



FACULTY OF INFORMATION & COMPUTER ENGINEERING

Exam network system

**A Report Submitted to the Faculty of Computer and Informatics Engineering,
SPU, in Partial Fulfillments of the Requirements for the Degree of BSc in
Computer and Informatics Eng.**

Prepared by

Anas Setan Swedan

Jhady jhady

Mohammad Madian Kamal Eddin

Supervised by

Dr. Salah Eldo haji

All Copyrights © reserved for SPU

2014

العرفان بالجميل

نشكر جميع الدكاترة و الأساتذة و المهندسين الأفاضل في كلية هندسة الحاسوب والمعلوماتية جزيل الشكر والتقدير لمساندتهم لنا خلال السنوات الدراسية واهتمامهم الكبير بإنشاء جيل جديد قادر على متابعة مسيرة التقدم و التطور في مجال المعلوماتية في وطننا الغالي....

ونخص بالشكر:

- د.علي سكاف.
- د.سموؤل الحكيم.
- د.غسان النمر.
- د.صلاح الدوه جي.
- د.علي عواضة.
- د.احمد النجار .
- د.فادي ابراهيم .
- د.حسان أحمد.
- د.ياسم قصبية.
- د.بدر أحمد..

مع خالص الاحترام لدورهم الكبير في إنجاح هذا العمل وفائق الشكر والتقدير إلى كل من ساهم في إثراء الثروة المعلوماتية.

فكرة المشروع

يمكن تلخيص الفكرة العامة والأساسية التي يدور حولها مشروعنا إلى تصميم نظام, يسمح بالتفاعل بين المعلم والطلاب أو المتدربين بطريقة سهلة في الصف التعليمي عبر الشبكة المحلية بحيث يمكن هذا النظام المعلم من إدارة وضبط والتحكم بسير العملية التعليمية ويساعد المتعلم على استيعاب المادة المراد تعلمها .

ويتكون النظام من مكونين هما :

برنامج المعلم : وهو القسم الرئيسي من النظام ويُنصب على جهاز المعلم ذو المواصفات العالية بحيث يمكن هذا البرنامج المعلم من التحكم وإدارة المحاضرات والامتحانات في الصف التعليمي باستخدام الشبكة المحلية . ويقوم بنشر شاشة المعلم على جميع أجهزة الطلاب .

برنامج الطالب (الزبون) : وهو برنامج صغير يُنصب على جهاز المتدرب من أجل التفاعل من خلالها مع العملية التعليمية التي يديرها برنامج المعلم , ويقوم الطلاب من خلاله بتقديم امتحانات أتمتة على الشبكة حيث يرى الطالب من خلالها ما يتم إعطائه من محاضرات وشرح من خلال

إن عملية نشر شاشة المعلم تتألف من خمس مراحل وهي :

1. التقاط صورة لشاشة المعلم .
2. ضغط الصورة .
3. نقل الصورة المضغوطة عبر الشبكة .
4. فك ضغط الصورة المستقبلية .
5. عرض الصورة .

سوف نقوم بالتحدث عن النظام من خلال الوظائف والأعمال التي يقدمها لكل من المعلم والطلاب , حيث أن المعلم هو صاحب البرنامج الأساسي أو بمعنى آخر هو الـ administrator program الذي عن طريقه يتم بث المحاضرات على الشبكة وإعداد أسئلة الإمتحانات ومدة الإمتحان وسماحيات الدخول للإمتحان.

والطالب هو صاحب البرنامج الزبون الذي يتلقى المحاضرات والـ presentation بشكل مرئي، ويمكنه أيضا من الدخول إلى امتحانات مؤتمتة.

و يتلخص عمل النظام بالجوانب التالية :

❖ نشر شاشة المعلم على جميع أجهزة الطلاب :

حيث تتم عملية النشر هذه بالزمن الحقيقي , أي في اللحظة التي يتم فيها عرض الصفحة على جهاز المعلم يتم فيها توزيعها ونشرها على أجهزة الطلاب .

يأخذ النظام بالحسبان عدد الأجهزة التي يجري التوزيع عليها لأن هناك اختلاف في الزمن بين التوزيع على 5 والتوزيع على 25 جهاز .

▪ ربط قاعدة معطيات عبر الشبكة :

حيث تمكن هذه العملية اتصال جميع الأجهزة الموجودة على الشبكة بقاعدة معطيات وتمكن جميع الطلاب من الوصول إلى أسئلة الإمتحانات عن طريق إذن يصل عليه Server الطلاب من جهاز المحاضرة دون الحاجة إلى أن يضع كل طالب أداة التخزين(قاعدة المعطيات الحاوية على الأسئلة) في جهازه

1. مستلزمات النظام :

كما رأينا في مقدمة الدراسة النظرية , فان هناك العديد من الخدمات التي يؤمنها النظام , مما يوجب علينا بناء نظام متكامل يحقق أهداف المشروع .

و بما أن هذا التطبيق هو تطبيق شبكي, فلا بد من دراسة تفصيلية لبنية النظام , و الذي يعتمد على عمليات ذات كلفة كبيرة , من أهم هذه العمليات :

- ❖ نشر شاشة المعلم لجميع حواسب الطلبة بالزمن الحقيقي , و هذا يتطلب :
- التقاط صور لشاشة المعلم .
- ضغط هذه الصور .
- نقل هذه الصور المضغوطة إلى جميع حواسب الطلبة بالزمن الحقيقي .

تنقسم مستلزمات النظام إلى متطلبات عتادية و متطلبات برمجة .

● متطلبات عتادية :

- ❖ شبكة محلية (Ethernet LAN) بسرعة 10Mbps , و يفضل أن تكون Fast Ethernet
- ❖ حاسب مركزي (حاسب المعلم): يجب أن يكون ذو مواصفات جيدة نسبيا, لما يقوم به من عمليات ذات كلفة عالية .
- ❖ حواسب الطلاب : حواسب ذات مواصفات عادية .
- ❖ مبدل (Switch) بسرعة 10Mbps , 24Port .

Abstract

We will talk about the system through the functions that it reserve to the teacher and the student, where the teacher is program administrator which through him the lectures are broadcasted, make exam questions, determine the exam period and the exam enter permeations.

And the student is the client that receive the lectures and the presentations in visual manner, and may also enter to automated exams.

The project idea can be briefed in designing a system allows the interactive between the teacher and the students in easy manner in the teaching class through a local network where it enables the teacher to maintain and control the teaching operation and helps the learner to understand the desired subject.

This system consists of two parts:

- The teacher program:

It is the mean part of the system and it is installed on the teacher computer, where this program enables the teacher to maintain and control the lectures and the exams on the local LAN and broadcast the teacher screen to all computers

- The student program:

It is a small program which s installed on the student computer to interactive with the teaching operation managed from the teacher program, the students can also perform automated exams through this program where the student can see the lectures.

Broadcasting the teacher screen operation consists of 5 levels

- Take an image to the screen
- Compress the image
- Transfer the compressed image through the network
- Decompress the image
- Display the image.

Dedicate

To Sir Alkonnen and two races of our Prophet Muhammad peace be upon him.

To which is more expensive than that described, and greater than praise the ...

To the source of love that is inexhaustible, and the river tender

To the alphabet that cannot be described ...

Suffice it for me proud to committees under her feet

Mom

To the hand that gave the love and care

To my example and a source of pride in this life

To those who died with the right words in the goodness and humility verses

Dad

To whom I am proud and proud of them

Of them to feel stronger and I am the whole universe in hand

Brothers

Acknowledgment

We thank all the doctors and professors, distinguished engineers in the Faculty of Computer Engineering and Informatics thanks and appreciation for their support to us during the university years and substantial interest in the establishment of a new generation is able to follow the path of progress and development in information technology in our country....

Special thanks:

- Dr. Ali Skaf
- Dr.Salah Eldoh je.
- Dr.Gassan Elnemr
- Dr. Samowaal Alhakeem
- Dr. Ahmad Alnajar
- Dr.Ali Awada
- Dr. Hassan Ahmad .
- Dr. Basem Qusaieba.
- Dr. Bader Ahmed.
- Dr. Raghad Alnajim.
- Dr. Mousa al-Hajj Ali.

With my sincere respect for their role in the success of this work and its profound thanks and appreciation to all those who contributed to the enrichment of wealth information.

Introduction:

The modern technology served ways and tools that had played a big turn in the development of teaching and learning in recent years which gave the chance to improve the learning manners which helped to increase the interest of the students and encouraged them ,and because this revolution continued to become larger and spread ,the computer was produced which is not only a big step but also combination to the past invents used in teaching and learning.

The fields of the computer use varies in teaching from using it as a teaching tool to the development of the teaching manners using computers, or using modern manners through which the computer can perform the goals of the subjects .

The huge development in physical networks led to the appearing of applications that interest in transferring the voice and the image on the network according to end to end rule.

The applications must be transferred in a narrow specific period and to ensure of not interacting events which means to ensure of finishing the process of that event before arriving the next event .

We saw that the development of the RTP systems helps the human in the fields of learning and teaching which helps in managing and controlling the teaching operations which make easy to get benefit of optimize the time and to optimize the content of the subjects.

There are a set of the various fields in which the computer can be used in teaching as:

First: Using the computer in managing the teaching operation:

This kind of programs is called service programs for the teacher and the student because the teacher spend a lot of time in preparing for the tests and checking them and putting a studying plan and organizing the students activities and so on. So different programs appeared which aid the teacher in doing routine works.

The computer also was used as a tool in managing the educational organizations and collecting information and storing it in specific ways and designs that leads to save time to get the information. Like checking the students information and to monitor there progress etc.

Second: Using the computer as a teaching tool in the teaching approaches: In spite of the various teaching manners which aid the teacher to explain the lesson and clear the mystery and avoiding the difference between the students. But these old manners was inefficient which made necessary to find efficient way and reserving the alternative experience and expressing the poor relations in visual manner.

The experts found there need in the computer which has the ability to be useful in doing various goals. Where it can be used to display ,process and store information.

We will talk about the system through the functions that it reserve to the teacher and the student, where the teacher is program administrator which through him

the lectures are broadcasted, make exam questions, determine the exam period and the exam enter permeations.

And the student is the client that receive the lectures and the presentations in visual manner, and may also enter to automated exams.

We can brief the aim of the program in the following:

1- broadcasting the screen of the teacher to all computers:

Where the broadcasting operation is accomplished in real time, that in the moment in which the presentation of the page is done on the computer of the teacher it is sent and displayed on the computers.

2-connect the database through the network:

Where this operation enable all computer's network to connect the SQL server database, and allow to students to access to exam's questions by a permission got it from the computer server and it does not need that each student to store the database on his computer.

CHAPTER 1: Theoretical study

1.1 System requirement:

As we saw before there are several services that the system provide which made must to build an integrated system to do the project goals.

Because this application is a network application, so we must study the architecture in detail, which depends on high cost operations like:

broadcasting the screen of the teacher to all computers in real time which requires:

- taking pictures to the teacher screen
- compress the images
- transferring the compressed images to all computers in real time

system requirements are divided into hardware and software requirements

1- hardware requirements:

- Ethernet LAN with 10Mbps speed, it rather be fast Ethernet
- Server computer(the teacher computer): it must be with good characteristic because of the high cost operations it performs
- Students computers: normal characteristic
- Switch with 10Mbps speed and 24 ports

The next network scheme illustrate the virtual class architecture as a hardware so it will illustrate the necessary hardware requirements to accomplish this project successfully

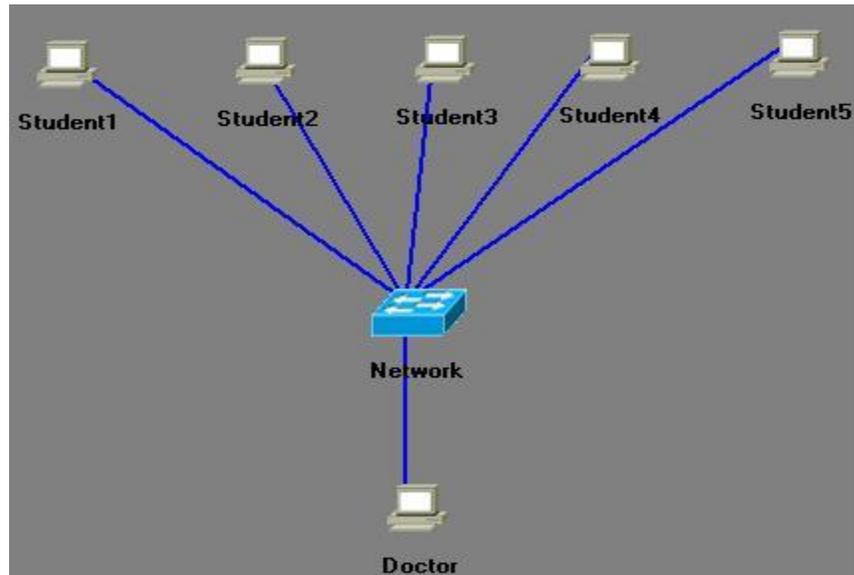


Figure (1) illustrates the hardware architecture of the virtual class

2-Software requirements

- Compressing the transferred data technique
- SQL Server program to be installed on the doctor computer
- Frame Work .NET program on all computers within the doctor computer

The software requirements must apply many rules which will be discussed next.

1.2 The project idea:

The project idea can be briefed in designing a system allows the interactive between the teacher and the students in easy manner in the teaching class through a local network where it enables the teacher to maintain and control

the teaching operation and helps the learner to understand the desired subject.

This system consists of two parts:

- The teacher program:

It is the main part of the system and it is installed on the teacher computer, where this program enables the teacher to maintain and control the lectures and the exams on the local LAN and broadcast the teacher screen to all computers

- The student program:

It is a small program which is installed on the student computer to interact with the teaching operation managed from the teacher program, the students can also perform automated exams through this program where the student can see the lectures.

Broadcasting the teacher screen operation consists of 5 levels

- Take an image to the screen
- Compress the image
- Transfer the compressed image through the network
- Decompress the image
- Display the image

NOTE:

Because the last levels are related (we can not start a new level except when the last level is done) so the performing period of each level is equal to the longest performing period

Now we will calculate the longest performing period:

The quality condition makes it necessary to be the frames show rate more than 15 frames per second :

So the longest performing period ETime

$$E\text{Time} = \frac{\text{Time}}{\text{Frame Rate}}$$

$$E\text{Time} = \frac{1}{16} \text{ second}$$

$$E\text{Time} = 62.5 \text{ ms}$$

So the longest performing period must not exceed 62.5ms

1.3 Bandwidth:

As we saw in the hardware requirements, the available bandwidth is 10Mbps so we will determine the maximum frame size transferred on the network

The size of data that must be sent in one second supposing the screen size is 1024*768 and in 3Byte deep

$$\text{Frame size} = 3 * 768 * 1024 =$$

$$= 2.25 \text{ mbyte}$$

$$\text{Transferred data size} = \text{Frame Rate} * \text{Frame size}$$

$$* \quad 16 \quad = \quad \text{mbyte } 2.25$$

$$= \quad 36\text{mbyte/second}$$

$$= \quad 288\text{mbps}$$

We notice that the size of data to be sent is 29 times the available bandwidth, and the data size is very big so we have to reduce it. To do that we can:

1-Compress the data being attention to the time condition which determines the performing period of each level less than 62.5ms

2-turn the size of the teacher screen to the least acceptable size

3-reduces the display depth on the teacher screen

Now and depending on the bandwidth condition we will calculate the frame size that must be accomplished using the past ways

$$\text{Frame size after processing} = \text{Bandwidth/Frame rate}$$

$$= \quad 10\text{Mbit} / 16$$

$$= \quad 0.625 \text{ Mbit}$$

$$= \quad 78.125\text{Kbyte}$$

So the size of the frame that we well to send must be after the processing less than 78.125Kbyte

Abstract:

The time condition: the length of the longest performing period must not exceed 62.5ms

The bandwidth condition: the sent frame after the processing must be less than 78.125Kbyte

1.4 Techniques used in the project:

Sockets:

A socket is an object that represents a low-level access point to the IP stack. This socket can be open or closed or one of a set number of intermediate states. A socket can send and receive data down this connection. Data is generally sent in blocks of a few kilobytes at a time for efficiency; each of these blocks is called a packet

Table 1 Types of protocol

Port Number	Protocol
20	FTP data
21	FTP control
Port Number	Protocol
25	SMTP (email, outgoing)
53	DNS
80	HTTP (Web)
110	POP3 (email, incoming)
143	IMAP (email, incoming)

All packets that travel on the Internet must use the Internet protocol.

This means that the source IP address, destination address must be included in the packet. Most packets also contain a port number. A port is simply a number between 1 and 65,535 that is used to differentiate higher protocols, such as email or FTP (Table 3.1). Ports are important when it comes to programming your own network applications because no two applications can use the same port. It is recommended that experimental programs use port numbers above 1024.

Packets that contain port numbers come in two flavors: UDP and TCP/IP. UDP has lower latency than TCP/IP, especially on startup. Where data integrity is not of the utmost concern, UDP can prove easier to use than TCP, but it should never be used where data integrity is more important than performance; however, data

sent via UDP can sometimes arrive in the wrong order and be effectively useless to the receiver. TCP/IP is more complex than UDP and has generally longer latencies, but it does guarantee that data does not become corrupted when traveling over the Internet. TCP is ideal for file transfer, where a corrupt file is more unacceptable than a slow download; however, it is unsuited to Internet radio, where the odd sound out of place is more acceptable than long gaps of silence.

User Datagram Protocol UDP

This means that the data will be bundled up with information that will be used by IP routers to ensure that the data can travel anywhere it wishes in the world. UDP data is not bundled with headers that track message integrity or security.

Furthermore, the receiving end is not obliged to reply to the sender with acknowledgments as each packet arrives. The elimination of this requirement allows UDP data to travel with much lower latency than TCP. UDP is useful for small payload transfers, where all of the data to be sent can be contained within one network packet. If there is only one packet, the out-of-sequence problems associated with UDP do not apply; therefore, UDP is the underlying protocol behind DNS.

The purpose of the UDP server is to detect incoming data sent from the UDP client. Any new data will be displayed in a list box.

The methods of UDP:

Table 1 kinds

Method or Property	Purpose
Constructor	Initializes a new instance of the <code>UdpClient</code> class. For client UDP applications, this is used as <code>new UdpClient (string, int)</code> ; for servers use <code>new UdpClient (int)</code> .
<code>Close()</code>	Closes the UDP connection.
<code>DropMulticastGroup()</code>	Leaves a multicast group.
<code>JoinMulticastGroup()</code>	Adds a <code>UdpClient</code> to a multicast group. This may be invoked thus: <code>JoinMulticastGroup(IPAddress)</code> .
<code>Receive()</code>	Returns a UDP datagram that was sent by a remote host. This may be invoked thus: <code>Receive(ref IPEndPoint)</code> . Returns <code>Byte[]</code> .
<code>Send()</code>	Sends a UDP datagram to a remote host. This may be invoked thus <code>Send(byte[], int)</code> .
<code>Active</code>	Gets or sets a value indicating whether a connection to a remote host has been made. Returns <code>Bool</code>
<code>Client</code>	Gets or sets the underlying network sockets. Returns <code>Socket</code> .

Using TCP/IP to transfer files

Most networked applications use TCP/IP because there is no risk of data becoming corrupted while traveling over the Internet. It is said to be connection oriented; that is, both client and server after a setup phase treat a set of IP packets as being sent along a virtual channel, allowing for data that is too large to fit into a single IP packet to be sent and for retransmission to occur when packets are lost.

This sample application will allow you to send any file from one computer to another. Again, it is client/server based, so you will need either two computers or to run both the client and server on the same computer.

[We will see a set of principles and terms that will be used with RTP protocol like:](#)

- RTP payload:

The transferred data in packages using RTP like audio samples or compressed video like the port to select the RTP session

- Transport address:

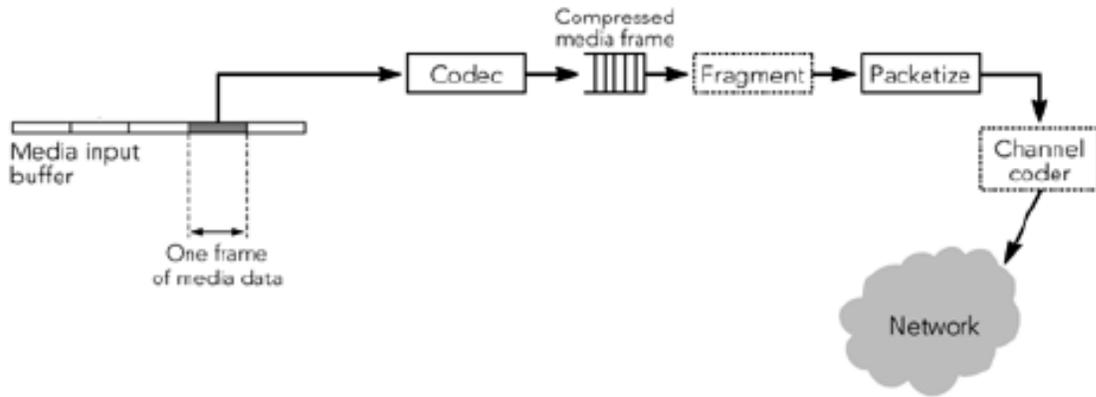
It consists of IP address and the port which determine the end-point like (UDP port ,IP address) and the packages are sent from source address to Non-RTP

This protocol is used mainly for multicast conference which lays on the application layer and built on the UDP protocol to perform new services that the UDP does not do and to benefit of the selecting services and find the mistakes

Another example to the translator includes connecting a set of hosts the talk just UDP/IP with a set of hosts that just understand ST-II, where it changes the encoding of the video burst from single resources without resynchronizing or joining Layered Encoding

Multimedia applications must be able to organize or to adjust the rate of the transfer to fit the ability of receiving PC or to decrease the jam on the network, where many applications depend on the source to justify but it does not work good with multicasting because of the different bandwidth at the receiving points

So we will depend on that on the receiving point by combining the encoding layers with transport layers in the system, where it can be allowed to the receivers to condition with network



Figure(5) illustrates the sending way

Chapter2: Perform our project

2.1 Introduction to the .NET framework:

- The .NET Framework is a new API that helps programmers to write applications for the Windows platform.
- .NET enables to write programs or applications for distributed environment (Web services, Web applications).
- .NET offers an application development called Visual Studio .NET that consists of several programming languages, such as Visual Basic .NET, Visual C#, Visual FoxPro and Visual C++ .NET.
- NET Framework base classes:
- Exceptions
 - .NET framework is designed to handle exceptions.
 - Try {}, catch {}, finally {}
- Threads
 - A thread is single executable sequence of code.
 - It is good practice to execute different sections of the application code, which are independent and parallel to each other.
- Delegates
 - Delegates are objects that allow to pass methods as parameters to another method.
 - In C#, events are special types of delegates that are designed to trap an event (keypress, move of the mouse).

2.2 Introduction to C#:

- C# is advanced version of C and C++ and is designed specially for the .NET environment.
- C#, pronounced *C sharp*, is a new object-oriented language used by programmers worldwide to develop applications that run on the .NET platform.
- C# builds on the features of C, C++, Visual Basic (VB), and Java.
 - The power of C.
 - Object-Oriented of C++.
 - Graphical interface of VB.
 - Byte code of java.
- Variables
 - `<modifiers> <data type> <variable1, variable2, ...>;`
 - `public int x = 10;`

Now we will explain design the forms and we will start with the

2.3 main form on server program:

This part of program will work on capture desktop and send the picture of desktop for every user on the network.

And by this form we can move to other forms such as Questions and Students Records forms which we talk about them later.

And by this form I can send the password for Students until they can enter to exams on the net work.

And by this form I can send duration for any exams to student for finish exam when duration is time out and lock form.

- from project file we select new project as figure1:

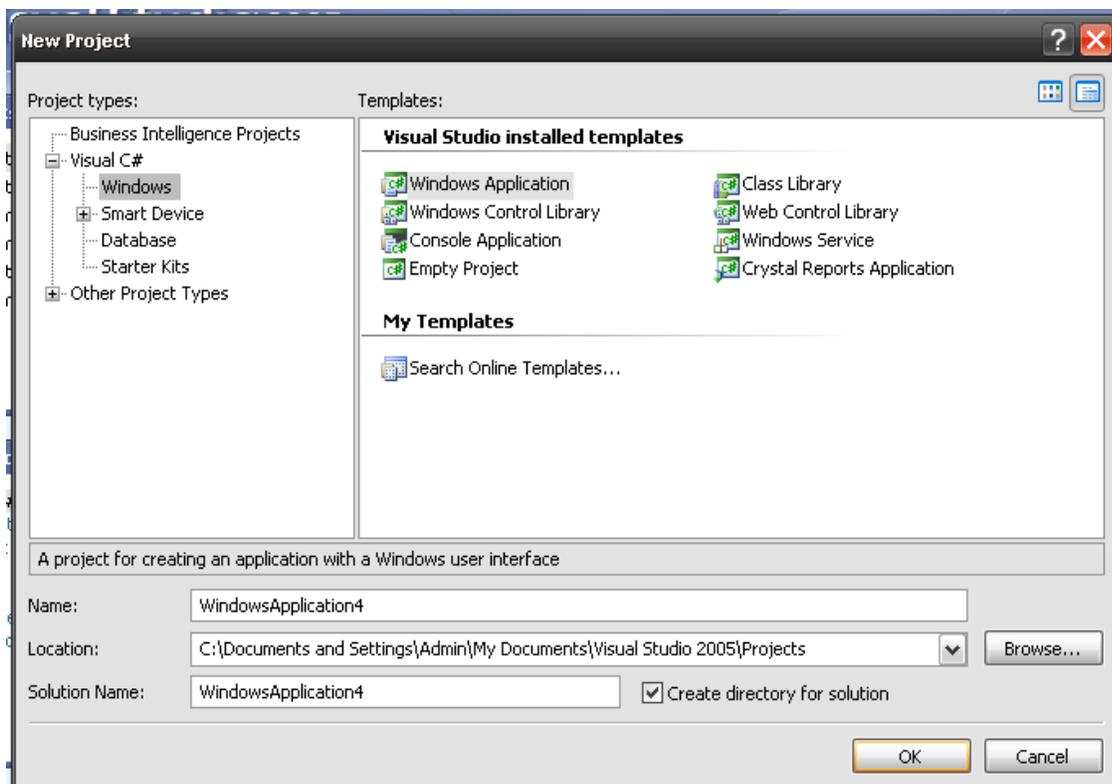
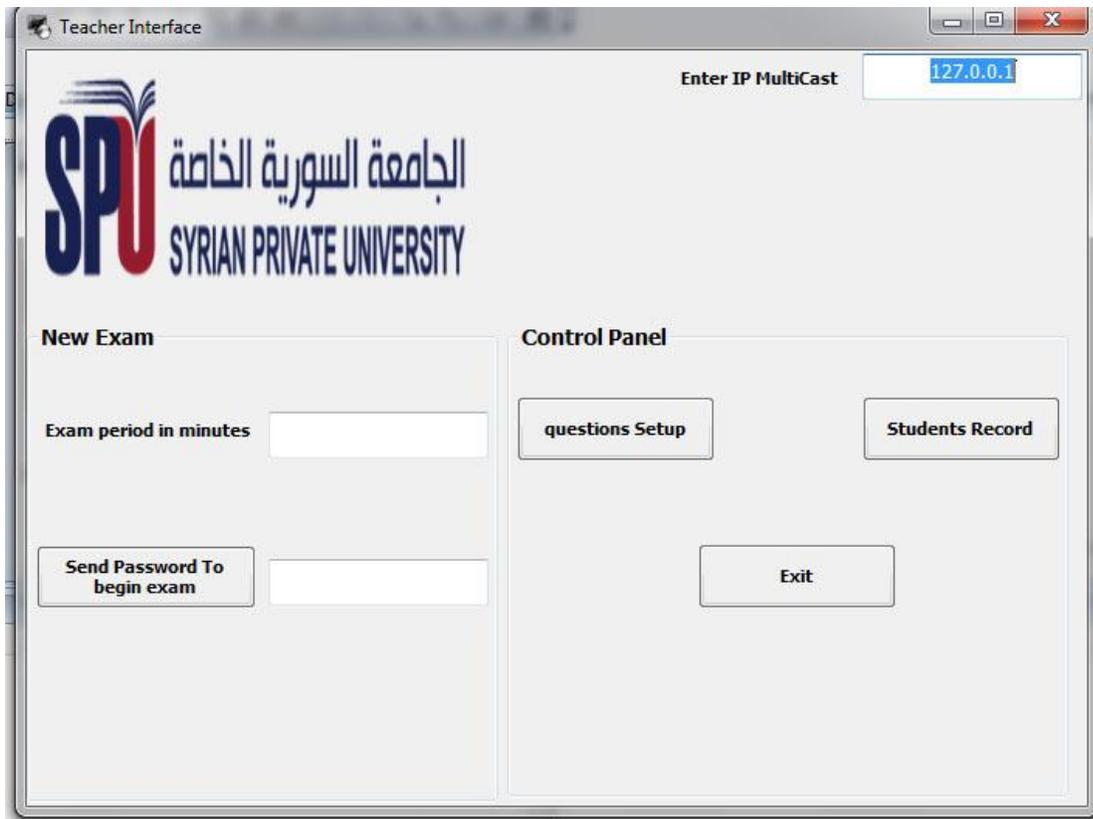


Figure (6) Type of frames

We must select visual C# project then determine the name of project and select windows application to create the main form then press ok , the result illustrated in the figure:



Figure(7) Teacher page

This form consist of :

1. questions Setup button
2. students Record button
3. send password button

4. send duration of exam button
5. IP broadcast Textbox
6. Exit

Then from project menu we select add class this class will present the most important part in server program this class perform capture to desktop and return picture to desktop:

There is no need to understand this code because you can got it from this reference: www.charlespetzold.com this site about programming windows the name of book is Programming Microsoft Windows with C# by Charles Petzold Microsoft Press (C) 2002

```
public static Bitmap GetDesktopImage()  
  
    {  
  
        //In size variable we shall keep the size of the screen.  
  
        SIZE size;  
  
        //Variable to keep the handle to bitmap.  
  
        IntPtr hBitmap;  
  
        //Here we get the handle to the desktop device context.  
  
        IntPtr hDC =  
PlatformInvokeUSER32.GetDC(PlatformInvokeUSER32.GetDesktopWindow());  
  
        //Here we make a compatible device context in memory for  
screen device context.  
  
        IntPtr hMemDC = PlatformInvokeGDI32.CreateCompatibleDC(hDC);
```

```

        //We pass SM_CXSCREEN constant to GetSystemMetrics to get the
X coordinates of screen.

        size.cx =
PlatformInvokeUSER32.GetSystemMetrics(PlatformInvokeUSER32.SM_CXSCREEN);

        //We pass SM_CYSCREEN constant to GetSystemMetrics to get the
Y coordinates of screen.

        size.cy =
PlatformInvokeUSER32.GetSystemMetrics(PlatformInvokeUSER32.SM_CYSCREEN);

        //We create a compatible bitmap of screen size using screen
device context.

        hBitmap = PlatformInvokeGDI32.CreateCompatibleBitmap(hDC,
size.cx, size.cy);

        //As hBitmap is IntPtr we can not check it against null. For
this purpose IntPtr.Zero is used.

        if (hBitmap != IntPtr.Zero)
        {

                //Here we select the compatible bitmap in memory device
context and keeps the reference to Old bitmap.

                IntPtr hOld =
(IntPtr)PlatformInvokeGDI32.SelectObject(hMemDC, hBitmap);

                //We copy the Bitmap to the memory device context.

                PlatformInvokeGDI32.BitBlt(hMemDC, 0, 0, size.cx,
size.cy, hDC, 0, 0, PlatformInvokeGDI32.SRCCOPY);

                //We select the old bitmap back to the memory device
context.

                PlatformInvokeGDI32.SelectObject(hMemDC, hOld);

                //We delete the memory device context.

                PlatformInvokeGDI32.DeleteDC(hMemDC);

```

```

        //We release the screen device context.
PlatformInvokeUSER32.ReleaseDC(PlatformInvokeUSER32.GetDesktopWindow(), hDC);

        //Image is created by Image bitmap handle and stored in
local variable.

        Bitmap bmp = System.Drawing.Image.FromHbitmap(hBitmap);

        //Release the memory to avoid memory leaks.

PlatformInvokeGDI32.DeleteObject(hBitmap);

        //This statement runs the garbage collector manually.

GC.Collect();

        //Return the bitmap

        return bmp;
    }

    //If hBitmap is null return null.

    return null;
}

```

Note: There is no need to understand this code because you can get it from this reference: www.charlespetzold.com the name of book is *Programming Microsoft Windows with C#* by Charles Petzold Microsoft Press (C) 2002.

Then what I should do? Yes, I will type code to broadcast button in this button I will run the timer but the timer in every tick will perform the following:

- Call function `GetDesktopImage()` which exist in previous class.
- Call function to resize bitmap which is Returned from class.

- Save this picture in memory.
- Convert this picture to array of bytes to initialize it to send.
- Create socket on network adapter .
- Create End-point on IP address on one of ports on network adapter.
- Then send picture by socket to end-point (port).
- Then close this socket.

Now we will talk about resize function:

There is a library re draw picture *DrawImage* this function will returned Image but this Image is resized as we like by pass tow parameters for width and for height.

```
private void button1_Click(object sender, EventArgs e)
{
    try
    {
        Capturing.Enabled = true;
    }
    catch { }
}

private void Capturing_Tick(object sender, EventArgs e)
{
    try
    {
        Bitmap bt = new Bitmap(CaptureScreen.GetDesktopImage());
```

```

        Image pic = ResizeBitmap(bt, 600, 400);

        MemoryStream ms = new MemoryStream();

        pic.Save(ms, System.Drawing.Imaging.ImageFormat.jpeg);

        byte[] arrImage = ms.ToArray();

        Socket server = new Socket(AddressFamily.InterNetwork,
SocketType.Dgram, ProtocolType.Udp);

        IPEndPoint iep = new IPEndPoint(IPAddress.Parse(textBox2.Text),
5000);

        server.SendTo(arrImage, iep);

        server.Close();

    }

    catch

    {

    }

}

public Bitmap ResizeBitmap(Bitmap b, int nWidth, int nHeight)
{

    Bitmap result = new Bitmap(nWidth, nHeight);

    using (Graphics g = Graphics.FromImage((Image)result))

        g.DrawImage(b, 0, 0, nWidth, nHeight);

    return result;

}

```

In Textbox2 the Professor type IP broadcast for the network which he/she work on it, because We created end-point on this IP broad cast.

NOTE: IP broadcast for any network is the last IP in the network.

For example: we have the network as the following: from 192.168.0.0 to 192.168.0.255 the first IP will be IP address of this network (192.168.0.0) this IP unused it is just for know the net work, but the last IP will be IP address for broadcast for this network (192.0.0.255).

The stop broadcast button for stop timer tick and stop capturing and stop sending picture, for this task just type the following:

```
Capturing.Enabled = false;
```

For this time we finished the part of server program which show Professor desktop for the computers student.

Questions form on server program:

By this form the professor can put Questions and true answer for every question for exams, and he can clear the data base for another exams and he can just update the questions. this form attached to SQL server program which is contains on data base for questions, and we can see how can I attached this form to SQL server data base then we see programming of every button on this form

Teacher Questions Control Panel

No. 0

How are data stored in the internal memory?

1 Bytes

2 Words

3 1+2

No. of true answer

0

Update

Add New

First

Prev

Clear all

Insert

Return

Last

Next

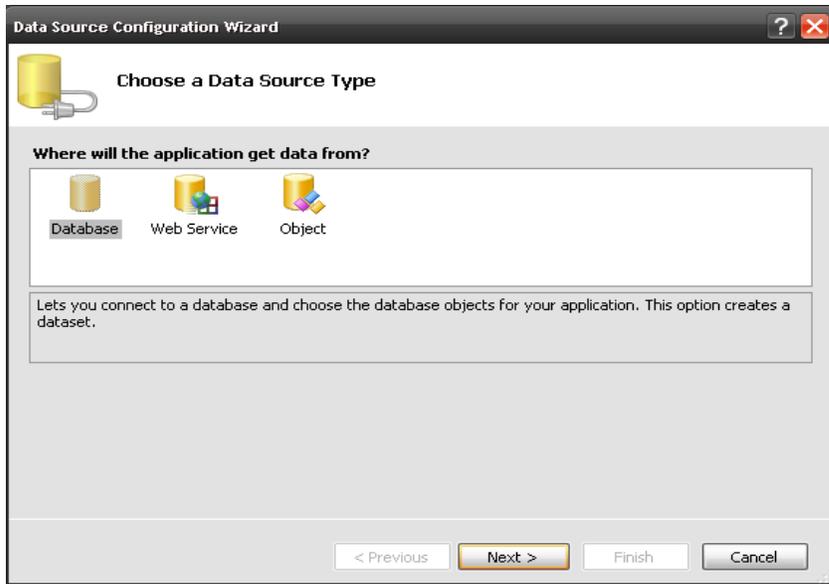
Exit

SPU
الجامعة السورية الخاصة
SYRIAN PRIVATE UNIVERSITY

Figure(8) Teacher question

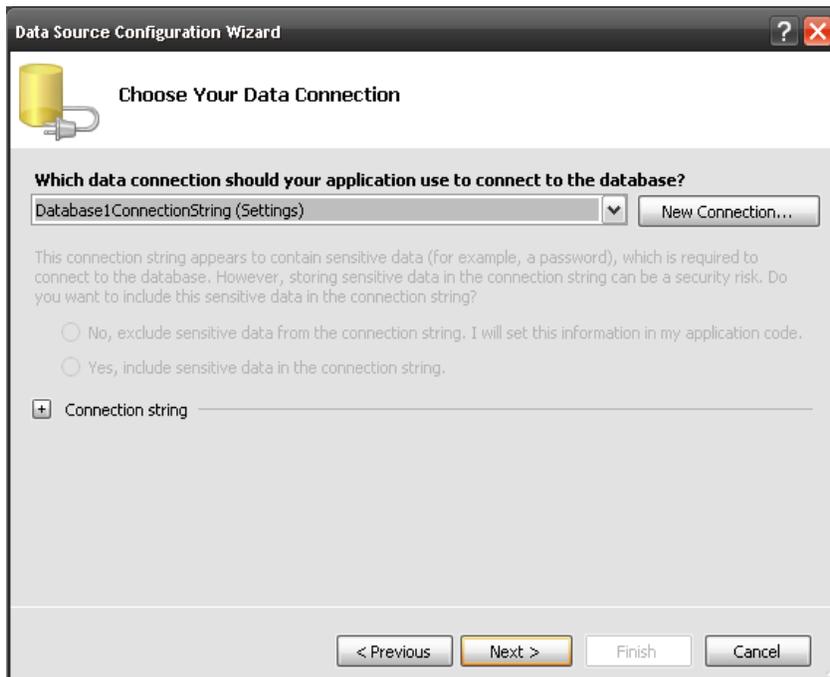
For connecting this form to data base do as the following:

- From data menu select add new data source the following window will appear:



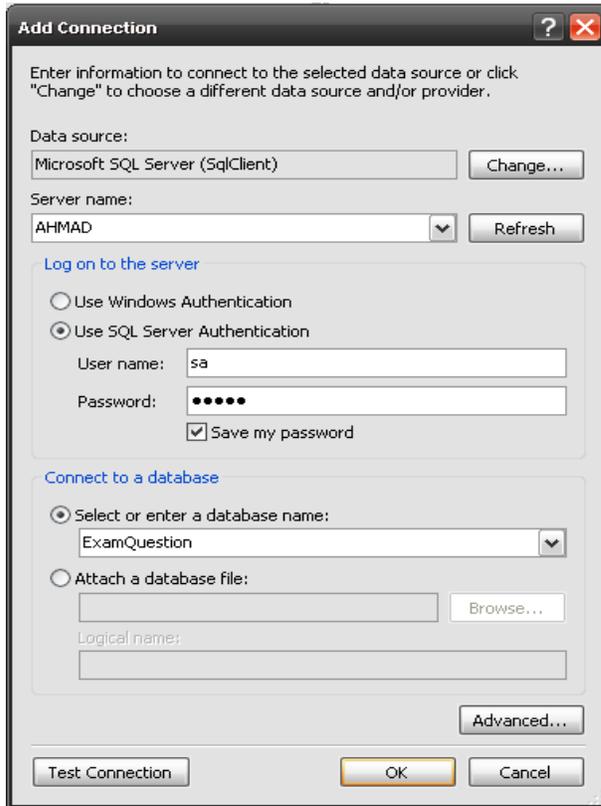
Figure(9)Type of Data Base

- select data base then next the following window will appears:



Figure(10) Data base Siting

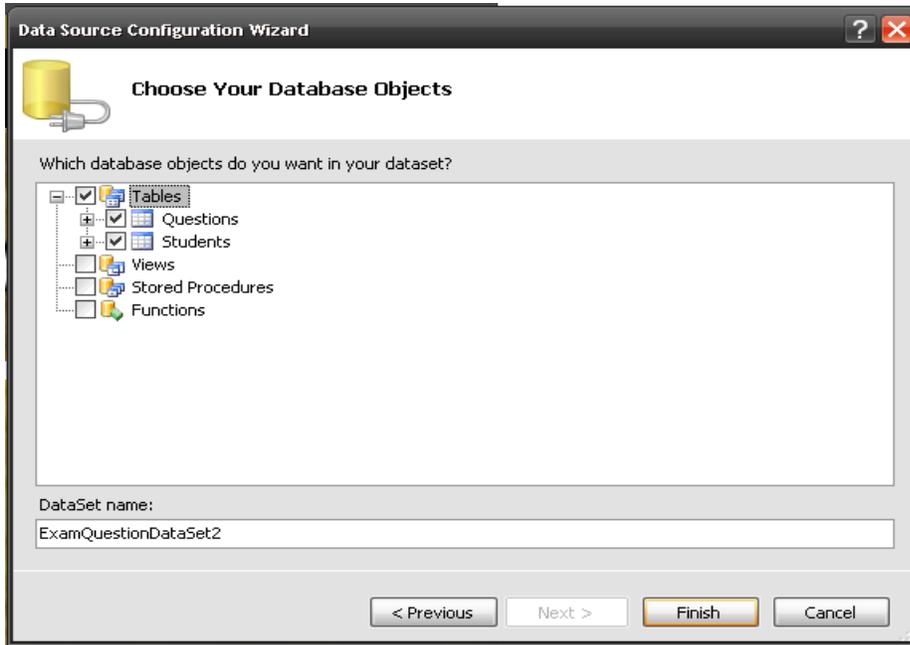
- now select new connection the next frame will be appears:



Figure(11) Add connection

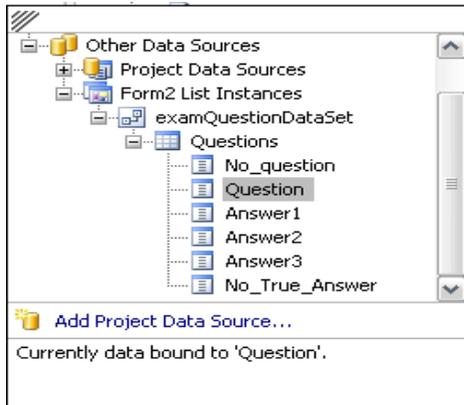
Now you must select data source type is Microsoft SQL server then in server name field select the name of computer that is contains of the SQL server program and attached to your network. And select use *SQL server authentication* instead of *use windows authentication* and type username and password to next tow fields. And select data base name from first field in

connect to data base. You can press test Connection button to testing. then press ok, now press next on the window appears. Now this winow appears:



Figure(12) Data base source

Now choose your data source objects, we select both of Questions and Students tables to add them to our project, then select finish. Now we can see the data base on the uplift corner. Now we determine the textbox1 for example and from its properties we expand *Data Binding* and from text we can see the following :



Figure(13) Type of question

We must select the column which we want to attach this textbox with it.

This information will stored on in *app.config* as the following:

```
<add  
name="WindowsApplication3.Properties.Settings.ExamQuest  
ionConnectionString"  
        connectionString="Data Source=AHMAD;Initial  
Catalog=ExamQuestion;Persist Security Info=True;User  
ID=sa;Password=12345"  
        providerName="System.Data.SqlClient" />
```

when I want to change the server name I just will put the new server name in this code instead of AHMAD or IP address. And such for other textboxes and other column.

Let us see the buttons code :

- Add New:

this to move at the last position to let us add and insert new data in insert button:

```
private void button10_Click(object sender, EventArgs e)
{
    this.BindingContext[this.examQuestionDataSet,
    "Questions"].EndCurrentEdit();

    this.BindingContext[this.examQuestionDataSet,
    "Questions"].AddNew()

        textBox2.Clear();

        textBox3.Clear();

        textBox4.Clear();

        textBox5.Clear();

        textBox6.Clear();

}
```

- Insert button:

```
private void button1_Click(object sender, EventArgs e)
```

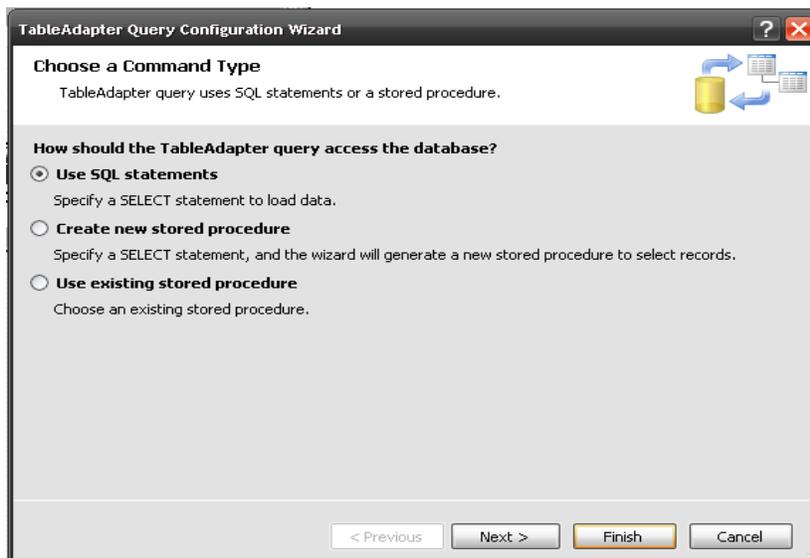
```

    {
this.questionsTableAdapter.InsertQuery(Int32.Parse(textBox1.Text), textBox2.Text, textBox3.Text, textBox4.Text, textBox5.Text, Int32.Parse(textBox6.Text));
    }

```

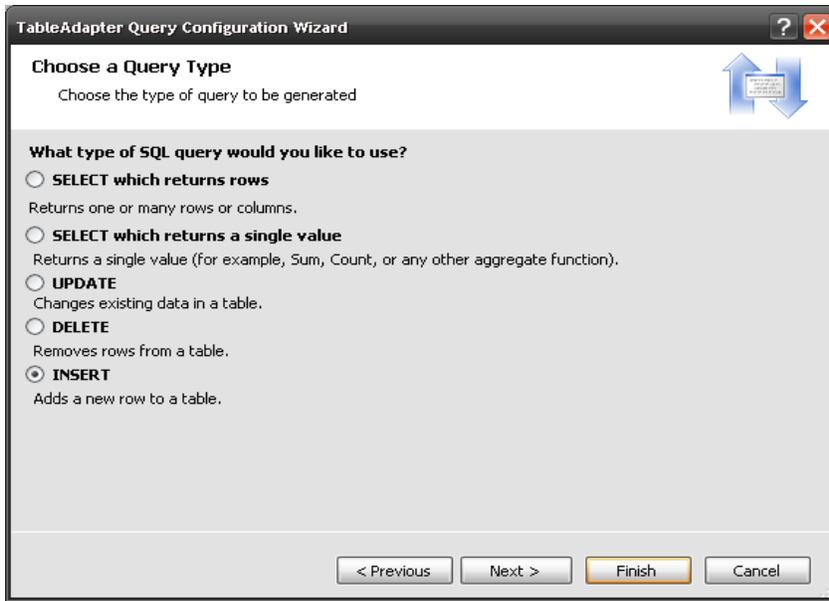
But of course I do Insert query before as the following:

From dataset `examQuestionDataSet` right click then add query, the following window will appears:



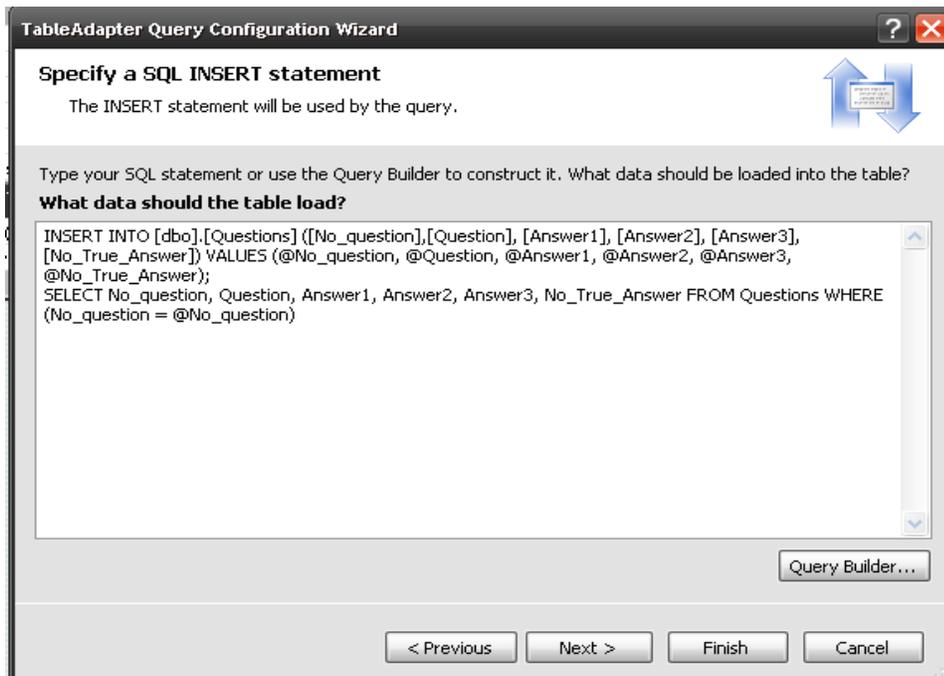
Figure(14) Table adapter

Select *Use SQL statements* then next:



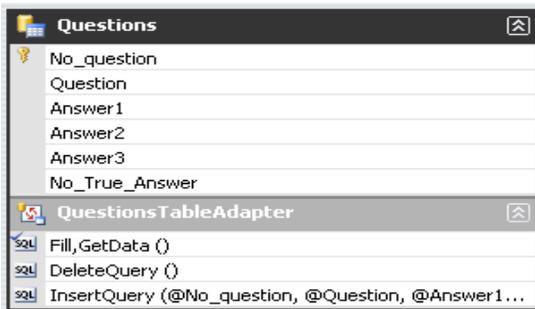
Figure(15) Table Adapter

Choose a query type *INSERT* then next:



Figure(15) Table adapter

Type the query to insert record as we see in this figure. then finish. At the same way we add delete query to this dataset for clear all button. Now the data set will be appears as the following:



Figure(16) Question Table

- Clear all button:

```
private void button9_Click(object sender,
EventArgs e)
{
```

```
this.questionsTableAdapter.DeleteQuery();
```

```
examQuestionDataSet.Clear();
```

```
}
```

- Update button:

```
private void button2_Click_1(object sender, EventArgs
e)
```

```
    {  
  
    this.questionsTableAdapter.Update(this.examQuestionData  
Set.Questions)  
  
    }
```

- Control buttons(next, prev, last, first) as the following:

```
private void button3_Click(object sender, EventArgs e)
```

```
    {  
  
    this.BindingContext[this.examQuestionDataSet,  
"Questions"].Position = 0;
```

```
    }
```

```
        private void button4_Click(object sender,  
EventArgs e)
```

```
    {  
  
    this.BindingContext[this.examQuestionDataSet,  
"Questions"].Position--;
```

```
    }
```

```
private void button5_Click(object sender,  
EventArgs e)
```

```
{
```

```
this.BindingContext[this.examQuestionDataSet,  
"Questions"].Position++;
```

```
}
```

```
private void button6_Click(object sender,  
EventArgs e)
```

```
{
```

```
this.BindingContext[this.examQuestionDataSet,  
"Questions"].Position =
```

```
this.BindingContext[this.examQuestionDataSet,  
"Questions"].Count - 1;
```

```
}
```

- Return and Exit buttons:

```
private void button7_Click(object sender, EventArgs e)
```

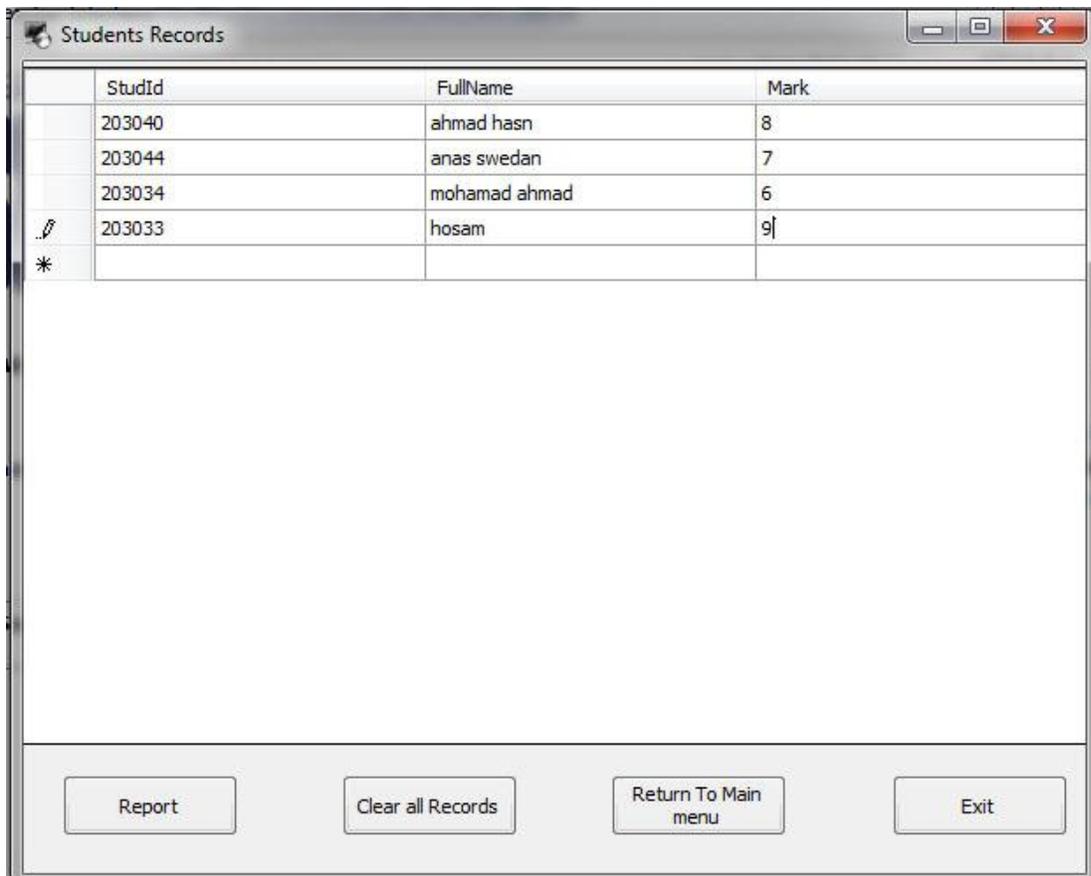
```
{  
  
    this.Close();  
  
}
```

```
private void button8_Click(object sender, EventArgs e)
```

```
{  
  
    Application.Exit();  
  
}
```

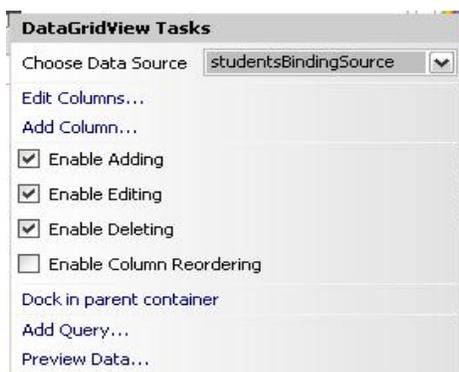
2.4 Students Records form on server program:

This is a simple form just for view students records, by this form the professor can see all students records. This form consist of data grid and three simple buttons.



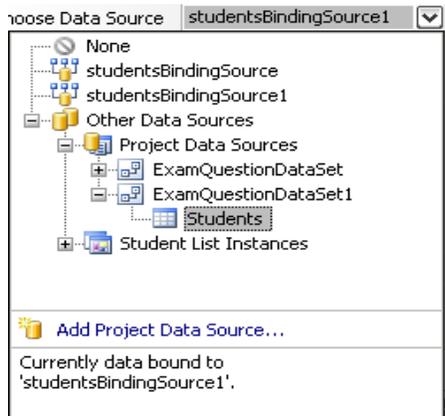
Figure(17) Student records

We must determine data source for this data grid on the left corner of data grid we can expand and see the following:



Figure(18) Data grid

Let us Choose data source for student table:



Figure(19)Data source

Remember that we put this table when we create dataset:

- Clear all button :

```
private void button1_Click(object sender, EventArgs e)
{
    this.studentsTableAdapter.DeleteQuery();
    dataGridView1.Refresh();
    examQuestionDataSet1.Clear();
}
```

We will back to main form to see what is remaining from component.

There is tow button :

- *Send password to enter exam and send time of exams* buttons:

The first button perform task that is send password to other computer to allow them to enter exam.

```
private void button5_Click(object sender, EventArgs e)
{
    try { TxConnect(); }
    catch (Exception ex1) {
        MessageBox.Show(ex1.Message); }
}
```

```
public void TxConnect()
{
    try
    {
        UdpClient udpClient = new UdpClient();

        udpClient.Connect(IPAddress.Parse(textBox2.Text),
            8080);
```

```
        Byte[] sendBytes =
Encoding.ASCII.GetBytes(textBox1.Text);

        udpClient.Send(sendBytes,
sendBytes.Length);

    }

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

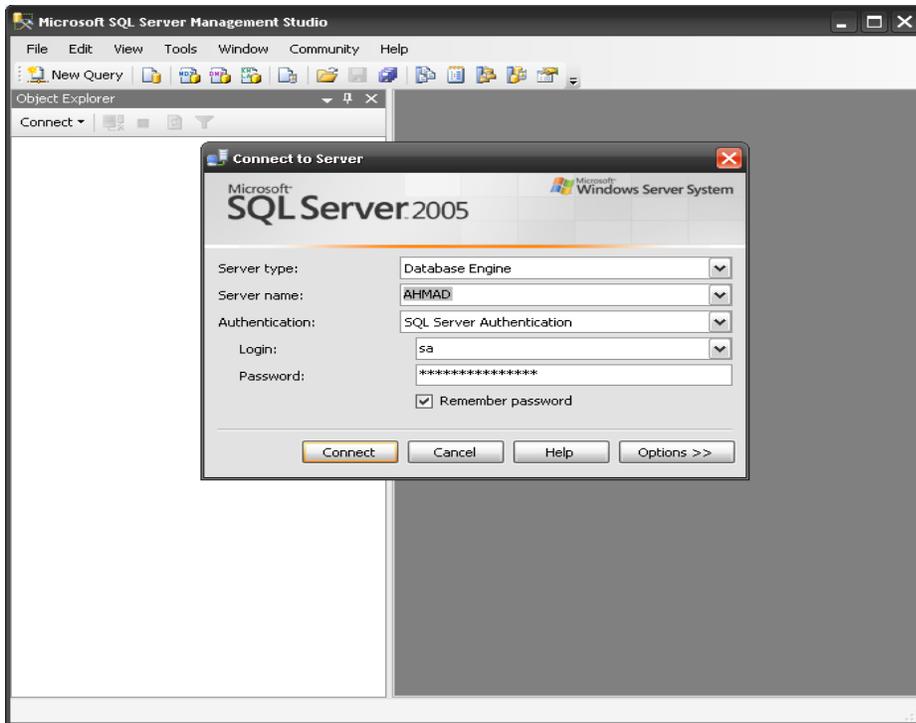
    }
```

This code convert the contain of textbox to array of bytes and send it as bytes.

The second button send time of exam at the same way I can create code to send time of exam.

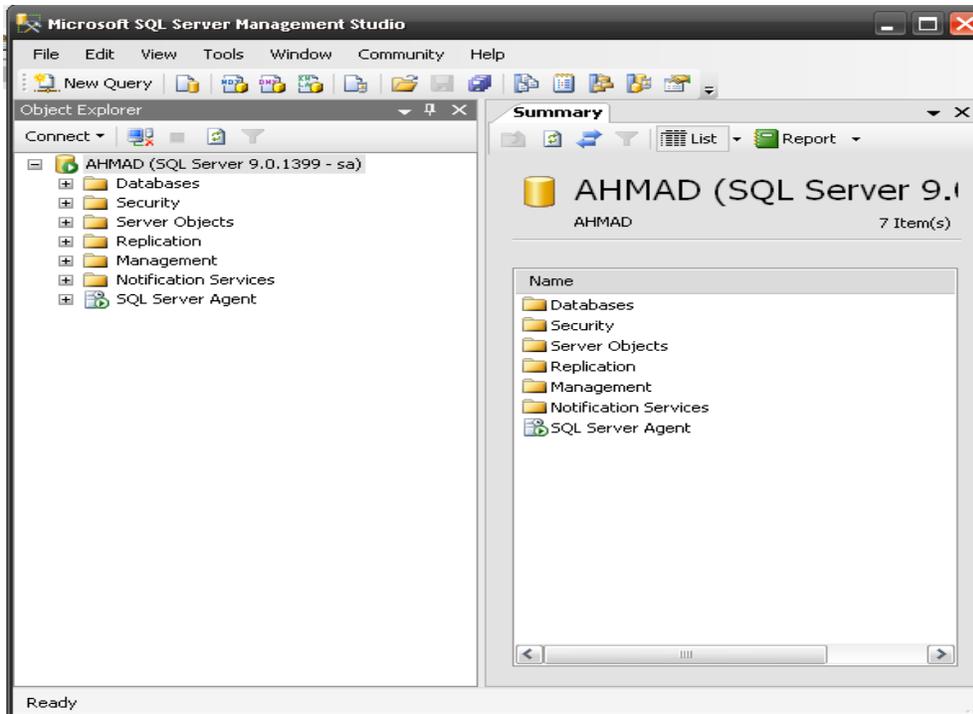
2.5 SQL server database:

Let us see how we can create and design database on SQL server program. First we open SQL server management studio the following window will be appear :



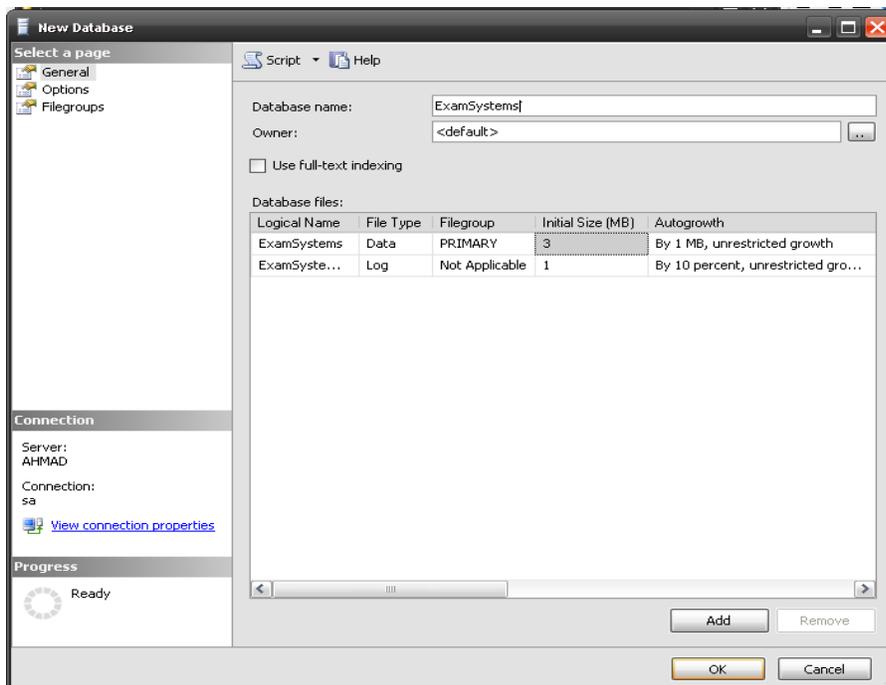
Figure(19) Login page

Now determine user name and password that I put them on I Installed SQL server then connect. Press ok the following widow will be appear:



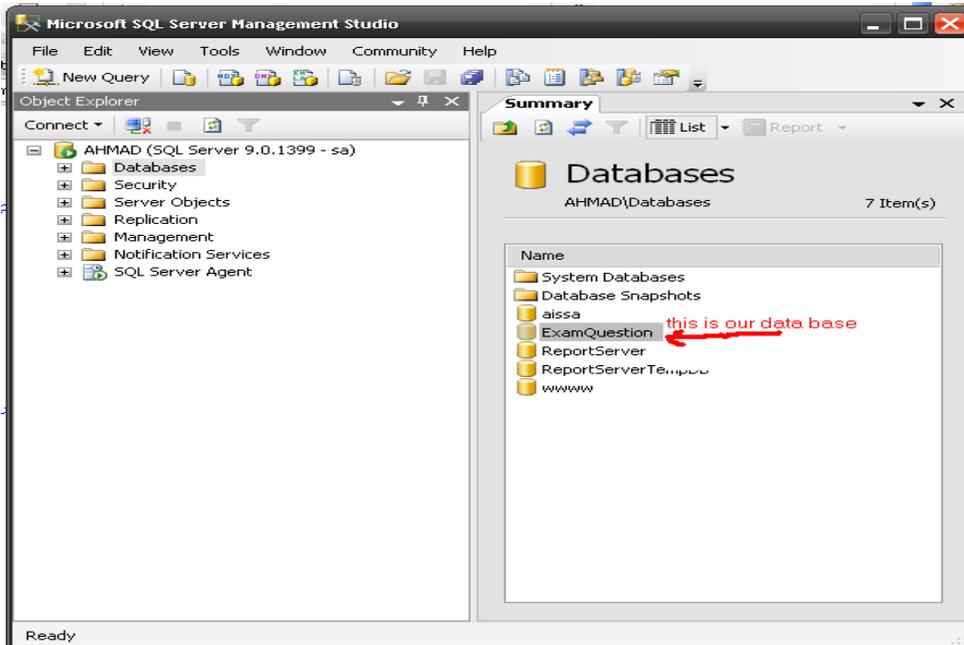
Figure(20) SQL Windows

Now select database and right click then new database then name database and press ok:



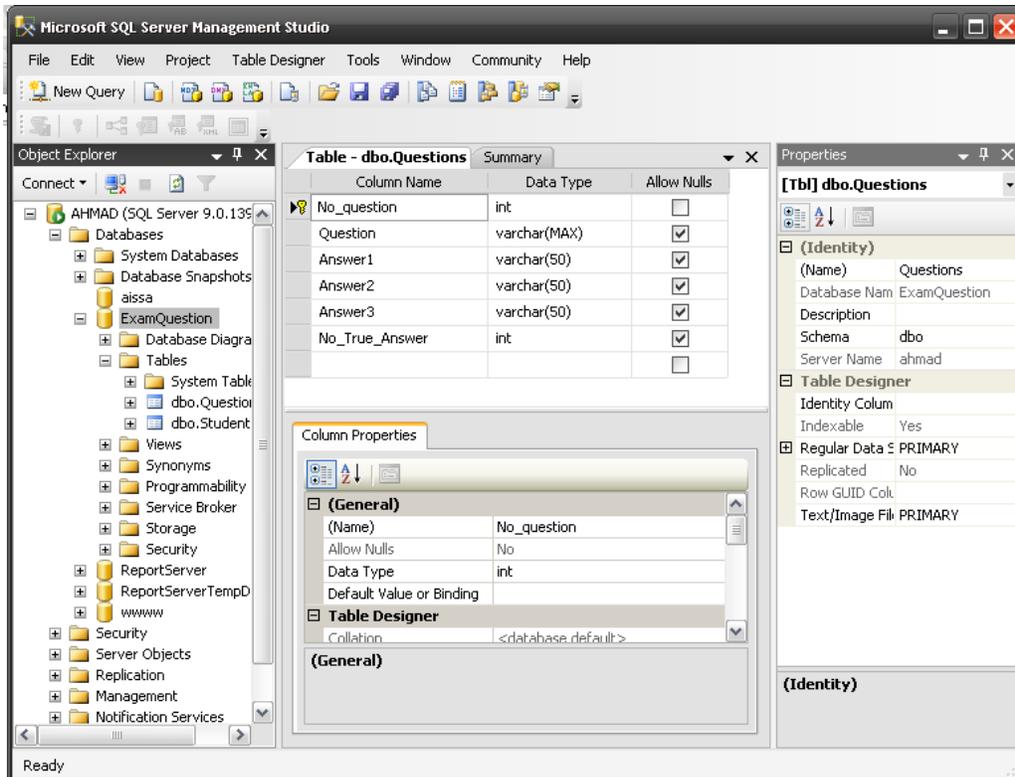
Figure(21) Data base name window

We can see our database now in the right part from this window:



Figure(22) SQL name chose

For add tables open this database and right click on tables then add table the following window will appears:



Figure(23) Data base type

Now we can create tables easily and determine type of data in every column and determine primary keys.

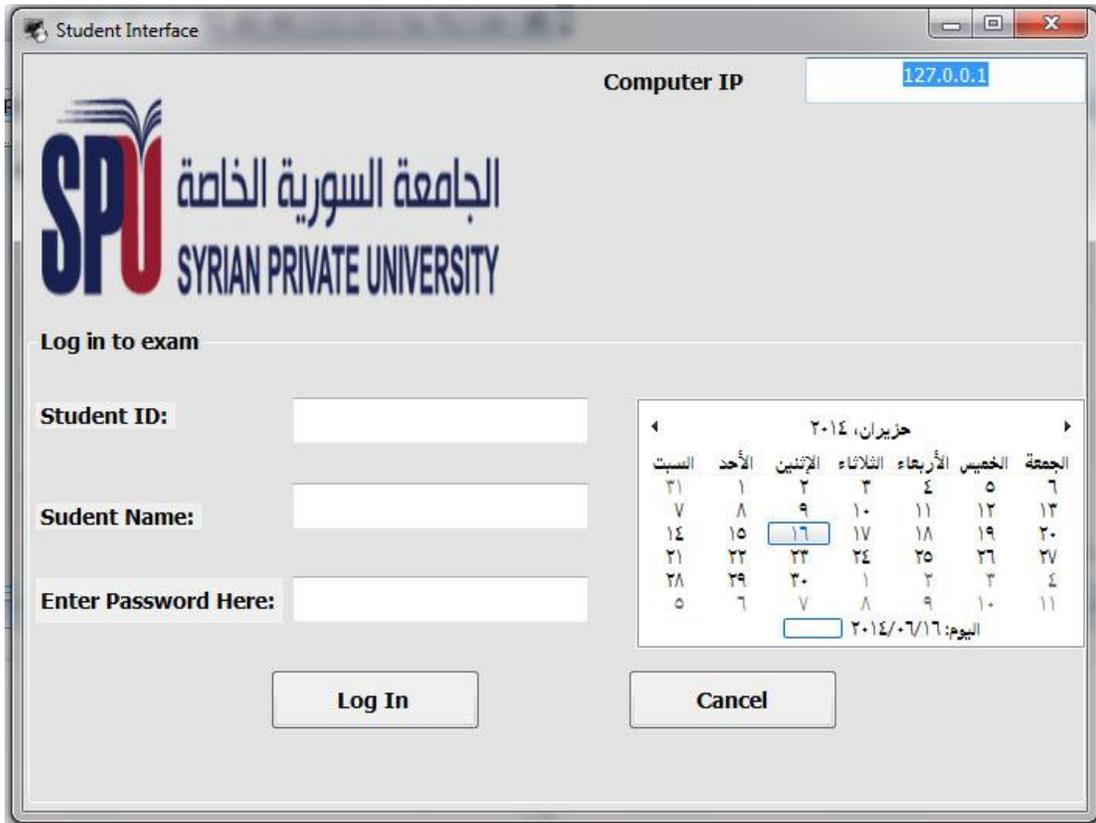
2.6 main form on Students program:

By this form the students can receive the image of desktop of server computer and display it for exams, and he can clear the data. And students can receive the password to enter exam.

This form consist of the following:

- Begin Receiving button
- Begin exam button

- Exit button
- Textbox IP address
- Textbox to let student enter the received password.
- PictureBox to display image received.



Figure(23) Student Window

Then what I should to do? Yes, I will to type code to begin receiving button in this button I will perform the following:

- Create UDPClient at the same port that I was sent data on it.
- connect to IP address on the same port.
- Run timer that he does the following:

- Create thread that call function Image-receive
- Function Image receive creates array of data for store data received from server .
- convert it into main form and store it in memory
- display the image on picturebox.

The code illustrate as the following:

```
private void button1_Click(object sender, EventArgs e)
{
    try
    {
        sock = new UdpClient(5000);
sock.JoinMulticastGroup(IPAddress.Parse(addrTextBox.Text));

        iep = new IPEndPoint(IPAddress.Parse(addrTextBox.Text),
5000);

        timer1.Enabled = true;
    }
    catch { }
}

private void timer1_Tick(object sender, EventArgs e)
{
    Thread myth;

    myth = new Thread(new
System.Threading.ThreadStart(Image_Receiver)); // Start Thread Session
```

```

        myth.Start();
    }
void Image_Receiver()
{
    data = sock.Receive(ref iep);
    MemoryStream ms = new MemoryStream(data);
    pictureBox1.Image = Image.FromStream(ms);
}

```

But how we can receive the password from the server and display it to student, it is easy:

- just at load form we listen to network adaptor at the same port that I sent the password on it.
- by create a thread that call function *serverThread*
- that Create UDPClient at the same port that I was sent password on it.
- connect to IP address on the same port.
- creates array of data for store password received from server
- Function GetString to store received password on string parameter
- Display password on message show.

This code presented as the following:

```

private void Form1_Load(object sender, EventArgs e)
{

```

```

        Thread thdUDPServer = new Thread(new
System.Threading.ThreadStart(serverThread));

        thdUDPServer.Start();

    }

public void serverThread()

    {

        udpClient = new UdpClient(8080);

        while(true)

            {

                IPEndPoint RemoteIpEndPoint = new
IPEndPoint(IPAddress.Any, 0);

                Byte[] receiveBytes = udpClient.Receive(ref
RemoteIpEndPoint);

                string returnData =
Encoding.ASCII.GetString(receiveBytes);

                b = (string)returnData.ToString();

                MessageBox.Show("Please Enter this password to begin
exam"+": " +(string)returnData.ToString());

            }

    }

```

Then we will compare the receive password with the typed password on textbox if equal open form contains of exam questions if not do nothing.

```

private void button1_Click_1(object sender, EventArgs e)

    {

```

```
        if (textBox1.Text == b)
        {
            Form2 s = new Form2();
            s.Show();
        }
    }
}
```

2.7 Questions form on students program:

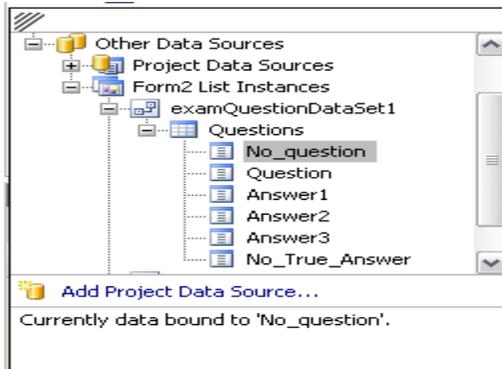
By this form the students can connect to SQL server database and do exam. By display question without answer, the student can select true answer from 3 answer or ignore the question to return it at the last and by this form the program can store all results in database.

First step its create dataset contains of the questions from data menu then new data source then connect to Sql server as we saw in server program.



Figure(24) Questions for students

Now we determine the label1 –display data- for example, and from its properties we expand *Data Binding* and from text we can see the following :



We must select the column which we want to connect this table with it.

After that I will create new dataset contains number of true answer for compare it with entered answers by the student.

To do that you will must create *SqlDataAdapter* then connect to database and determine the data you will want to put it in dataset, the right click on this *SqlDataAdapter* and choose generate dataset, name it dataset1.

Now I want to grant the student ability to answer the questions by create radio button where the student determine the radio button related the true answer then it will be compared to the true answer that I got it from dataset, if the answer matches the correct answer the mark will be increased by 1, also there is a radio button to ignore the question, but the questions that the student ignored it will be returned at the end, to allow the student to answer on it again. This work illustrated in the following code in next button:

```
private void button1_Click(object sender, EventArgs e)
{
    if (answer != "s")
```

```

    {
        sqlConnection1.Open();

        this.dataSet11.Clear();

        sqlDataAdapter1.SelectCommand.CommandText = "SELECT
No_True_Answer FROM Questions";

        sqlDataAdapter1.SelectCommand.ExecuteNonQuery();

        sqlDataAdapter1.Fill(dataSet11);

        DataTable dataTable = dataSet11.Tables[0];

        if (answer == "0")
        {
            a[j] = i + 1;

            j++;
        }

        if (dataTable.Rows.Count != 0)
        {
            if (answer == (string)dataTable.Rows[i][0].ToString())
            {
                mark++;
            }

            i++;
        }

        sqlConnection1.Close();

        this.BindingContext[this.examQuestionDataSet1,
"Questions"].Position++;
    }

```

```

        if (i == this.BindingContext[this.examQuestionDataSet1,
"Questions"].Count)
        {
            button1.Enabled = false;

            button2.Enabled = true;

            if (j != 0)
            {
                MessageBox.Show("Press Ok To Answer Onto The
Questions That You Are Ignored It");

                this.questionsTableAdapter1.FillBy(examQuestionDataSet1.Questions, a[k]);

                button1.Visible = false;

                button2.Enabled = false;

                button5.Visible = true;

                radioButton4.Visible = false;

            }
        }

        answer = "s";

        radioButton1.Checked = false;

        radioButton2.Checked = false;

        radioButton3.Checked = false;

        radioButton4.Checked = false;

    }
}

```

Where the radio button checked means the following:

```

private void radioButton1_CheckedChanged(object sender, EventArgs e)
    {
        answer = "1";
    }

private void radioButton2_CheckedChanged(object sender, EventArgs e)
    {
        answer = "2";
    }

private void radioButton3_CheckedChanged(object sender, EventArgs e)
    {
        answer = "3" ;
    }

private void radioButton4_CheckedChanged(object sender, EventArgs e)
    {
        answer = "0";
    }

```

There is a new query to return the ignored questions, but at the beginning I must determine Id of ignored questions, and store this Id in array to enable us to return the ignored questions.

By new query in dataset this query illustrate as the following :

```

SELECT No_question, Question, Answer1, Answer2, Answer3, No_True_Answer FROM dbo.Questions
where No_question=@a

```

At the beginning we said that the exam has finite period, this period the student receive it from server computer this period are visible to students, let us see how I can receive this period and use it in this form to prevent student from continue in answering the questions after time out, now we will see how I can receive period from computer server by listen to network adapter on a specific port when form is loaded, this code illustrate this operation:

```

Thread thdUDPServer = new Thread(new
System.Threading.ThreadStart(serverThread));

```

```

        thdUDPServer.Start();

public void serverThread()
    {
        try
        {
            udpClient = new UdpClient(5020);

            while (true)
            {
                IPEndPoint RemoteIpEndPoint = new
IPEndPoint(IPAddress.Any, 0);

                Byte[] receiveBytes = udpClient.Receive(ref
RemoteIpEndPoint);

                string returnData =
Encoding.ASCII.GetString(receiveBytes);

                w = Int32.Parse(returnData);

                y = w * 60;
            }
        }
        catch{}
    }

```

I sent number represent time of exam but this time will be in minutes by multiplying it with 60. When time out the following operation will be run :

Message will appear told the student that is time out and prevent student from continue in exams and enable finish button, the following code illustrate that:

```

private void timer1_Tick(object sender, EventArgs e)
{
    label4.Text = "period :" + (string)w.ToString() + " minutes";

    b++;

    c = b / 60;

    d = b % 60;

    label1.Text = (string)c.ToString() + ":" + (string)d.ToString();

    if (b == y)
    {
        MessageBox.Show("Time out && good luck");

        button5.Enabled = false;

        button5.Visible = false;

        button2.Enabled = true;

        button1.Enabled = false;

        timer1.Enabled = false;
    }
}

```

And by timer tick the label will be displayed counter time to exam in minutes and seconds and other label will display the hole period of exam.

At the end of exam, the program must to store the exam results for each student, we can make that by create a new dataset for students table and on this dataset I will add the following query:

INSERT INTO Students

(StudId, FullName, Mark)

VALUES (@StudId,@FullName,@Mark);

SELECT StudId, FullName, Mark FROM Students **WHERE** (StudId = @StudId)

Then I will call this query by finish button to store the result in students records table in computer server as the following code:

```
private void button2_Click(object sender, EventArgs e)
{
    if (textBox1.Text != "" && textBox2.Text != "")
    {
        try
        {
            this.studentsTableAdapter.InsertQuery(Int32.Parse(textBox1.Text),
            textBox2.Text, mark);

            MessageBox.Show("your mark is " +
            mark.ToString() + " of " + (string)i.ToString());

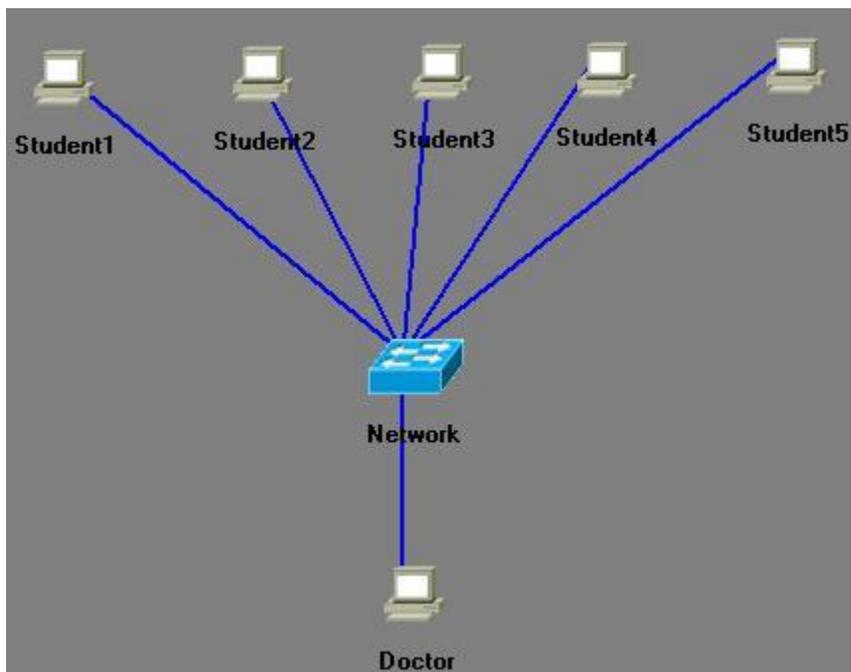
            button2.Enabled = false;
        }
        catch { }
    }
    else
        MessageBox.Show("Please Enter Your ID And Your Name");
}
```

Up to now we have just explained how we made the project, and we represented the aid codes to understand the function of our project. In the next we will illustrate to the user how can used this program.

Chapter3:User Guide for the program

3.1 Configuring A LAN

The administrator setup a LAN as illustrated in the figure, where the IP varies (from 192.168.0.10 to 192.168.0.254)

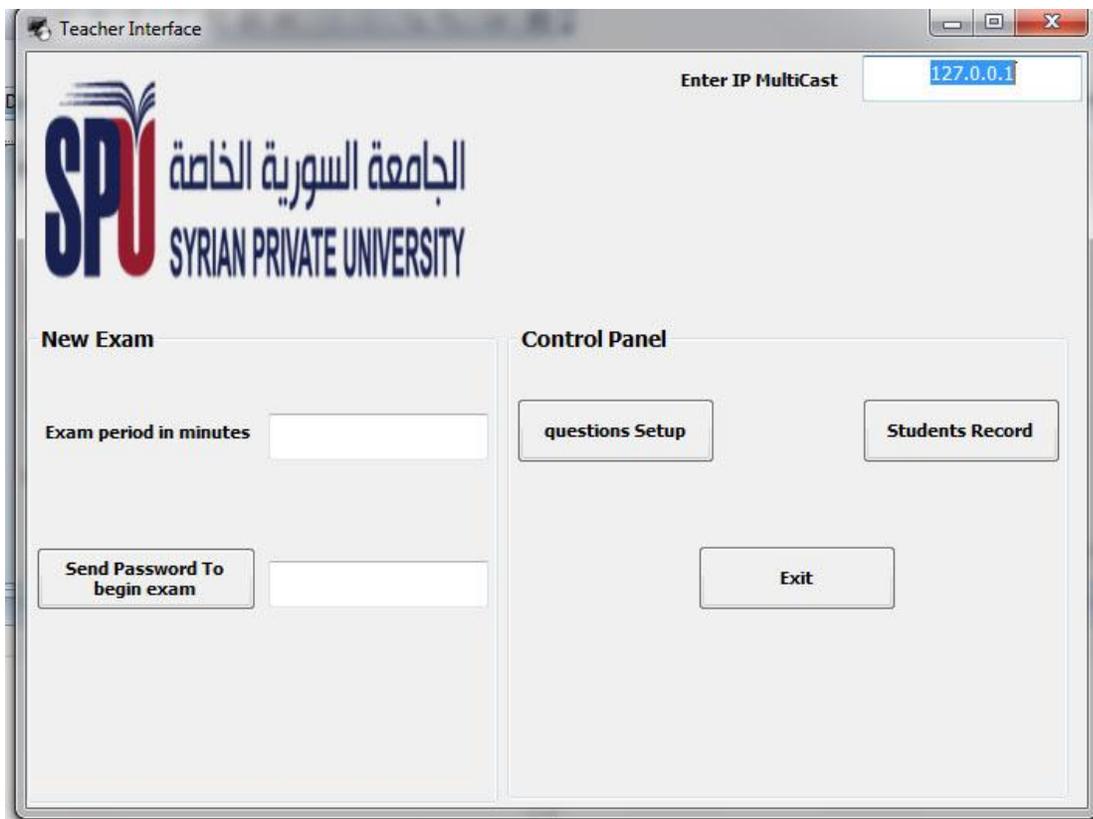


Figure(25) Connections view

3.2 Lecture management operation:

The lecturer determines the broadcast IP to the network connected to. Where the broadcast IP is the last IP in the network , for example I work in a network it is IP ranges(from 192.168.0.0 to 192.168.0.255)

Where the first IP is the network IP and the last is the broadcast IP so they can not be given to any user. And it asks each student to enter his own IP. To start the lecture the lecturer has to press the broadcast button and asks the Students to press begin receiving button, and to end the lecture the lecturer will press stop broadcast button

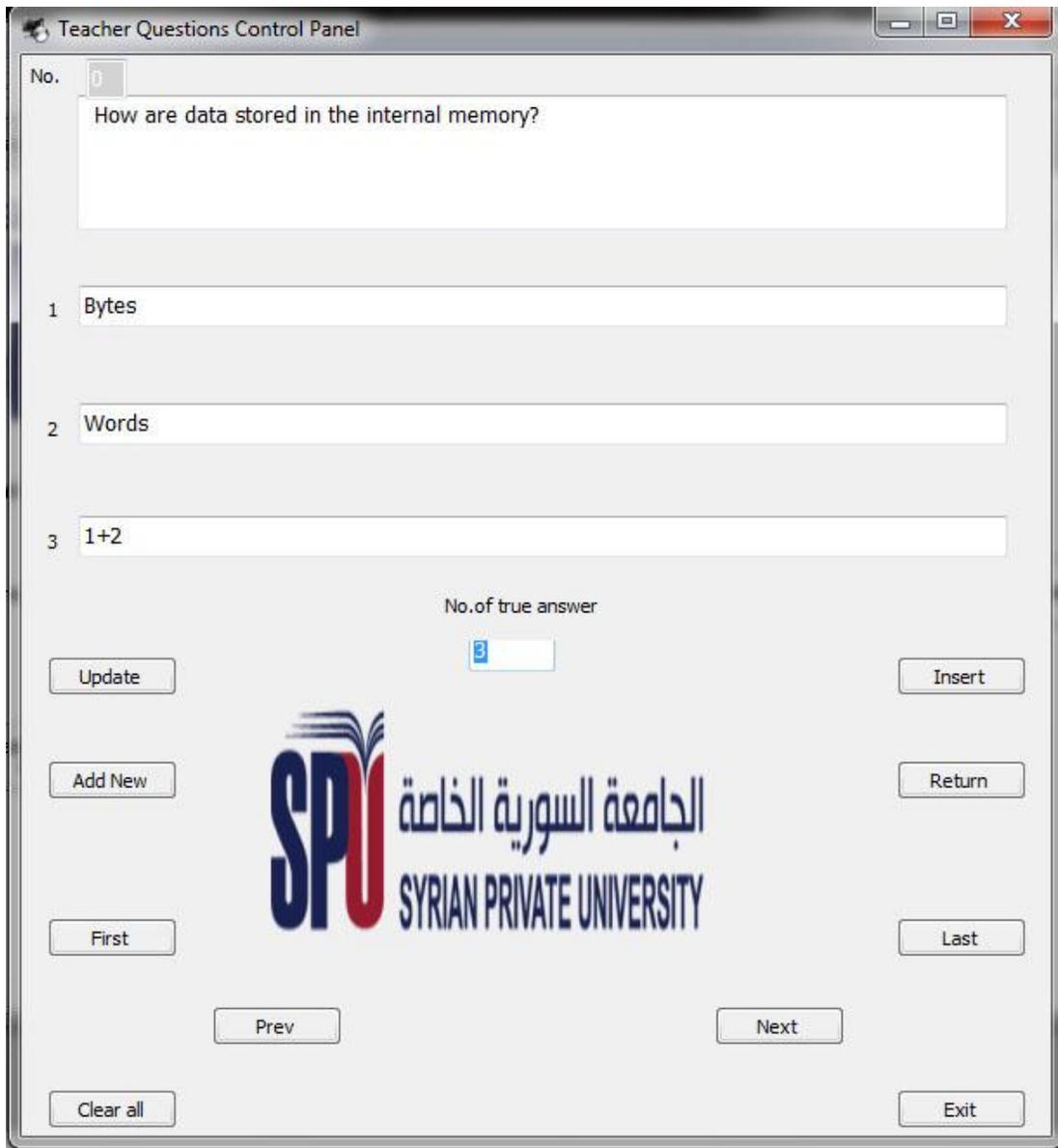


Figure(26) Teacher Window

3.3 Making questions operation:

The lecturer press on make questions button as a result the following form will appear, the add new button enables the lecturer to add a new question, while insert button is to store the question on the database, now if we well to update a question we can use the update button, but if the lecturer wanted reset all the questions he can press the clear all button, after finishing of making question he may press exit to exit the program or return to back to the mean frame.

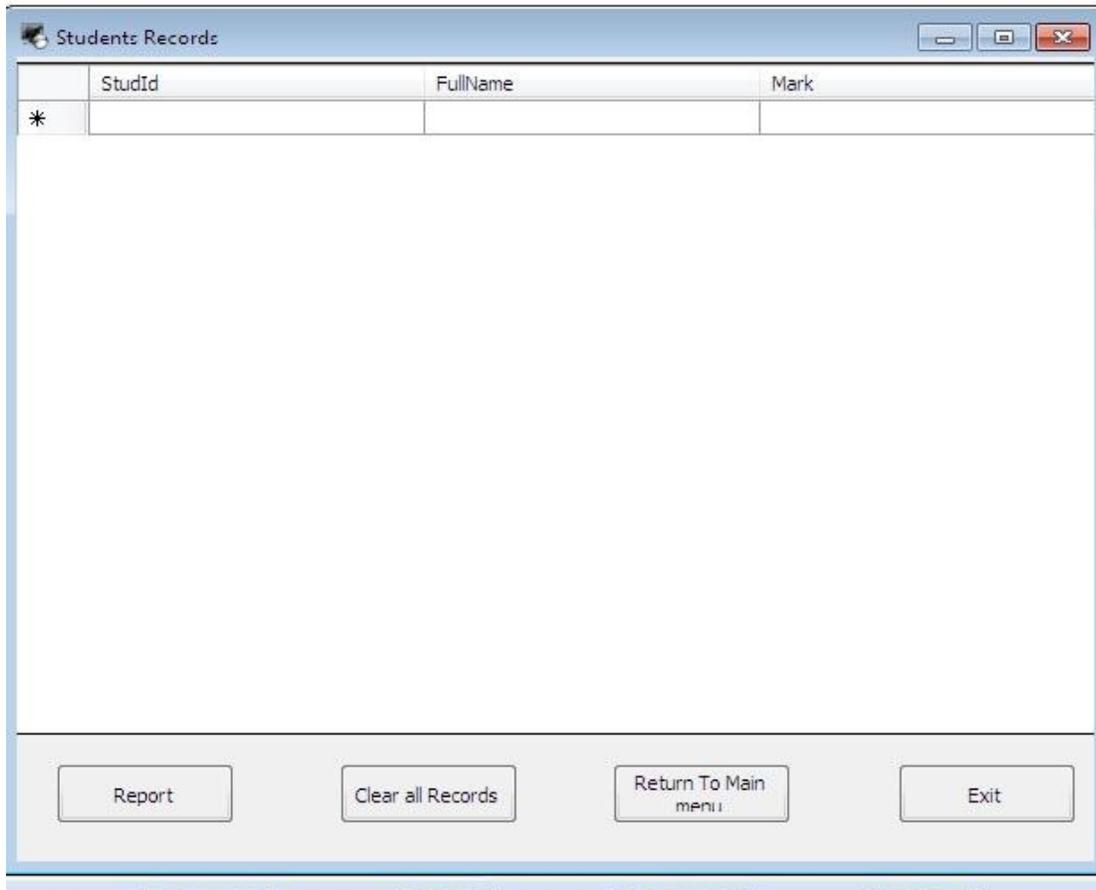
The 4 rest buttons(next, prev, first and last) are to move between the questions



Figure(27) Questions window

3.4 viewing Students records:

To view the Students records press students records button. The following window will appear this window contains a button to clear all students records to make them available to another exam.

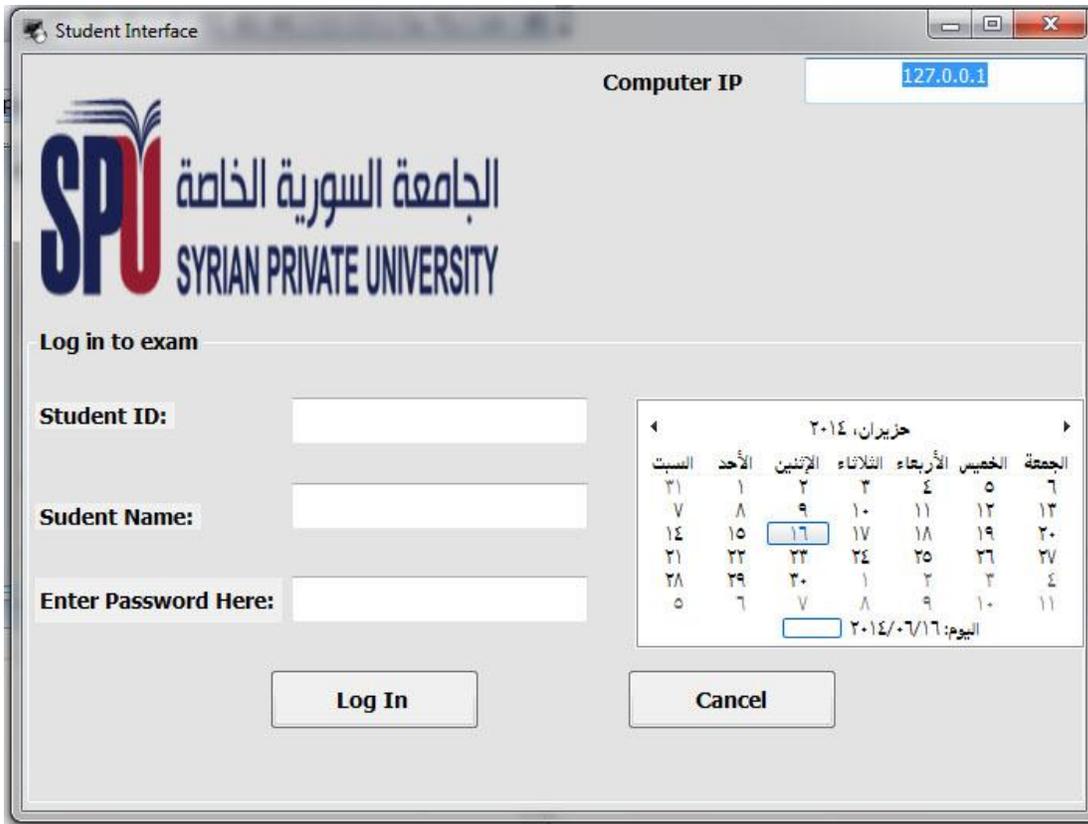


Figure(28) Students Records

3.5 Exams system

At the beginning of the exam the lecturer must type a password on the textbox password in figure (1) to the exam and press on send password which will send a message to ask the students to enter the password in password textbox in Fig(2).

The following message will appear in all students computers to enter it on the password textbox and press on begin exam button to start the exam.



Figure(28) Student Window

The lecturer can determine the exam period after the students have entered the exam in time box illustrated in Fig(1) then press send time button This figure illustrate the exam interface



Figure(29) Questions for students window

The student can choose one of three answers or he can ignore question, the program will return all ignored questions after finishing of answering all the

questions, where the program tells the student that it will return all ignored question by a message box.

If the student did not do all questions in the specific time the program shows up a message that the time out and enables finish button

When the student press on the finish button his degree will appear and his data with his degree will be stored on the database on the server computer

Conclusion:

Web services have been very much hyped as the next big thing in information technology. They are arguably one of the simplest remote procedure call systems ever developed and possibly the most interoperable technology ever developed by Microsoft. Having said that, remoting can outperform Web services under most conditions, and the technology is still in its infancy. Many features, especially within WSE 1.0, are under implemented and could easily cause headaches for some developers.

As this concludes this project on .NET networking, I hope it proves beneficial to you and helps you to further your career as a professional developer. Good luck, and may your programs be bug free and efficient!

References

- [1]- Network Programming in .NET With C# and Visual Basic .NET Fiach Reid, Elsevier Digital Press 200 Wheeler Road, Burlington, MA 01803, USA Linacre House, Jordan Hill, Oxford OX2 8DP, UK Copyright © 2004, Elsevier Inc.
- [2]- Metzger, Debugging by Thinking , ISBN 1-55558-307-5, 600pp, 2003
- [3]- Mosher, Microsoft Outlook Programming: Jump Start for Administrators, Developers, and Power Users , ISBN 1-55558-286-9, 624pp, 2002
- [4]- Lawrence, Compaq Visual Fortran: A Guide to Creating Windows Applications, ISBN 1-55558-249-4, 468pp, 2002
- [5]- Breakfield & Burkey, Managing Systems Migrations and Upgrades: Demystifying the Technology Puzzle , 320pp, ISBN 1-55558-256-7, 2002
- [6]- www.charlespetzold.com (Site for connection).

Certification

I certify that this project “PROGRAM OPTIMIZING EXAMS ON NETWORK” was prepared under our supervision at the faculty of computer and informatics at The Syrian International Private University for Science and Technologies, as a partial fulfillment of the requirements for the degree of Bachelor of Science in IT Engineering.

Signature:

Name:

Date:

Write & Norma-control :

Dr.

.

Contents

Title	Page No
Abstract-----	I
Contents-----	- 77 -I
Introduction-----	III
CHAPTER 1 : Theoretical study	
1.1 System requirement-----	3
1.2 The project idea -----	4
1.3 Bandwidth-----	5
1.4 Techniques used in the project-----	6
CHAPTER 2: Implementation our project	
2.1 Introduction to the .NET framework-----	14
2.2 Introduction to C#-----	14
2.3 main form on server program-----	15
2.4 Questions form on server program-----	22
2.5 Students Records form on server program-----	32
2.6 SQL server database-----	36
2.7 main form on students program-----	39
2.8 Questions form on students program-----	42
CHAPTER 3: User Guide for the program	
3.1 Configuring A LAN-----	50
3.2 Lecture management operation-----	50
3.3 Making questions operation-----	52
3.4 viewing Students records-----	53
3.5 Exams system-----	54
CHAPTER 4: Conclusion	
Conclusion -----	56
Reference-----	57

الخلاصة

- تعزيز دور المعلم في إدارة و تنظيم الحصة الصفية .
- تعزيز عملية إدارة المحتوى التعليمي .
- تعزيز استيعاب الطلاب للمحتوى التعليمي .
- رفع مستوى التفاعل و التكامل بين المعلم و الطلاب .

يمكن تلخيص الفكرة العامة والأساسية التي يدور حولها مشروعنا:

- تصميم نظام بالزمن الحقيقي حيث يسمح بالتفاعل بين المعلم والطلاب بطريقة سهلة و فعّالة
- ويتكون النظام من مكونين هما :
- برنامج المعلم :
- وهو القسم الرئيسي من النظام ويُنصب على جهاز المعلم ، ويمكنه من التحكم وإدارة ومراقبة جميع الأجهزة الخاصة بالطلاب
- برنامج الطالب (الزبون) :
- وهو برنامج صغير يُنصب على جهاز المتدرب

الهدف من المشروع هو تسهيل عملية الاتصال بين المدرسين والطلاب في أي وقت وفي أي مكان أي أنه يؤمن عملية التواصل الاجتماعي الأكاديمي .

استطعنا من خلال هذا الموقع خلق ميزات جديدة تلبي حاجات الطلاب والمدرسين مما يختصر عليهم بعض العناء واستهلاك الوقت والحرص في اختيار المكان وكل هذا عن طريق شبكة محلية التي أصبحت بمتناول معظم الطلاب والمدرسين الأكاديميين.

تم بناء هذا النظام علائقياً باستخدام اللغة العالمية المشهورة :

MYSQL

كما تمت عمليات البرمجة لهذا النظام باستخدام:

C#

