

# **Taylor's Landscape Pro: Lawn Care Management System**

**By**

**Brad W. Skoog**

Submitted to  
the Faculty of the Information Engineering Technology Program  
in Partial Fulfillment of the Requirements for  
the Degree of Bachelor of Science  
in Information Engineering Technology

University of Cincinnati  
College of Applied Science

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Brad W. Skoog

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Date

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Professor Tamisra Sanyal, Faculty Advisor

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## **Abstract**

*Taylor's Landscape Pro: Lawn Care Management System* is a program that was developed to help a professional landscaping company better organize and keep track of the businesses information, while giving the landscaping company a professional touch and look. Currently there are not many software options out there to specifically help landscaping companies to manage and keep track of their business. This cutting edge product was created with the latest software tools: Microsoft Visual Studio.NET with C# language and Microsoft Access Database. This product was created to make it easier for a landscaper to manage the business side of their company in an easy and organized professional manner. This program is user friendly and easy to pick up and learn. Taylor's Lawn Pro is able to keep track of all customer information such as their contact information, the services they request, and their history with landscaping company. The software is also able to keep track of the employee information, expenses the business has made, schedules for the business to follow, and create and print invoices.

# **Taylor's Landscape Pro: Lawn Care Management System**

## **1. Statement of the Problem**

This year, my stepfather, Tim, has decided to start building his own landscaping company by starting out relatively small, while keeping his normal full-time job. Through this past season his business has really taken off and he has acquired quite a few customers. His plan for future years is to be able to quit his regular job and dive full-time into his own business. By running this company full-time, he is going to keep acquiring more customers and will need some type of organization and professionalism in his business.

Tim's current method of billing is a handwritten document that is mailed out and filed away when returned. With a growing business, the amount of data to store and file away is going to become too much to handle and will create huge clutter. With a large number of customers, scheduling is going to grow more difficult as well. It is easy to remember which customers have been serviced when there are only five, but when there are 20 customers to service in a week, there is going to be a need to schedule both client information and work detail. It would also be great to understand and keep track of what expenses the landscaping business has, and when they are being expensed. This would also help in filing taxes. One last item to keep track of would be the maintenance of the equipment and vehicles for the company.

## **2. Description of the Solution**

My product is a user-friendly interface windows application written using C# language that will allow Tim to enter all of the information about customers, employees, schedules, expenses, create and view invoices, customer payments, and equipment and

store that information into a Microsoft Access backend database. Tim will easily be able to look up, enter, and modify any of the information to manage his business. This application will easily be installed onto his laptop, which has more than sufficient hardware to maintain and run the application. Installation of the application on a laptop will be very handy so that he can transport and call on all of the information at jobsites.

## **2.1 User Profile**

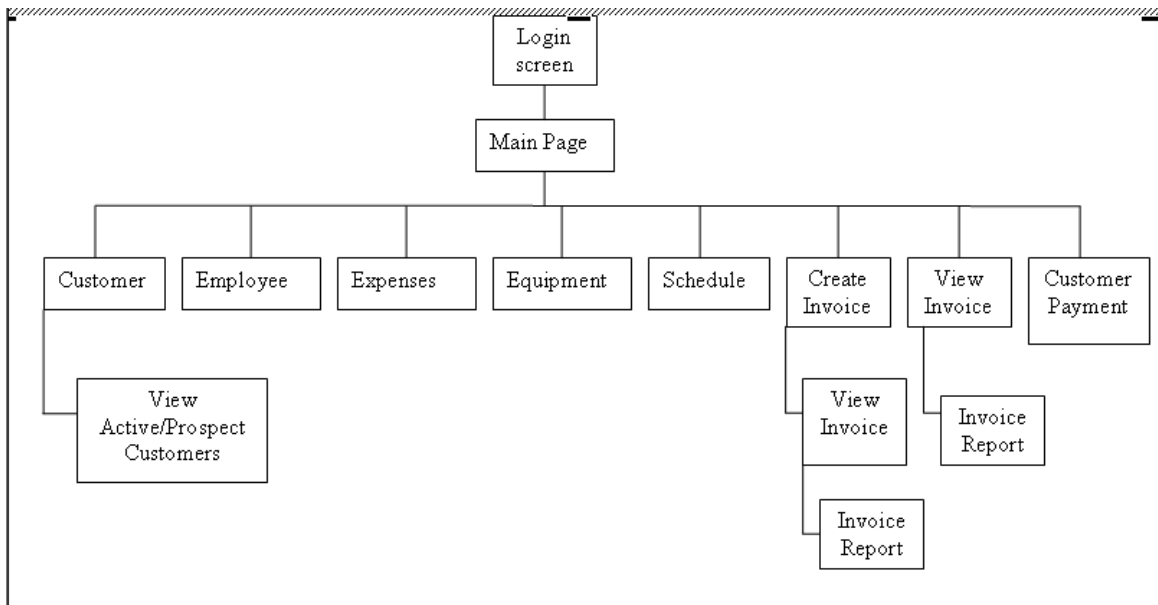
The intended user for this program would be my stepfather, Tim Prues, and possibly in the future, other lawn care companies seeking this sort of organized management. The user is expected to be familiar with basic computer knowledge and comfortable with using a computer. The user will also have to learn how to use the programs' many features that are being designed. However, with its user-friendly interface, learning these features can be self-taught.

## **2.2 Design Protocol**

The user interface was created using Microsoft Visual Studio.Net 2003 with the C# language. This product allows the developer to have complete control productivity, usability, and interactivity of the programs content. There are many tools built into Visual Studio that make it possible to control and code a very useful product. The Lawn Care Management System allows Tim to be able to navigate and use the application easily. The main window form of the application will get him to any part of the program that he needs to add to, modify, or create information. Any of the other window forms for expenses, equipment, schedules, and customers, etc. can be closed and returned to the main form. Examples provided below screen explanations list.

The database will be programmed and developed with Microsoft Access. This Microsoft tool is sufficient to run and store all of the information that is needed for the lawn care company. SQL Server is another database option, however it is quite costly and is more database than required to run the application. Microsoft Access is sufficient enough, but it also comes installed with most computers and is cost efficient.

The Lawn Care Management System has a logon screen that is validated for security with the database. After the logon, the application goes to the main page that allows the user to navigate to eight pages that will manage information for a particular area of the business such as customer contact information or creating an invoice. An outline of the Management System can be found below (See figure.).



**Figure 1 Lawn Care Management Outline**

The first page of the Management System is the logon screen. If the user a correct username and password they are directed to the main page of the application. If the user does not enter a correct username and password a message is displayed saying “Incorrect username or password”. In order for a new user to be created to use the Management

System a current administrator or manager must first login and create a profile under the employee page. In the employee page they will pick a username and password in order to login to the system. I will also ask for the employee/user: First Name, Last Name, City, State, Address, Zip Code, Employee Type, and Email address which it then stores to the Access Database.

The user can easily navigate through the entire Management System. From the main page of the application the user can click on a button for each of the management areas and then exit that page back to the main page of the application.

All pages contain the same color scheme, which is a Gainesboro background and black foreground for text. All of the buttons are silver background with a green foreground for text. Each page also contains a green exit button with black text located at the bottom of the page.

### **3. Deliverables**

1. An application that will manage the data (schedules, customer information, expenses, and maintenance records) for the landscaping company.
2. The user interface will be written and designed in C#, which allows simple use.
3. The interface will allow the user to enter the information and store it to the database.
4. Tim will have a secure login that is authenticated by the database.
5. Tim will be able to complete the following tasks:
  - Enter new customer information
  - Tell what services are provided for each customer
  - Print and store invoices for customers

- Manage payments made by customers
- Manage maintenance of equipment
- Make schedules for the week
- Manage the expenses for the company

#### 4. Design and Development

The next sections describe the projects timeline and overall budget with hardware and software.

##### 4.1 Timeline

The timeline listed in Table 4.1 below gives an accurate timeline for the items necessary to finish the Lawn Care Management System from Senior Design I through Senior Design III.

ID	Task Name	Start	Finish	2005								
				M	T	W	T	F	S	S	M	
1	Research	Fri 4/1/05	Fri 5/20/05									
2	Write Proposal	Mon 5/16/05	Fri 5/27/05									
3	Present Proposal	Mon 5/23/05	Mon 5/23/05									
4	Develop/Test Database	Mon 6/6/05	Mon 10/17/05									
5	Develop/Test Client Application	Mon 7/18/05	Fri 1/20/06									
6	Present Prototype	Mon 12/12/05	Mon 12/12/05									
7	Turn in final Design Freeze	Fri 10/28/05	Fri 10/28/05									
8	Complete Programming	Mon 12/26/05	Mon 2/13/06									
9	Compile Program	Fri 1/6/06	Fri 1/20/06									
10	Final Tests	Mon 1/2/06	Wed 3/1/06									
11	Present Completed Project	Fri 3/3/06	Mon 3/6/06									
12	Final Report	Mon 1/23/06	Mon 3/6/06									

Figure 2 Senior Design Sequence Timeline

##### 4.2 Budget

###### 4.2.1 Software requirements

1. Microsoft Office 2003 Pro (MS Access)
2. Visual Studio.NET 2003 Professional

3. McAfee Anti-Virus

#### 4.2.2 Hardware requirements

1. 864 Mhz laptop
2. 576 Mb RAM
3. 20 G hard drive

Item	Explanation	Cost
Microsoft Office 2003 Pro (MS Access)	Own	499.99
Visual Studio.NET 2003 Pro	Own	442.00
McAfee Anti-Virus	Own	40.00
864Mhz machine (minimum)	Own	599.00
756Mb RAM (minimum)	Own	200.00
20G HDD (minimum)	Own	65.00
<b>Actual Total:</b>		<b>\$1,845.99</b>
<b>My Total:</b>		<b>\$0.00</b>

**Figure 3 Budget Details**

#### 4.3 Technical Details

##### 4.3.1 Hardware

Tim already has a sufficient enough computer that will enable me to develop, run and support the program that is being developed. The machine is up to date enough that no upgrades or system requirements should affect him in the next several years. A sufficient laptop or hand held pocket pc would be a great investment in order to make the reasoning for the project a complete success (7). Throughout the process of

designing the Management System Tim and I have decided that the 864Mhz laptop that I have is going to be necessary to have for the business to take to the job sites in order to enter customer information, customer services and invoicing on site. By installing the application on the laptop as well as the home desktop, it will fully fit the use and the purpose for this project, which was to eliminate paper and pencil and create some good organization.

Desktop:

**Processor:** Intel 2.8Ghz hyperthreaded

**RAM:** 512MB PC3200

**Hard Drive:** 180Gb 7200rpm

**Graphics:** Radeon 7000

Other

Laptop: (2)

**Processor:** Intel 864Mhz

**RAM:** 576MB

**Hard Drive:** 20Gb 5200rpm

Pocket PC: (2)

#### **4.3.2 Software**

I plan on using Microsoft software in order to develop the database and client application. The database will be developed and stored with Microsoft Access because it is an easily manageable database and it is already installed on Tim's machine. I will be programming the client application using Microsoft Visual Studio.NET technologies with the C# language. The software and license fee can get

quite expensive to purchase, but through the University of Cincinnati students get Microsoft software for free. This is another reason for using the software that I chose.

*Microsoft Office* – I will use Microsoft Office for the access database program as a backend to the lawn care management product.

*Microsoft Visual Studio.NET* – I will use the .NET programming technology to write the front-end client application using the C# language.

*McAfee Anti-virus* – The computer will need some anti-virus program which is does not have currently and especially since it will have data that needs to be secure.

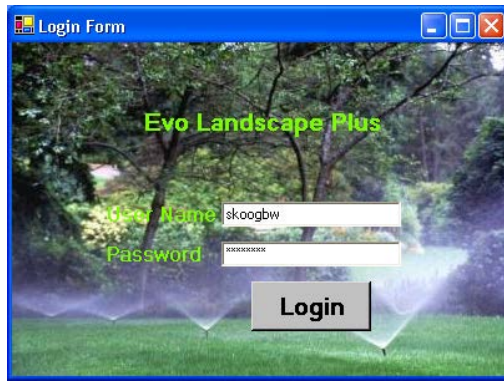
## **5. Proof of Design**

The next section shows in detail how the deliverables of the project were fulfilled and what challenges were encountered.

### **5.1 User Interface**

#### **5.1.1 Screen 1 – Log-in Screen**

This is the page that opens first when you run the program so that the user can log into the program with secure access to the company information. If the user inputs the correct information for username or password, it is authenticated by the database and access is granted to continue to the rest of the program. If the user incorrectly enters the username or password, an error message displayed “incorrect username or password has been entered!”



**Figure 4 Login Screen**

### 5.1.2 Screen 2 – Main Page

This screen is the main page for the program that provides access and navigates the user to all of the other pages necessary to manage the lawn care business. There are buttons located at the right of the screen that will direct the user to the Customer, Employee, Expense, Equipment, Schedule, and Invoice screens.



**Figure 5 Main Page**

### 5.1.3 Screen 3 – Customer

On this page the manager can enter customer information necessary for services, billing and contact information.

**Figure 6 Customer**

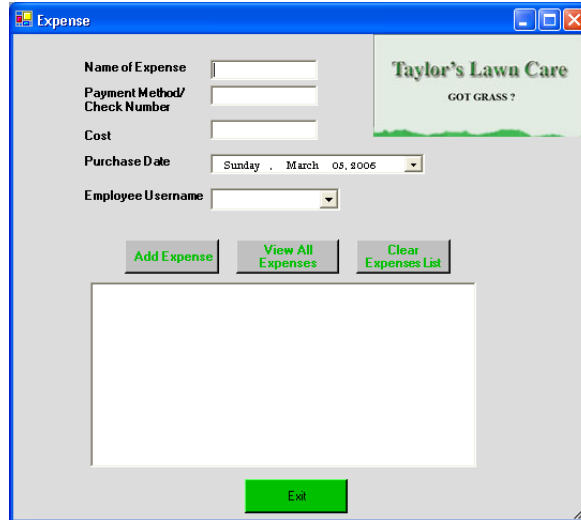
### 5.1.4 Screen 4 – Employee

On this page the manager can enter information about individual employees that might be necessary for payroll, taxes or username and password to use the management program.

**Figure 7 Employee**

### 5.1.5 Screen 5 – Expense

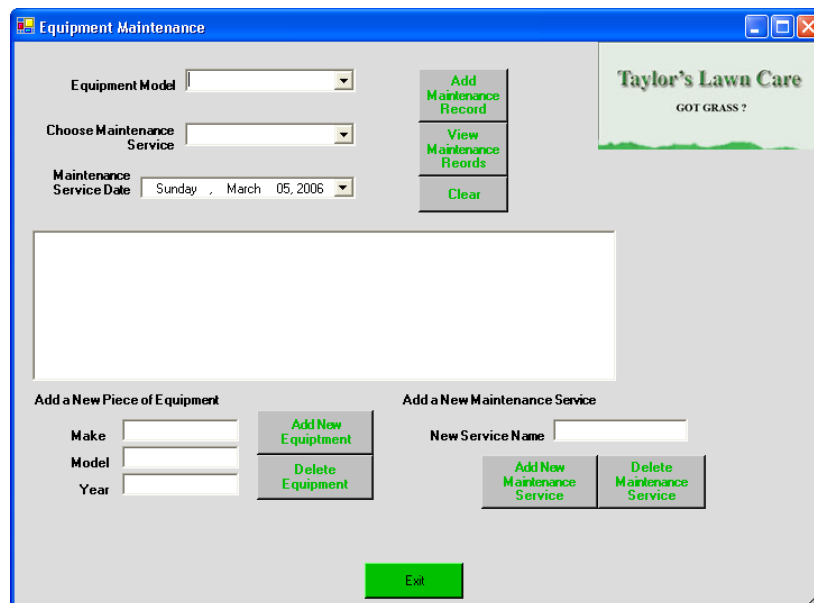
This screen will allow the user to enter and view any expenses that are paid for by the business.



**Figure 8 Expense**

### 5.1.6 Screen 6 – Equipment

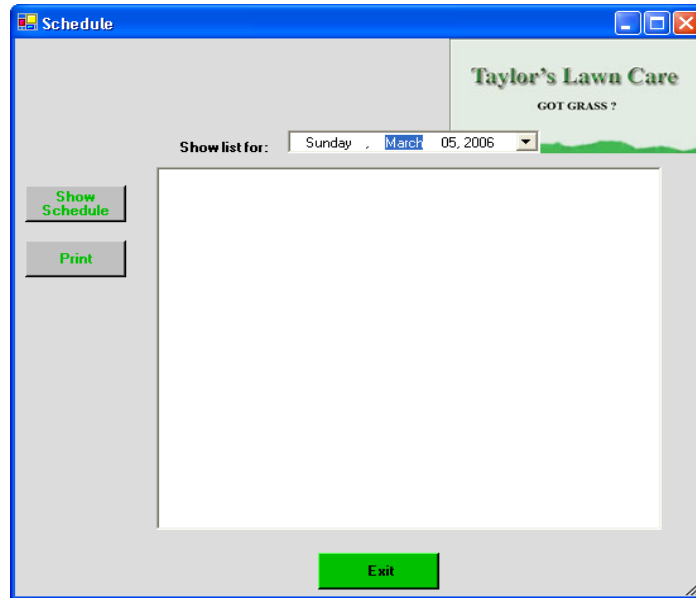
The equipment page allows the user to enter in new equipment and keep track of maintenance that was performed on equipment and vehicles.



**Figure 9 Equipment**

### 5.1.7 Screen 7 – Schedule

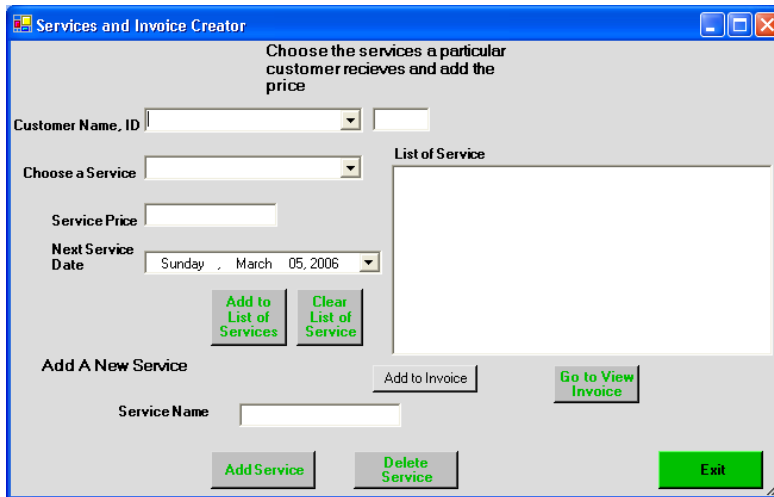
The schedule screen will allow the user to view and print a list of all customers that have not been services for the coming or current week.



**Figure 10 Schedule**

### 5.1.8 Screen 8 – Create Invoice

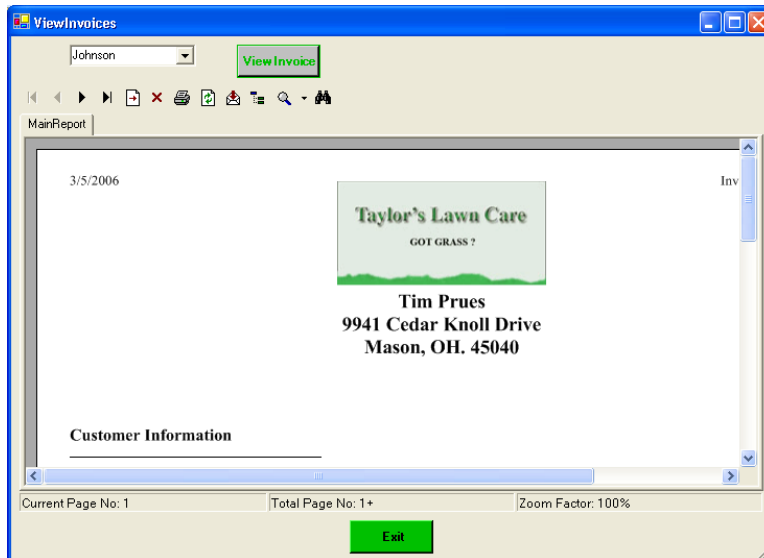
This screen will allow the user to create an invoice for a particular customer and view the information that was added to the invoice. This page will also allow the user to enter new services that the lawn care company offers as business grows. You are also able to navigate to the invoice viewer page to view an invoice for any particular customer.



**Figure 11 Create Invoice**

### 5.1.9 Screen 9 – View Invoices

The view invoice page allows the user to view an invoice for any particular customer. From this page you will also be able to print the invoice so that it can be mailed to that customer.



**Figure 12 View Invoices**

### 5.1.10 Screen 10 – Customer Payment

The customer payment page allows the user to enter the payment information for a customer after an invoice is received (See figure 5.10).

**Figure 13 Customer Payment**

### 5.2 Database

The Lawn Care Management Database is a fairly extensive database that was created to store all of the necessary information for the entire application. Below is an outline and diagram of the entire database and the necessary relationships (See figure 14).

<b>Customer</b>	<b>Employee</b>	<b>Expense</b>	<b>Equipment</b>
custID	EmployeeID	expenID	EquipmentID
custFirName	emplFirstName	employeeUserNa	eqptMake
custLastName	emplLastName	me	eqptModel
custType	emplTitle	expName	eqptYear
CustAddress	emplHireDate	expCost	
custCity	emplBirthday	expPurchaseDate	
custState	emplAddress	expPayMethod	
custZip	emplState		
custPhone	emplCity		

custEmail	emplZip emplPhone emplUserName emplPassword emplType		
<b>Maintenance</b> maintenanceID maintenanceName	<b>Maintenance Detail</b> MaintenanceDetailID eqptModel maintenanceName maintenanceDate	<b>Pay</b> paymentID payMethod checkNumber paidAmount paidInFull	<b>Invoice Detail</b> InvoiceDetailID custID custLastName ServiceName ServicePrice NextServiceDate
<b>Service</b> serviceID ServiceName			

**Figure 14 Database Design**

## 5.3 Database Relationships

The following table is a chart of the relationships that were formed in the database (See figure 6.2).

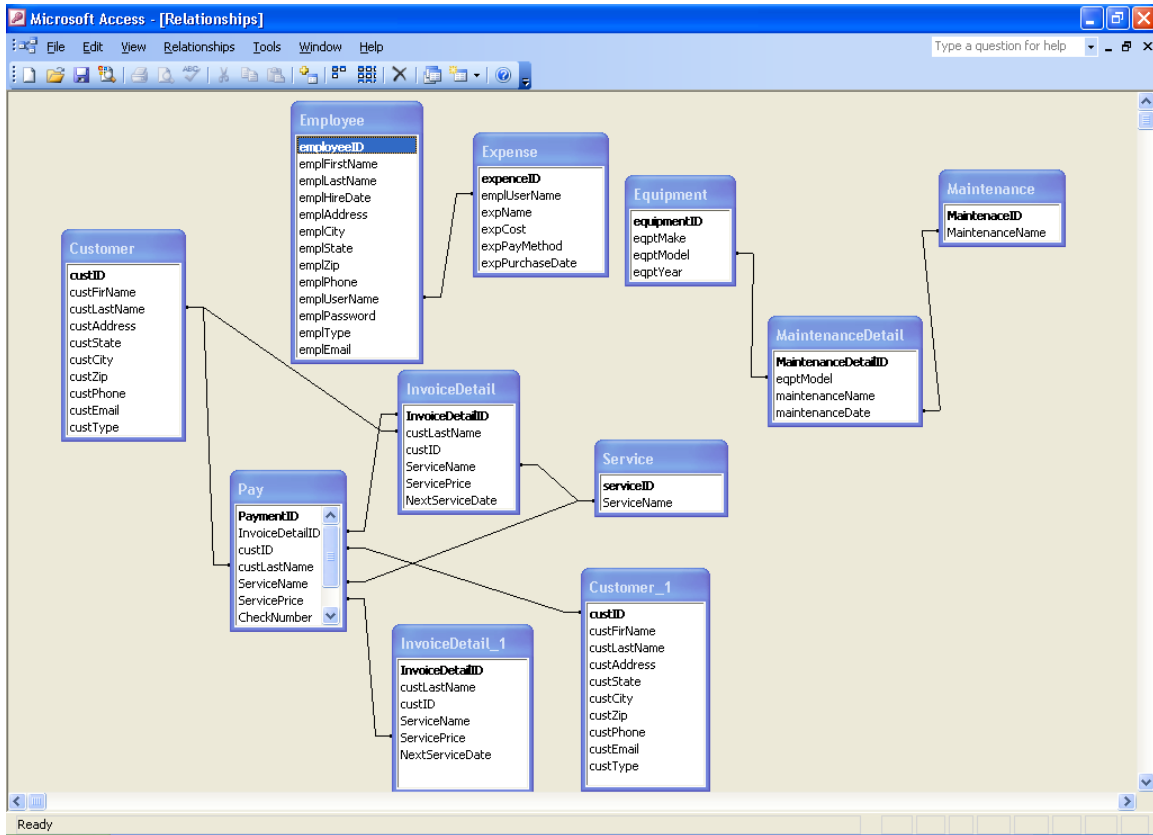


Figure 15 Database Relationships

## 6. Testing Procedures

There have been multiple forms of testing done to ensure that the Lawn Care Management System is a valid and reliable program. Testing is always done throughout the coding and design of the project to check for bugs. A former OCAS student as well as Tim Prues has also done testing. This testing made sure there are no bugs and the program works properly without errors. More importantly this test phase will guarantee that the design of the project does what it is supposed to do and that there are not necessary or unnecessary item that should be implemented or omitted from the program.

Tim and I took actual data and information that he had written down from previous business and put it in a real working scenario to fit all needs of managing the company to perform a final test.

## **7. Conclusion and Recommendations**

### **7.1 Conclusion**

This project was created for Tim Prues and his need for a more professional and organized system to manage his new landscaping company. I created a colorful design management system that fits every aspect and need in order to adequately keep track of his business. This product is user-friendly and easy to follow and use. To prepare the project I used Microsoft Visual Studio.NET and Microsoft Access Database. This project was created, developed and implemented over the course of a three quarter Senior Design sequence. The budget for a real world scenario that would need to purchase everything to implement this system would be approximately \$1,800.00. The project fulfilled all of my design freeze deliverables. Testing was done to ensure the project usability.

### **7.2 Recommendations**

While working on this project I encountered quite a few challenges. A solid understanding of crystal reports is recommended before starting this project. The crystal report is a tool built into Visual Studio.Net that is used to make various types of reports. The type of report I used in the project was an invoice for billing. When the user creates an invoice the crystal report tool will add all of the necessary information to a report document that the developer creates and organizes to look like an invoice. The difficult part of crystal reports that I ran into was getting the dataset to fill the data from the

database to the crystal report. There are various books and inline tools available to help guide the process of crystal reports. I had previously taken a class on C# which the Management System program was written and we completed a crystal report project. I used that example and book from the class *The C# Bible (1)* as well as Professor Schlemmer for a reference to get through that task.

Another area of confusion was when coding the connection to the database. It is necessary from there to be code in order call data from the database. The way I was familiar to connect to the database was to use a dataAdapter that has a built in wizard in which you form your connection string there. Latter I found it more useful to actually code the connection because you have to include a connection string, which includes the location of the database. If that location to the database ever changes then it will not find the database. This would cause many problems such as not finding the database to check the username and password during the login as well as many other problems. I would recommend taking a look at code examples from the web site [www.thecodeproject.com](http://www.thecodeproject.com). (See Appendix C 1 for code snippets example of the connection string).

## **Appendix A**

### **Research Information**

During my research I found many different tools to help me get through the various parts of the Management system. I did much research in order to see if there were any programs out there that did what I was looking to do and was specific for lawn care management. Through most of my findings there were a few business management software packages available, however, none of those were specific for lawn care. They included too many tools that were irrelevant and not enough tools that were relevant for lawn care management. I did come across one software package that did exactly what I was looking for Lawn Pro [www.lawnprosoftware.com](http://www.lawnprosoftware.com) (4). I used this software in my initial stages of planning and designing for ideas to guide me through the process. I also got ideas from talking to landscapers (10) and Tim Prues (5) to find what was needed to incorporate into the management system.



# Appendix C

## Code Snippets

### C 1. Login Page Code Snippet

This code snippet shows the Visual Studio.Net C# code for the login screen that will allow the program to connect to the Microsoft Access database and check the username and password for the employee.

```
private void LoginBtn_Click(object sender, System.EventArgs e)
{
    string strSQL = "select emplType, emplUserName,
emplPassword from Employee where ([emplUserName] = '" + textBox1.Text +
"' and [emplPassword] = '" + textBox2.Text + "')";
    string strConn =
@"Provider=Microsoft.Jet.OLEDB.4.0;Data Source=E:\Senior Design
III\TaylorsLawnCare\bin\Debug\TaylorLawnCare.mdb";
    string date = "'" + DateTime.Now.Month.ToString() +
"/" + DateTime.Now.Day.ToString() + "/" +
DateTime.Now.Year.ToString() + " " + DateTime.Now.ToShortTimeString() +
"';

    OleDbConnection conn = new OleDbConnection(strConn);
    conn.Open();

    OleDbCommand cmd = new OleDbCommand(strSQL,conn);

    OleDbDataReader rdr;
    rdr = cmd.ExecuteReader();
    if (rdr.HasRows)
    {
        rdr.Read();
        string strLoginName = rdr[1].ToString();
        string emplType = rdr[0].ToString();

        if(emplType.Equals("Manager"))
        {
            EvoLandscape frm = new EvoLandscape(this,
strLoginName);

            frm.Show();
            this.Visible = false;

        }
        else if (emplType.Equals("Administrator"))
        {
            EvoLandscape frm = new EvoLandscape(this,
strLoginName);

            frm.Show();
            this.Visible = false;
        }
    }
}
```

```

        }
    }
    else
        MessageBox.Show("Login failed!");
    rdr.Close();
    conn.Close();
}

```

## C 2. Crystal Report Code Snippet

This code snippet shows the Visual Studio.Net C# code for the crystal report. It will allow the dataSet to fill the data by the select statement to the crystal report for the invoice.

```

DataSet ds;
private void ViewInvoices_Load(object sender, System.EventArgs e)
{
    OleDbConnection conn = new
OleDbConnection(@"provider=Microsoft.Jet.OleDb.4.0;Data
Source=E:\Senior Design
III\TaylorsLawnCare\bin\Debug\TaylorLawnCare.mdb");
    OleDbDataAdapter da = new OleDbDataAdapter("select
custID, custLastName from customer", conn);
ds = new DataSet();
da.Fill(ds, "Lastnames");
comboBox1.DataSource = ds.Tables["Lastnames"];
comboBox1.DisplayMember = "custLastName";
comboBox1.ValueMember = "custID";
}

private void button1_Click(object sender, System.EventArgs e)
{
    string temp = "SELECT Customer.custAddress, Customer.custCity,
Customer.custFirName, Customer.custID, Customer.custLastName,
Customer.custState, Customer.custZip, InvoiceDetail.InvoiceDetailID,
InvoiceDetail.NextServiceDate, InvoiceDetail.ServicePrice,
InvoiceDetail.ServiceName FROM (Customer INNER JOIN InvoiceDetail ON
Customer.custID = InvoiceDetail.custID)";
    OleDbDataAdapter1.SelectCommand.CommandText = temp + " where
Customer.custID = " + comboBox1.SelectedValue;
    InvoiceDS invoicesDS1 = new InvoiceDS();

    invoiceDS1.Clear();
    OleDbDataAdapter1.Fill(invoiceDS1);
    CrystalReport1 rpt = new CrystalReport1();
    rpt.SetDataSource(invoiceDS1);
    crystalReportViewer1.ReportSource = rpt;
    crystalReportViewer1.Visible = true;
}

```

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