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Industrial Informatics 2023
-Homework 2 –

The second Homework consists of a Web Application that has access to a database. The Web Service of this WebApp is then consumed by a Windows Form App.

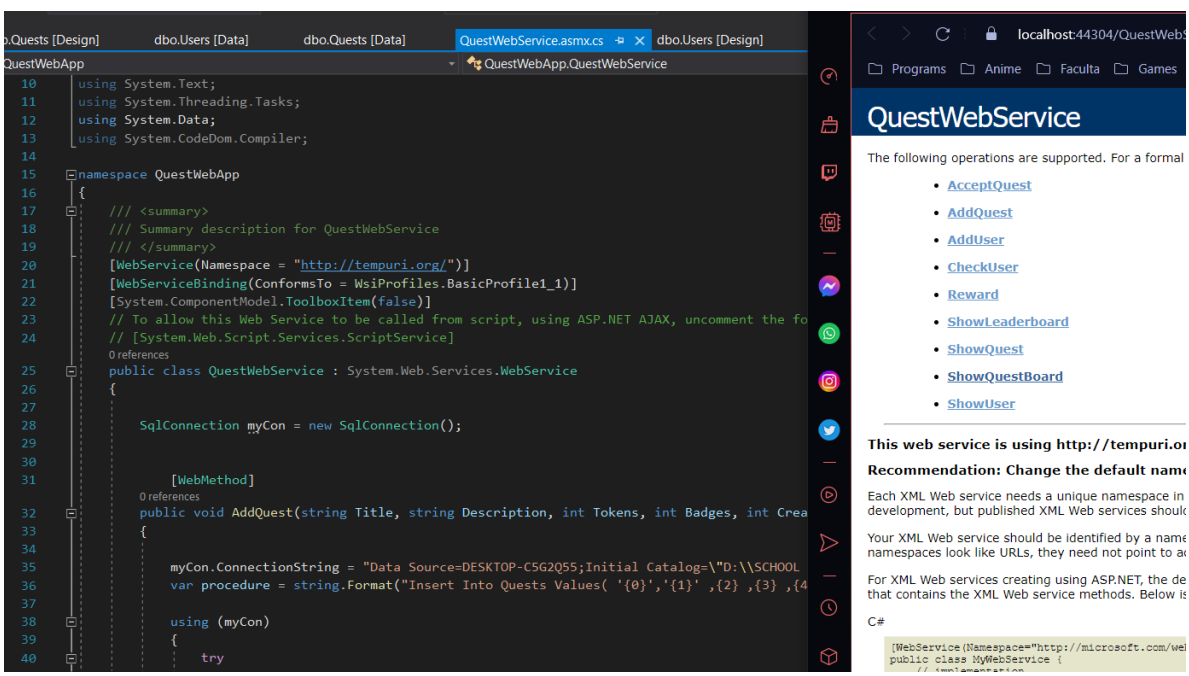
The theme of the following project is a video game where players can create, view, and accept quests. Said quests grant

> **Tema:** Creati un serviciu Web care ofera acces la o baza de date care stocheaza informatii. Apoi, creati un client de tip Windows Form App care utilizeaza serviciul. Serviciul va oferi metode de adaugarea si modificare a informatiilor. Tema aplicatiei este la alegere.

them prices which determine the player's rank in a leaderboard. Certain aspects of the application are simplified as they were unnecessary for presenting a general understanding of functionality of the project. Project will be nicknamed "QuestBringer".

1.QuestWebApp

First, the QuestWebApp is a ASP.NET Web Application which will provide a number of webservices, which also access the database: "QuestBringer". The QuestWebService has the following functions:



- AddQuest receives parameters with which it creates a new entry in the “Quests” Table
- AddUser receives parameters with which it creates a new entry in the “Users” Table
- CheckUser is part of the login process and identifies the user corresponding to the given parameters (username and password). It will either return the id of the identified user or ‘0’ which represents that no user was found with the given credentials
- ShowUser returns data of the user with a given id
- ShowQuest returns data of a quest with a given id
- SHowLeaderboard returns a list of all registered users ranked by their game currency
- ShowQuestBoard returns a list of all quest entries
- AcceptQuest will delete a quest of a given id, as a player/user “claims it”
- Reward adds the in-game currency related to the quest they claimed (through an update query)

```
    [WebMethod]
0 references
public void AddQuest(string Title, string Description, int Tokens, int Badges, int CreatorId)
{

    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LA
    var procedure = string.Format("Insert Into Quests Values( '{0}','{1}' ,{2} ,{3} ,{4} )", Title,Description,Tokens,Badges,CreatorId);

    using (myCon)
    {
        try
        {
            SqlCommand command = new SqlCommand(procedure, myCon);
            command.Connection.Open();
            command.ExecuteNonQuery();
            Console.WriteLine("Added Quest!");
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
        }

    }
    myCon.Close();
}

[WebMethod]
0 references
public void AddUser(string Username,string Password, int Tokens, int Badges )
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LA
    var procedure = string.Format("Insert Into Users Values( '{0}','{1}' ,{2} ,{3})", Username, Password, Tokens, Badges);
    using (myCon)
    {
        try
        {
            SqlCommand command = new SqlCommand(procedure, myCon);
            command.Connection.Open();
```

```
            Console.WriteLine("Added User!");
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
        }
        myCon.Close();
    }
}


[WebMethod]
0 references
public string[] ShowQuest(int id)
{
    string[] quest;//title,desc,tokens,badges, creator
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LAB\\PROJECTACCESA\\QUESTWEBAPP\\QUESTWEBAPP\\APP_DATA\\QUEST
    var procedure = string.Format("Select Quests.Id, Title,Description,Quests.Tokens,Quests.Badges, Users.Username From Quests Join Users ON Quests.CreatorId = Users.Id WHERE  Quests.Id = {0}", id);
    DataSet ds = new DataSet();
    myCon.Open();
    using (myCon)
    {
        SqlDataAdapter da = new SqlDataAdapter(procedure, myCon);
        da.Fill(ds,"Quests");
        DataTable dt = ds.Tables[0];
        DataRow row = dt.Rows[0];
       quest= new string[row.ItemArray.Length];
        for (int i= 0; i < row.ItemArray.Length; i++)
        {
            quest[i] = row[i].ToString();
            Console.Write(quest[i] = row[i].ToString());
        }

    }
    myCon.Close();
    return quest;
}
```

```
0 references
public int CheckUser(string username, string password)
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LAB\\PROJECTACCESA\
    int userId;//username,tokens,badges
    var procedure = string.Format("Select * From Users Where Username = '{0}' And Password ='{1}'", username,password);
    DataSet ds = new DataSet();
    myCon.Open();
    using (myCon)
    {
        SqlDataAdapter da = new SqlDataAdapter(procedure, myCon);
        da.Fill(ds, "Users");

        DataTable dt = ds.Tables[0];
        if (dt.Rows.Count > 0)
        {
            DataRow row = dt.Rows[0];
            userId = int.Parse(row[0].ToString());
            myCon.Close();
            return userId;
        }
        else
            return 0;
    }
}

[WebMethod]
0 references
public string[] ShowUser(int id)
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LAB\\PROJECTACCESA\
    string[] user;//username,tokens,badges
    bool find = true; //change find after successful select
    var procedure = string.Format("Select *,RANK() OVER(ORDER BY Badges * 20 + Tokens  DESC) 'Player_Rank ' From Users Where Id  = {0}", id);
    DataSet ds = new DataSet();
    myCon.Open();
    using (myCon)
    {
        SqlDataAdapter da = new SqlDataAdapter(procedure, myCon);
        da.Fill(ds, "Users");
        DataTable dt = ds.Tables[0];
        DataRow row = dt.Rows[0];
        user = new string[row.ItemArray.Length];
        for (int i = 0; i < row.ItemArray.Length ; i++)
```

```
        for (int i = 0; i < row.ItemArray.Length ; i++)
        {
            user[i] = row[i].ToString();
        }

    }
    myCon.Close();
    if (find)
    {
        return user;
    }
    else return null;

}

[WebMethod]
0 references
public string[] ShowLeaderboard()
{

    string[] rankings;
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORMATICS\\LAB\\PROJE
    var procedure = string.Format("Select Username, Badges, Tokens, RANK() OVER(ORDER BY Badges * 20 + Tokens  DESC) 'Player_Rank ' from Users   ");
    DataSet ds = new DataSet();
    myCon.Open();
    using (myCon)
    {
        SqlDataAdapter da = new SqlDataAdapter(procedure, myCon);
        da.Fill(ds, "Users");
        DataTable dt = ds.Tables[0];

        rankings = new string[dt.Rows.Count]; int i = 0;
        string[] temp = new string[dt.Rows[0].ItemArray.Length];
        foreach (DataRow row in dt.Rows)
        {

            for (int j = 0; j < row.ItemArray.Length ; j++)
            {
                temp[j] = row[j].ToString();

            }
            rankings[i] = string.Join(" ;", temp);
            i++;
        }
    }
    return rankings ;
}
```

```
[WebMethod]
0 references
public string[] ShowQuestBoard()
{
    string[] quests ;
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOO
    var procedure = string.Format("Select * From Quests");
    DataSet ds = new DataSet();
    // string questList = "";
    myCon.Open();
    using (myCon)
    {
        SqlDataAdapter da = new SqlDataAdapter(procedure, myCon);
        da.Fill(ds, "Quests");
        DataTable dt = ds.Tables[0];

        quests = new string[dt.Rows.Count]; int i=0;
        string[] temp =new string[dt.Rows[0].ItemArray.Length];
        foreach (DataRow row in dt.Rows)
        {

            for (int j = 0; j < row.ItemArray.Length - 1; j++)
            {
                temp[j] = row[j].ToString();

            }
            quests[i] = string.Join(" ;", temp);
            i++;
        }

    }
    return quests;
}

[WebMethod]
0 references
public void AcceptQuest(int id)
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOO
    var procedure = string.Format("DELETE FROM QUESTS WHERE Id = {0}",id);

    using (myCon)
    {
        try
        {
            SqlCommand command = new SqlCommand(procedure, myCon);
            command.Connection.Open();
            command.ExecuteNonQuery();
```

```
[WebMethod]
0 references
public void AcceptQuest(int id)
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORM
    var procedure = string.Format("DELETE FROM QUESTS WHERE Id = {0}",id);

    using (myCon)
    {
        try
        {
            SqlCommand command = new SqlCommand(procedure, myCon);
            command.Connection.Open();
            command.ExecuteNonQuery();
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
        }
    }
    myCon.Close();
}


[WebMethod]  //Both AcceptQuest and Reward are called one after the other
0 references
public void Reward(int id, int tokens,int badges)
{
    myCon.ConnectionString = "Data Source=DESKTOP-C5G2Q55;Initial Catalog=\"D:\\SCHOOL BOOKS\\AN III SEMESTRU II\\INDUSTRIAL INFORM
    var procedure = string.Format("Update  Users SET Tokens=(Tokens+{1}), Badges=(Badges+{2})  WHERE Id = {0}", id,tokens,badges);

    using (myCon)
    {
        try
        {
            SqlCommand command = new SqlCommand(procedure, myCon);
            command.Connection.Open();
            command.ExecuteNonQuery();
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
        }

    }
    myCon.Close();
}
```

The Database consists of two tables, Users, and Quests, with the following fields:

dbo.Users [Data] | QuestWebService.asmx.cs | dbo.Users

Update | Script File: dbo.Users.sql

Name	Data Type	Allow Nulls	Default
Id	int	☐	
Username	nchar(50)	☐	
Password	nchar(50)	☐	
Badges	int	☑	
Tokens	int	☑	
		☐	

QuestWebApp - dbo.Quests [Design]

dbo.Quests [Data] | dbo.Quests [Design]

Update | Script File: dbo.Quests.sql

Name	Data Type	Allow Nulls	Defaul
Id	int	☐	
Title	nchar(50)	☐	
Description	nvarchar(MAX)	☐	
Tokens	int	☐	
Badges	int	☐	
CreatorId	int	☐	
		☐	

We also start with the following data already added to the table:

dbo.Users [Data] | QuestWebService.asmx.cs | dbo.Users [Design]

Max Rows: 1000

Id	Username	Password	Badges	Tokens
1	Alex_The_Great ...	password ...	3	120
2	Brave_Player ...	password1 ...	2	20
3	Challenger ...	password2 ...	1	200
4	QuestLord ...	password3 ...	4	0
5	Alin ...	password4 ...	20	2
6	Alex ...	password5 ...	1	10
NULL	NULL	NULL	NULL	NULL

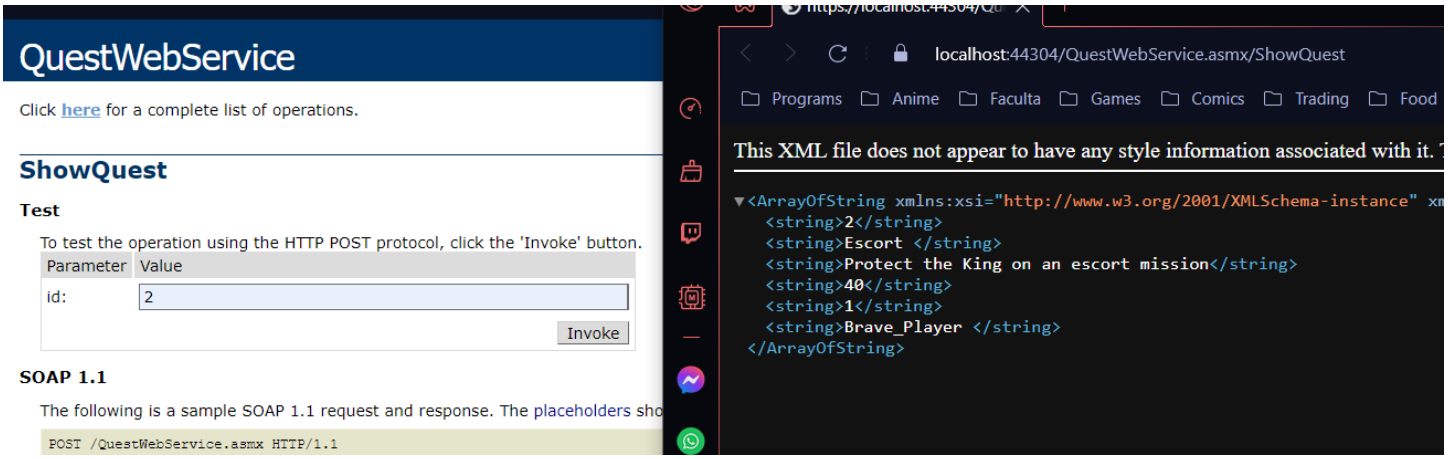
QuestWebApp - dbo.Quests [Data]

dbo.Quests [Data] | dbo.Quests [Design]

Max Rows: 1000

Id	Title	Description	Tokens	Badges	CreatorId
2	Escort ...	Protect the King...	40	1	2
3	Missing person ...	Help find a mis...	20	0	1
4	Slay the Dragon...	Go to the Moun...	80	0	1
5	Explore Dunge...	The Dungeon t...	100	0	3
6	Mine Pests ...	The mine in the...	20	2	3
NULL	NULL	NULL	NULL	NULL	NULL

As for an example, here we test the ShowQuest(id) function:



2.QuestWinForm

QuestWinForm is a ASP.NET Windows Form that will connect to the QuestWebService and be the interface of the project. It consists of 4 forms: Login (sign in for the user or creating a new account) , Form2 (Home/ User Page), Leaderboard (showing the users' rankings) and Questboard (showing the available quests and letting the user pick and accept a quest).

```
5 references
public partial class Login : Form
{
    QuestWinForm.ServiceReference1.QuestWebServiceSoapClient service = new QuestWinForm.ServiceReference1.QuestWebServiceSoapClient();
    2 references
    public Login()
    {
        InitializeComponent();
        pictureBoxTitle.Image = Image.FromFile("quest.png");
        pictureBoxUser.Image = Image.FromFile("adventurer.png");
    }

    1 reference
    private void loginButton_Click(object sender, EventArgs e)
    {
        if (!string.IsNullOrEmpty(usernameBox.Text))
        {
            if (!string.IsNullOrEmpty(passwordBox.Text)) {

            int id=service.CheckUser(usernameBox.Text.ToString(), passwordBox.Text.ToString());
                if (id != 0){
                    Hide();
                    Form2 next = new Form2(id);
                    next.Show();
                }
                else MessageBox.Show("Incorrect Login Information!", "Warning");
            }
            else MessageBox.Show("Please enter your password to log in!", "Warning");
        }
        else MessageBox.Show("Please enter your username to log in!", "Warning");
    }


    1 reference
    private void registerButton_Click(object sender, EventArgs e)
    {
        if (!string.IsNullOrEmpty(usernameBox.Text))
        {
            if (!string.IsNullOrEmpty(passwordBox.Text))
            {
                int id;
                service.AddUser(usernameBox.Text.ToString(),passwordBox.Text.ToString(),0,0);
                id = service.CheckUser(usernameBox.Text.ToString(), passwordBox.Text.ToString());
                Hide();
                Form2 next = new Form2(id);
                next.Show();
            }
            else MessageBox.Show("Please create a password to register!.", "Warning");
        }
        else MessageBox.Show("Please create a username to register!.", "Warning");
    }
}
}
```

m2.cs [Design] | Questboard.cs | Questboard.cs [Design] | Leaderboard.cs | Form2.cs | Lo

QuestWinForm | QuestWinForm.Form2

```
namespace QuestWinForm
{
    11 references
    public partial class Form2 : Form
    {
        QuestWinForm.ServiceReference1.QuestWebServiceSoapClient service = new QuestWinForm.ServiceReference1.QuestWebServiceSoapClient();
        int id;
        0 references
        public Form2()
        {
            InitializeComponent();

        }

        4 references
        public Form2(int id)
        {
            this.id = id;
            InitializeComponent();

            pictureBoxUser.Image = Image.FromFile("adventurer.png");
            pictureBoxTitle.Image = Image.FromFile("quest.png");
          //  picBoxRank.Image = Image.FromFile("leaderboard.png");

            picBoxBadge.Image = Image.FromFile("badge.png");
            picBoxBadge1.Image = Image.FromFile("badge.png");
            picBoxBadge2.Image = Image.FromFile("badge.png");

            picBoxToken.Image = Image.FromFile("token.png");
            picBoxToken1.Image = Image.FromFile("token.png");
            picBoxToken2.Image = Image.FromFile("token.png");

            tabControl.SelectedTab = Home;

            ArrayOfString userInfo;
            userInfo = service.ShowUser(id);
             usernameBox.Text = userInfo[1];
            badgeCount.Text = userInfo[3];
            tokenCount.Text = userInfo[4];
        }

        1 reference
        private void Form2_Load(object sender, EventArgs e)
        {  }

        1 reference
        private void logoutButton_Click(object sender, EventArgs e)
        {
            Hide();
            Login next = new Login();
            next.Show();
        }

```

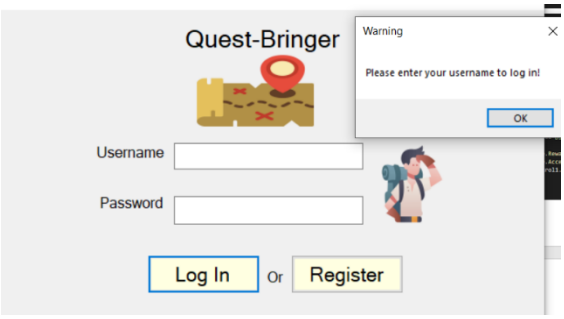
```
    1 reference
    private void quest_Click(object sender, EventArgs e)
    {
        tabControl.SelectedTab = Quest_Maker;
        badgeBox.Text = "0";
        tokenBox.Text = "0";
        titleBox.Text = "0";
    }

    1 reference
    private void postQuestButton_Click(object sender, EventArgs e)
    {

        if (int.Parse(badgeBox.Text) <= int.Parse(badgeCount.Text)  && int.Parse(tokenBox.Text) <= int.Parse(tokenCount.Text)) {
        var result = MessageBox.Show("Are you sure you want to post this Quest? It cannot be deleted afterwards!", "Confirm",
                                     MessageBoxButtons.YesNo,
                                     MessageBoxIcon.Question);

        if (result == DialogResult.Yes)
        {

                service.AddQuest(titleBox.Text.ToString(), taskBox.Text.ToString(),int.Parse(tokenBox.Text),int.Parse(badgeBox.Text),id);
        }

        }
        else MessageBox.Show("Insufficient resources for reward.", "Warning");
    }

    1 reference
    private void leaderboardButton_Click(object sender, EventArgs e)
    {
        Hide();
        Leaderboard next = new Leaderboard(id);
        next.Show();
    }

    1 reference
    private void questboardButton_Click(object sender, EventArgs e)
    {
        Hide();
        Questboard next = new Questboard(id);
        next.Show();
    }
}
```

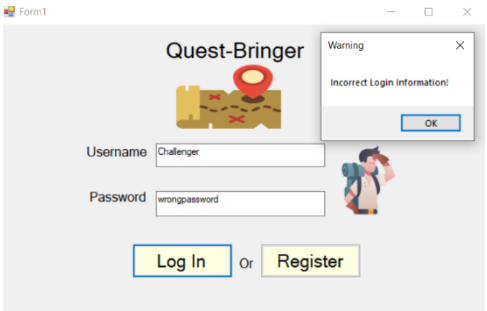
```
namespace QuestWinForm
{

    5 references
    public partial class Leaderboard : Form
    {
        QuestWinForm.ServiceReference1.QuestWebServiceSoapClient service = new QuestWinForm.ServiceReference1.QuestWebServiceSoapClient();
        int id;
        0 references
        public Leaderboard()
        { }
        1 reference
        public Leaderboard(int id)
        {
            this.id= id;
            InitializeComponent();


            picBoxCrown.Image = Image.FromFile("first.png");
            picBoxLeaderboard.Image = Image.FromFile("leaderboard.png");


            //add user rankings
            ArrayOfString leaderboard;
             leaderboard = service.ShowLeaderboard();
               string space;
            foreach ( string row in leaderboard) {
               string[] splitrow = row.Split(';');
               space = new String(' ',32-splitrow[0].Trim().Length );
                listBoxRank.Items.Add(splitrow[0].Trim()+ space+ splitrow[2].Trim() + new String(' ', 16 - splitrow[2].Trim().Length) + splitrow[1].Trim() +new String(' ', 16 - splitrow[1].Trim().Length)+"#" + splitrow[3].Trim());
            }
        }

        1 reference
        private void homeButton_Click(object sender, EventArgs e)
        {
            Hide();
            Form2 next = new Form2(id);
            next.Show();
        }
    }
}
```

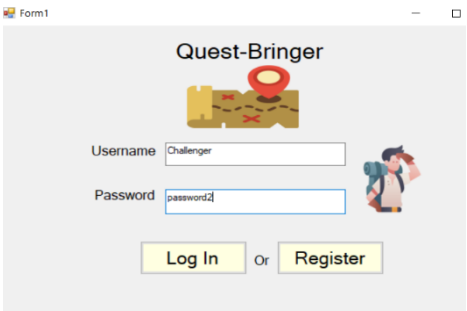
```
    5 references
    public partial class Questboard : Form
    {
        QuestWinForm.ServiceReference1.QuestWebServiceSoapClient service = new QuestWinForm.ServiceReference1.QuestWebServiceSoapClient();
        int id;
        ArrayOfString questboard;
        int questId;
        0 references
        public Questboard()
        {
            InitializeComponent();
        }

        1 reference
        public Questboard(int id)
        {
            this.id = id;
            InitializeComponent();
            pictureBoxQuest.Image = Image.FromFile("questboard.png");


            questboard = service.ShowQuestBoard();
             string space;
            foreach (string row in questboard)
            {
                string[] splitrow = row.Split(';');
                space = new String(' ', 60- splitrow[1].Trim().Length);
                listBoxQuests.Items.Add(splitrow[1].Trim() + space+ splitrow[3].Trim() + " Tokens " + splitrow[4].Trim()+" Badges");
            }

                pictureBoxTitle.Image = Image.FromFile("quest.png");
            picBoxBadge2.Image = Image.FromFile("badge.png");
            picBoxToken2.Image = Image.FromFile("token.png");

        }

        1 reference
        private void pickQuestButton_Click(object sender, EventArgs e)
        {
                string[] splitrow = questboard[listBoxQuests.SelectedIndex].Split(';');
            questId = int.Parse(splitrow[0]);
            tabControl1.SelectedTab = QuestPage;

            ArrayOfString questInfo;
           questInfo= service.ShowQuest(questId);
            titleBox.Text = questInfo[1];
            taskBox.Text = questInfo[2];
            tokenBox.Text = questInfo[3];
            badgeBox.Text = questInfo[4];
            creatorBox.Text = questInfo[5];

        }
```

```
    1 reference
    private void homeButton_Click(object sender, EventArgs e)
    {
        Hide();
        Form2 next = new Form2(id);
        next.Show();
    }

    1 reference
    private void takeQuestButton_Click(object sender, EventArgs e)
    {
        var result = MessageBox.Show("Are you sure you want to accept this Quest?", "Confirm",
                                     MessageBoxButtons.YesNo,
                                     MessageBoxIcon.Question);

        if (result == DialogResult.Yes)
        {
            service.Reward(id, int.Parse(tokenBox.Text), int.Parse(badgeBox.Text));
            service.AcceptQuest(questId);
            tabControl1.SelectedTab = BoardPage;
        }
    }
}
```

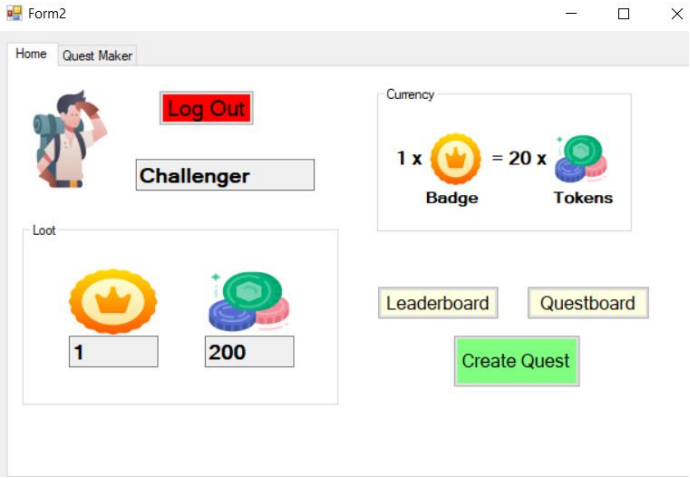
The Login will ask for a user's username and password. Failing to fill one of the fields prompts a warning message. If the user tries to log in with wrong information, a warning prompt will appear as well.



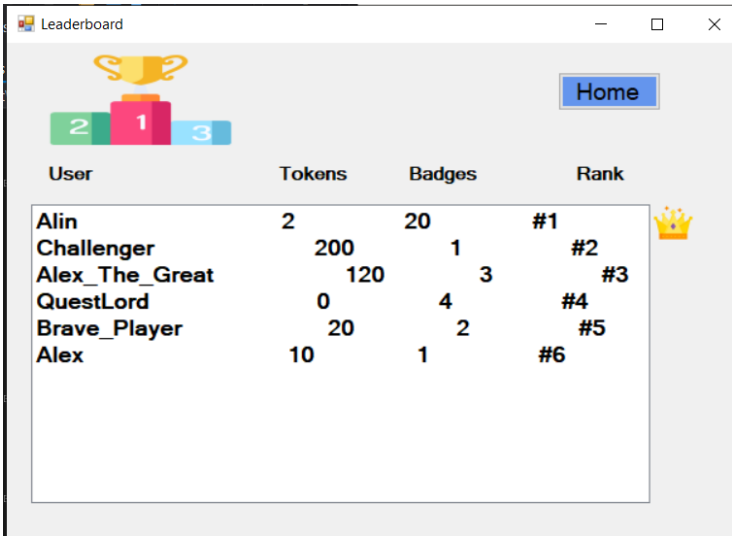


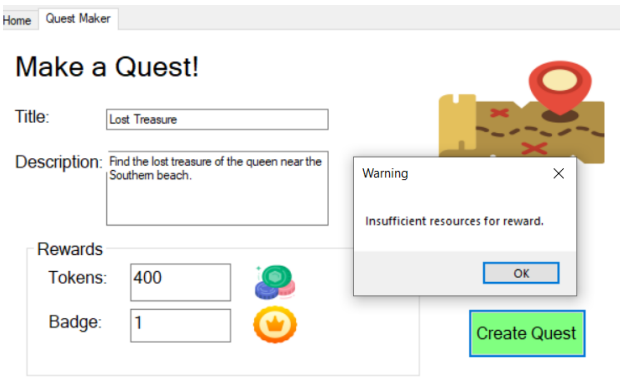


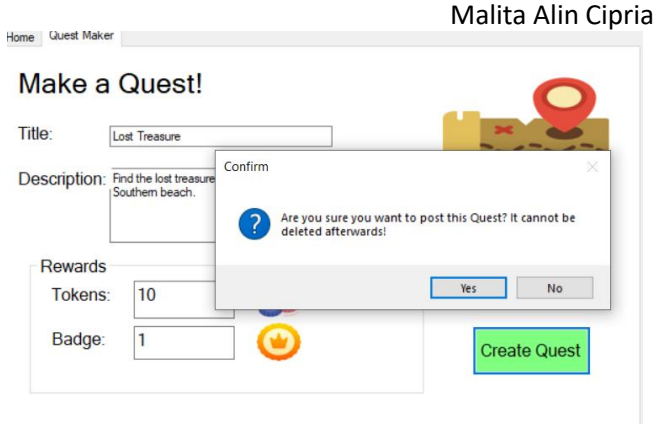
Once we are logged in, we have the options to logout, see the leaderboard, see the questboard or create a quest.



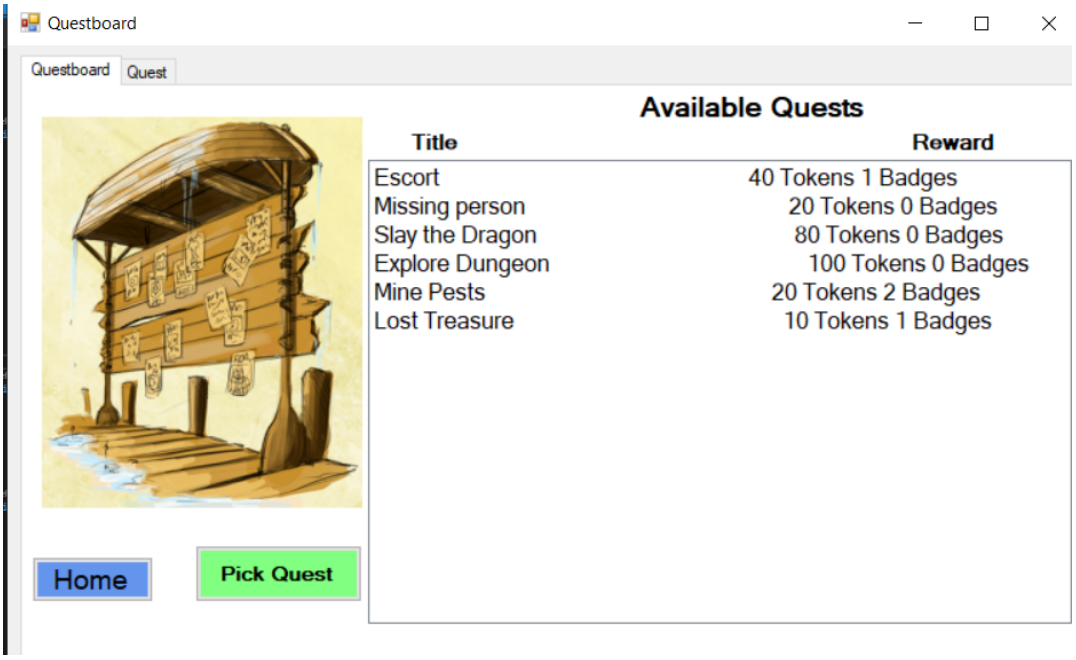
The leaderboard will be displayed with a listBox in descending order. The "Home" button brings us back to the user menu.



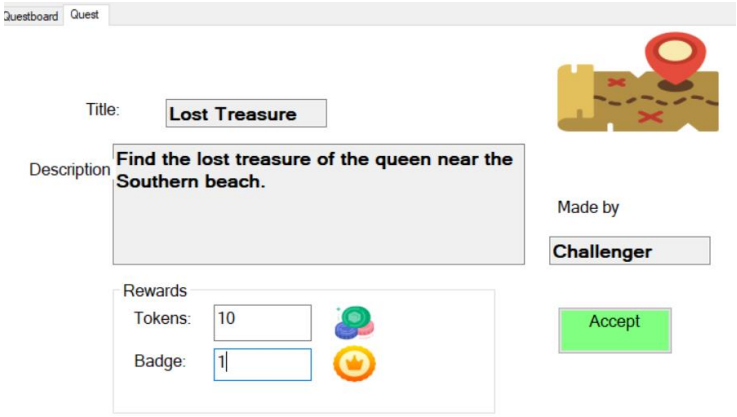


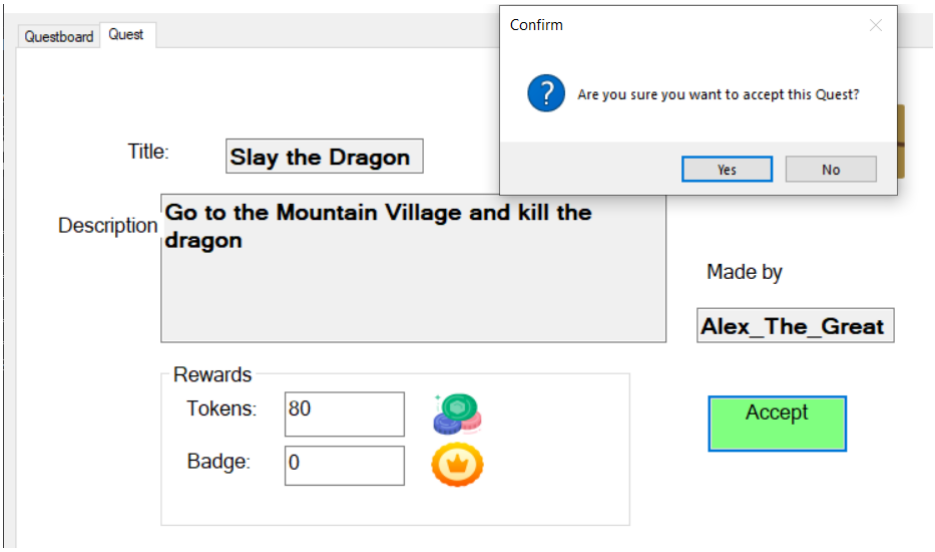


We add a quest, and if the user does have the resources for the reward, the quest will be added to the database and displayed in the Questboard page. Here are also examples of displayed quests that we picked:

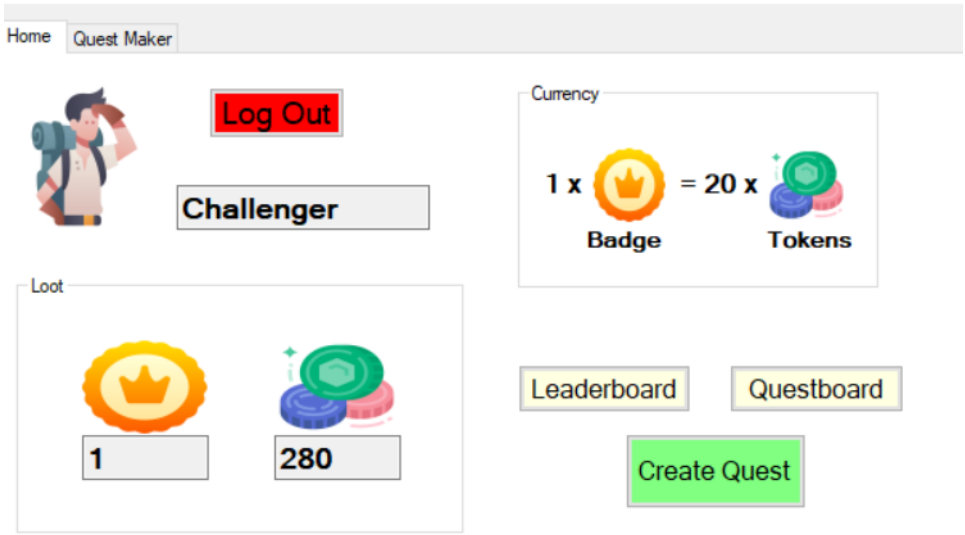


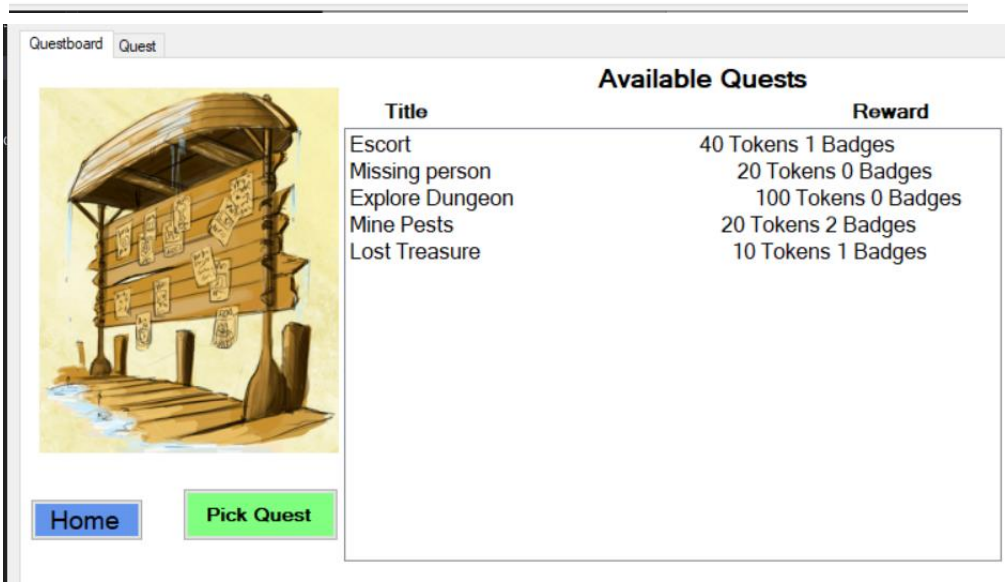
Id	Title	Description	Tokens	Badges	CreatorId
2	Escort ...	Protect the King...	40	1	2
3	Missing person ...	Help find a mis...	20	0	1
4	Slay the Dragon...	Go to the Moun...	80	0	1
5	Explore Dunge...	The Dungeon t...	100	0	3
6	Mine Pests ...	The mine in the...	20	2	3
9	Lost Treasure ...	Find the lost tre...	10	1	3
NULL	NULL	NULL	NULL	NULL	NULL



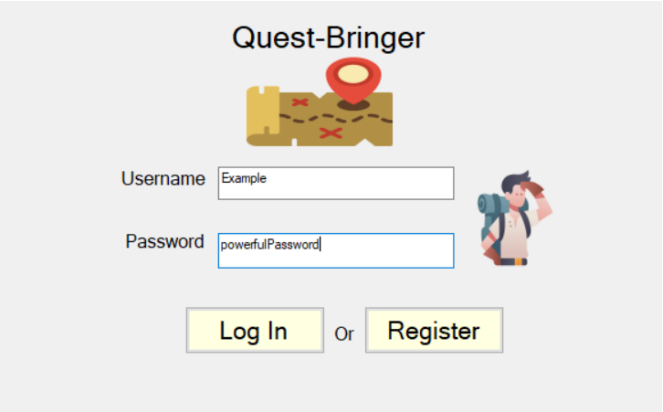


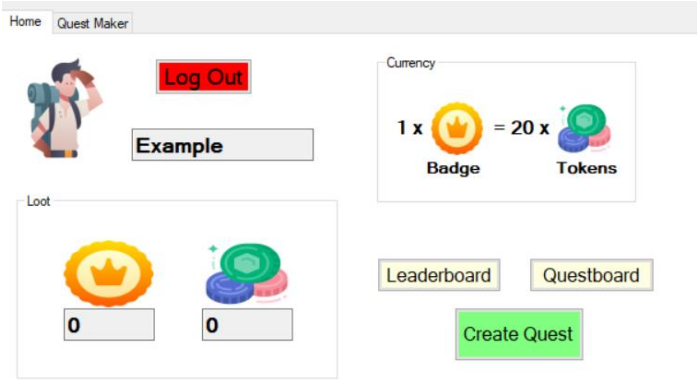
Before accepting a quest, we confirm it. Then after exiting the form and reentering, the quest will no longer be present on the QuestBoard. We can also see the rewards added to the user's Loot section:



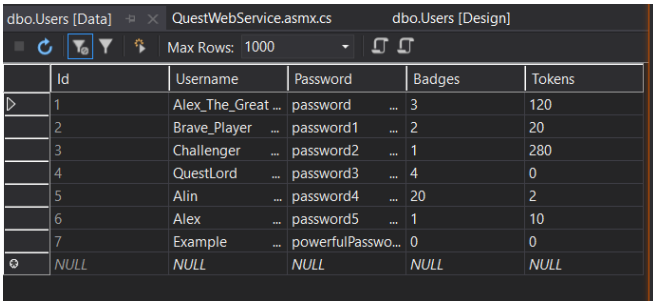


Finally, we log out, enter new user data and register, seeing that a new user starts with no loot:





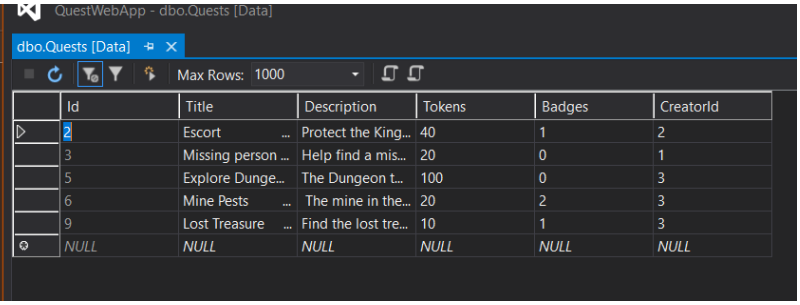
Here are the Tables at the end of all the previous operations:



dbo.Users [Data] | QuestWebService.asmx.cs | dbo.Users [Design]

Max Rows: 1000

Id	Username	Password	Badges	Tokens
1	Alex_The_Great ...	password ...	3	120
2	Brave_Player ...	password1 ...	2	20
3	Challenger ...	password2 ...	1	280
4	QuestLord ...	password3 ...	4	0
5	Alin ...	password4 ...	20	2
6	Alex ...	password5 ...	1	10
7	Example ...	powerfulPasswo...	0	0
NULL	NULL	NULL	NULL	NULL



QuestWebApp - dbo.Quests [Data]

dbo.Quests [Data]

Max Rows: 1000

Id	Title	Description	Tokens	Badges	CreatorId
2	Escort ...	Protect the King...	40	1	2
3	Missing person ...	Help find a mis...	20	0	1
5	Explore Dunge...	The Dungeon t...	100	0	3
6	Mine Pests ...	The mine in the...	20	2	3
9	Lost Treasure ...	Find the lost tre...	10	1	3
NULL	NULL	NULL	NULL	NULL	NULL

3. Conclusions

As presented, the application allows a user to log in and interact with the quest system through the webservice functions. The WebApp offers the ability to insert into, update, select and delete from the given tables, using primarily the id of the Users entry and of the Quests entry. Besides improvements to the visual aspect of the interface, there are several features that could be implemented in the future:

- Users able to modify their username or password
- Creating a quest consumes your in-game currency
- Admin user-type
- User not being allowed or accept quests made by themselves