUMAN RESOURCE MANAGEMENT is given in the Figure 2. Tomcat 6 Server was used for this study. This server is configured by URL: http:\\localhost:8080. Tomcat is an open source servlet developed by the Apache Software Foundation (ASF). Tomcat implements the Java Servlet and the Java Server Pages (JSP) specifications from Sun Microsystems, and provides a "pure Java" HTTP web server environment for Java code to run.

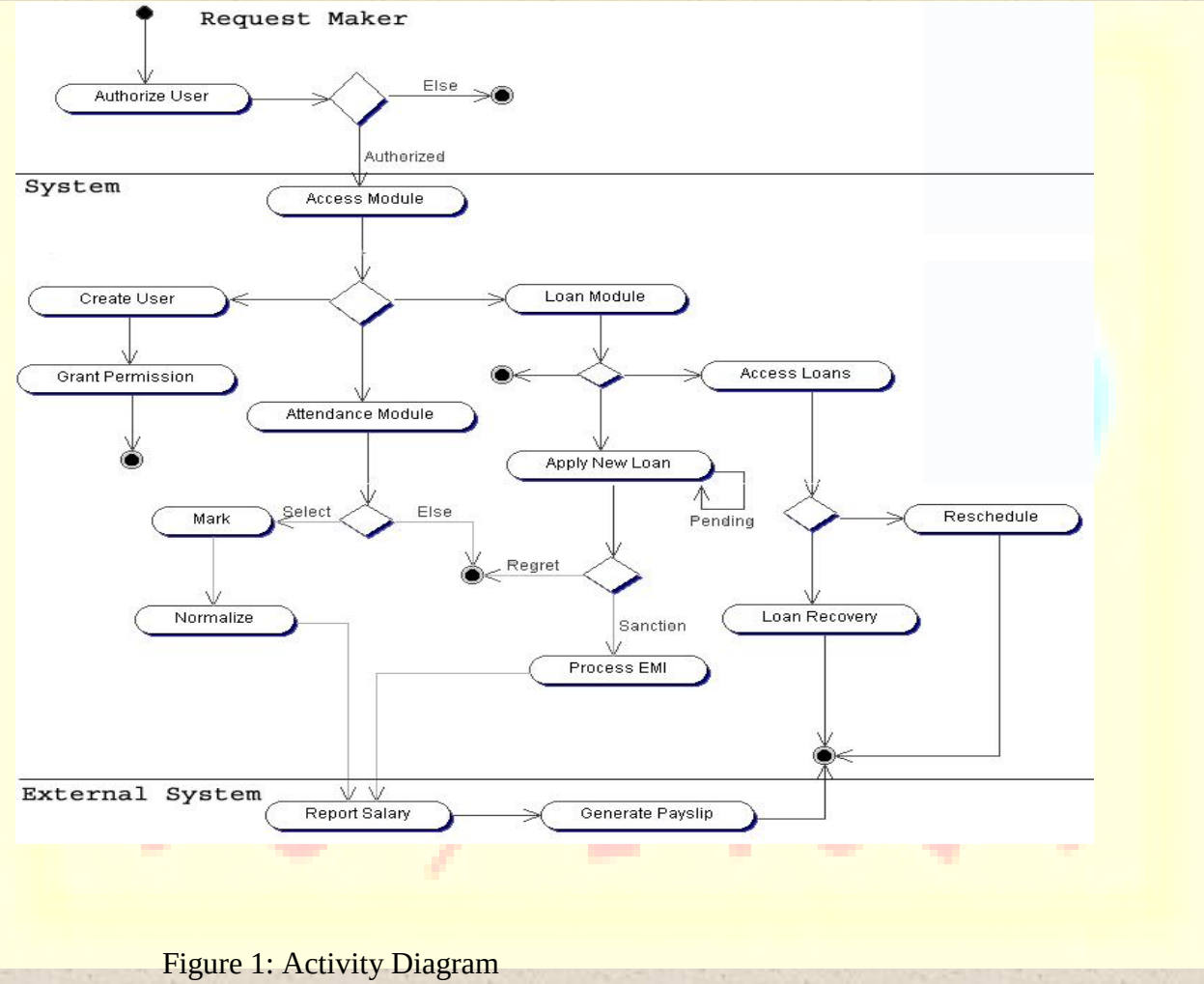


Figure 1: Activity Diagram

The Figure 1 above describes how the proposed solution would assist in managing HR needs of a company. An authorized company employee is allowed to access and edit critical information regarding each employee.

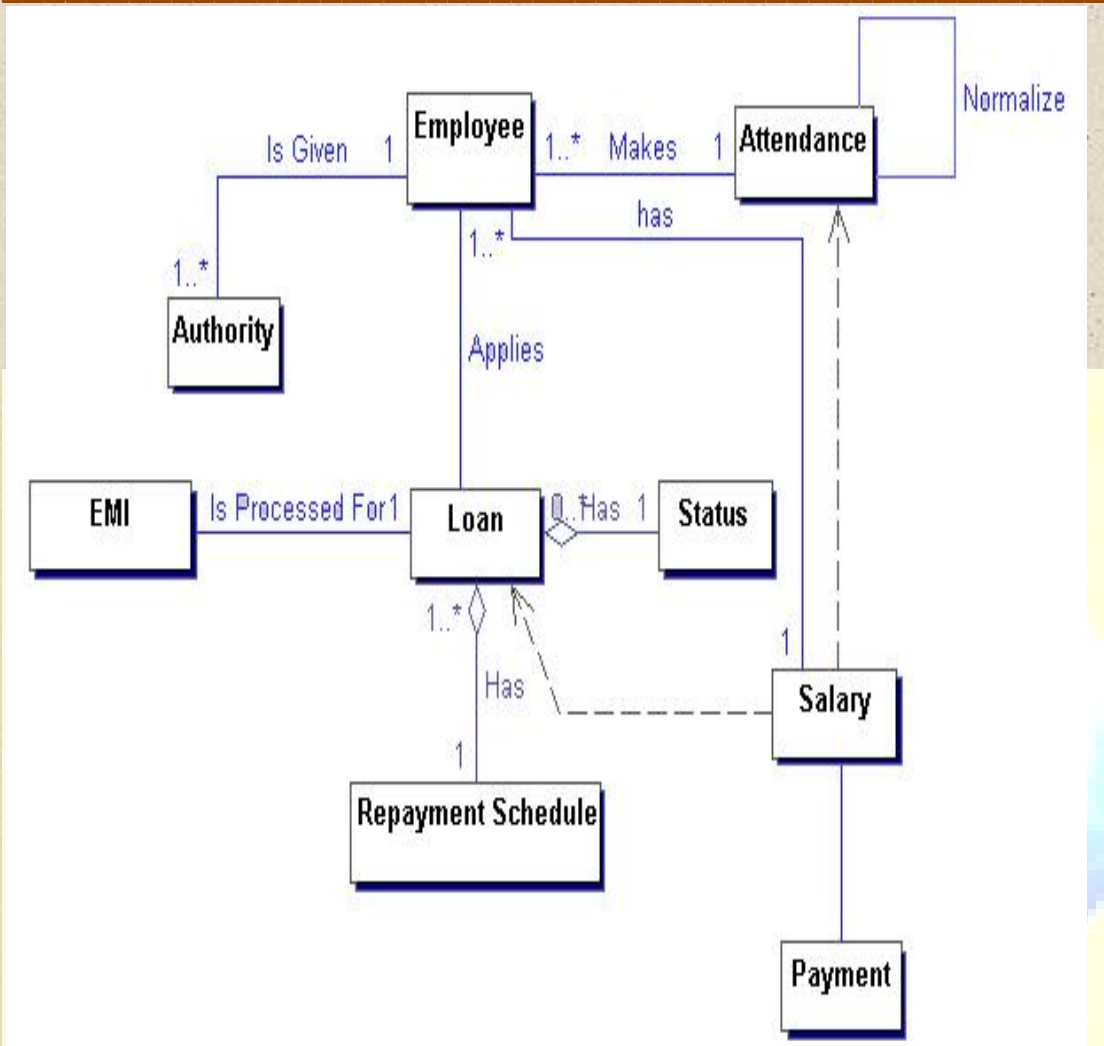


Figure2: Business Concept Model

Business concept model is a mind map that relates the terms generated in the business process like Loan, Employee, EMI and other important terms

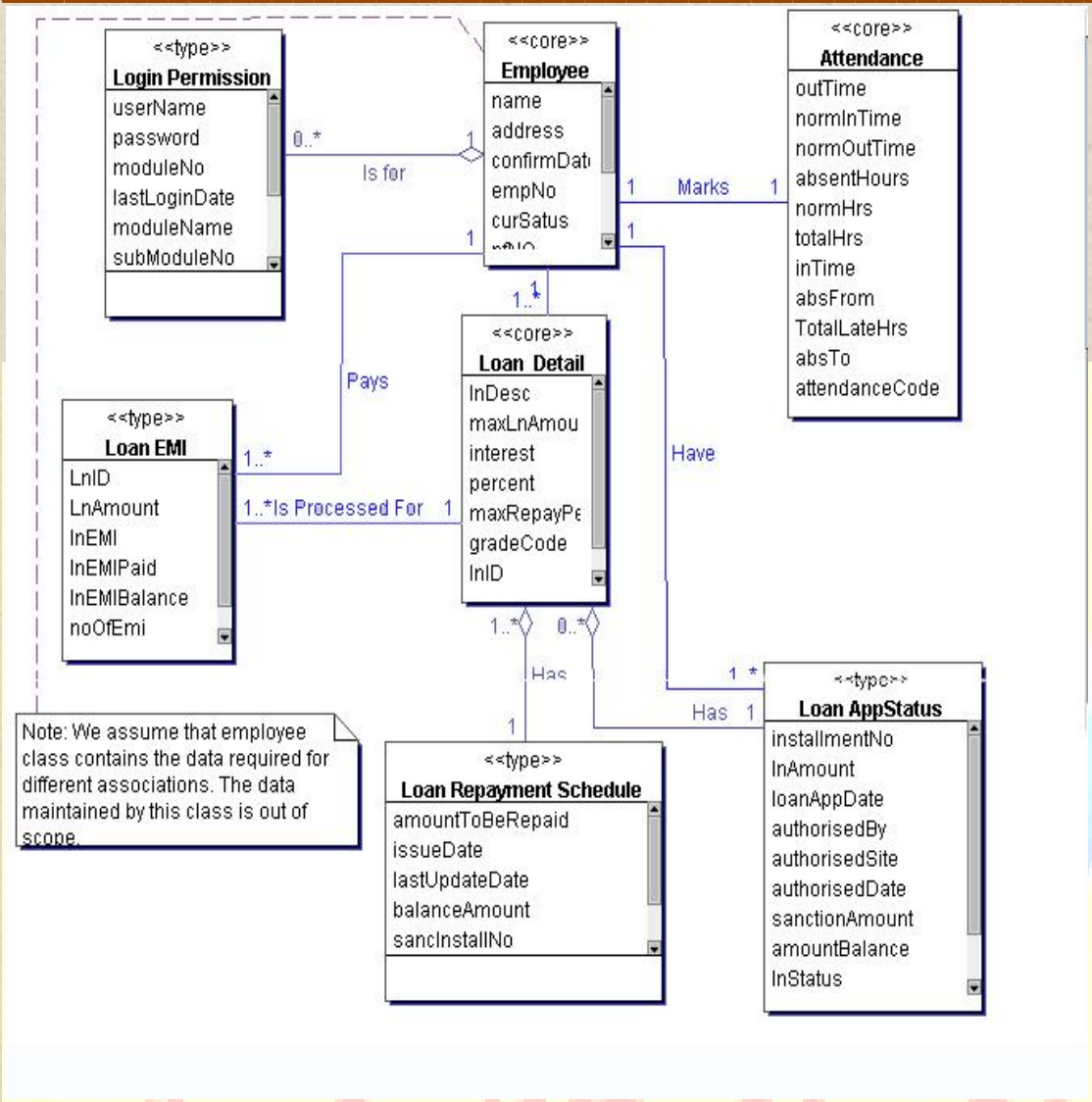


Figure 3 – Business Type Model

The Figure 3 shows the Class Diagram for the proposed model. Here the Employee is the external system that is out of scope of the given project domain. We assume that the information needed for our problem domain will be shared form this external system.

3.2 MEHOD OF VECTOR DATA STRUCTURE:

Here are the **Vector** constructors:

Vector( )

Vector(int *size*)

Vector(int *size*, int *incr*)

Vector(Collection *c*)

Storing into database using vector:

```
Vector hrm = new Vector();
try {
    PreparedStatement ps = dbConn.prepareStatement("INSERT INTO emp (BLOBcolumn)
VALUES (?)");
    ps.setObject(1, hrm, Types.OTHER);
    ps.executeUpdate();
    ps.close();
} catch (Exception e) {
    System.out.println("ERROR storing vector into db: " + e.toString());
}
```

Reading from database using vector:

```
Vector hrm = new Vector();
try {
    Statement stmt = dbConn.createStatement();
    ResultSet rs = stmt.executeQuery("SELECT * FROM emp");
        if (rs.next())  hrm = (Vector) rs.getObject(1);

    rs.close();
    stmt.close();
} catch (Exception e) {
    System.out.println("ERROR reading vector from db: " + e.toString());
}
```

Method:

```
Vector hrm = new Vector();
//create a Vector object
try
{
// Load the Driver class
Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
//Create the connection using the static getConnection method
connection = DriverManager.getConnection("jdbc:odbc:HRM");
 //Create a Statement class to execute the SQL statement
statement = connection.createStatement();
String emp = "select * from employee";
//Execute the SQL statement and get the results in a Resultset
ResultSet resultset = statement.executeQuery(emp);
while (resultset.next())
hrm.add(resultset.getString(1));
//Add resultsset  to Vector
}
catch (Exception e) {}
```

4. RESULTS:

This application can run on any server. For this study Tomcat 6 server was used. Figure 4 shows the user interface after login

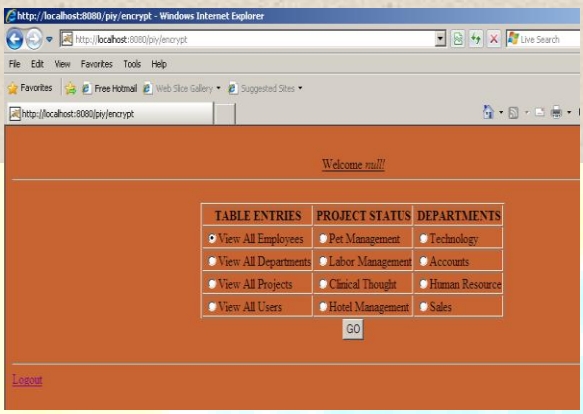


Figure 4: User Interface after login

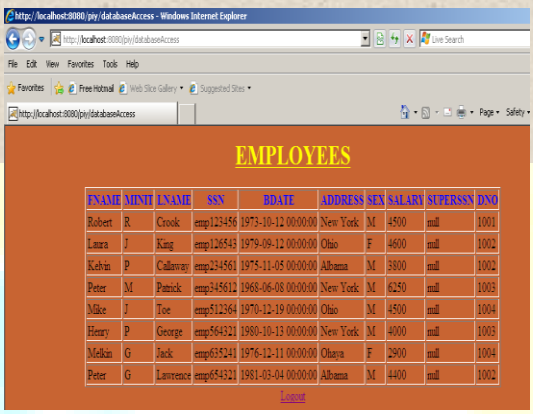


Figure 5:Total strength of Employees and their status.

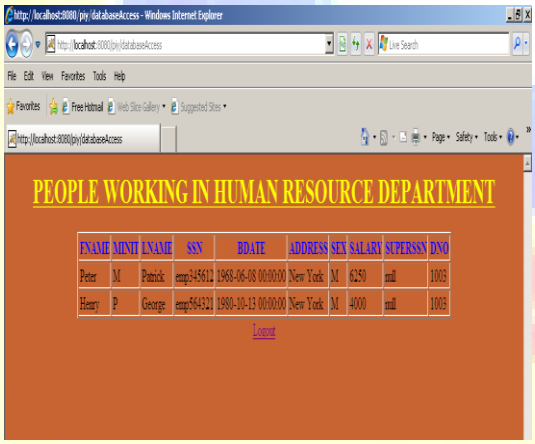


Figure 6: Excerpt from the Database

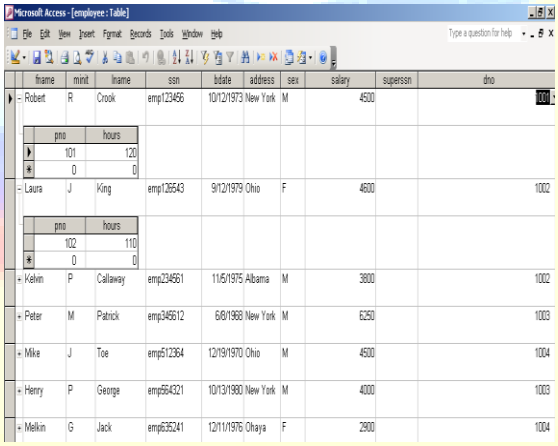


Figure 7: List of Employee from Human Resource Department.

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