Practical Lecture 3
Building an Admin GUI

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Practical Session Structure

1. Introduction
2. Building a business component
3. **Building an admin GUI**
4. Introducing .NET remoting
5. Creating a web service and client website
6. Developing a Java client

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Overview

- In order to start this session, you need to have completed all of the practical lecture 2
- In this lecture we will implement a graphical user interface (GUI) that provides admin functionality to a project supervisor, making use of the business component built previously

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Learning Objectives

- Create a graphical user interface
- Make use of an existing business component deployed as a DLL

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Introduction

- In this practical session we will:
  - Implement a GUI application to test the business component developed in the previous practical lecture
  - Make use of a number of GUI controls (widgets) to build the application
  - Use the façade class for the Admin role in order to extract/insert data into the database

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Creating the Project

- We will create the Admin GUI as a *Windows Application* in a new solution
- Open Visual Studio 2005
- Go to *File -> New Project*
- Select *Visual C#* as the project type and then select *Windows Application* as the template
- Name the project *AdminApplication* and save it in a suitable location

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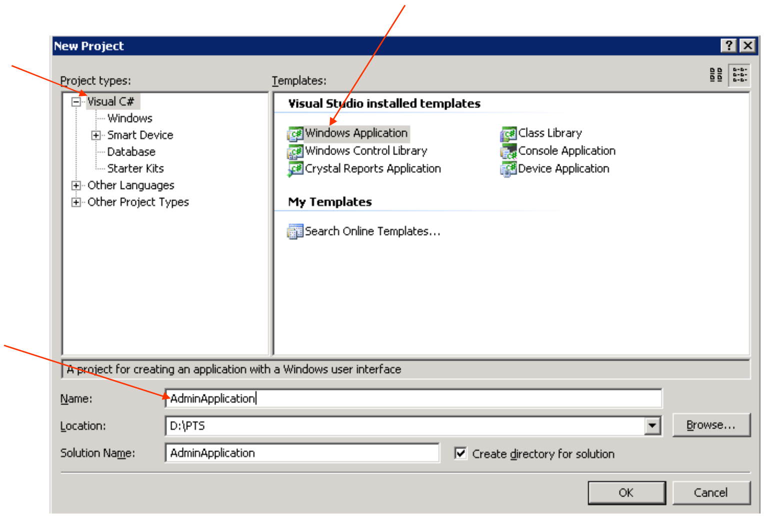
Creating the Project /2



New Project

Project types:

- Visual C#
  - Windows
  - Smart Device
  - Database
  - Starter Kits
- Other Languages
- Other Project Types

Templates:

Visual Studio installed templates

Windows Application	Class Library
Windows Control Library	Console Application
Crystal Reports Application	Device Application

My Templates

Search Online Templates...

A project for creating an application with a Windows user interface

Name: AdminApplication

Location: D:\PTS

Solution Name: AdminApplication

[✓] Create directory for solution

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Administrator Role

- We need to build a user interface to support the administrator's functionality:
  - setting up the project
  - dividing the project into tasks
  - assign tasks to teams
  - create new teams if necessary
  - update any changes to the project
  - track overall project progress

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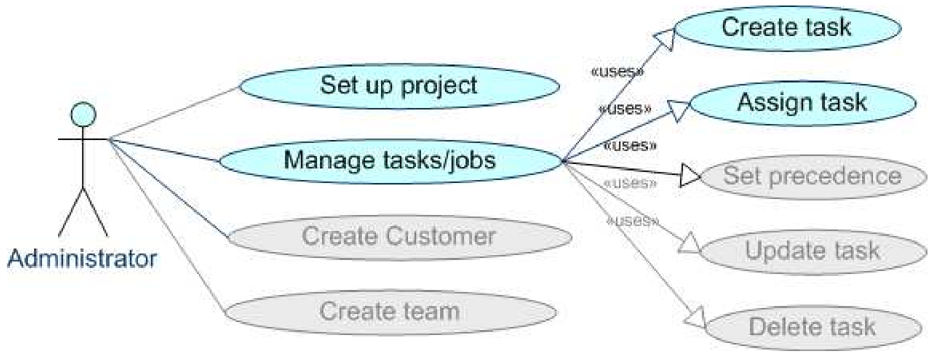
What are we building?



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What are we building?

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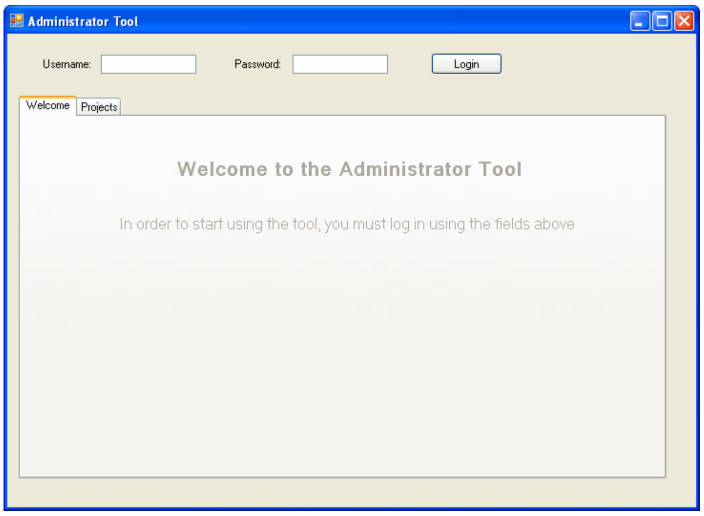
What are we building?



Administrator Tool

Username:

Password:

Login

Welcome | Projects

Welcome to the Administrator Tool

In order to start using the tool, you must log in using the fields above

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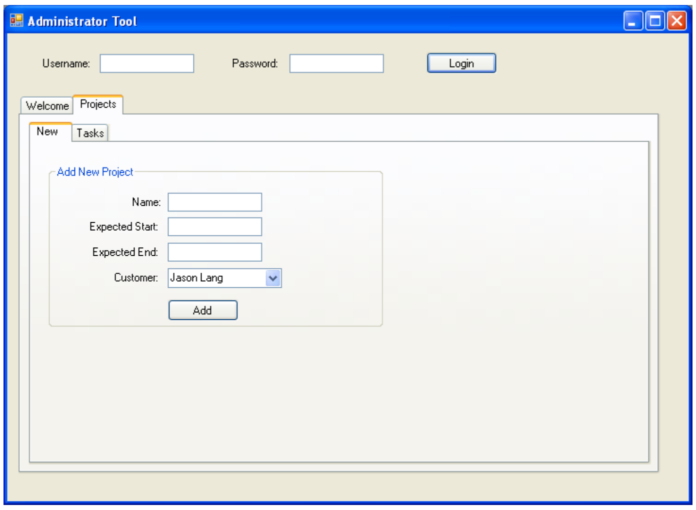
What are we building?



Administrator Tool

Username:

Password:

Login

Welcome | Projects

New | Tasks

Add New Project

Name:

Expected Start:

Expected End:

Customer: Jason Lang

Add

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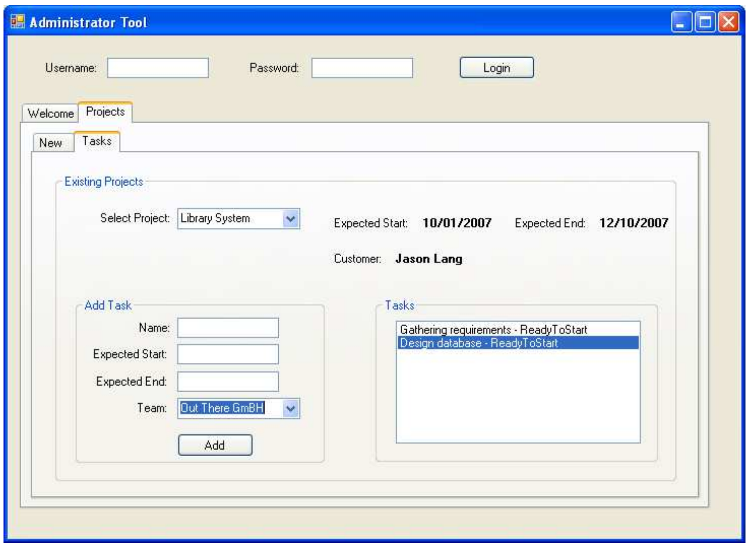
What are we building?



Expected Start: 10/01/2007 Expected End: 12/10/2007

Customer: Jason Lang

Gathering requirements - ReadyToStart
Design database - ReadyToStart

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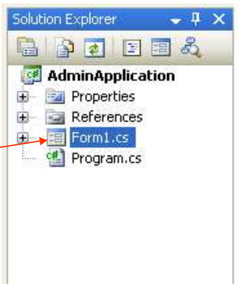
frmAdmin

- By creating a windows application, Visual Studio will automatically create a windows form
- Right-click and rename it to frmAdmin.cs



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Partial Classes

- When creating forms in Visual Studio 2005, it will create two files for each form
- Separation of logic and user interface design and layout code
- When you add controls to a form the code for positioning, customising, adding events, etc. will be placed in a xxx.Designer.cs file
- Thus, the code for the logic is not cluttered

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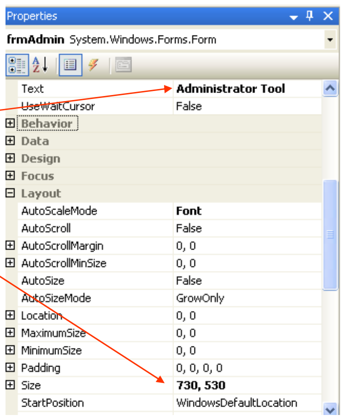
Form Properties

- In the properties of the form:
  - Change "Text" to *Administrator Tool*
  - Resize the form to 730 by 530



frmAdmin System.Windows.Forms.Form

Text	**Administrator Tool**
UseWaitCursor	False
⊞ Behavior	
⊞ Data	
⊞ Design	
⊞ Focus	
⊟ Layout	
AutoScaleMode	**Font**
AutoScroll	False
⊞ AutoScrollMargin	0, 0
⊞ AutoScrollMinSize	0, 0
AutoSize	False
AutoSizeMode	GrowOnly
⊞ Location	0, 0
⊞ MaximumSize	0, 0
⊞ MinimumSize	0, 0
⊞ Padding	0, 0, 0, 0
⊞ Size	**730, 530**
StartPosition	WindowsDefaultLocation

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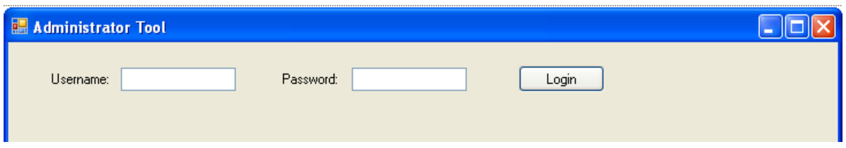
Controls for Login

- Add 2 textboxes and change the Properties (from the Toolbox pane):
  - Name: txtUsername, txtPassword
- Add associated labels to each textbox with the text set to Username and Password.
- Add a button named btnLogin and Text set to Login



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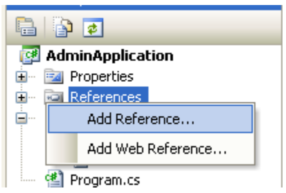
Using the PTSLibrary

- The admin tool user interface we are building will need to communicate with the PTSLibrary
  - For this we need to add the PTSLibrary component as a reference to our project
  - Right-click on *References* in the Solution Explorer and then select *Add Reference…*



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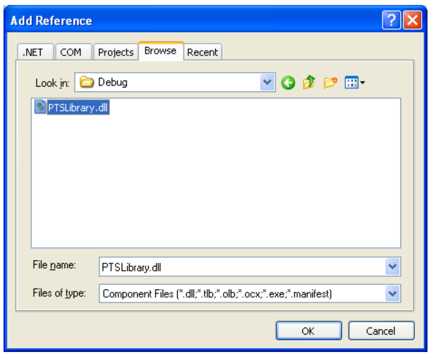
Adding a Reference

- On the Add Reference dialog select the *Browse* tab and browse to the PTSLibrary project (subfolder PTSLibrary > bin > Debug) and add the PTSLibrary.dll as a reference

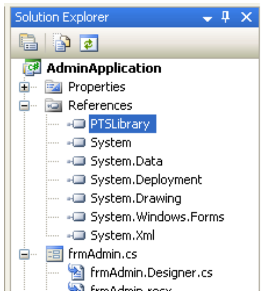


Look in: Debug

PTSLibrary.dll

File name: PTSLibrary.dll

Files of type: Component Files (*.dll;*.tlb;*.olb;*.ocx;*.exe;*.manifest)



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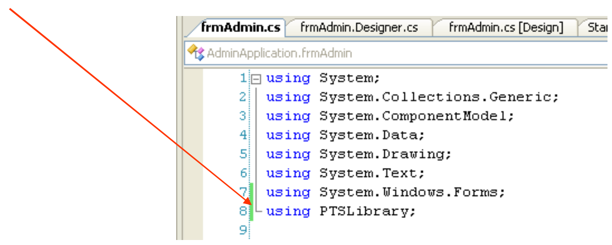
Adding a Reference /2

- By adding a reference to the PTSLibrary, we provide our project with visibility of our component
  – But in order to make calls on the PTSAdminFacade from the code in our frmAdmin form, we still need to add a using directive



```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using PTSLibrary;
```

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Using a Component in a Different Namespace

- Calls are made from our admin tool (AdminApplication namespace) to our business component (PTSLibrary namespace)
  - Visibility needs to be considered
    - Classes in PTSLibrary were created with default visibility
    - All classes that will need to be accessed externally will need to be made public (including classes used as return types)

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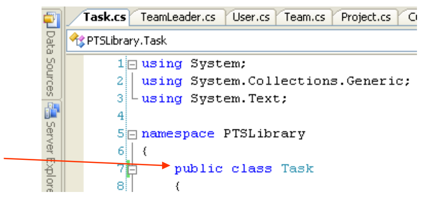
Making Classes Public

- Open the PTSLibrary project created in the previous session and change the visibility of the following classes to *public:*
  - PTSSuperFacade
  - PTSAdminFacade
  - PTSCustomerFacade
  - PTSClientFacade
  - Customer
  - Project
  - User
  - Team
  - TeamLeader
  - Task
  - PTSSuperDAO



```
using System;
using System.Collections.Generic;
using System.Text;

namespace PTSLibrary
{
    public class Task
    {
```

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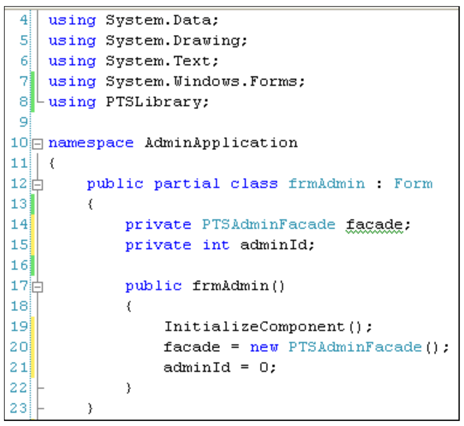
Instantiating Façade

- Open the code of the frmAdmin file and add code to declare/instantiate an object of PTSAdminFacade and an integer called adminId



```
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using PTSLibrary;

namespace AdminApplication
{
    public partial class frmAdmin : Form
    {
        private PTSAdminFacade facade;
        private int adminId;

        public frmAdmin()
        {
            InitializeComponent();
            facade = new PTSAdminFacade();
            adminId = 0;
        }
    }
```

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Adding Event Handling

- Visual Studio makes it easy to add event handling code
- To add code that is executed when the btnLogin button is clicked, just double click on the button on the designer
  - An event handler is automatically attached
  - Skeleton code is created for a handling method

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Login Code

- Add code to the skeleton method to take the details from the text fields and attempt authentication on PTSLibrary

Extracts the text from the text field

```
private void btnLogin_Click(object sender, EventArgs e)
{
    try
    {
        adminId = facade.Authenticate(this.txtUsername.Text, this.txtPassword.Text);
        if (adminId != 0)
        {
            this.txtUsername.Text = "";
            this.txtPassword.Text = "";
            MessageBox.Show("Successfully logged in");
        }
        else
        {
            MessageBox.Show("Wrong login details");
        }

    }
    catch (Exception ex)
    {
        MessageBox.Show(ex.Message);
    }
}
```

Displays a popup

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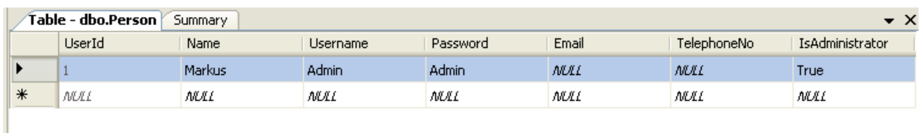
Add Administrator to DB

- In order to test the login, we will need to add an administrator to our database
  - Ensure that SQL Server is running
  - Open your database
  - Open the Person table and add an administrator (make sure *IsAdministrator* is set to true)



	UserId	Name	Username	Password	Email	TelephoneNo	IsAdministrator
▶	1	Markus	Admin	Admin	NULL	NULL	True
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

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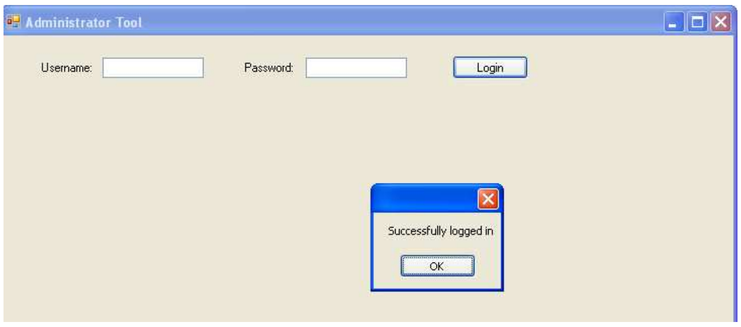
Test Login

- Run the form by clicking on ▶ , selecting *Start Debugging* from the *Debug* menu or press F5
  – If all goes well, you should see a popup as shown below, if not you need to find and correct the problem



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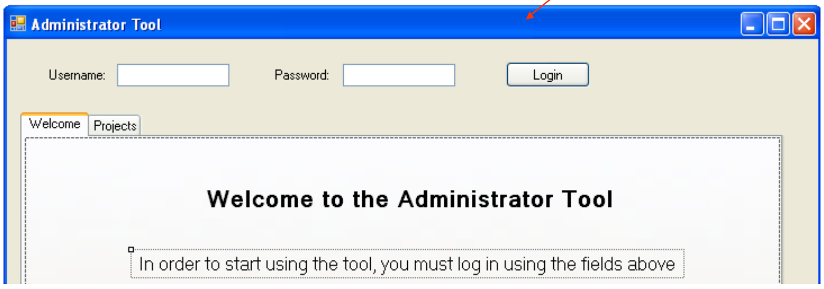
Add a TabControl

- Drag a TabControl from the Toolbox onto the form and change the text on the tab pages to *Welcome* and *Projects*
- Add two labels to the first tab page

Should now look like this



Welcome to the Administrator Tool

In order to start using the tool, you must log in using the fields above

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Add Another Tab Control

- On the second tab page (Projects), add another tab control with two tabs (*New* and *Tasks*)
- On the first page of the second tab control add:
  - 1 GroupBox
  - 4 Labels
  - 3 TextBoxes (txtProjectName, txtProjectStart, txtProjectEnd)
  - 1 ComboBox (cbCustomer)
  - 1 Button (btnAddProject)
- Have a look at the next slide to see what it should look like when you're finished

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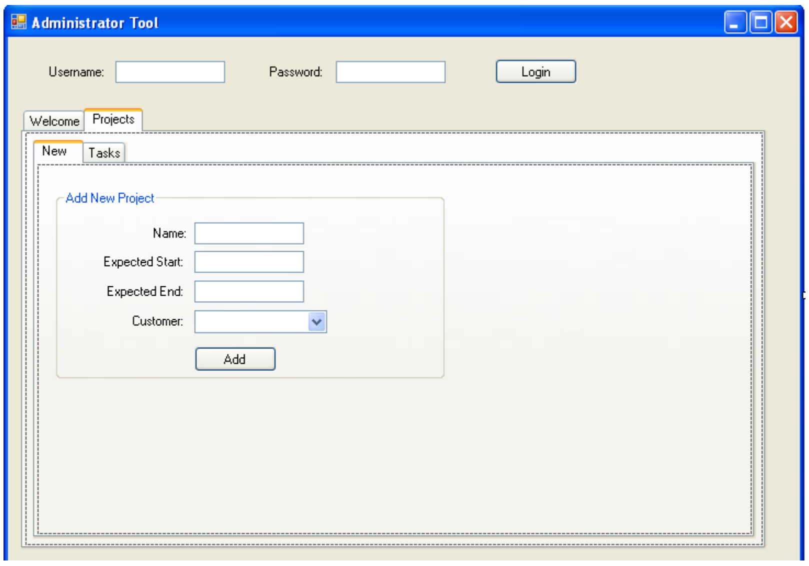
Add Another Tab Control /2



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Adding More Controls

- Go to the second tab of the second tab control (Tasks) and add:
  - 3 GroupBoxes
  - 8 Labels - normal
  - 3 Labels – set to bold (lblStartDate, lblEndDate, lblCustomer)
  - 3 TextBoxes (txtTaskName, txtTaskStart, txtTaskEnd)
  - 2 ComboBoxes (cbProjects, cbTeams)
  - 1 Button (btnAddTask)
  - 1 ListBox (lbTasks)

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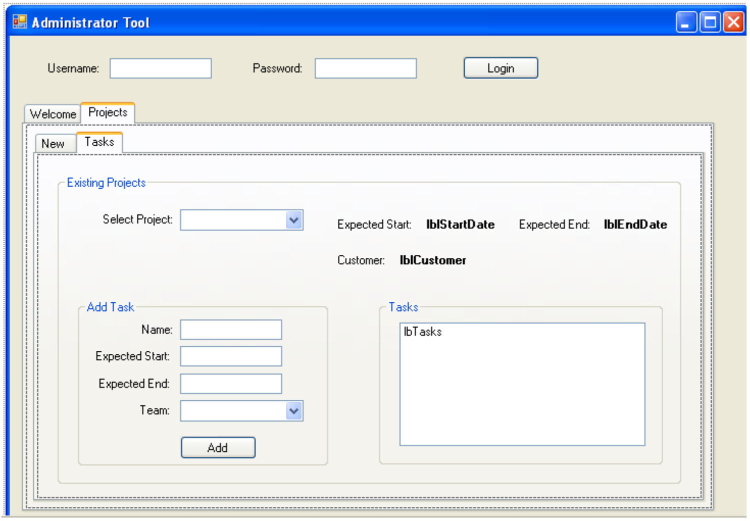
Adding More Controls /2

- Your form should now look like this:



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Restricting Access

- When a user starts the application, we want to restrict access to anything on the second page of the first tab control until he/she has logged in successfully
- Select the *tabControl1* and set its *Enabled* property to *False*
- If you run the application now, you will see that the tab control is greyed out

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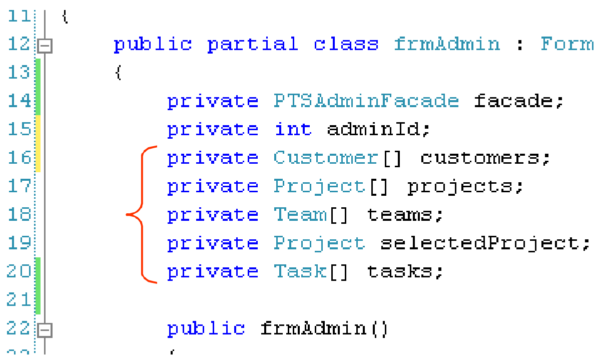
Add Required Variables

- Declare the variables that will be needed in our tool:



```
{
    public partial class frmAdmin : Form
    {
        private PTSAdminFacade facade;
        private int adminId;
        private Customer[] customers;
        private Project[] projects;
        private Team[] teams;
        private Project selectedProject;
        private Task[] tasks;

        public frmAdmin()
        {
```

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Adjust Login Code

- Add code to the *btnLogin_Click* method to ensure that the tab control is enabled and user taken to the next tab on successful login

```
private void btnLogin_Click(object sender, EventArgs e)
{
    try
    {
        adminId = facade.Authenticate(this.txtUsername.Text, this.t
        if (adminId != 0)
        {
            this.txtUsername.Text = "";
            this.txtPassword.Text = "";
            MessageBox.Show("Successfully logged in");
            tabControl1.SelectTab(1);
            tabControl1.Enabled = true;
        }
        else
        {
            tabControl1.SelectTab(0);
            tabControl1.Enabled = false;
            MessageBox.Show("Wrong login details");
        }

    }
```

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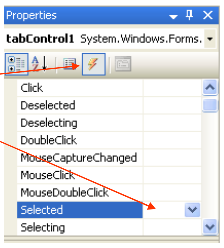
Load Customers

- When the *Projects* tab of *tabControl1* is selected, the customers should be loaded into the *cbCustomer* combo box
  - Need to add a method to react to the event of the control being selected
    - Select tabControl1
    - Go to the properties
    - Change to Events
    - Double-click in the field next to *Selected*
    - Skeleton method is automatically created



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Load Customers /2

- If the second page is selected, the customers will be obtained from the façade and the combo box is populated
- Add the following code to the *tabControl1_Selected* method:

Call to the PTSLibrary

```
private void tabControl1_Selected(object sender, TabControlEventArgs e)
{
    if (tabControl1.SelectedIndex == 1)
    {
        customers = facade.GetListOfCustomers();
        cbCustomer.DataSource = customers;
        cbCustomer.DisplayMember = "Name";
        cbCustomer.ValueMember = "id";
    }
}
```

Note how the combo box is bound to an array

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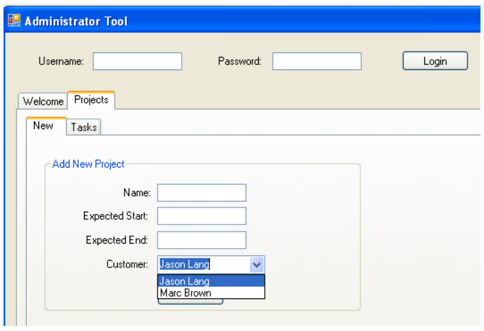
Load Customers /3

- Before you can test the new code, make sure that you enter some entries into the Customer table of the database
- If all goes well you will see the customers you entered listed in the combo box


Administrator Tool

Username:

Password:

Login

Welcome | Projects

New | Tasks

Add New Project

Name:

Expected Start:

Expected End:

Customer: Jason Lang

Jason Lang

Marc Brown

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Add New Project

```
private void btnAddProject_Click(object sender, EventArgs e)
{
    DateTime startDate;
    DateTime endDate;

    if (txtProjectName.Text == "")
    {
        MessageBox.Show("You need to fill in the name field");
        return;
    }

    try
    {
        startDate = DateTime.Parse(txtProjectStart.Text);
        endDate = DateTime.Parse(txtProjectEnd.Text);
    }
    catch (Exception)
    {
        MessageBox.Show("The date(s) are in the wrong format");
        return;
    }
    facade.CreateProject(txtProjectName.Text, startDate, endDate, (int)cbCustomer.SelectedValue, adminId);
    txtProjectName.Text = "";
    txtProjectStart.Text = "";
    txtProjectEnd.Text = "";
    cbCustomer.SelectedIndex = 0;
    MessageBox.Show("Project successfully created");
    tabControl2.SelectTab(1);
}
```

- Add code to be executed when the *Add* button for a project is pressed

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Loading Projects and Teams

- When the *Tasks* tab of *tabControl2* is selected, the projects and teams should be loaded into the *cbProjects and cbTeams* combo boxes
- Similar to customer combo box add an event handling method

```
private void tabControl2_Selected(object sender, TabControlEventArgs e)
{
    if (tabControl2.SelectedIndex == 1)
    {
        projects = facade.GetListOfProjects(adminId);
        cbProjects.DataSource = projects;
        cbProjects.DisplayMember = "Name";
        cbProjects.ValueMember = "ProjectId";
        setProjectDetails();

        teams = facade.GetListOfTeams();
        cbTeams.DataSource = teams;
        cbTeams.DisplayMember = "Name";
        cbTeams.ValueMember = "TeamId";
    }
}
```

Again, note how the combo boxes are bound to arrays of objects

We need to define this method

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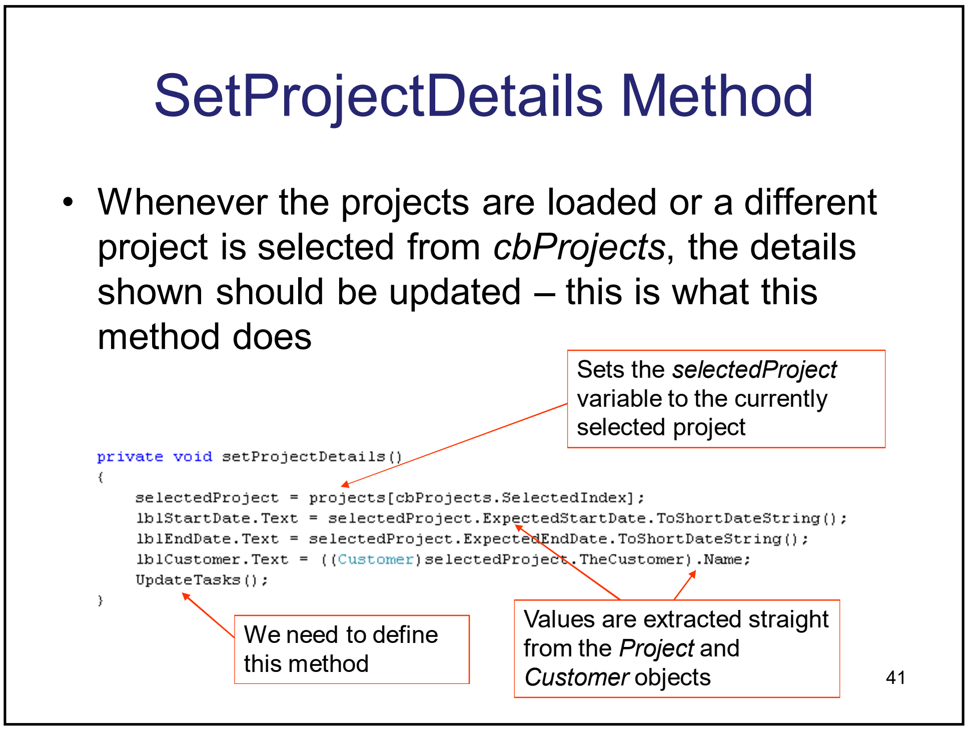

SetProjectDetails Method

- Whenever the projects are loaded or a different project is selected from *cbProjects*, the details shown should be updated – this is what this method does

```
private void setProjectDetails()
{
    selectedProject = projects[cbProjects.SelectedIndex];
    lblStartDate.Text = selectedProject.ExpectedStartDate.ToShortDateString();
    lblEndDate.Text = selectedProject.ExpectedEndDate.ToShortDateString();
    lblCustomer.Text = ((Customer)selectedProject.TheCustomer).Name;
    UpdateTasks();
}
```

Sets the *selectedProject* variable to the currently selected project

We need to define this method

Values are extracted straight from the *Project* and *Customer* objects

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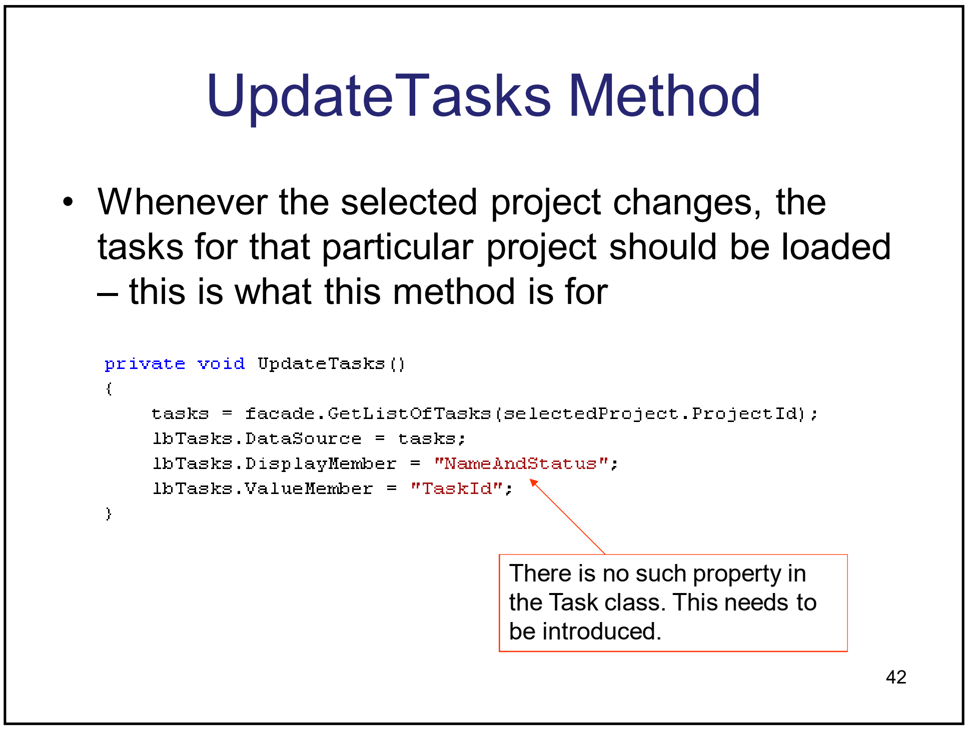

UpdateTasks Method

- Whenever the selected project changes, the tasks for that particular project should be loaded – this is what this method is for

```
private void UpdateTasks()
{
    tasks = facade.GetListOfTasks(selectedProject.ProjectId);
    lbTasks.DataSource = tasks;
    lbTasks.DisplayMember = "NameAndStatus";
    lbTasks.ValueMember = "TaskId";
}
```

There is no such property in the Task class. This needs to be introduced.

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NameAndStatus Property

- In order to display the name and status of each task in the list box, it is necessary to add a property which returns this in the Task object
- Open the PTSLibrary project and add the following code to the Task class. Then rebuild the project

```
public string NameAndStatus
{
    get { return name + " - " + status; }
}
```

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Reload Project Details

- We have a method for reloading project details – *setProjectDetails*
- When the selected index of *cbProjects* changes, this method should be called
- Double-click on the *cbProjects* combo box
  - This automatically adds an event handler and writes a skeleton method
  - Add a method call to *setProjectDetails*

```
private void cbProjects_SelectedIndexChanged(object sender, EventArgs e)
{
    setProjectDetails();
}
```

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Add New Task

```
private void btnAddTask_Click(object sender, EventArgs e)
{
    DateTime startDate;
    DateTime endDate;

    if (txtTaskName.Text == "")
    {
        MessageBox.Show("You need to fill in the name field");
        return;
    }

    try
    {
        startDate = DateTime.Parse(txtTaskStart.Text);
        endDate = DateTime.Parse(txtTaskEnd.Text);
    }
    catch (Exception)
    {
        MessageBox.Show("The date(s) are in the wrong format");
        return;
    }
    facade.CreateTask(txtTaskName.Text, startDate, endDate, (int)cbTeams.SelectedValue, selectedProject.ProjectId);
    txtTaskName.Text = "";
    txtTaskStart.Text = "";
    txtTaskEnd.Text = "";
    cbTeams.SelectedIndex = 0;
    MessageBox.Show("Task successfully created");
    UpdateTasks();
}
```

- Add code to be executed when the *Add* button for a task is pressed

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Test the Application

- Now that you have built a prototype of the Admin tool, compile and run it
- Test all the features implemented
  - Log in
  - Add project
  - Add task
  - Change selected project
- Fix any problems that you might find

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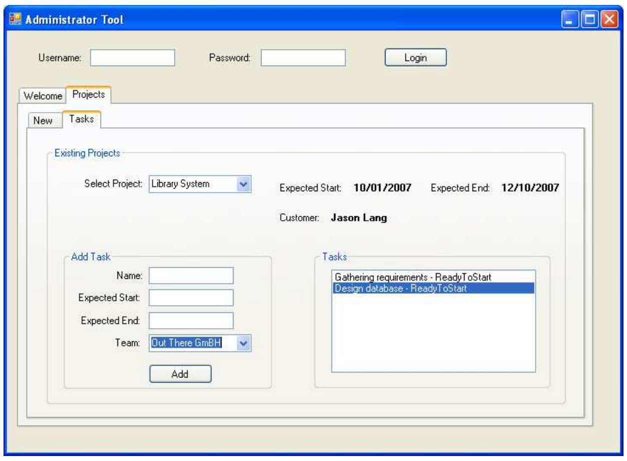
Test the Application /2

- Your application should look somewhat like this:



Select Project: Library System

Expected Start: 10/01/2007 Expected End: 12/10/2007

Customer: Jason Lang

Team: Out There GmBH

Gathering requirements - ReadyToStart
Design database - ReadyToStart

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Complete Code listing /2

- Please see the notes of this slide for the complete code listing of the *frmAdmin.Designer.cs* file

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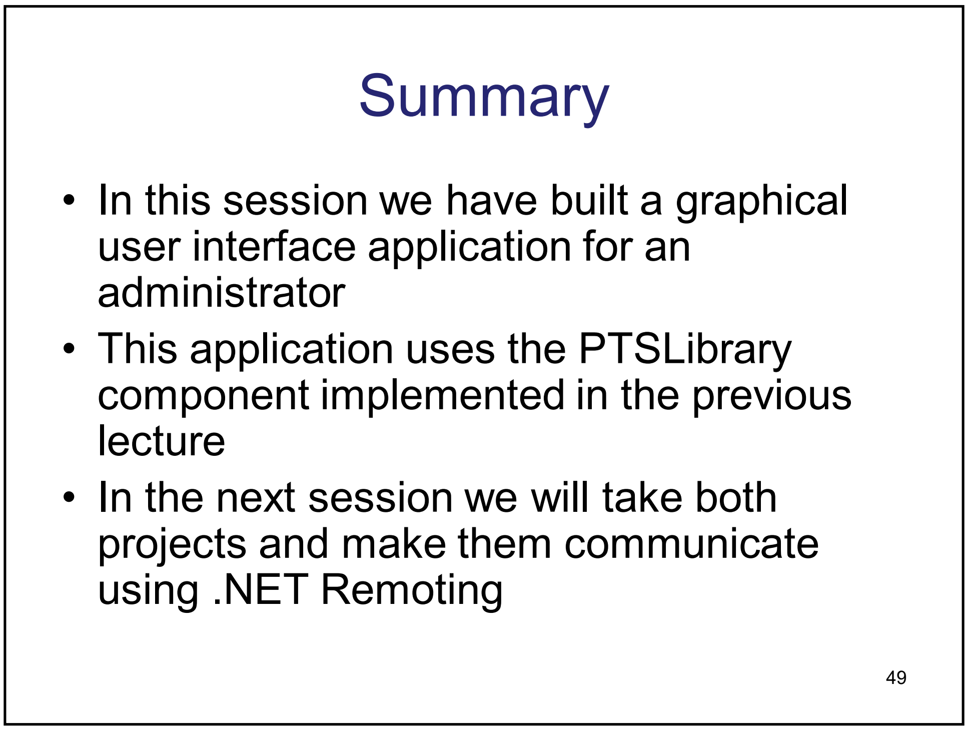

Summary

- In this session we have built a graphical user interface application for an administrator
- This application uses the PTSLibrary component implemented in the previous lecture
- In the next session we will take both projects and make them communicate using .NET Remoting

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