

# **CENG 491**

## **SENIOR PROJECT**

### **Requirement Analysis Report**

***PDC***

*(PROJECT DEVELOPMENT CENTER)*

PROJECT TITLE:

VIRTUAL CLASSROOM

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|                                                |    |
|------------------------------------------------|----|
| 1. Introduction and Scope of the Project ..... | 3  |
| 1. Identification of Customer Needs .....      | 5  |
| 2. Detailed Description of the Project .....   | 7  |
| 1. The Users .....                             | 7  |
| 2. User Log Ons .....                          | 9  |
| 3. Inside the Classroom .....                  | 11 |
| 4. Process Model and Team Organization .....   | 12 |
| 5. Project Estimation .....                    | 13 |
| 5.1. Function Point Estimation .....           | 13 |
| 5.2. Lines of Code Estimation .....            | 15 |
| 5.2.1 LOC Based Effort Estimation .....        | 15 |
| 5.2.2 FP Based Effort Estimation .....         | 15 |
| 5.3. Basic COCOMO Estimation .....             | 15 |
| 6. Models .....                                | 16 |
| 6.1. DFD & CFD .....                           | 16 |
| 6.4. ERDiagram .....                           | 24 |
| 6.5. Data Dictionary .....                     | 25 |
| 7. Technical Requirements .....                | 32 |
| 7.1. Software Requirements .....               | 32 |
| 7.2. Hardware Requirements .....               | 33 |
| 7.3. Development Platform Analysis .....       | 34 |
| 8. Risk Management .....                       | 35 |
| 9. Major Milestones and Project Schedule ..... | 36 |

# 1. Introduction and Scope of the Project

The growing popularity of Internet and e-learning introduced new terms to education, such as “virtual classroom”. May be in the near future students will not go to anywhere in order to take diploma. The concept “virtual classroom” defines a simulation of the real classroom that enables users to attend a class from anywhere through Internet and provides a learning experience. This project is intended to give both teacher and student the ability to do their jobs effectively and efficiently without even leaving their places. The project is simply described as modeling a real world object (i.e. classroom) into computer world. As in the real life the students can see their teacher writing on the board or teacher can see students chatting or anyone can want permission to ask question.

When we investigate the current “virtual classroom” projects we observe that they can be grouped mainly in two classes. In the first class the projects are designed to work on small LAN (the product of NetOP company is an example of such project) that can be used in a school or any education center. The second kind of projects that are designed to work through Internet that allows it to be used more commonly. (The product of IBM Company is an example of such project). These systems are designed according to their working environments that they have different properties due to their usage areas.

All the systems that are introduced on the web have some common features that they exist almost in all systems. These features can be listed as follows:

- A **whiteboard** that teacher and students use to draw images, write functions display text etc. And also teacher can play editable slides on this board. The board typically looks like “MS Paint”.
- A **Group discussion Board** (a chat system that enables to communicate in real-time with the on line users)
- **Question and Answer Board** (it is like newsgroup system in our

department that is not exactly real time communication tool)

- **Slide Show** (an area that slides can be seen)
- **Student Control** (Controlling the actions of the students like not playing games or preventing the students to make some events)

On the other hand there are some systems with special features that are rarely used. These features can be listed as follows:

- Broadcasting the teacher's screen to the students screen
- Broadcasting media files to the classroom
- Monitor all the students as they work or not (it is seen on the systems that work on small LANs)
- Managing all students computers (like locking keyboard, shutting down the computer)
- Video Conferencing (real-time image and voice transformation)
- Distribute and collect documents from students simultaneously
- Visual laboratory or course material

After investigating many systems we observed many different implementations with different properties. First of all our intended system will be web based, in other words it will be accessible from everywhere. There will be three actors using this system. The first one is the "Admin" who will be mainly responsible for creating course, creating teacher and instructor account. The second actor is the "instructor" who will login the system and give the lecture online to the class. And the third kind of user is the "student". Mainly our system will have the following properties and functionalities:

- There will be a whiteboard that can be accessed by every member; unlimited access for the instructor and limited access to the student (the student will ask permission to the instructor, when instructor gives permission he/she will access the board)
- There will be a chat tool to provide real time communication between the students and the instructor.

- The teacher will see all the online users and he/she can throw away some users due to their bad behaviors during the course.
- The teacher will have chance to make online pop up quizzes during the course.
- The teacher will have chance give assignments to the students.
- The teacher can also follow the students participate by observing statistics.
- The teacher will have option to upload useful course materials in order to use during the lectures like audio files, video files, slides, images etc.
- The teacher will have chance to upload some lecture notes that will be available offline to the registered students.
- The system will have the “voice transmitting” property.
- Due to the slow connection speeds in Turkey we do not add video transmitting property.

In order to make an efficient and well working system we will define some constraints. Our system will be reachable from everywhere via Internet, so we will put a pre registration constraint in order to avoid everybody to access the virtual classroom (only pre registered users will access the virtual classroom). Secondly there will be a credit constraint on students that they cannot join every course available in the classroom. And thirdly in order to have well working system the courses will have capacities that will enable the system to work properly. These are the basic properties of our intended system. The details of the system will be explained in the next section.

As it is seen this system can be used in any school or education center without any big requirement. By this way students and instructors can do their works efficiently without even leaving their places that both sides benefits.

## **1. Identification of Customer Needs**

As for a possible customer to our project, we made a contact the administrator, Halil Gamsız, of the “Smart Class” in Physics department of METU. We asked some

questions about the system and tried to identify the possible customer needs. First of all we asked general questions about the working flow of the system and then we asked the defects of the system. Our questions and his answers are recorded as follows:

Q – What are the hardware and software requirements of this system?

A – The system uses the Lotus software and IBM Domino Server and for recording purposes Matrox Capture Card is used.

Q – What are the basic features of this system?

A – The system mainly based on video conferencing system that a camera records the actions of the instructor and system broadcasts these records to a distance place. Also there is a blackboard in the system and the teacher gives his lecture by this tool. There is the option of sharing the entire screen. By this tool the teacher, for example, starts a program like MS PowerPoint and he can show the slides to all students. Another option of the system is instant messaging system. The instructor and students may send text messages to each other by this tool. And also there exists a “poll” tool that this tool follows all questionnaires and quizzes. These are the main components of this system.

Q – Does all the functions of the system is working now?

A – No, the system does not work full functionality for the time being. Only the lectures are broadcasted to distance classrooms and students follow the lectures from a distant class. Currently, the instructor does not teach his/her lecture by blackboard the students cannot follow the courses from Internet.

Q – In order to handle video conferencing properly what kind of Internet connection speed is required?

A – video conferencing is the most important module of the system therefore the connection must be very well. The system requires at least 256KB/sec connection speed to work properly.

Q – What are the defects of the system according to you and what kinds of problems do you face?

A – There may be some problems about streaming. It sometimes is not able to start streaming. Also there is no student control during courses, so students cannot

focus on lectures efficiently. For example some of them play games, some of them surf on the web throughout the courses that reduces the efficiency of the lecture. And for this reason we did not set up students' computers in the class.

## 2. Detailed Description of the Project

After a wide investigation and identifying customer needs explicitly we reached a consensus on our system. Our system will be a web-based system that will enable users to do their duties without even leaving their places. A user needs only a PC that is connected to the Internet and a web browser that is working properly. These two constraints are the minimum requirements for our intended system. There will be three kind of user of this system that they will interact with. The first is the “admin”, the second kind is the “instructor” and the last actor is the “student”. The roles of these actors will be as follows:

### *1. The Users*

**Admin:** Admin is the master of the system that he/she handles so many events. In our system we assumed that the instructors does not need to know the system and technical details very well, therefore we assigned some duties of the instructor to the admin like creating course, editing existing courses etc. The jobs of the admin can be listed and explained as follows:

- The admin will create the users. Our system will be working through Internet; therefore there will be many redundant possible users who want to enter the virtual classroom. In order to prevent redundant people to enter the classroom, the students must preregister to the system by admin. When the student is accepted to use the virtual classroom the admin will create an entry in the database by giving a username and a password. After that the student will log on the classroom with these username and password. And similar conditions will be valid for the instructor. An instructor account must be created by admin before instructor's entrance to the system.

- The admin will create the courses. As stated previously we assumed that the instructors would not need to have detailed knowledge about the system, therefore the courses will be created in the database by admin.
- The admin will assign the instructors to the courses. One of the duties of the admin is the assigning the instructors to the courses that some courses can be given by more than one instructor.
- The admin will also edit the courses. After some time some lectures may be old and need refreshed or some new courses may need to be added to the system. In these cases the admin will make the modifications in the database.
- The admin will also edit the users. Deleting some users from system or modifying existing people is another duty of the admin.
- The admin will also inform the users about the system by sending mail to the discussion group or the user's mailbox.

**Instructor:** Instructor is the second type of the possible user. The duties and responsibilities of the instructor can be listed and described as follows:

- When instructor log on to the system he/she will be able to start the online lecture.
- The instructor will upload course materials if exists. For each course there will be an option of uploading some documents related to the lecture. These may be lecture notes; image files related to lecture, sound or audio files, graphics, and text files etc.
- The instructor can view the list of the students that are enrolled in his lectures and he/she can edit these lists.
- The instructor may put some restrictions to his lectures like banning some students from attending his lectures.
- The instructor can make pop up quizzes during the lectures.
- The instructor may give homework to the students.
- The instructor may send messages to the course announcement group box.
- The instructor may check pending members. The teacher can see if there



are any requests to enter the course. The teacher then checks the user's info and according to it he/she can accept the request so the user is then put in students list of that course or he/she can ban the user so the user is added to banned students.

- The instructor may update the schedule. He/she can change the time of the next lecture.
- The instructor may edit his/her own profile

**Student:** The third type of the user is the student. A student can do the following events in the system:

- The student may edit his/her own profile.
  - The student may log on to the system and download available documents related to his/her enrolled courses.
  - The student may follow the discussion groups.
  - The student may chat with his friends and with teacher during the lecture
  - The student can ask questions to the instructor during the lectures.

## ***2. User Log Ons:***

### **Admin Log On:**

Like all other users the admin will log on the system from the main log on interface that will be reached through Internet with a specific address. When admin log on to the system he/she will mainly interact with the database. As stated before the main responsibility of an admin will be database dependent tasks. When admin successfully logs on to the system a main menu will meet the admin. In this menu there will be some events for admin to do.

The admin is the only actor to create users to the system, so creating user will be a one of the major options of this menu As stated before in order to prevent redundant people to log on to the system, the users must be created by admin. When admin creates a student an entry will be created in the students table and a temporary password and username will be assigned to this user in order to first log on to the

system. When the student first log on to the system the system will want user to fill the other parts of the student information and warn the student to choose a new password and a username. The same events take place for creating an instructor user.

The second option is the creating courses in the system's database. The admin will create the courses according to the demands of the instructors. He/she will also assign the attributes of the courses like credit, course\_id, course name, semester etc.

Some courses may be given more than one instructor; therefore the admin will also assign some instructors to the lectures.

Editing the existing courses in the database or deleting the courses from the database will be another responsibility of the admin.

Another event that admin can do is sending mail to the discussion group or to the mailboxes of the users if needed.

Like all other users, the admin can also edit his/her profiles like changing username, password, e-mail address etc.

### **Instructor Log On:**

The instructor will enter the system from the main menu, like any other user. When the instructor first logs on to the system, some menus will meet the instructor.

One of the possible menus will be about courses. Under this option there will be submenus each of them is a link to assigned courses of the instructor. For example if an instructor is assigned three courses in the system than there will be three submenus under the courses menu. If instructor chooses one of them another interface will meet the instructor. There will course related options. From these options the instructor will edit the course properties, view the students list that are assigned to the course. From this option the instructor can ban some students to enter the class due to their bad behaviors during lectures. Additionally the instructor can upload some course material to the database that can be used during courses like audio files, video files, images, some questions or another lecture notes. Another option will be giving assignment to the students. And also the teacher will send mail to discussion group of the lecture. Managing the schedule of the course will be another duty of the instructor. And lastly the instructor has option to start the lecture (enter the classroom).

Another option will be editing own profile. The instructor will update his/her information or change username or password.

And lastly the instructors have option to reach the discussion group related to the assigned courses and general discussions.

### **Student Log On:**

When students log on the system a list of options will meet them. From these options the students will select an event that they want to do. One of the major options will be about courses. Under the courses option the student will see the enrolled courses and there will their status just near them (online, offline). Also the lectures that student is banned by the instructor or admin will be indicated. After selecting the desired course from the list, there will be course specific events for student like downloading available lecture notes, viewing course schedule, viewing instructor, downloading the assignments or any other supplementary material and finally “enter virtual classroom” option if available.

Like all other users the student can change own profile like password, username, e-mail, address etc.

And finally a student can reach discussion groups and view the messages and send message to the discussion groups from this page.

### ***3. Inside the Classroom***

When a student and instructor log into the virtual classroom, they will see almost the same view with some small different properties. The basic components and their properties that will exist in the virtual classroom can be listed and described as follows:

**Whiteboard:** Whiteboard is the one of the main components of the system and it will allow participants to use drawing tools to create images or graphics that can be seen and edited by users. The instructor will explain the topics on this tool and the students will see what he/she writes on the board. And if instructor gives permission to the students they can also write on the board. For example instructor can write a mathematical equation and want a user to solve the equation. On the upper part of the

whiteboard there will be navigation field that will be used for to go a specific web page. And it will be disabled/enabled by the instructor during courses.

**Drawing Toolbar:** This toolbar will be located just near the whiteboard and there will be drawing options like pen style, color, pen size, some geometric styles. This option will help instructor to teach the lecture effectively.

**Chat Tool:** Under the whiteboard tool there will be chat toolbox that will enable users to talk in real-time via text-messages. The users will be seen by their usernames in this chat environment and they will communicate by each other.

**Question Answer Box:** This property will allow students to submit questions to the instructor directly and allow instructor to reply directly. These questions may be private or public.

**Users List Box:** This box will show all online users with their usernames.

**Access Control Box:** There will be some tools for instructor to monitor the students. By this tool the instructor will be able to remove some students from the course due to their bad behaviors.

In the classroom the instructor can write on the whiteboard, chat with students, allow his voice to broadcast to the students, ask a question and chose a student to answer the question, kick a student out of class, display slides, make pop up quizzes, display any supplementary material, display a specific web page, control access to the class after start of the lecture.

As for the student the student follows what instructor does. If voice broadcasting is enabled he/she can hear the instructor also. While following the course he/she may ask any question to the instructor.

Moreover the instructor can disable chat at the students' side so students can't chat with each other anymore. They will only be able to send messages to the instructor.

The student or the instructor can select another student in the class and view his/her info. (First and last name, e-mail...)

## **4. Process Model and Team Organization**

We are planning to use the oldest and most widely used software engineering paradigm that is called “Linear Sequential Model”. Since our team is a small team we cannot use RAD and incremental methods. It is very important for our model to state all the requirements explicitly; therefore we spent very long time to find out all the requirements at the beginning. We made customer contacts and searched through Internet in order to remove the uncertainties at the beginning. At each step (Analysis – Design – Code - Test) of this model we will make duty distribution among team members. Although it has some weaknesses, it is the most suitable model for our team.

As a team organization system we choose “Controlled Decentralized” (CD) team model. The project is not so huge so we did not choose “Controlled Centralized” (CC) model. And also we thought that the “Democratic Decentralized” (DD) model could be time consuming for our team. Having a permanent team leader is most suitable for our team spirit, therefore we chose CD model.

## 5. Project Estimation

Estimations are essential to have a general idea about the schedule, cost, effort. These are required in the early phases of the project. Then we restore the estimates with the help of metrics. We will use these metrics to determine progress and to estimate future projects. If we can make our plans according to these estimations then it will be easier to manage risks and increase efficiency.

### 5.1. Function Point Estimation

| Measuremnt Parameter  | Count | Simple   | Average  | Complex  | Sub-Total  |
|-----------------------|-------|----------|----------|----------|------------|
| Number of Inputs :    | 20    | <b>3</b> | 4        | 6        | <b>60</b>  |
| Number of Outputs :   | 20    | 4        | <b>5</b> | 7        | <b>100</b> |
| Number of Inquiries : | 50    | 3        | 4        | <b>6</b> | <b>300</b> |
| Number of files :     | 50    | <b>7</b> | 10       | 15       | <b>350</b> |

|                        |    |          |   |    |            |
|------------------------|----|----------|---|----|------------|
| Number of Interfaces : | 20 | <b>5</b> | 7 | 10 | <b>100</b> |
|------------------------|----|----------|---|----|------------|

Count Total : **910**

We evaluated the questions according to the following criteria table.

- 0: Not important or applicable  
1: Insignificant influence  
2: Moderate influence  
3: Average influence  
4: Significant influence  
5: Absolutely essential

| QUESTIONS                                                                                                    | IMPORTANCE |
|--------------------------------------------------------------------------------------------------------------|------------|
| Does system require reliable backup and recovery?                                                            | 4          |
| Are data communications required?                                                                            | 4          |
| Are there distributed processing functions?                                                                  | 3          |
| Is performance critical?                                                                                     | 5          |
| Will the system run in an existing operational environment?                                                  | 4          |
| Does the system require on line data entry?                                                                  | 5          |
| Does the on line data entry require the input transaction to be built<br>ove multiple screens or operations? | 4          |
| Are the master files updated on line?                                                                        | 4          |
| Are the inputs, outputs, files are complex?                                                                  | 3          |
| Is the internal processing complex?                                                                          | 3          |
| Is the code designed to be reusable?                                                                         | 2          |
| Are conversion and installation included in the design?                                                      | 3          |
| Is the system designed for multiple installations in different<br>organizations?                             | 0          |
| Is the application designed to facilitate change and ease of use by<br>the user?                             | 2          |
| TOTAL                                                                                                        | 46         |

(we referred these questions from the Roger's Software Engineering(P.91))

$$\begin{aligned}\text{FP(Function Point)} &= \text{count-total} * [0.65 + 0.01 * \sum \text{Fi}] \\ &= 910 * [0.65 + 0.01 * 46] \\ &= 1010\end{aligned}$$

## 5.2.Lines of Code Estimation

| Functions                       | Lines of Code    |
|---------------------------------|------------------|
| Graphical User Interface Design | 5000             |
| Database Design                 | 1000             |
| Whiteboard Functions            | 2500             |
| Communication Functions         | 2000             |
| Inquiry Functions               | 3000             |
| <b>TOTAL</b>                    | <b>13500 LOC</b> |

### 5.2.1 LOC Based Effort Estimation

$$\begin{aligned}\text{Effort} &= 5.5 + 0.73 * (\text{KLOC})^{1.16} \quad (\text{Bailey-Basili Model}) \\ &= 5.5 + 0.73 * (13.5)^{1.16} \\ &= 20.44 \text{ person / month}\end{aligned}$$

### 5.2.2 FP Based Effort Estimation

$$\begin{aligned}\text{Effort} &= -13.39 + 0.0545 * \text{FP} \quad (\text{Albrecht and Gaffney}) \\ &= -13.39 + 0.0545 * 1010 \\ &= 41.65 \text{ person / month}\end{aligned}$$

## 5.3.Basic COCOMO Estimation

|                     | <b>a<sub>b</sub></b> | <b>b<sub>b</sub></b> | <b>c<sub>b</sub></b> | <b>d<sub>b</sub></b> |
|---------------------|----------------------|----------------------|----------------------|----------------------|
| <b>Organic</b>      | 2.4                  | 1.05                 | 2.5                  | 0.38                 |
| <b>Semidetached</b> | <b>3.0</b>           | <b>1.12</b>          | <b>2.5</b>           | <b>0.35</b>          |
| <b>Embedded</b>     | 3.6                  | 1.2                  | 2.5                  | 0.32                 |

We use semidetached COCOMO model, therefore

$$\text{Effort} = 3.0 * (\text{KLOC})^{1.12}$$

$$\text{Duration} = 2.5 * (\text{Effort})^{0.35}$$

$$\text{Effort} = 3.0 * (13.5)^{1.12}$$

$$= 55.34 \text{ person-months}$$

$$\text{Duration} = 2.5 * (55.34)^{0.35}$$

$$= 10.18 \text{ months}$$

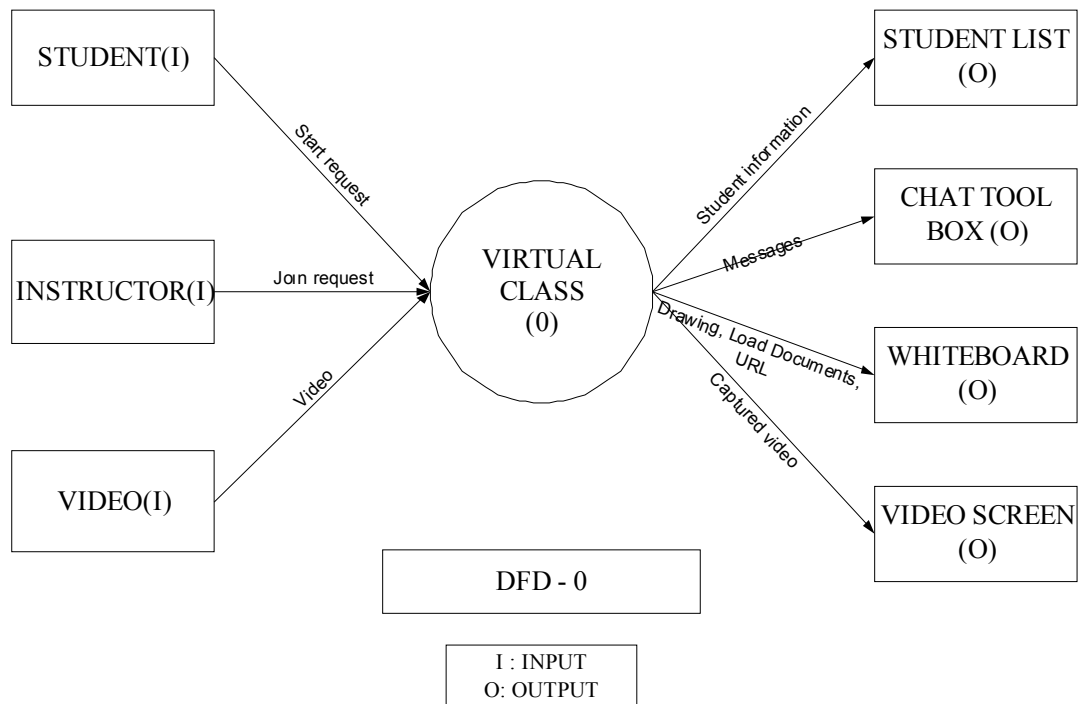
$$N = E / D$$

= 55 / 10

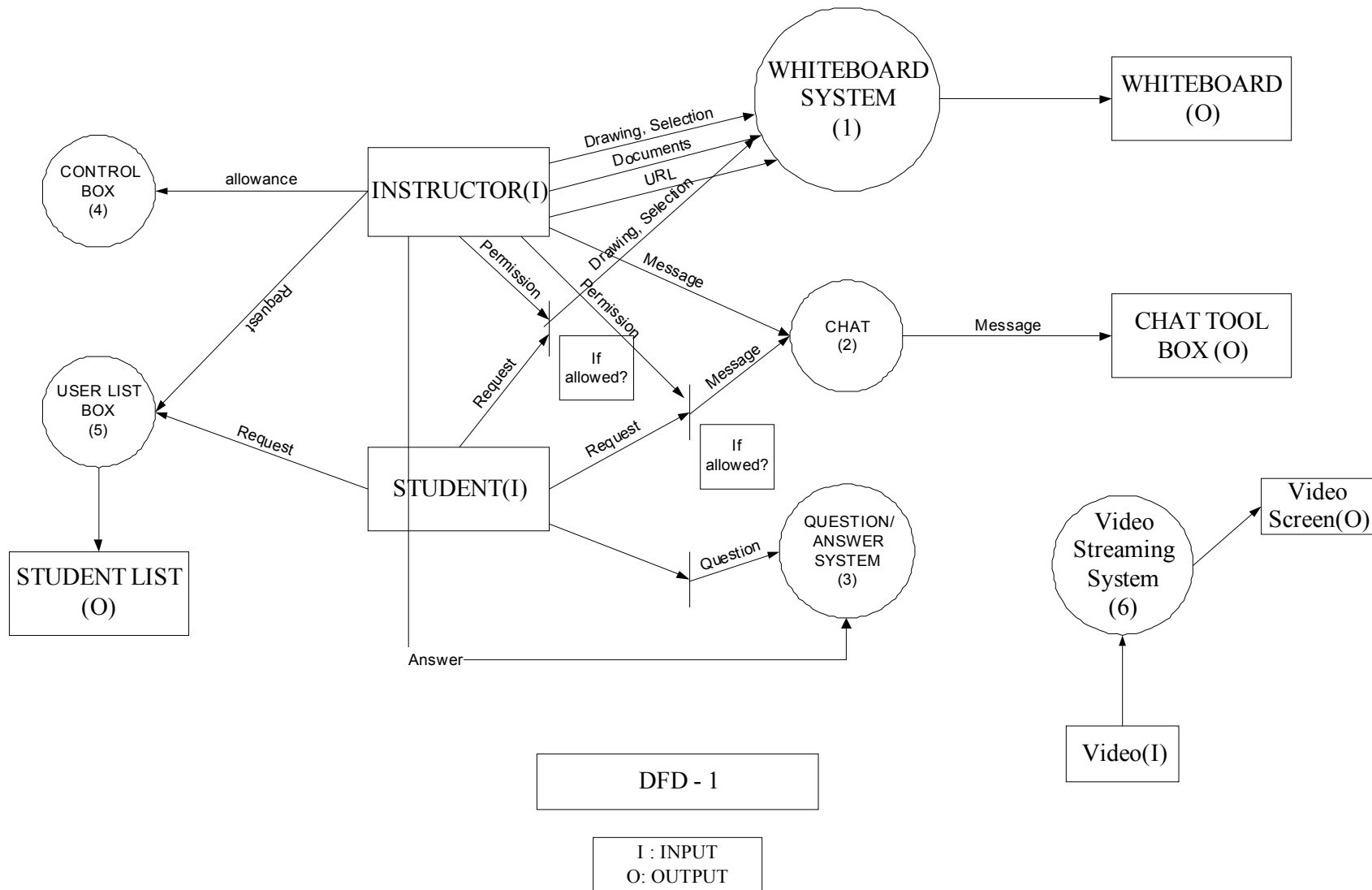
~ 5 people

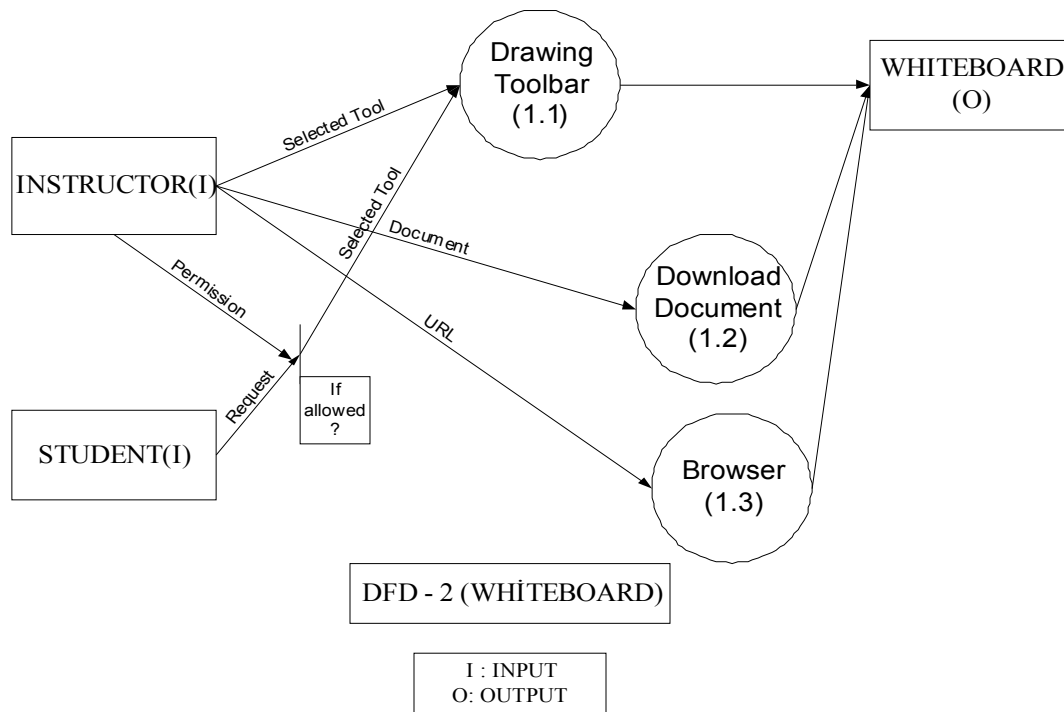
## 6. Models

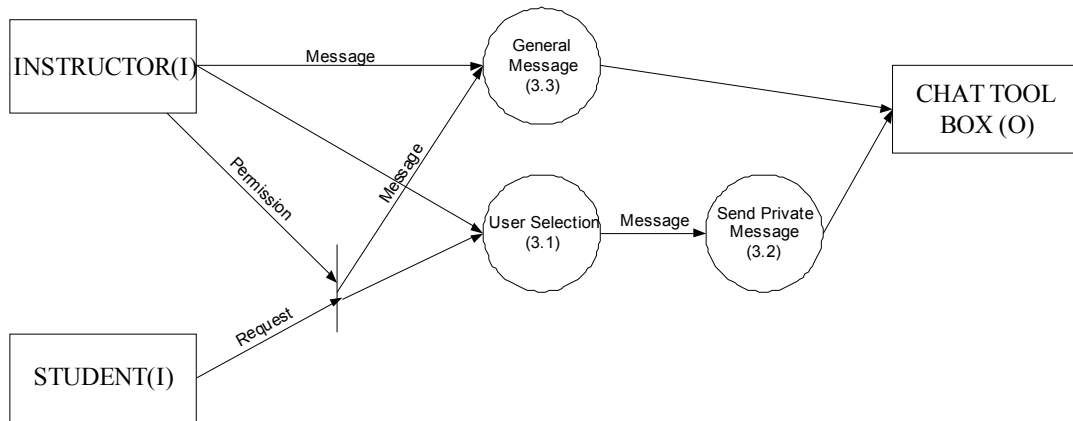
### 6.1.DFD & CFD





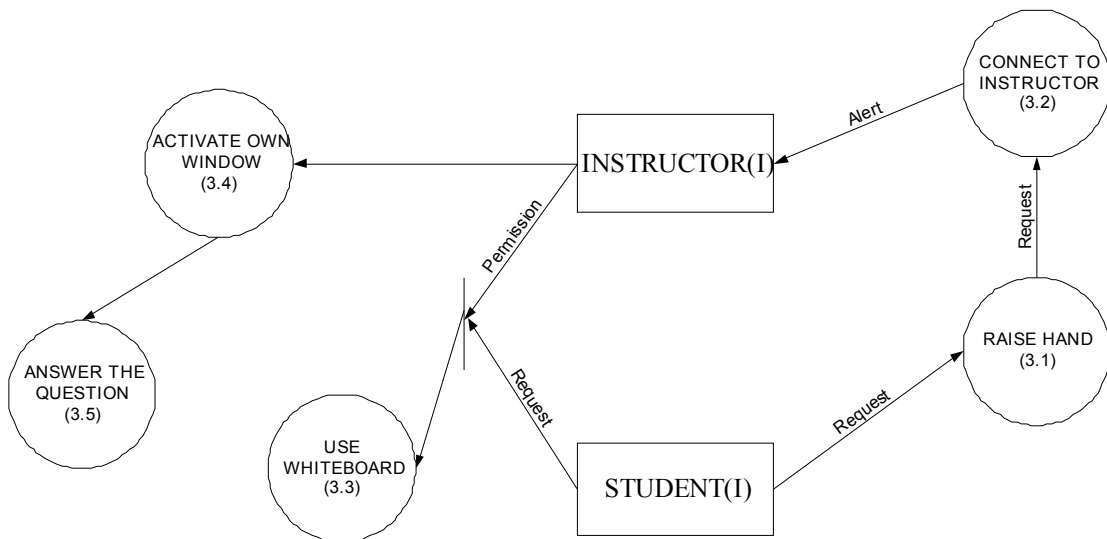






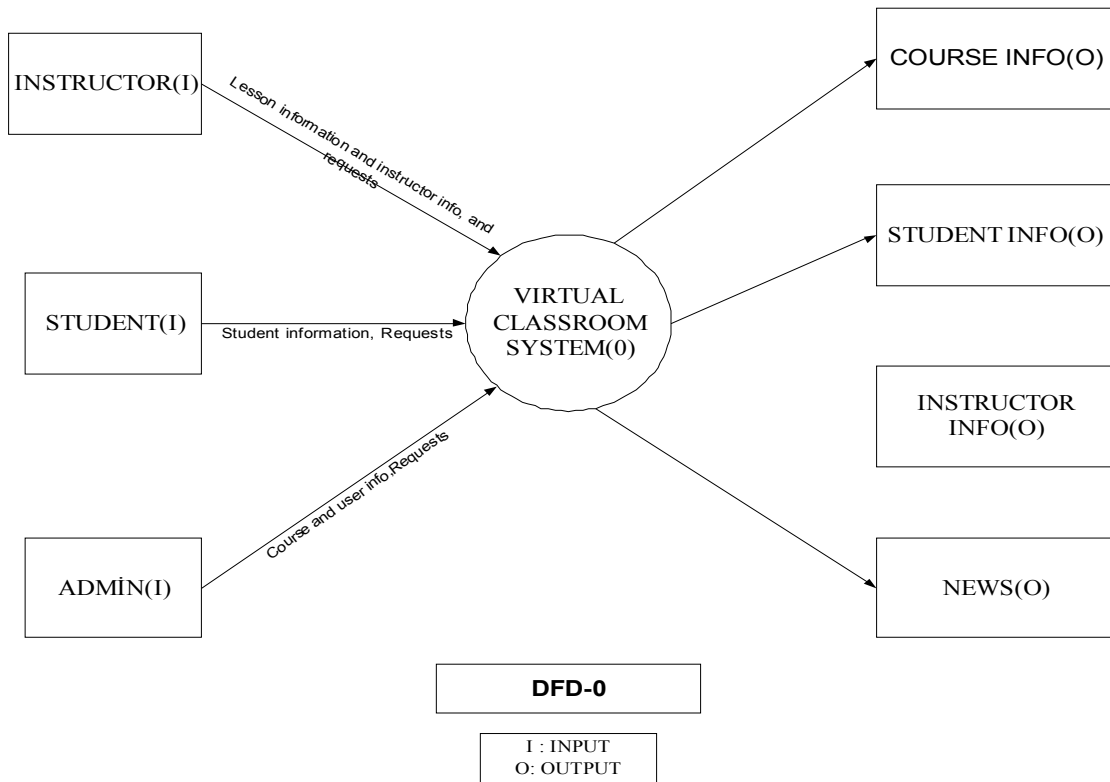
DFD - 2 (CHAT TOOL)

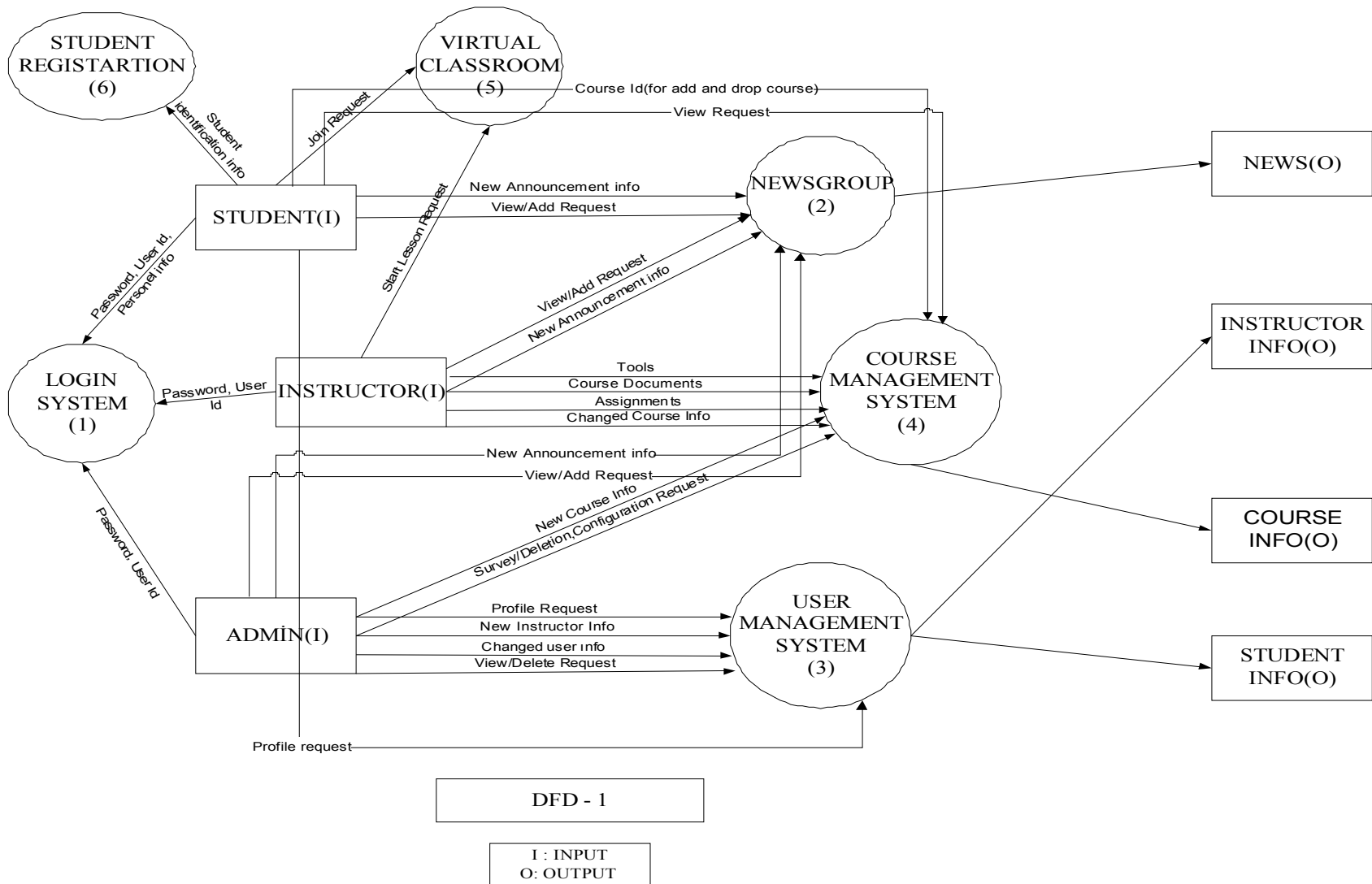
I : INPUT  
O: OUTPUT

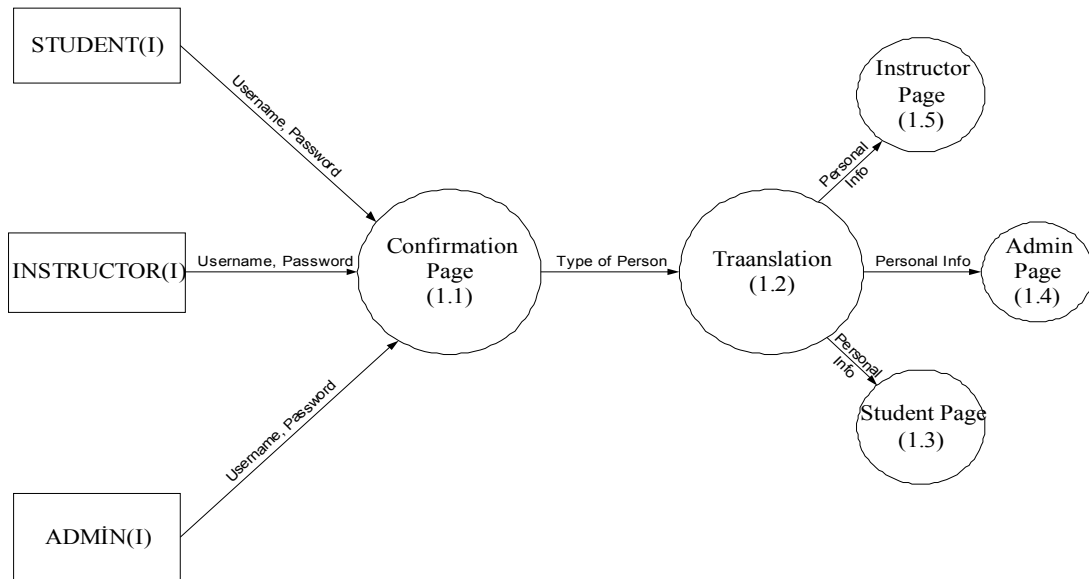


DFD - 2 (Q/A BOX)

I : INPUT  
O: OUTPUT

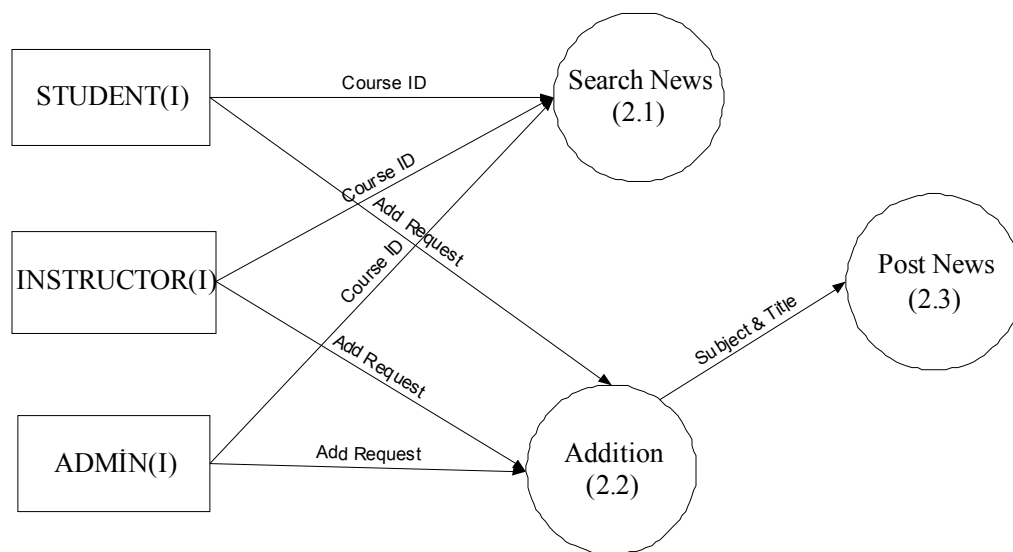






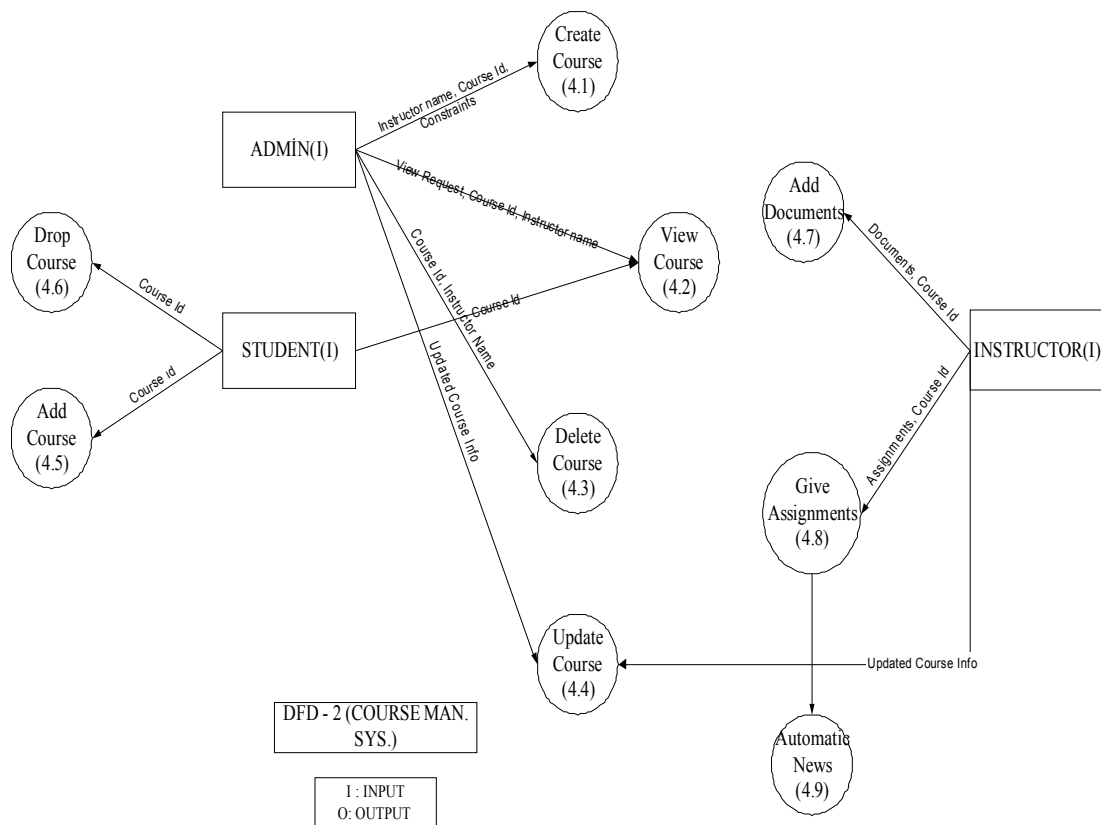
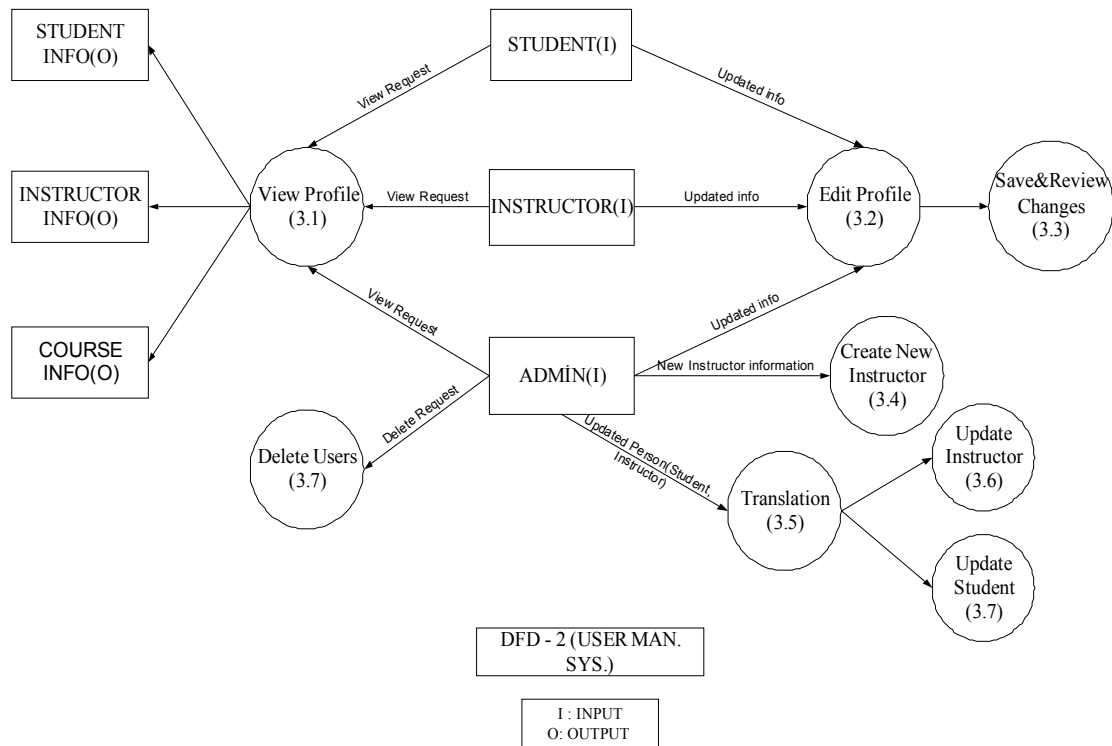
DFD - 2(LOGIN SYSTEM)

I : INPUT  
O: OUTPUT

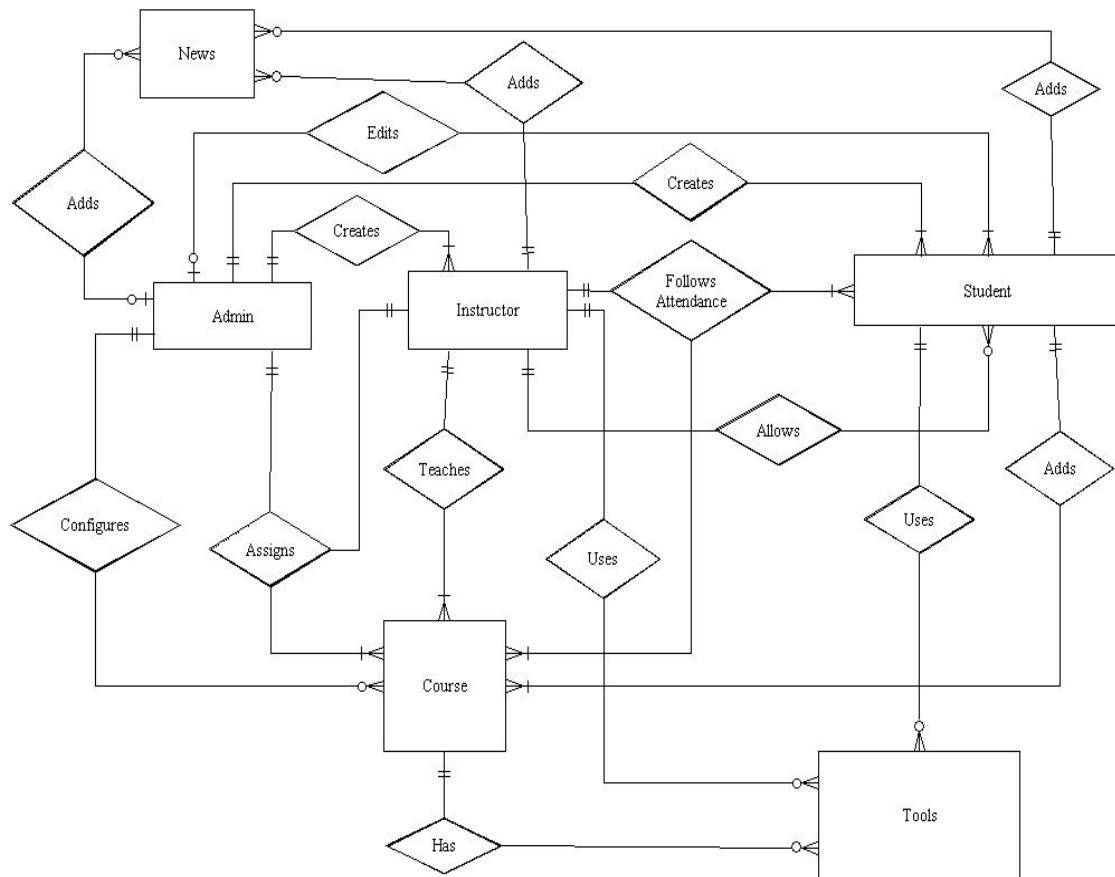


DFD - 2 (NewsGroup )

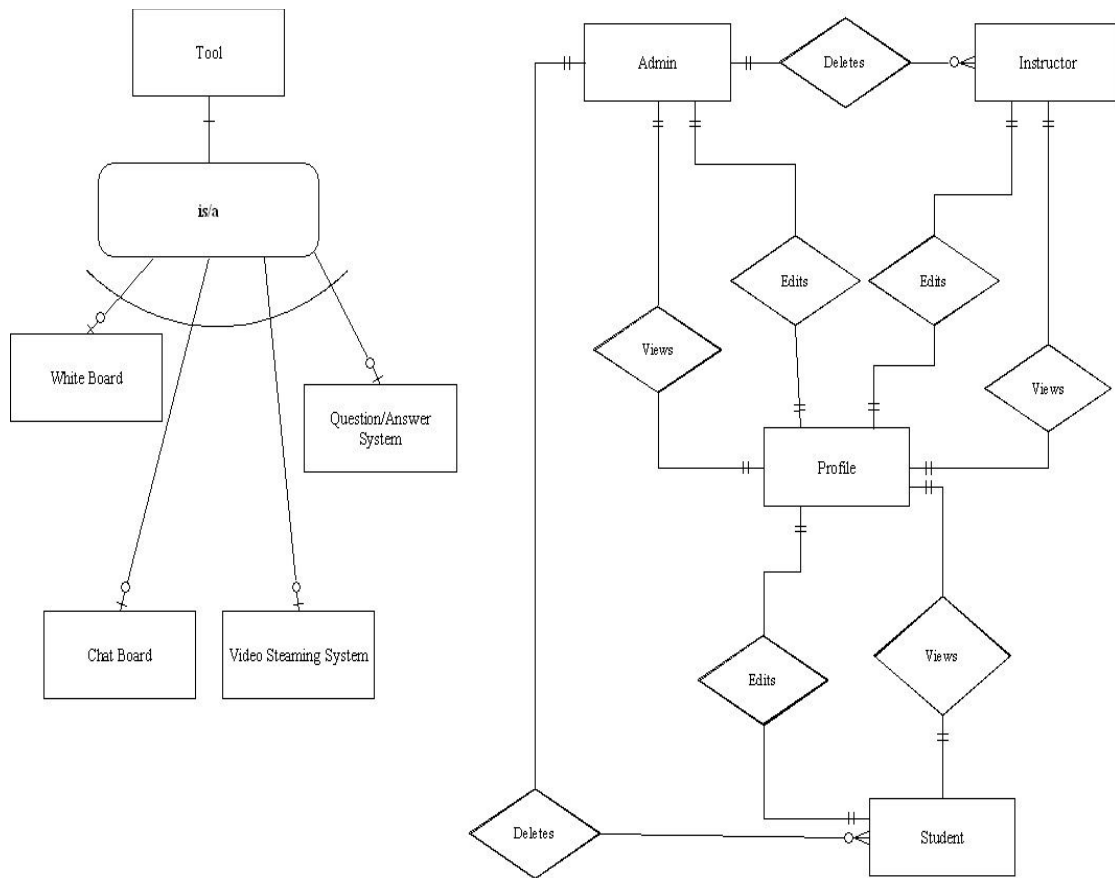
I : INPUT  
O: OUTPUT



## 6.4. ERDiagram







## 6.5.Data Dictionary

Name: Username

Where/How Used: Student, Instructor, Admin (output)

Confirmation Page (input)

Content Description: String

Supplementary Information: Together with Password, forms the key.

Name: Password

Where/How Used: Student, Instructor, Admin (output)

Confirmation Page (input)

Content Description: String

Supplementary Information: Together with Username forms the key.

Name: Type of person

Where/How Used: Confirmation Page (output)

Translation (input)

Content Description: String

Name: Personal info

Where/How Used: Translation (output)

Instructor Page, Admin Page, Student Page (input)

Content Description:

Name: Username

Content Description: String

Supplementary info: Together with Password, forms the key

Name: Password

Content Description: String

Supplementary info: Together with Username, forms the key

Name: Name

Content Description: String

Name: Surname

Content Description: String

Name: Address

Content Description: String

Name: Phone Number

Content Description: Int

Name: Course Id

Where/How Used: Student, Instructor, Admin (output)

Search News (input)

Create, View, Delete, Drop, Add Course (input)

Give Assignments (input)

Content Description: String

Supplementary Information: Together with instructor name, forms the key

Name: Updated Info

Where/How Used: Student, Instructor, Admin (output)

Edit Profile (input)

Content Description:

Name: Username

Content Description: String

Supplementary info: Together with Password, forms the key

Name: Password

Content Description: String

Supplementary info: Together with Username, forms the key

Name: Name

Content Description: String

Name: Surname

Content Description: String

Name: Address

Content Description: String

Name: Phone Number

Content Description: Int

Name: Add Request

Where/How Used: Student, Instructor, Admin (output)

Content Description: Addition (input)  
Boolean

Name: Subject & Title

Where/How Used: Addition (output)

Content Description: Post News (input)  
String

Name: Instructor Name

Where/How Used: Admin (output)

Content Description: Create Course (input)  
String

Name: View Request

Where/How Used: Student, Instructor, Admin (output)

Content Description: View Profile (input)  
Boolean

Name: Delete Request

Where/How Used: Admin (output)

Content Description: Delete Users (input)  
Boolean

Name: Updated Course Info

Where/How Used: Instructor (output)

Update Course (input)

Content Description:

Name: Course Id

Content Description: Primary Key

Name: Course Name

Content Description: String

Name: Capacity

Content Description: Int

Name: Assignments

Where/How Used: Instructor (output)

Give Assignments (input)

Content Description: String

Name: Documents

Where/How Used: Instructor (output)

Add Documents (input)

Content Description: String

Name: New Instructor Information

Where/How Used: Admin (output)

Create New Instructor (input)

Content Description:

Name: Username

Content Description: String

Supplementary info: Together with Password, forms the key

Name: Password

Content Description: String

Supplementary info: Together with Username, forms the key

Name: Name

Content Description: String

Name: Surname

Content Description: String

Name: Address

Content Description: String

Name: Phone Number

Content Description: Int

Name: Allowance

Where/How Used: Instructor (output)

Control Box (input)

Content Description: Boolean

Name: Drawing

Where/How Used: White Board System (input)

Instructor (output)

Content Description: String

Name: Document

Where/How Used: Instructor (output)

White Board System (input)

Download Document (input)

Content Description: String

Name: URL

Where/How Used:

Instructor (output)

White Board System (input)

Browser (input)

Content Description:

String

Name: Message

Where/How Used:

Instructor (output)

Chat (input)

Chat (output)

Chat Tool Box (input)

General Message (input)

User Selection (output)

Send Private Message (input)

Content Description:

String

Name: Answer

Where/How Used:

Instructor (output)

Question/Answer System (input)

Content Description:

String

Name: Selected Tool

Where/How Used: Instructor (output)

Drawing Toolbar (input)

Content Description: String

## 7. Technical Requirements

### 7.1. Software Requirements

- **Web Server:** Since we will use Microsoft .NET products, we are planning to use IIS for web server or any other Microsoft's Web server.
- **DBMS:** When the development platforms are thought the Oracle, MS SQL Server 2000 are the possible solutions. As stated before we chose .NET for development platform; therefore we will use any ADO .NET databases and MSSQL Server 2000 will be our database choice that we thought it will be the best solution for us.
- **Development:** For development phase of our system we decided again on Microsoft's products. Our development platform will be .NET and we are planning to use the following tools and languages.
  - Visual C# .NET programming language for main development
  - ASP .NET for Web side solutions
  - XML web services
  - Microsoft Visual Studio .NET 2003 as development tool.
- **Other Development Software:**
  - Windows XP operating system
    - MS Office Packet for reports or any other documents
    - Microsoft Visio for diagrams
    - SmartDraw for diagrams or time charts
  - **Client Side:** A proper working web browser and a good working operating system.

-Windows 95/98/NT/2000/ME/XP

-Microsoft Vision or Planner (for Linux)



- Microsoft Power Point
- Microsoft .NET Development Studio 2003
- Microsoft Windows Server 2003
- Microsoft SQL Server 2000
- Any Browser

## ***7.2.Hardware Requirements***

- **Web Server:** We need a reliable web server for our system. This machine must be fast and must show high performance in all situations. At least 512MB RAM and Pentium 4 2000MHz processor seems to be the minimum requirements for this machine. Any IBM, HP machine can be selected for this purpose.
- **Database Server:** Since our system requires a huge amount of data to be stored, we will need an apart machine that will serve as a database. At least 40GB storage capacity is needed for this system. And this machine must also be a high performance machine. An IBM machine like xseries 382 may be a suitable choice for this purpose.
- **Client side:** For a client, a PC that is connected to Internet and also having a sound card may be enough.
- **Web cam:** for video transmitting a web cam will be needed also.
- **Developers:** To develop the system each group member needs a good PC with at least Pentium 4 2000MHz, 256MB Ram and 20Gb Hard disk having machines. And also the other requirements like mouse, keyboard etc.

- A video camera
- ADSL Internet connection
- 256 MB Memory
- Client PC

- Pentium 3 800 MHz / AMD 800 MHz or higher
- Mouse & keyboard
- Monitor supporting 800\*600 pixels with High Color
- 20 GB Disk Space (for server)

### ***7.3.Development Platform Analysis***

We will use .NET as for our development platform that it will ease our work. Microsoft announced .NET in June 2000. It is a very young technology that has a broad new vision for integrating the Internet and the Web in the development, engineering and use of software. One key aspect of the .NET strategy is its independence from a specific language or platform. Rather than forcing developers to use a single programming language, developers can create a .NET application in any .NET-compatible language. Programmers can contribute to the same software project, writing code in the .NET languages (such as C#, Visual C++ .NET, Visual Basic .NET and many others) in which they are most competent. The .NET architecture can exist on multiple platforms, further extending the portability of .NET programs. In addition, the .NET strategy involves a new program-development process that could change the way programs are written and executed, leading to increased productivity. The strategies of .NET can be categorized as follows:

- The .NET strategy extends the concept of software reuse to the Internet, allowing programmers to concentrate on their specialties without having to implement every component of every application. Instead, companies can buy Web services and devote their time and energy to developing their products. The .NET strategy further extends the concept of software reuse to the Internet by allowing programmers to concentrate on their specialties without having to implement every component. Visual programming has become popular, because it enables programmers to create applications easily, using such prepackaged components as buttons, text boxes and scrollbars. Similarly, programmers may create an application using Web

services for databases, security, authentication, data storage and language translation without having to know the internal details of those components.

- The .NET strategy incorporates the idea of software reuse. When companies link their products in this way, a new user experience emerges. For example, a single application could manage bill payments, tax refunds, loans and investments, using Web services from various companies. An online merchant could buy Web services for online credit-card payments, user authentication, network security and inventory databases to create an e-commerce Web site.
- *Universal data access* is another essential concept in the .NET strategy. If two copies of a file exist (such as on a personal and a company computer), the less recent version must constantly be updated—this is called file *synchronization*. If the separate versions of the file are different, they are *unsynchronized*, a situation that could lead to errors. Under .NET, data could reside in one central location rather than on separate systems. Any Internet-connected device could access the data (under tight control), which would then be formatted appropriately for use or display on the accessing device. Thus, the same document could be seen and edited on a desktop PC, a PDA, a cell phone or other device. Users would not need to synchronize the information, because it would be fully up-to-date in a central area.

## 8. Risk Management

Risk is an inevitable concept of software projects and it mainly concerns future happenings. We want to produce a well working system therefore we have to consider all the possible defects and unexpected conditions. First of all we have to define possible risks and develop a management style for each of them. After a deep investigation we identified the following possible risks of our project.

- The tasks that are planned in the schedule may overflow
  - Customer may not appreciate the product; this is supervisor for our case.
  - Some team members may not focus on the project deeply.

- A team member may leave the group.
- The team members may not be suitable for group work.
- The motivation of team members may not be sufficient.
- The number of people in the project may not be enough for the project.
- The development tools may be difficult for team members to learn and these tools may not be the best solution for some cases.
- For our project, we will be using incremental-model as process model and hence the requirements and identification of customer needs may not be very well understood and this may cause serious problems in the later steps of the project.

For the risk management we select the most catastrophic risks of this list and we developed special several strategies in order to handle or block these unexpected situations. According to our risk table the most effective risks are about team members, motivation of the group and understanding the customer requirements. Our risk management strategies are planned as follows:

- We will make a strict schedule for our meetings.
- If one of the team members does not join a meeting without a reasonable excuse we will give extra work for the next week as a punishment.
- In order to motivate team members we will arrange some social organizations.
- In order to meet the customer requirements effectively we will follow the supervisor meetings seriously.

## **9. Major Milestones and Project Schedule**