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Worksheet 1 – Introduction to .NET

.NET Classes required for practical classes

Covered topics:

- Binary files
- Sockets TCP
- ProtocoloSI

1. Binary Files

The following exercises are intended to show how you can manipulate a file in binary mode.

Exercises

1. Download the file:
   http://www.experian.com/blogs/data-breach/wp-content/uploads/2012/01/crime-scene-data-security.jpg
   and save to c:\temp named "security.jpg";

2. Create an application, *Windows Forms Application*, which copies file "security.jpg" to "bak_security.jpg" partially, i.e., reads and writes N (20480) bytes before proceeding to the next iteration:
   a. Use the class *FileStream* and, if necessary: *FileInfo* and *File*.

2. Sockets

Below are presented three exercises that will allow the use of the TCP protocol for exchange of information through network, and also check some of the properties of this protocol.

Exercises

1. Develop client / server scenario, *Console Application*, using 9999 as the port and that use the following classes:

a) Server:

- TcpListener
- TcpClient
- NetworkStream (.Read e .Write)

b) Client:

- TcpClient
- NetworkStream (.Read e .Write)

c) Both:

- Encoding.UTF8.GetString (Array)
- Encoding.UTF8.GetBytes(String)

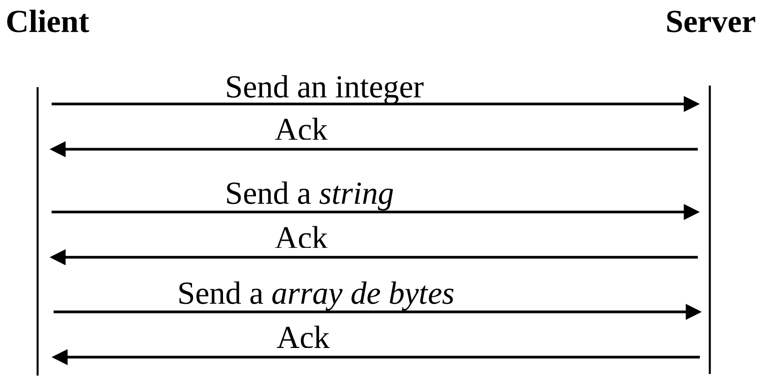
2. Implement the following exchange of information between client and server, so the server shows, in the terminal, information sent by the client:

a) Sending an integer;

b) Sending a *string*;

c) Sending an *array* de *bytes*;

Ensure that applications take caution with synchronization of communication between client and server, so that the following protocol is implemented:



3. ProtocolSI

The protocol is structured in a very simple way:

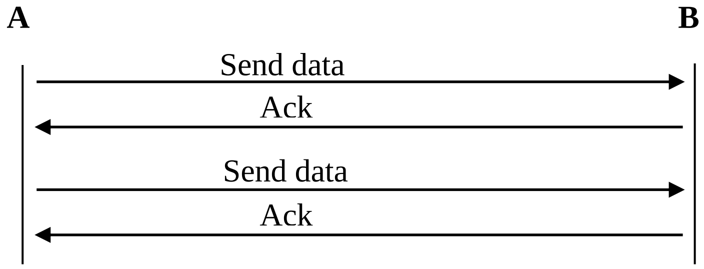
- The maximum size, in bytes, of each package is: 1403.

Command	Length of the data	Data
1 byte	2 bytes	until … 1400 bytes

- The first byte [**command**] indicates the command. The command meaning the purpose that we want to assign to the packet. There are several commands available: NORMAL, ACK, NACK, DATE, etc.. (see documentation. CHM)
- The second and third byte [**length of the data**] indicates how many bytes of data comes next.
- The remaining bytes [**data**] are the information you want to send / receive. In this implementation only can be sent up to 1400 bytes per packet.

To avoid problems using NetworkStream associated with the TcpClient and TcpListner, the communication should be synchronized as follows:

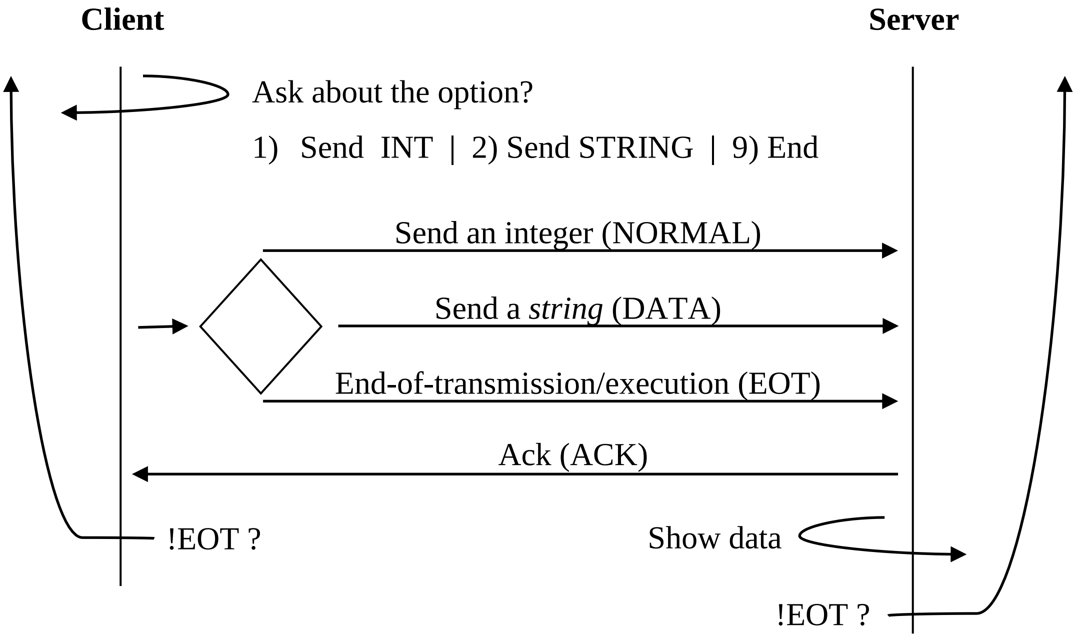
- each sending (.Write) must be associated with an ACK confirmation (.Read) of receipt.



Note: all applications to develop in practical classes will be 1 to 1, i.e., only a client and a server.

Exercise

1. Develop a new client / server scenario for using the ProtocolSI as showed in the next protocol:


Client
Server
Ask about the option?
1) Send INT | 2) Send STRING | 9) End
Send an integer (NORMAL)
Send a *string* (DATA)
End-of-transmission/execution (EOT)
Ack (ACK)
!EOT ?
Show data
!EOT ?