Лабораторная работа №4. Чат

ОГУ
КАФЕДРА ВТИЗИ
ГАЛИМОВ Р.Р.

Асинхронный ввод-вывод

```
using System.Net;
using System.Net.Sockets;
using System.Windows.Forms;
namespace Sockets
{
    class CAsynchronousIoServer
    {
        private Socket _serversocket;
     private Form1 form1;
        int port;
        private void AddMess(string mess)
        {
            form1.Invoke(form1.myDelegate,mess);
        }
        public CAsynchronousIoServer(int _port,Form1 _form1)
        {
            port = _port;
            form1 = _form1;
        }
```

Асинхронный ввод-вывод

```
void SetupServer()
{
    IPHostEntry localMachineInfo =
 Dns.GetHostEntry(Dns.GetHostName());
 IPEndPoint myEndPoint = new
 IPEndPoint(localMachineInfo.AddressList[3],
 port);
 _serversocket = new
 Socket(myEndPoint.Address.AddressFamily,
 SocketType.Stream, ProtocolType.Tcp);
  _serversocket.Bind(myEndPoint);

 serversocket.Listen((int)SocketOptionName.MaxCo
 nnections);
        }
```

Асинхронный ввод-вывод

```
private class ConnectionInfo
        {
            public Socket Socket;
            public byte[] Buffer;
        }
        private List<ConnectionInfo>
  _connections =    new
  List<ConnectionInfo>();
```

Асинхронный ввод-вывод

```
private class ConnectionInfo
        {
            public Socket Socket;
            public byte[] Buffer;
        }
        private List<ConnectionInfo>
  _connections =    new
  List<ConnectionInfo>();
```

Асинхронный ввод-вывод

```
private class ConnectionInfo
        {
            public Socket Socket;
            public byte[] Buffer;
        }
        private List<ConnectionInfo>
  _connections =   new
  List<ConnectionInfo>();
public void Start()
        {
            SetupServer();
            _serversocket.BeginAccept(new
  AsyncCallback(AcceptCallback),
  _serversocket);          }
```

Асинхронный ввод-вывод

```
private void AcceptCallback(IAsyncResult result)
        {
            ConnectionInfo connection = new ConnectionInfo();
            try
            {
                // Завершение операции Accept
                Socket s = (Socket)result.AsyncState;
                connection.Socket = s.EndAccept(result);
                connection.Buffer = new byte[255];
                lock (_connections) _connections.Add(connection);
                // Начало операции Receive и новой операции Accept
                connection.Socket.BeginReceive(connection.Buffer,
                    0, connection.Buffer.Length, SocketFlags.None,
                    new AsyncCallback(ReceiveCallback),
                    connection);
                _serversocket.BeginAccept(new AsyncCallback(
                    AcceptCallback), result.AsyncState);
            AddMess("Соединение установлено");
            }
            catch (SocketException exc)
            {       CloseConnection(connection);
            AddMess("Socket exception: " + exc.SocketErrorCode);
            }
            catch (Exception exc)
            {
                CloseConnection(connection);
          AddMess("Exception: " + exc);
            }
        }
```

```
private void ReceiveCallback(IAsyncResult result)
        {
            ConnectionInfo connection = (ConnectionInfo)result.AsyncState;
            try
            {   int bytesRead = connection.Socket.EndReceive(result);
                AddMess(String.Format("Получено {0} байт", bytesRead));
                AddMess("Текст:" + Encoding.ASCII.GetString(connection.Buffer, 0, bytesRead));
                if (0 != bytesRead)
                {
                    lock (_connections)
                    {
                        foreach (ConnectionInfo conn in _connections)
                        {
                            if (connection != conn)
                                conn.Socket.Send(connection.Buffer, bytesRead,
   SocketFlags.None);
                         }
                    }
                    connection.Socket.BeginReceive( connection.Buffer, 0,
   connection.Buffer.Length, SocketFlags.None,
                        new AsyncCallback(ReceiveCallback),  connection);
                }
                else CloseConnection(connection);
            }
            catch (SocketException exc)
            {   CloseConnection(connection);
                AddMess("Socket exception: " +  exc.SocketErrorCode);
            }
            catch (Exception exc)
            {   CloseConnection(connection);
                AddMess("Exception: " + exc);
            }
        }
```

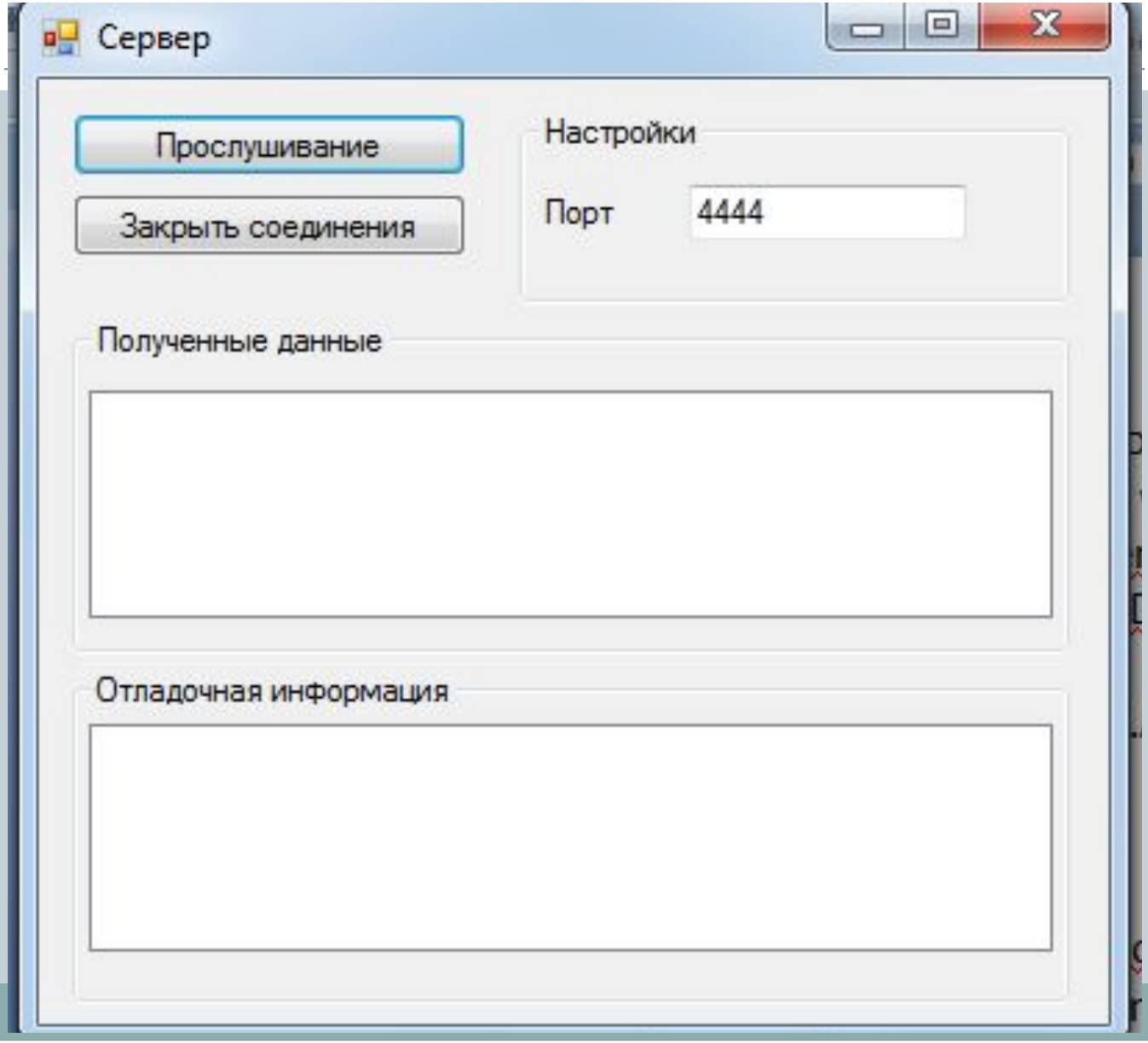
```
private void CloseConnection(ConnectionInfo
  ci)
        {
            ci.Socket.Close();
            lock (_connections)
  _connections.Remove(ci);
        }
```

```
namespace ConsoleApplication1 {
// Создадим делегат
delegate int IntOperation (int i, int j);
class Program { // Организуем ряд методов
    static int Sum(int x, int y)
      { return x + y; }
    static int Prz(int x, int y)
      { return x * y; }
    static int Del(int x, int y)
       { return x / y; }
static void Main() { // Сконструируем делегат
    IntOperation op1 = new IntOperation(Sum);
    int result = op1(5, 10);
    Console.WriteLine("Сумма: " + result);
// Изменим ссылку на метод
    op1 = new IntOperation(Prz);
    result = op1(5, 10);
     Console.WriteLine("Произведение: " + result);
    Console.ReadLine();
}
}
```

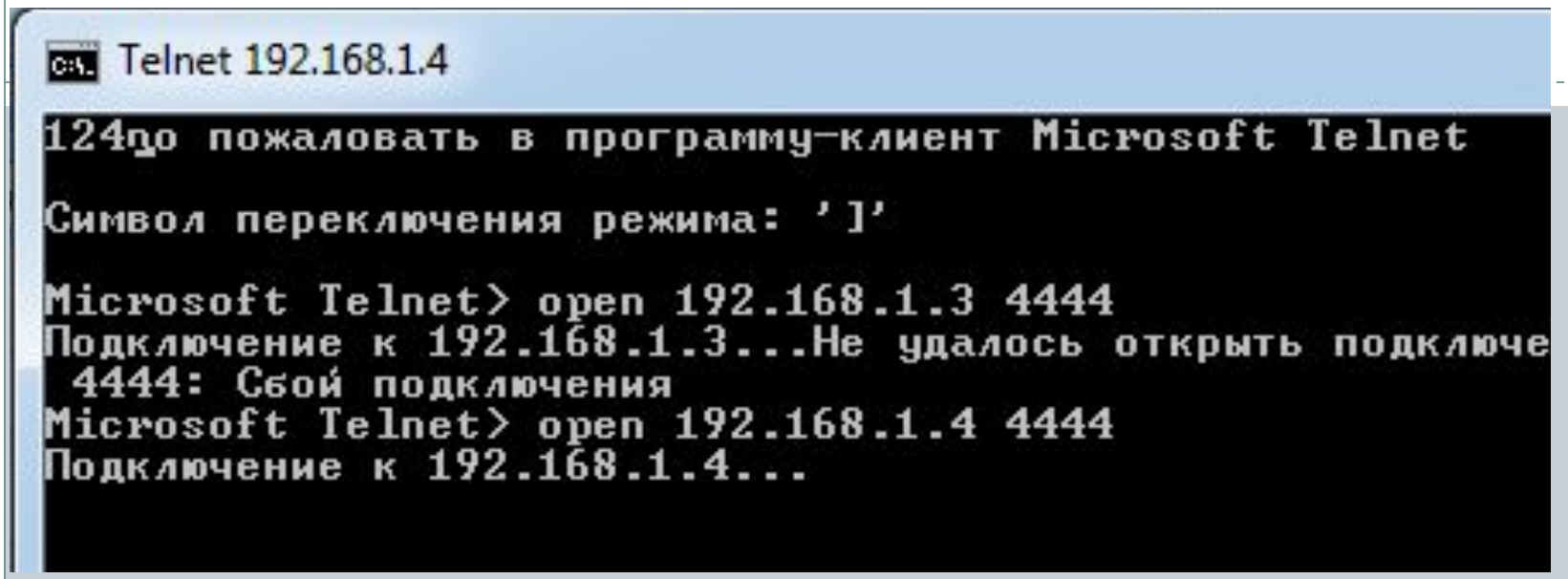
Основная форма

```
public partial class Form1 : Form
   {    public delegate void AddListItem(string smess);
        public AddListItem myDelegate;
        private void AddDebugText(string smess)
        {
            listBox1.Items.Add(smess);
        }
        public Form1()
        {
            InitializeComponent();
            myDelegate = new AddListItem(AddDebugText);
        }
        private void button1_Click(object sender, EventArgs e)
        {
            CAsynchronousIoServer sercver = new
    CAsynchronousIoServer(Convert.ToInt32(txtBoxPort.Text),this);
            sercver.Start();
        }          }
```

Основная форма



Основная форма



Основная форма

```
public class StateObject
{
    // Client socket.
    public Socket workSocket = null;
    // Size of receive buffer.
    public const int BufferSize = 256;
    // Receive buffer.
    public byte[] buffer = new byte[BufferSize];
    // Received data string.
    public StringBuilder sb = new StringBuilder();
    public Form1 frm;
}
```

Основная форма

```
public partial class Form1 : Form
    {
        Socket client=null;
        public delegate void AddItem(string str);
        public AddItem addRes;
        public void AddResponse(string str)
        {
            listBox1.Items.Add(str);
        }
        public Form1()
        {
            InitializeComponent();
            addRes = new AddItem(AddResponse);
        }
```

```
private void button1_Click(object sender, EventArgs e)
    {
        IPAddress ipAddress = IPAddress.Parse(textBox1.Text);
        IPEndPoint remoteEP = new IPEndPoint(ipAddress,
Convert.ToInt32(textBox2.Text));
        client = new Socket(AddressFamily.InterNetwork,
          SocketType.Stream, ProtocolType.Tcp);
        try
        {
            client.Connect(remoteEP);
        }
        catch(Exception ex)
        {
            MessageBox.Show("Не удалось подключиться к
серверу\n"+ex.Message);
            client = null;
        }
```

```
try
        {
            // Create the state object.
            StateObject state = new StateObject();
            state.workSocket = client;
            state.frm = this;

            // Begin receiving the data from the remote device.
            client.BeginReceive(state.buffer, 0,
   StateObject.BufferSize, 0,
                new AsyncCallback(ReceiveCallback), state);
        }
        catch (Exception ex)
        {
            MessageBox.Show("Ошибка определения
   обработчика получения данных\n" + ex.Message);
        }
}
```

```
private void button2_Click(object sender, EventArgs
    e)
    {
        if (client == null)
            return;
        byte[] byteData =
Encoding.Unicode.GetBytes(textBox3.Text);
        client.Send(byteData);
    }
```

```
private  static void ReceiveCallback(IAsyncResult ar)
      {          try
         {
      StateObject state = (StateObject)ar.AsyncState;
            Socket client = state.workSocket;
      int bytesRead = client.EndReceive(ar);
            if (bytesRead > 0)
            {
      string response = Encoding.Unicode.GetString(state.buffer, 0,
   bytesRead);
               state.frm.Invoke(state.frm.addRes, response);
               client.BeginReceive(state.buffer, 0, StateObject.BufferSize, 0,
                  new AsyncCallback(ReceiveCallback), state);
            }

         }
         catch (Exception e)
         {
            MessageBox.Show("Error\n" + e);
         }
      }
```

Литература

1. Дэрин Кили. Winsock. https://msdn.microsoft.com/ru-ru/library/dd335942.aspx