Parallel & Distributes Computing Project

Group Memebers:
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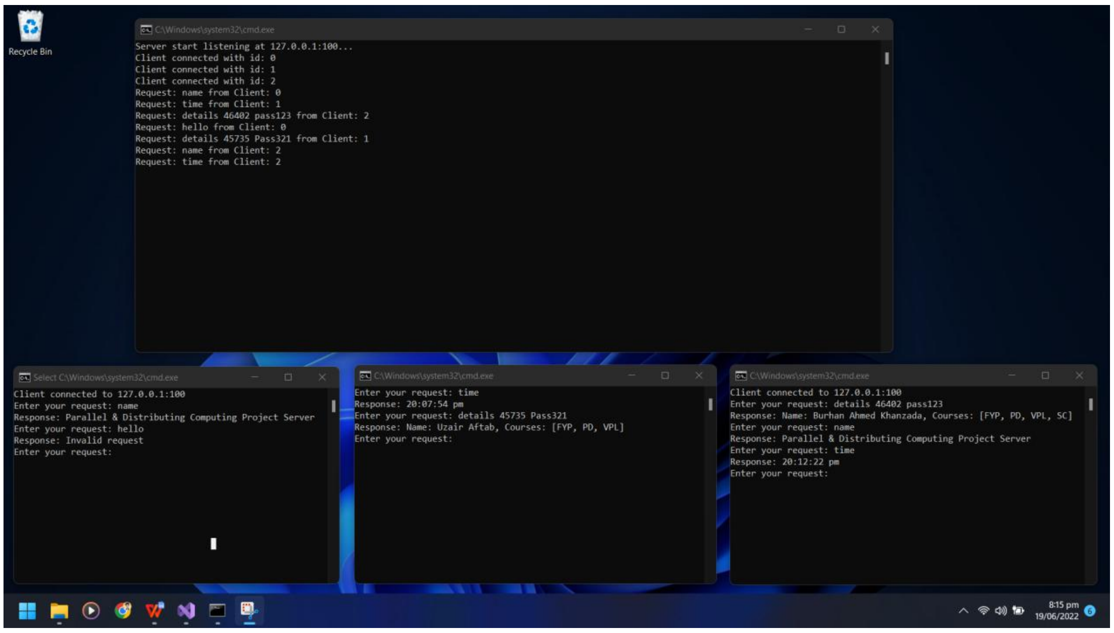
Server with multi request and multi client support


Recycle Bin
C:\Windows\system32\cmd.exe
Select C:\Windows\system32\cmd.exe
C:\Windows\system32\cmd.exe
C:\Windows\system32\cmd.exe
8:15 pm
19/06/2022

```
Server start listening at 127.0.0.1:100...
Client connected with id: 0
Client connected with id: 1
Client connected with id: 2
Request: name from Client: 0
Request: time from Client: 1
Request: details 46402 pass123 from Client: 2
Request: hello from Client: 0
Request: details 45735 Pass321 from Client: 1
Request: name from Client: 2
Request: time from Client: 2
```

```
Client connected to 127.0.0.1:100
Enter your request: name
Response: Parallel & Distributing Computing Project Server
Enter your request: hello
Response: Invalid request
Enter your request:
```

```
Enter your request: time
Response: 20:07:54 pm
Enter your request: details 45735 Pass321
Response: Name: Uzair Aftab, Courses: [FYP, PD, VPL]
Enter your request:
```

```
Client connected to 127.0.0.1:100
Enter your request: details 46402 pass123
Response: Name: Burhan Ahmed Khanzada, Courses: [FYP, PD, VPL, SC]
Enter your request: name
Response: Parallel & Distributing Computing Project Server
Enter your request: time
Response: 20:12:22 pm
Enter your request:
```

Here in this picture there is server running on top then three clients on bottom which send multiple request and get response on each one without any blocking.

We Use C# .Net Socket Programming with AsyncCallback on socket side to handle multiple clients at them same time and give back response to that client immediately.

Server call handle these requests:
name -> give server name as response
time -> give server time in hour:minutes format
details [id] [pass] -> this will give details of a user with matching id and password

Any other request will give response as invalid request

Here is Server Code:

```
using System;
using System.Collections.Generic;
using System.Net;
using System.Net.Sockets;
using System.Text;
using System.Threading.Tasks;

namespace Server
{
    internal class Program
    {

        static Socket serverSocket = new
Socket(AddressFamily.InterNetwork, SocketType.Stream, ProtocolType.Tcp);
```

```
        static List<Socket> clientSocketList = new List<Socket>();

        static byte[] buffer = new byte[1024];

        static void Main(string[] args)
        {
            SetupServer();
            Console.ReadLine();
        }

        static void SetupServer()
        {
            var ipEndPoint = new IPEndPoint(IPAddress.Loopback, 100);
            serverSocket.Bind(ipEndPoint);
            Console.WriteLine("Server start listening at {0}...", 
ipEndPoint.ToString());
            serverSocket.Listen(100);
            serverSocket.BeginAccept(new AsyncCallback(AcceptCallback), 
null);

            //while (true)
            //{
            //    Task.Delay(10000).Wait();
            //    SendAnnoucement("A new Annoucment");
            //}
        }

        static void AcceptCallback(IAsyncResult result)
        {
            var clientSocket = serverSocket.EndAccept(result);

            clientSocketList.Add(clientSocket);

            var clientId = clientSocketList.IndexOf(clientSocket);

            Console.WriteLine("Client connected with id: {0}", clientId);

            clientSocket.BeginReceive(buffer, 0, buffer.Length, 
SocketFlags.None, new AsyncCallback(ReceiveCallback), clientSocket);

            serverSocket.BeginAccept(new AsyncCallback(AcceptCallback), 
serverSocket);
        }

        public static void ReceiveCallback(IAsyncResult result)
        {
            var clientSocket = (Socket) result.AsyncState;

            var receiveLength = clientSocket.EndReceive(result);

            var request = Encoding.ASCII.GetString(buffer, 0, 
receiveLength);

            var clientId = clientSocketList.IndexOf(clientSocket);

            Console.WriteLine("Request: {0} from Client: {1}", request, 
clientId);

            String response = generateResponse(request);

            var responseBytes = Encoding.ASCII.GetBytes(response);

            clientSocket.BeginSend(responseBytes, 0, responseBytes.Length,
SocketFlags.None, new AsyncCallback(SendCallback), clientSocket);

            clientSocket.BeginReceive(buffer, 0, buffer.Length,
SocketFlags.None, new AsyncCallback(ReceiveCallback), clientSocket);
        }

        static String generateResponse(String request)
        {
            string[] tokens = request.Split(' ');

            if (tokens.Length > 1)
            {
                if (tokens[0] == "details")
                {
                    if (tokens[1] == "46402" && tokens[2] == "pass123")
                    {
                        return "Name: Burhan Ahmed Khanzada, Courses:
[FYP, PD, VPL, SC]";
                    }

                    if (tokens[1] == "45735" && tokens[2] == "Pass321")
                    {
                        return "Name: Uzair Aftab, Courses: [FYP, PD,
VPL]";
                    }
                }
            }

            if (request == "name") {
                return "Parallel & Distributing Computing Project Server";
            }

            if (request == "time")
            {
                return DateTime.Now.ToString("HH:mm:ss tt");
            }

            return "Invalid request";
        }

        static void SendCallback(IAsyncResult result)
        {
            Socket clientSocket = (Socket)result.AsyncState;
            clientSocket.EndSend(result);
        }

        static void SendAnnoucement(String annoucement)
        {

            var responseBytes = Encoding.ASCII.GetBytes(annoucement);

            Console.WriteLine("Start Broadcasting : {0}", annoucement);

            foreach (var socket in clientSocketList)
            {

                socket.BeginSend(responseBytes, 0, responseBytes.Length,
SocketFlags.None, new AsyncCallback(SendCallback), socket);

            }

            Console.WriteLine("End Broadcasting : {0}", annoucement);
```

```
                }
        }
}
```

Here is the Client Code:

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Net;
using System.Net.Sockets;
using System.Text;
using System.Threading.Tasks;

namespace Client
{
    internal class Program
    {

        static Socket clientSokcket = new
Socket(AddressFamily.InterNetwork, SocketType.Stream, ProtocolType.Tcp);

        static void Main(string[] args)
        {
            SetupClient();
            Console.ReadLine();
        }

        static void SetupClient()
        {
            try {
                clientSokcket.Connect(IPAddress.Loopback, 100);
                Console.WriteLine("Client connected to {0}",
clientSokcket.RemoteEndPoint.ToString());
                AskRequest();
            } catch (Exception e) {
                Console.WriteLine("Exception : {0}", e.Message);
            }
        }

        static void AskRequest()
        {
            while (true)
            {
                Console.Write("Enter your request: ");
                var request = Console.ReadLine();
                var requestBytes = Encoding.ASCII.GetBytes(request);
                clientSokcket.Send(requestBytes);
                PrintResponse();
            }
        }

        static void PrintResponse()
        {
            var buffer = new byte[1024];
            var receiveLength = clientSokcket.Receive(buffer);
            var response = Encoding.ASCII.GetString(buffer, 0,
receiveLength);
            Console.WriteLine("Response: {0}", response);
        }
    }
}
```