Development of Essential Features for a Human Resource Management System

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Abstract

A Human Resource Management System (HRMS) is the core of any successful organization. It is the centralized repository for all the critical data needed for administrating a workforce. An efficient HRMS, besides managing employee records, transforms an impersonal "company" into a trusted employer. As a company grows, traditional methods for addressing employee information needs usually result in a haphazard combination of paper and computer-based systems. In many cases, these systems are redundant and non-communicative. This results in inconsistent information and costly duplication of effort. The present system, HUMAN RESOURCE MANAGEMENT SYSTEM (HRMS), is built in an industry-standard client/server environment to alleviate these problems. It allows the personnel department to perform the tasks of storing, retrieving, and processing personnel data such as payroll and time reporting as well as generating managerial reports in a timely fashion. The *HRMS* is also in compliance with all government and corporate requirements. The system employs specialized input and maintenance programs along with a generalized robust data management that is user-friendly. It uses the Sybase's "SQL Anywhere" relational database on the server side and open-ended, object-oriented PowerBuilder on the client end.

Keywords: Human resource management system, client/server technology, employee management, relational database

1. INTRODUCTION

Human Resource Management Systems (HRMS) have entered a new era with new generation of client/server application packages. Various organizations have realized the strategic importance of Human Resource Management (HRM). Accordingly, organizations are now willing to align their HRMS with new objectives such as empowering employees to increase the efficiency and responsiveness of HR administration and providing the essential information on employees and tools to improve the overall quality of HRM within the organization.

A properly managed HRMS can significantly improve the performance of any personnel department. A vendor may offer 100 different features, but if those do not include the specific 20 that the organization needs, the system will not be effective. Earlier systems did not integrate their HR benefits and payroll components, but state-of-the-art HRMS do (Henson 1996).

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Furthermore, leading Enterprise Resource Planning (ERP) vendors such as SAP, Oracle, and PeopleSoft, currently include robust HRM solutions within their enterprise-wide application offerings. The market of HRMS packages for large and mid-size organization remains highly competitive with disparate functionality and technology provided by a great diversity of solutions (Slabodkin, Olsen, Jackson, and Dorobek 1997).

The ever-changing requirements for government and corporate reporting are causing the personnel department to spend too many hours on manual labor. Preparing payroll for all employees is time-consuming and tedious, involving countless hours of calculating taxes, writing paychecks, filing tax deposits, or supervising the people who do these jobs. Also, if the present systems are in traditional File Management Systems that may not easily share information, the result may be inconsistent information and costly duplication of effort. Many organizations are considering either to adapt a computerized HRMS or to make a transition to easy-to-use Windows-based HRMS from traditional DOS-based systems.

The main objective of this research project is to provide an easy-to-use, reliable HRMS to function in a client/server environment for reliable data management. The following are some of the major HR functions that the system can perform.

⇒ Employee-information management
⇒ Employee vacation tracking
⇒ Pay roll, Taxes, and W-2s
⇒ Employee benefits

The system also provides necessary security access controls, data entry, and audit trails.

2. LITERATURE REVIEW

More powerful and useful HR software systems are available in the market (Auxillium 1999; Lye 2000). As is true with any software product, HRM software is designed for an ideal or target user. A new system for a small company can cost between $205,000 to around $560,000 out of which about $50,000 - $150,000 is required for new software with appropriate modules (Walker 1996). The five most popular areas targeted by HR software are enterprise resource planning, recruiting, payroll, employee self-service, and competency and performance management (Greengard 1999).

While 1970s and 1980s were eras of centralized computing with the IBM mainframe occupying over 70% of the world's computer businesses, the era of 1990s was the transition phase toward client/server computing, a totally new concept and technology capable of re-engineering the entire business world. There has never been a technology that has risen as rapidly as client/server technology. The client/server model significantly enhances the HRMS. It provides greater access, capacity, connectivity, and applications' process. This technology adds intelligence to the traditional File server platform by allocating processing and data management across networked resources (Hunter 1996). Client/server technology gives personnel the flexibility they need to decentralize or distribute HR applications without having to relinquish centralized financial control.

Client/server architecture allows HR managers throughout the company to distribute information better within the organization and to access information for reporting, analysis, and planning (Henson 1996). As a whole, the development and implementation of client/server technology is more complex, more difficult, and more expensive than traditional single process applications. However, client/server is still highly desirable because the business demands increased benefits (Linthicum 1996).

The relational database model currently dominates the database market with approximately four billion dollars in sales per year. Relational databases are one of the most powerful tools of current computing technologies. They provide the foundation for a number of current tools and packages. They are also at the heart of corporate information systems and decision support (Soni, Stone, and Thomas 1999). Relational Database Management System (RDBMS) provides users with a conceptual representation of data that does not include many of the details of how the data is stored (Rob and Coronel 1997).

Choosing the right HRMS from several off-the-shelf systems is not an easy task. It should be considered as carefully as any other process implementations since they may be either too complicated to implement or too expensive to afford, therefore not serving the exact needs of the organization. Many vendors sell separate stand-alone systems such as one for "Employee Management" and another for "Payroll Management." It is essential to create a custom-built HRMS employing the industry standard client/server environment. The application was built using one of the most popular and reliable relational databases, "SQL Anywhere" from Sybase as the server side database and PowerBuilder as Graphic User Interface (GUI), which is easy to use, object-oriented, modular, scalable, and portable across several platforms.

3. METHODOLOGY

To facilitate efficient handling of the employee management issues and provide instant access to the authorized users and based on the system specifications and requirements (such as details of several entities that exist in the system, their relations and constraints, the user access levels, and security features), following

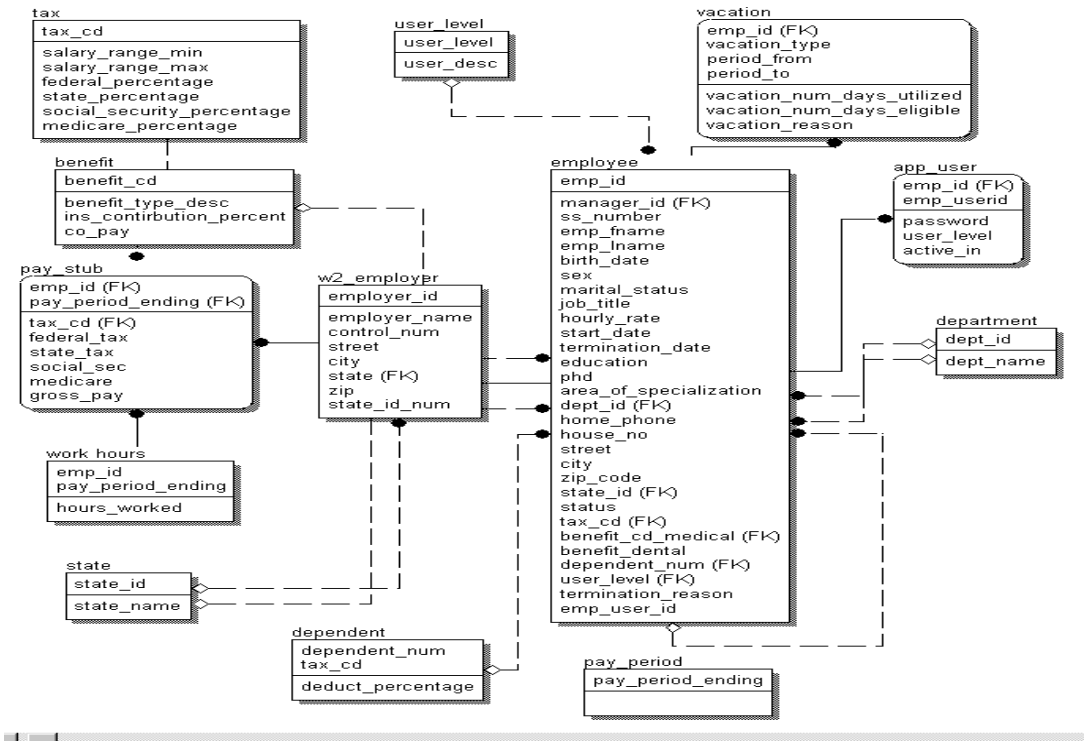


Figure 1. Logical schema

entities were identified: Employee, Department, Pay period, Work hours, Dependent, Tax, Benefit, State, W-2 Employer, and Vacation. The relations between the entities and corresponding attributes were normalized for benefiting from the advantages of normalization. All the relations were normalized to the third normal form.

Figure1 is the result of the logical design, prepared using 'ERWIN' and is a complete picture of the database for managing the data that is independent of any particular database management system. The goal is to design a database that will efficiently and securely handle all data processing. The physical schema as shown in figure 2 represents all the tables, columns, and their data types.

The current system uses object-oriented features supported by PowerBuilder. The logon screen provides a password that enables secured entry to the application. It allows a change of password by typing a new password in the "New Password" field and repeating it in the "Verify Password" field. The current system provides special security encryption capability to protect from unauthorized access to the application. When a new employee has been added to the system, he/she needs to be assigned with a user level, which decides the type of access he/she needs to be given on the application. The system is designed for three tier security user levels: System Administrator, Administrative Clerk, and User. System Administrator is the super user who can perform all the operations supported by the system, from adding a new employee to deleting an employee, adding new departments, etc. Administrative Clerk can view all the information about the employees, but cannot make any updates to the database. The User will be able to update (to a limited extent) his/her personal records only.

The main screen, as shown in figure 3, provides a starting point and gives access to the set of various functions supported by the system. Clicking the "Employee" icon or selecting the "Employee" under "Activities" menu brings the screen shown in figure 4. The employee ID is a sequence number generated by the system (every employee will be assigned with a unique number). When a new employee is being added to the system, it obtains the previous maximum employee ID form the database, and assigns the next ID to the new employee. This prevents from assigning a duplicate employee ID.

Clicking the "Work Hours" icon or selecting "Work Hours" under "Activities" menu produces the screen shown in figure 5. This module lets either the System Administrator enter the work hours for all the employees for different pay periods or allows the user to enter his/her own work hours to facilitate preparation of pay stubs. The Administrative Clerk can view the work hours of all the employees, but will be unable to make any corrections. The system allows entering a new row of work hours for an employee.

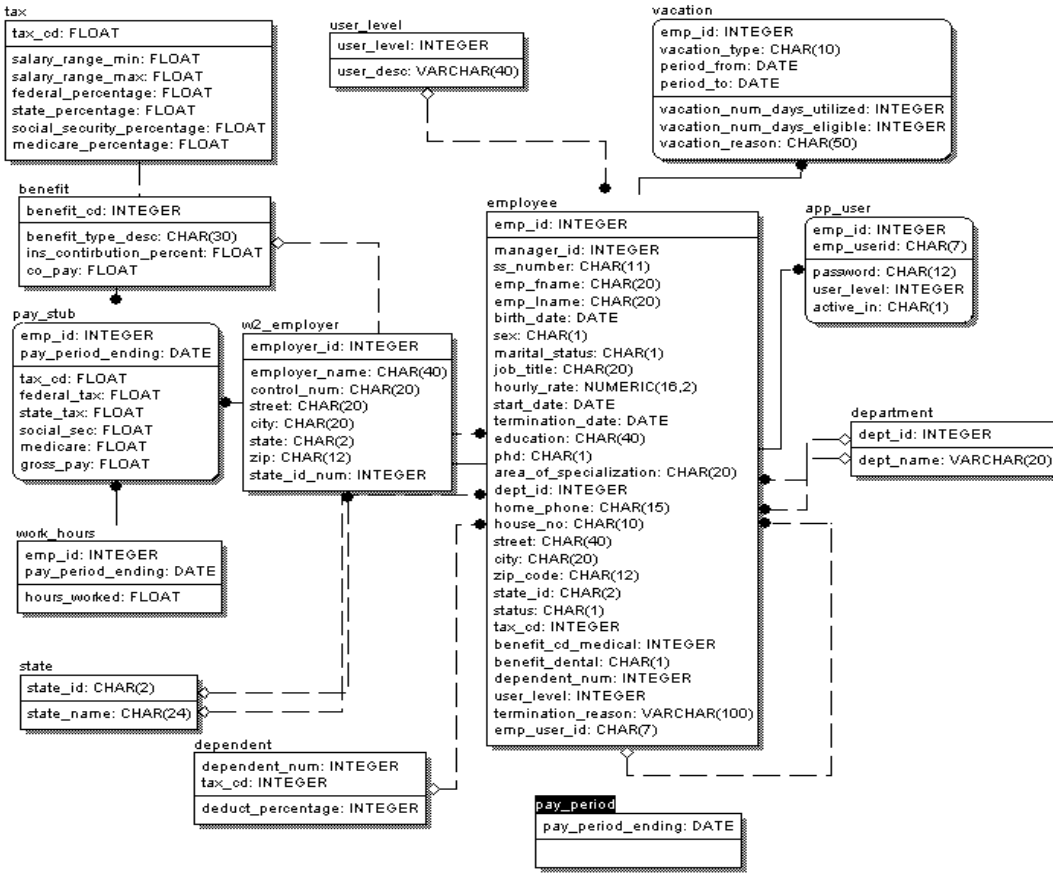


Figure 2. Physical schema

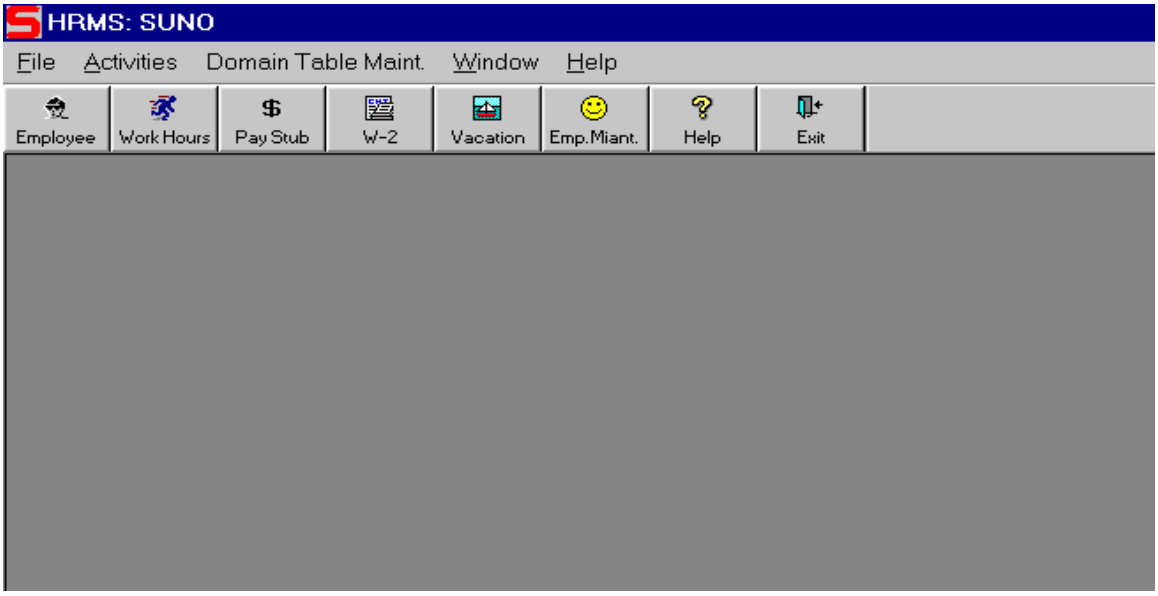


Figure 3. Main screen

The system provides yet another feature, which is the preparation of a pay stub. The "Pay stub_filter" screen as shown in figure 6 can be invoked by clicking the "Pay Stub" icon or selecting "Pay Stub" under "Activities" menu. An employee needs to have payable work hours

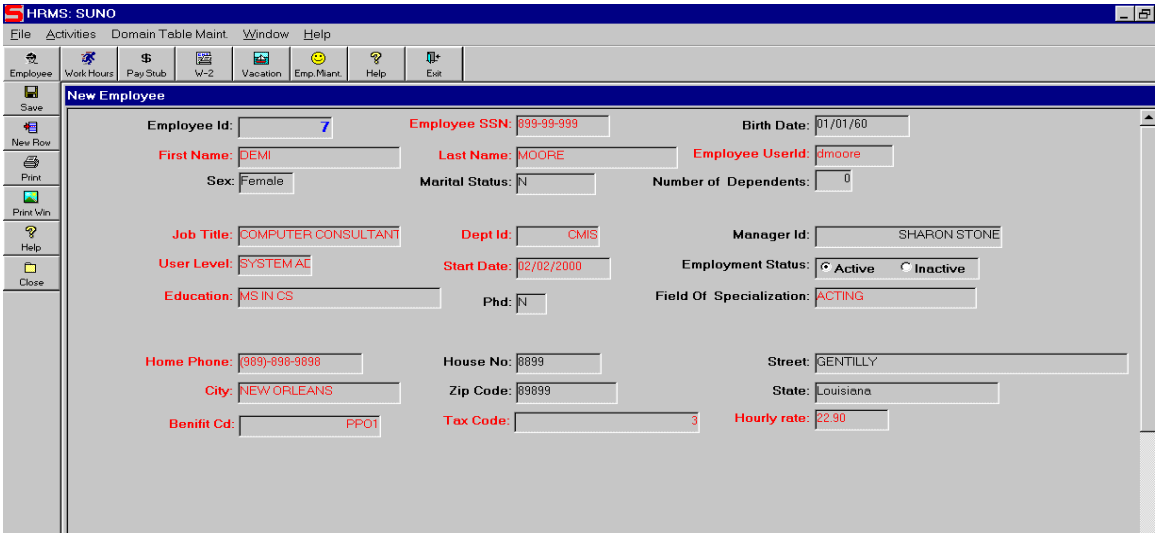


Figure 4. Employee module

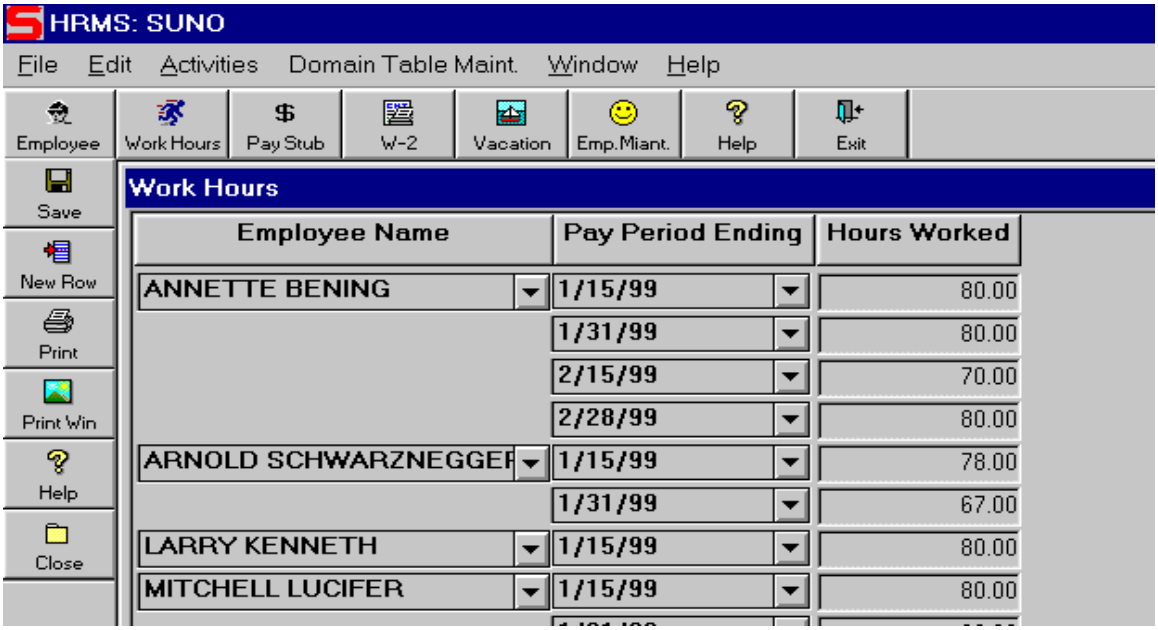


Figure 5. Work hours module

in his/her name during the period for which the pay stub needs to be prepared. If one is not sure whether the employee has payable hours, one need to open the Work Hours module as described previously and make sure that there are payable work hours.

Using the current system, W-2 forms can be created for all the employees working in the organization for a specified year. The W-2 forms that are generated from the system are in a ready-to-submit state. Clicking "W-2" icon or selecting "W-2" under the "Activities" menu brings the "W-2 filter" screen as shown in figure 7.

The "Vacation" module as shown in figure 8 lets either the System Administrator enter the vacation details for all the employees or the user to enter his/her own vacation. The Administrative Clerk, on the other hand, can only view the vacation details of all the employees but will be unable to make any modifications. Based on the vacation type selected, the system will automatically post the available vacation hours for a particular employee while considering the vacation hours already used. Then the user needs to enter the vacation starting and ending period, and the system will automatically post the number of days the employee has taken vacation. If the user tries to enter one of the dates on

which vacation has already been taken the system will post a warning to change the dates.

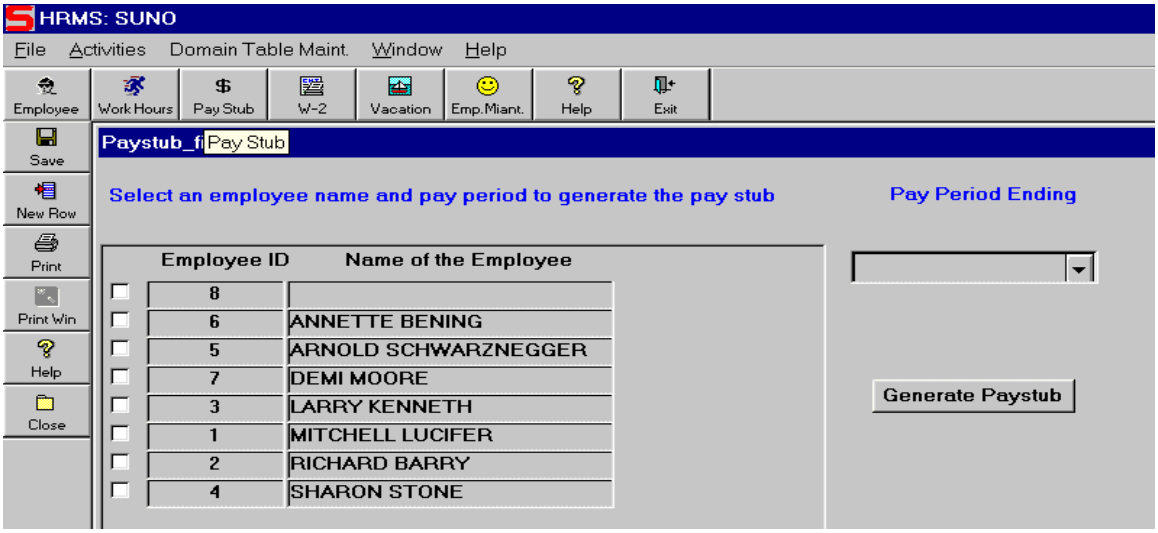


Figure 6. Pay-stub module

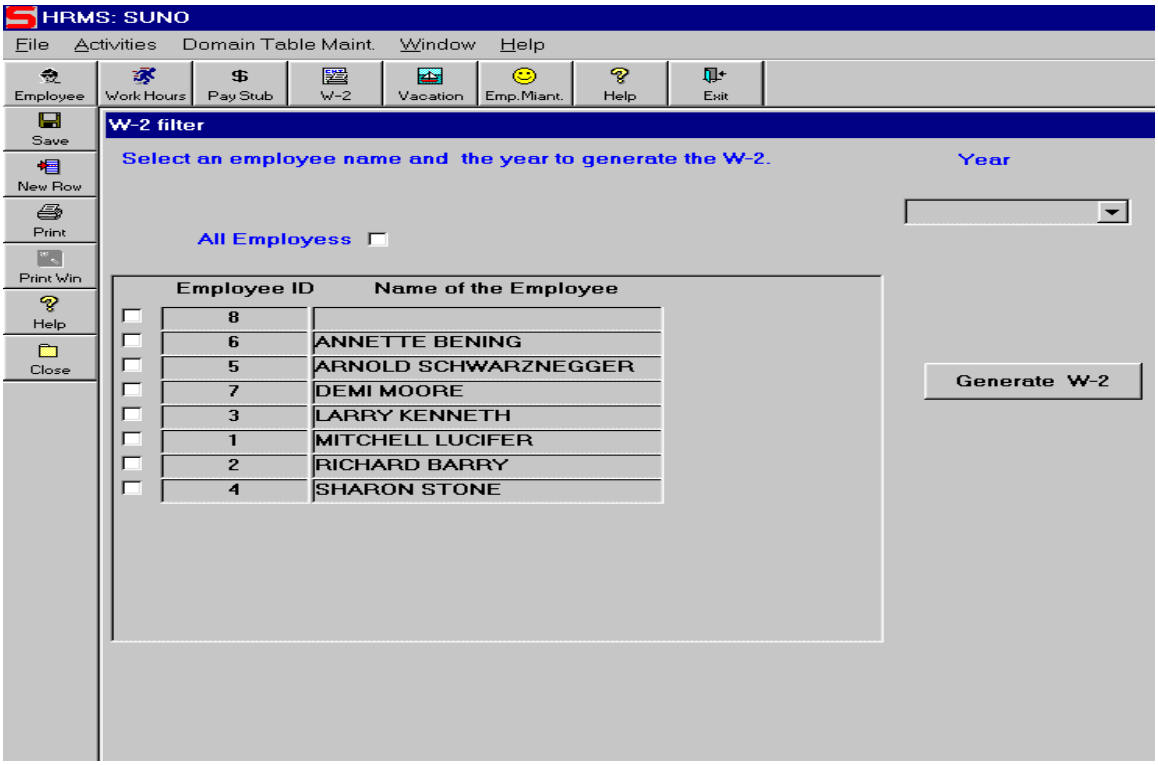
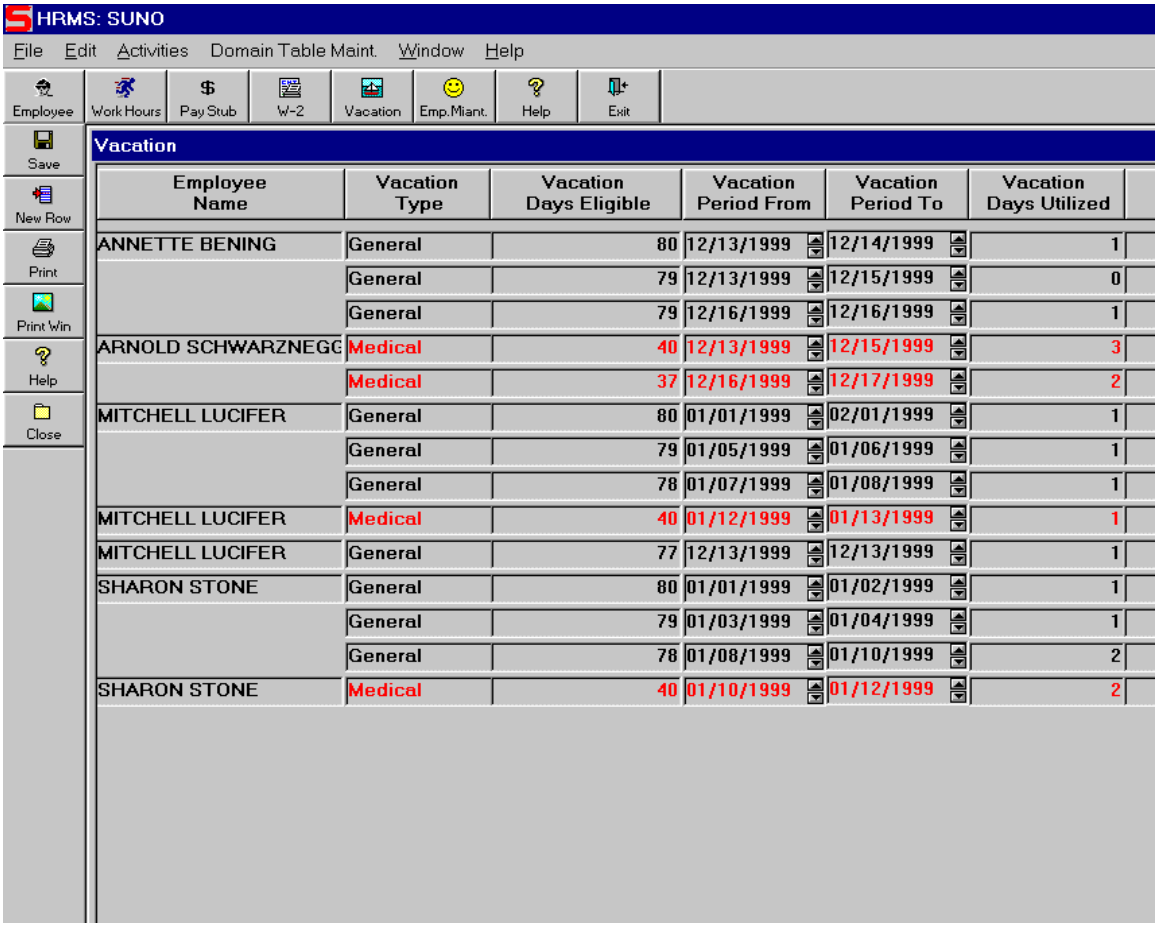


Figure 7. W2 filter module

The "Employee Maintenance" module is intended to facilitate updates of employee's personal information during the course of an employee's tenure. The screen can also be used to record the termination of an employee together with details of termination. The "Department" screen is intended to add new departments. When new employees are added, the departments are assigned through a dropdown data-window based on the entries in this table only. No employee can be allotted to a department that does not exist in this table. A new department can be added by selecting the "Department" under the "Domain Table Maintenance" menu option.

The "Benefit" screen is intended to add new medical benefits. When new employees are added, the employees will be offered the available medical benefit plans such as "PPO" or "HMO" and are assigned through a dropdown data-window based on the entries in this table only. No employee can be allowed to a benefit that does not exist in this table. A new benefit can be added by selecting the "Benefit" under the "Domain Table Maintenance" menu option. Similarly, the "Pay Period" module was developed.



Employee Name	Vacation Type	Vacation Days Eligible	Vacation Period From	Vacation Period To	Vacation Days Utilized
ANNETTE BENING	General	80	12/13/1999	12/14/1999	1
	General	79	12/13/1999	12/15/1999	0
	General	79	12/16/1999	12/16/1999	1
ARNOLD SCHWARZNEGG	Medical	40	12/13/1999	12/15/1999	3
	Medical	37	12/16/1999	12/17/1999	2
MITCHELL LUCIFER	General	80	01/01/1999	02/01/1999	1
	General	79	01/05/1999	01/06/1999	1
	General	78	01/07/1999	01/08/1999	1
MITCHELL LUCIFER	Medical	40	01/12/1999	01/13/1999	1
MITCHELL LUCIFER	General	77	12/13/1999	12/13/1999	1
SHARON STONE	General	80	01/01/1999	01/02/1999	1
	General	79	01/03/1999	01/04/1999	1
	General	78	01/08/1999	01/10/1999	2
SHARON STONE	Medical	40	01/10/1999	01/12/1999	2

Figure 8. Vacation module

The "Tax" module is intended to add new tax codes. When new employees are added, the employees will be entitled to choose suitable tax deductions from their regular paychecks, and the same is assigned through a dropdown data-window based on the entries in this table only. Other modules developed as part of the system are "User Level" and "Dependant" and these modules are developed similar to other modules.

4. CONCLUSIONS

The current system enables all the units and departments to access employee information for a variety of uses. The system can be used for maintenance, reporting of personnel information, using specialized input and maintenance programs, a generalized robust data management, reporting, and retrieval of the information. The following are some of the activities that can be performed by the system.

1) HRMS allows the employees to access benefit information or change personal information.
2) It helps to manage salaries, pay ranges, employee, work hours, tax codes, and benefits more effectively.
3) The system facilitates calculation of automatic deduction procedure for each employee based on annualized plan costs and pay frequency.
4) It facilitates the generation of pay stubs.
5) HRMS generates annual W-2 forms.
6) It also provides context-sensitive online help.

The present system has been built in client/server environment that utilizes the robust relational database. Various factors such as navigation, system setup, data entry, and data manipulation are made easy. The system has been built with an open architecture that is easy for

future upgrades as well as portability across many platforms with little or no configuration changes. Its easy to use menu navigation built as per the Windows standards needs no extra training (i.e., any user with experience using Microsoft Office can easily put this system to use). Online, context-sensitive help provides the detailed functionality of each module and the instructions to run the same.

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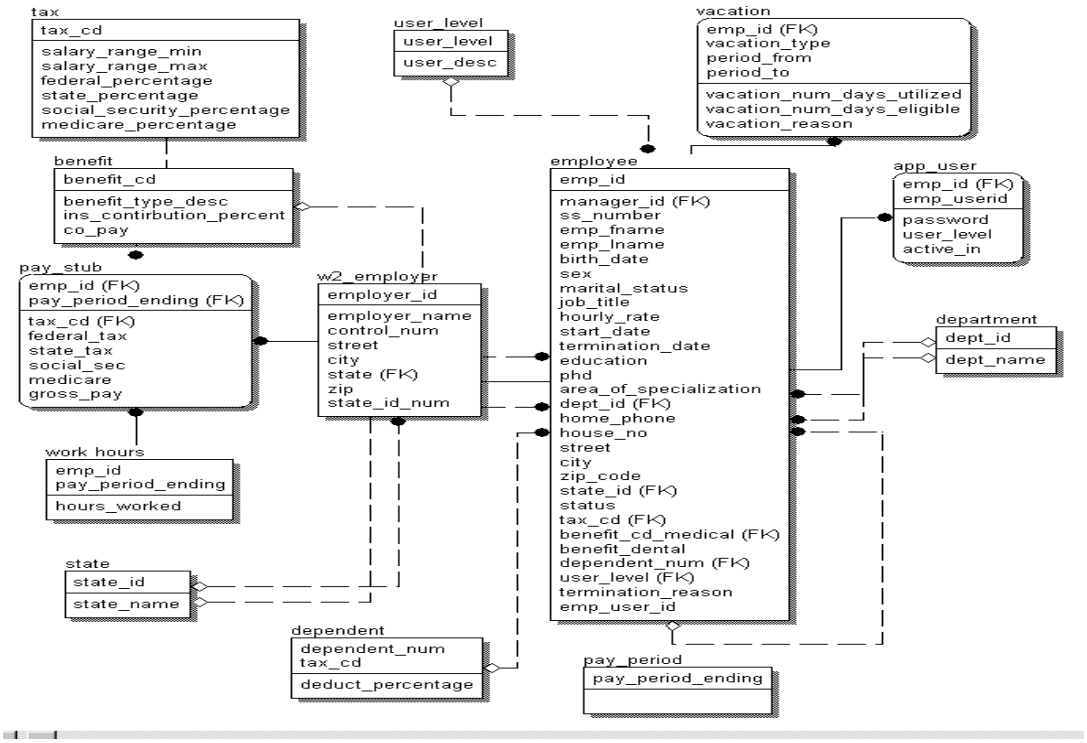

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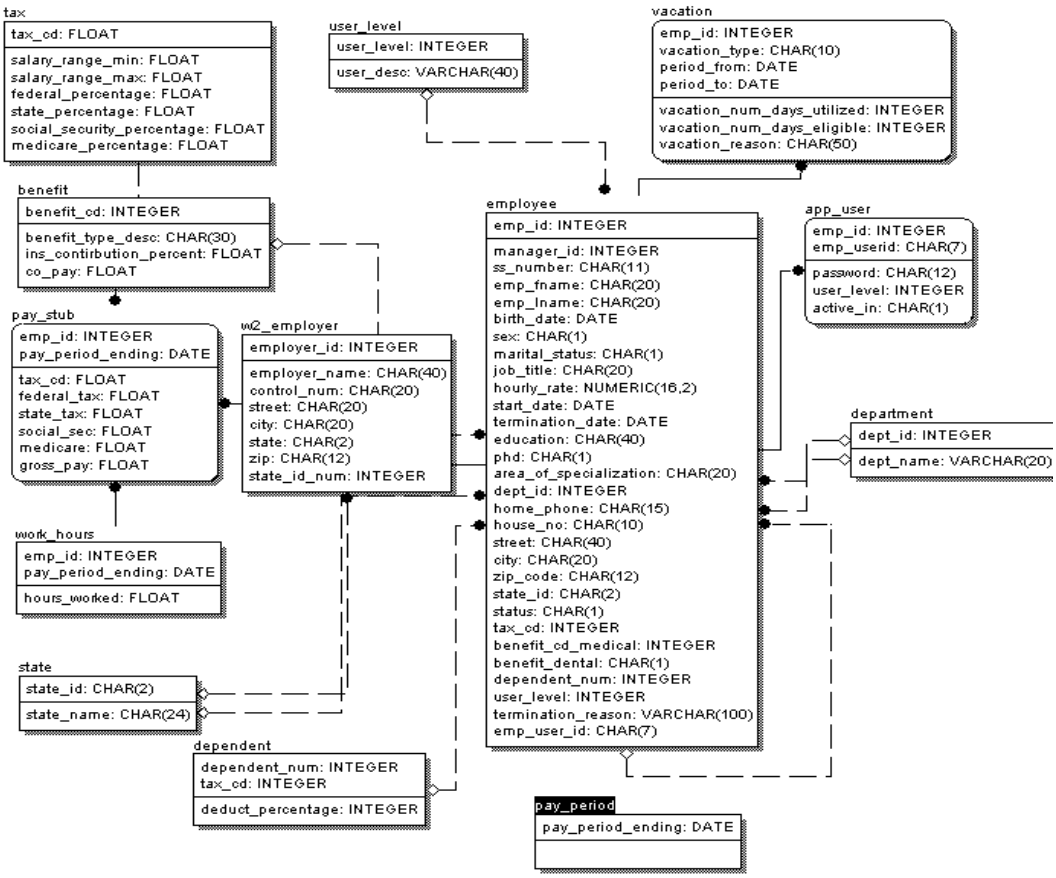

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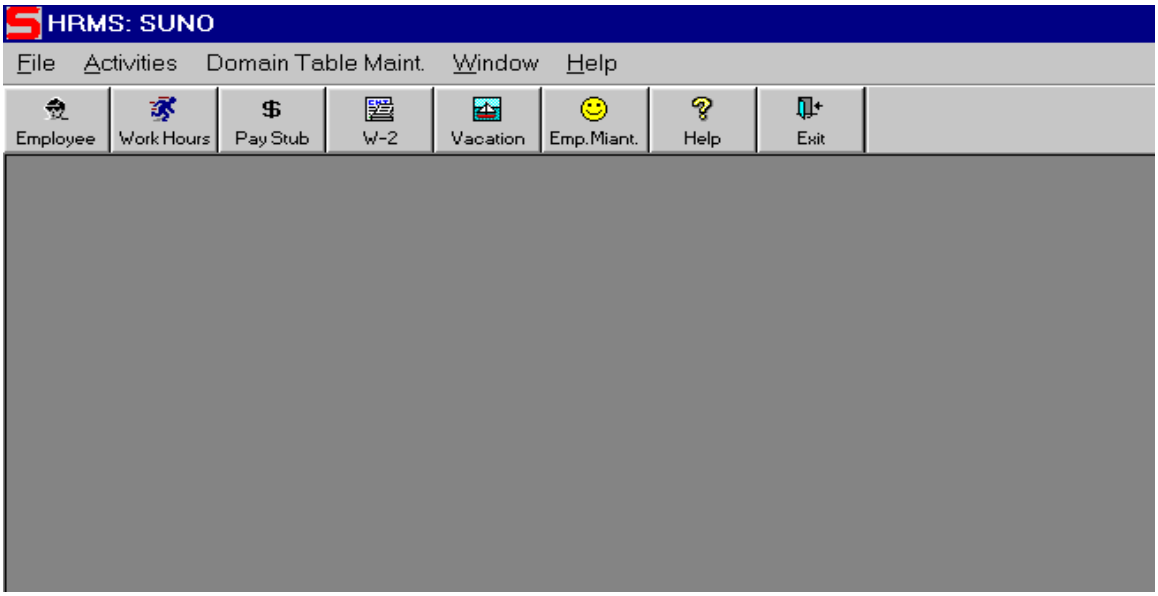

Figure 3. Main screen

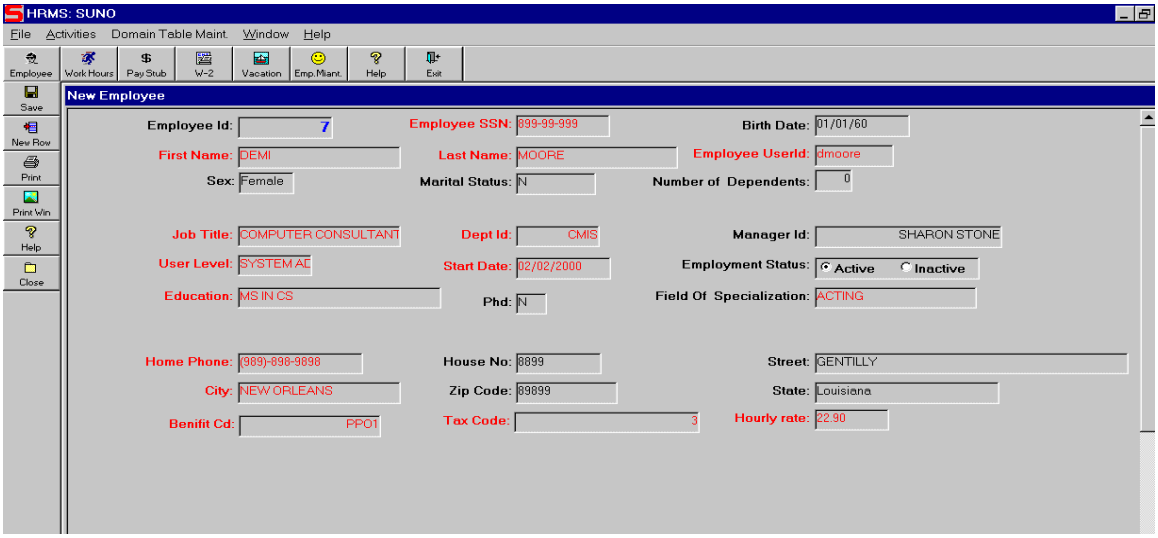

Figure 4. Employee module

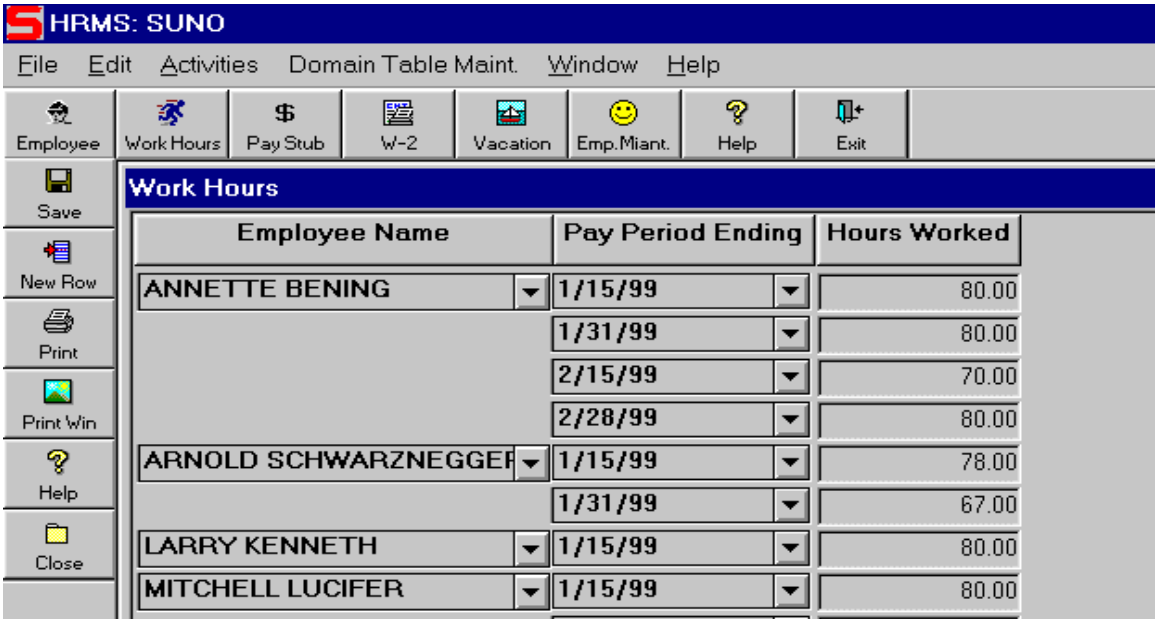

Figure 5. Work hours module

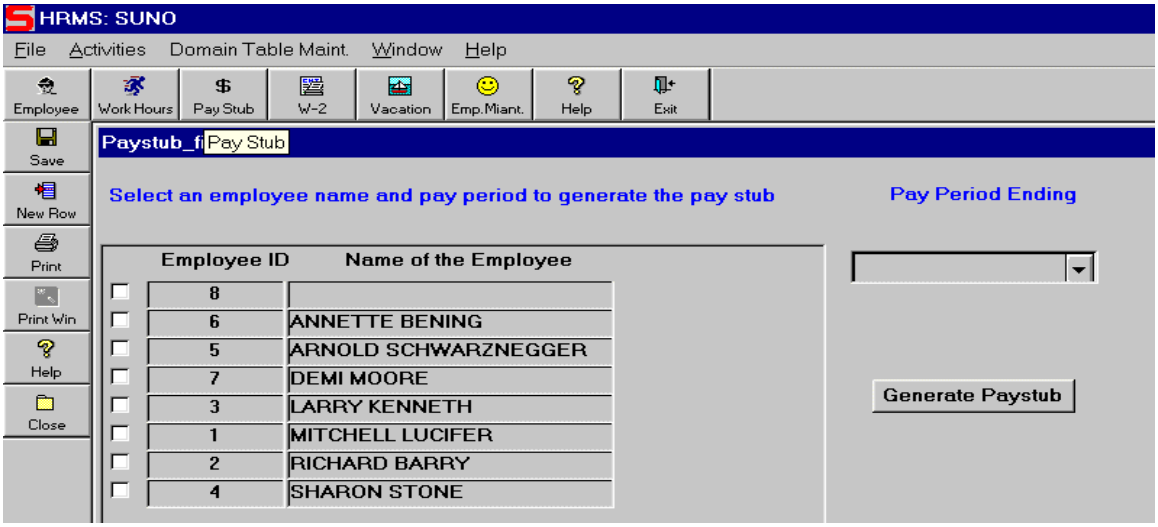

Figure 6. Pay-stub module

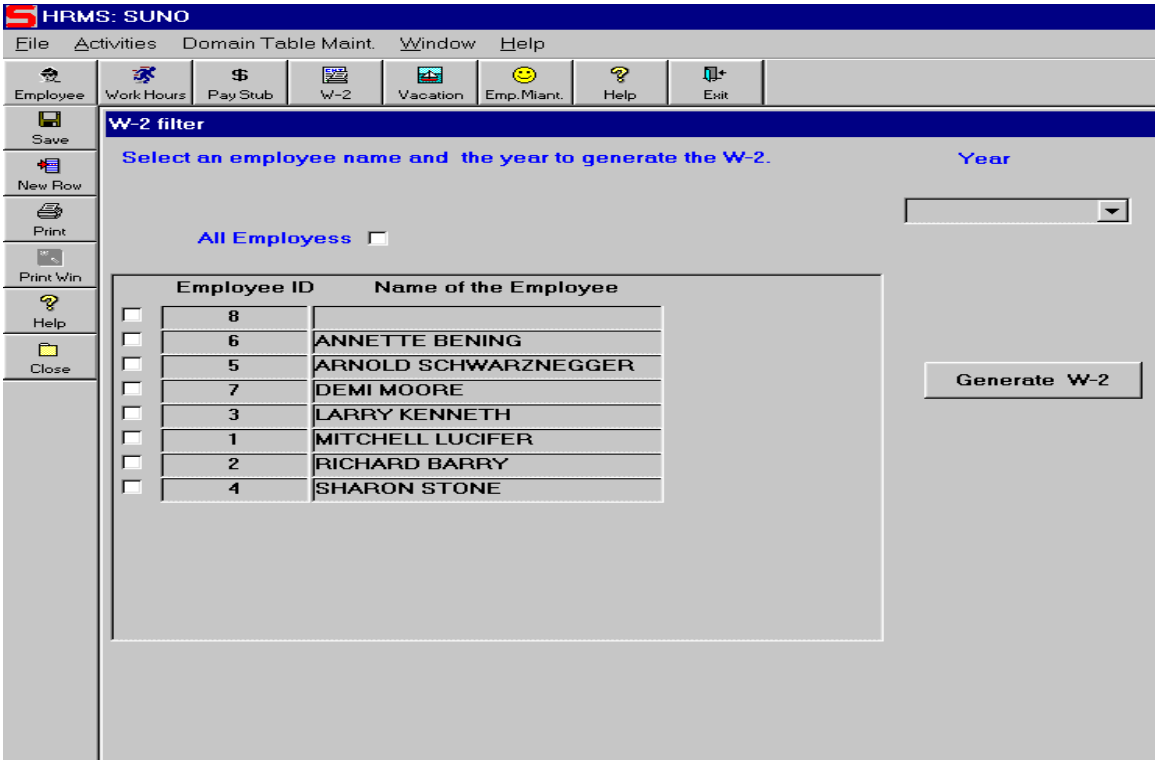

Figure 7. W2 filter module

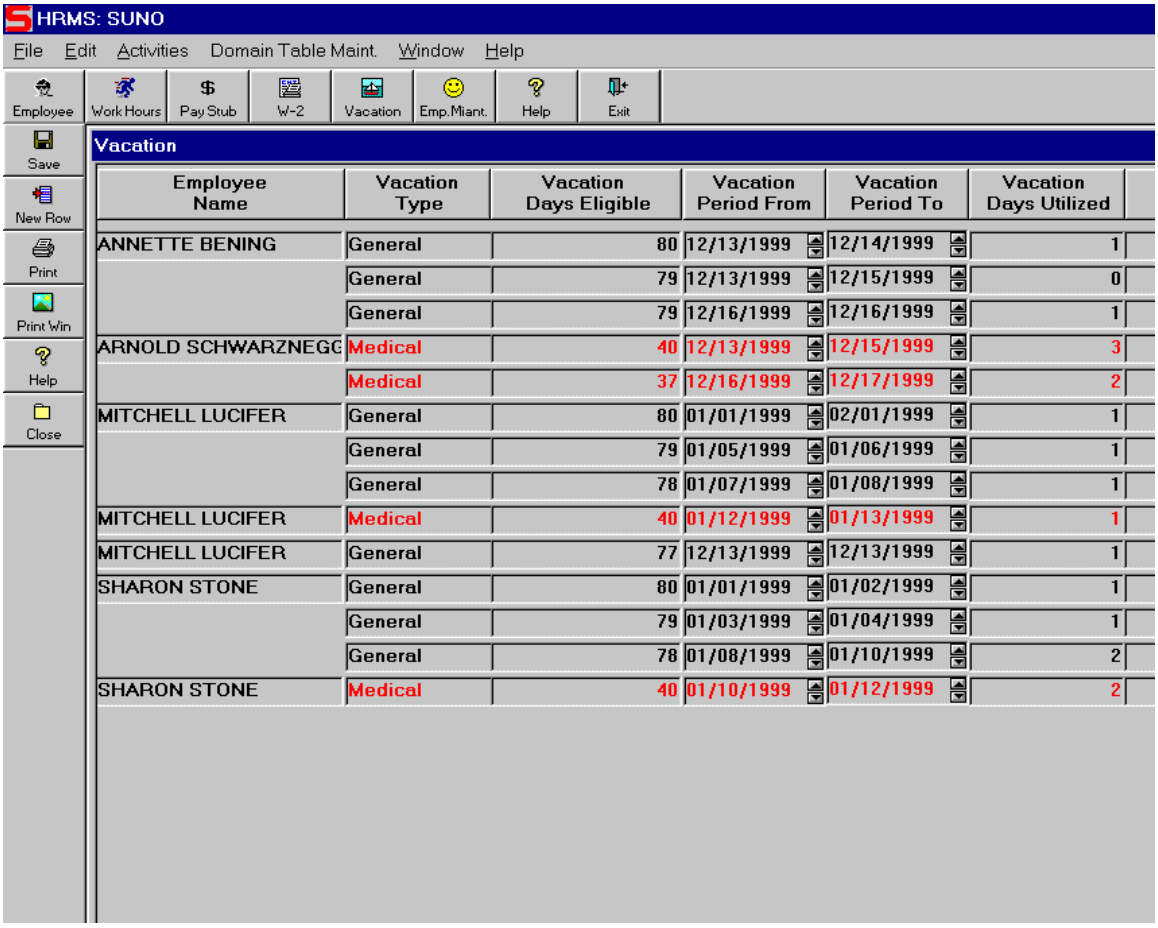

Figure 8. Vacation module