Draft List of Requirements for Software Projects (Fall 2010)

ELT-MCGID: An E-learning Tool for Minimizing Communication Gap and Interaction Delay

The following are the core requirements of this project.

- **Distinguished Features**

Following features might have been supported by other chat applications but they are not present as a whole in a single application. These features make our methodology very specific and beneficial to an EL university.

- **Separate Lists of Class Participants and Questioners**

Our methodology provides two types of lists named List-A and List-B. List-A shows participants of the VC i.e. list of online students and List-B displays only those students who want to ask a question. List-B is developed in chronological order i.e. the first student who wants to ask a question, is given a place on the top of the list and the second student is listed under the previous student and so on. Advantage of List-B is that the teacher is not disturbed by the students who want to ask a question. They are just listed in the List-B and then teacher allows them to ask a question as per list order. This feature is not provided by other applications.

- **Raising and Dropping Hand**

This feature is used by a student enquiring teacher to grant permission for asking a question.
When a student raises hand his/her name is appended to List-B and when a student drops hand his name is excluded from List-B.

- **Controlling and Coordination Mechanism**

This mechanism is for teacher to control the VC. In the start, all of the students can just listen or see (text chat) ongoing conversation between teacher and student. None of the students can use white board, text chat controls or speak. In order to use white board or ask a question using text or audio chat, a student requires permission from teacher. In order to allow a student ask a question, teacher selects a student from List-B and then clicks the 'Allow' button. When the teacher clicks the 'Allow' button, all components on the student interface become enable and now a student can ask a question either by audio or text chat mode. Similarly, teacher has the privileges to block or remove a student. A blocked student means that he has been forcefully blocked by the teacher to ask a question. These are very important features to control and help in the smooth running of VC. This mechanism is provided only by the 'Dimdim'; one of the application.

- **White Board**

Provision of a white board is very important feature for VC. Our methodology provides this feature to share such things which can not be typed or got in a verbal communication. For example, some complex mathematical notations symbols can be easily drawn and communicated using the white board which may be difficult in other ways.

- **Unlimited Users**

Other software applications impose restriction on the maximum number of people in a group. For example, MSN messenger allows 20, Yahoo messenger allows 50 and Skype allows 20 to 200 persons to join a group. In case of our application there is no limit on maximum number of students to join the VC.

- **Explicit Registration Not Required**

To use other chat applications, one has to create an account, but in case of our methodology a student automatically gets registered at the time of his enrollment in the university. For example, in VUP, a student of BSCS is issued ‘BS1001233’ as a registration number at the time of admission. This ID will also be used to get login into our application. Our methodology authenticates the user by interacting with the university database. Therefore, a separate registration is not required for our application.

- **Security**

Only a university student who has been issued a registration number can use or ELT-MCGID. So, our methodology is very secure comparatively to other chat applications where any person can create an ID to use the application.

- **Display of Teacher Name**

When we do text chat via MSN or Yahoo messenger, it is very difficult to distinguish between teacher and student. To eliminate this problem, our methodology displays the word ‘teacher’ as a prefix of the teacher’s reply as well as teacher’s name is displayed the menu bar of the window of each student and his name is also highlighted in list of class participants. This feature removes ambiguity to identify the teacher.

- **Reusability**

Our methodology provides an interface to integrate it with the university database. This feature has made our methodology a reusable component. It enables our system to validate students’ identity, populate teacher and students’ ‘Virtual Class Rooms’ by connecting with the university database.

- **Student Interface**

Using this interface a student can attend the VC. Initially all components of this interface are disabled and a student can not send text message, draw any thing on the whiteboard or speak. He can just watch or listen to conversation being conducted between teacher and students. This interface is very similar the teacher’s interface. Difference between teacher interface and student interface is that in place of pane to control VC on teacher interface, there is an option to raise and drop hand on student interface. Raising hand is a signal that the student wants to ask a question. This option is provided by a ‘check box’ control. When first time it is selected by a student, its state changed to selected and name of the student is appended to the list of ‘Questioners’. When it is clicked second time, the state of this check box changes to unselected and now the student is excluded from the list of questioners.

- **Configuration Interface**

It provides a mechanism to integrate our system with the university database. This interface provides six text fields and one button. Six text fields are for various purposes which are as follows: ‘User Name’ and ‘Password’ text fields require ID and password of university’s database that is going to be integrated with our system. Database URL text field requires URL (uniform resource locator) of the database. Database URL is an address of the physical location of the university database. DB driver text field demands database driver which is used to connect with university database. In next two text fields, labeled as ‘User Authentication Query’ and ‘Course Selection Query’, administrator writes queries which are embedded in our system to fetch data from university database for authentication of student/teacher who wants to join the VC and to fetch registered courses of the student/teacher. ‘Save’ button saves all the provided information and now our system is integrated with the university database.

Draft List of Requirements for Collaborative File Sharing System

The following are the core requirements of this project.

1. **For All Users:**
   - Text-chat feature will allow users to chat with the available online users.

2. **For Registered User:**
   - Allow users to create new folders and sub-folders, to store (upload) files.
   - Allow users to perform move/copy/delete operations on folders and files.
   - The percentage of storage capacity remaining and used should be displayed on the top.
   - Automatic versioning system will record the version/revision information when a file is replaced/overwritten
   - Team management feature will allow users to work in teams (by inviting other existing registered users). The activities of the team include access to the password protected area for the team, uploading files, commenting on the uploaded files (discussion), polls, automatic and manual reminders to the team members.

3. **For Administrator:**
   - Approve/Reject new team requests; update/delete existing teams.
   - View all the files and folders uploaded on the server.
   - Allow to perform delete operation on any existing file/folder existing on the server.
   - Delete account for any registered user.
   - Define and Edit storage capacity and other limits such as Maximum file size allowed for uploading.

Tools: Mircosoft .Net and MS SQL Server; Java/PHP and MySQL

Draft List of Requirements for Data Encryption Compression Simulator

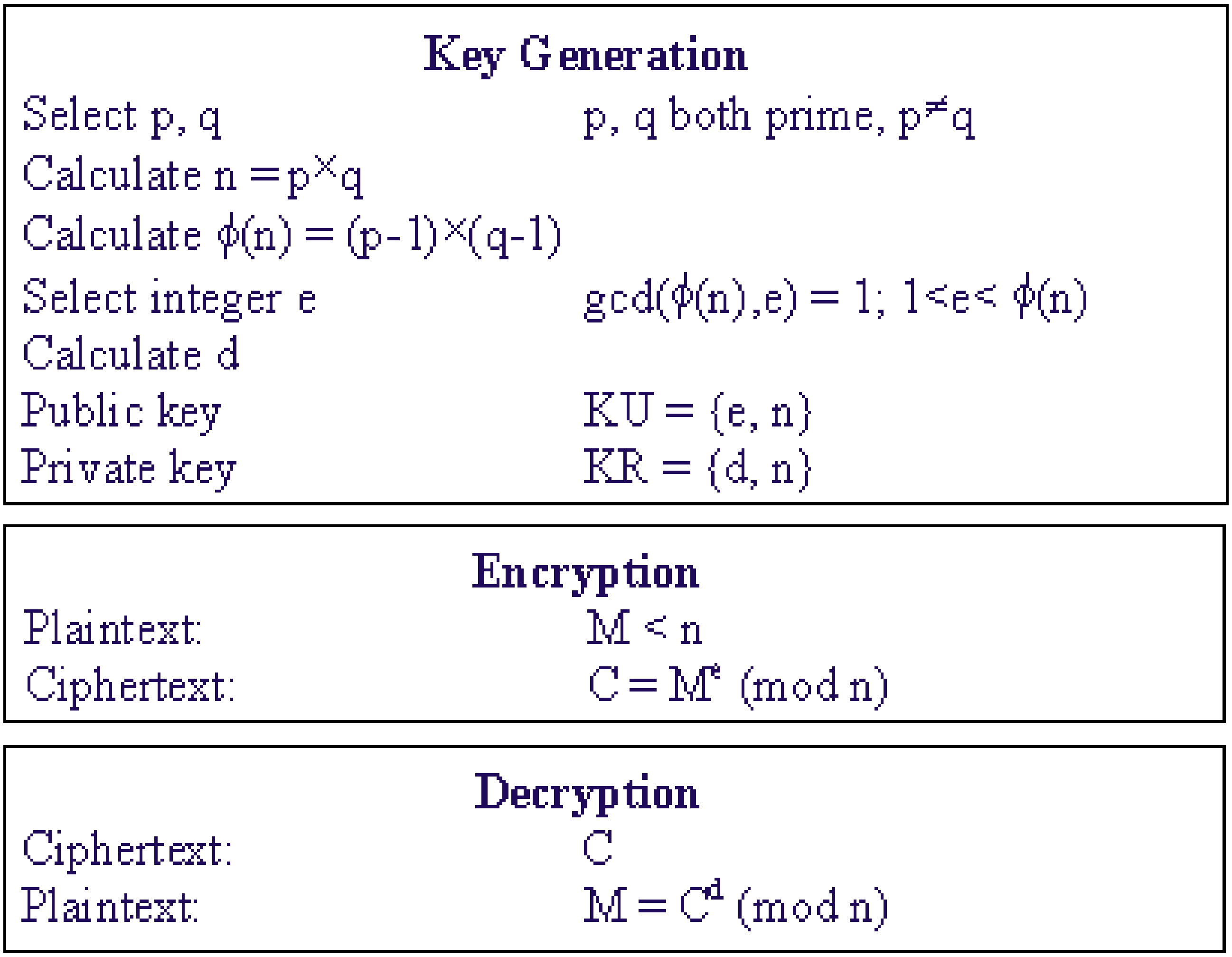
The following are the core requirements of this project.

Security is the key concern in the current electronic era. There are multiple techniques used for data encryption and decryption like ACK (Acknowledgement), AES(Advanced Encryption Standard), AKA (Authentication and Key Agreement),CBCM(Cipher Block Chaining with Output Feedback Masking),CHAP (Challenge Handshake Authentication Protocol), DES(Data Encryption Standard)etc.

When we use encryption technique it increases the length of data as well cost of sending it. Use compression technique to reduce its length and RSA algorithm to encrypt data to secure data. RSA (which stands for Rivest, Shamir and Adleman who first publicly described it) involves a public key and a private key concept. The public key known to everyone and is used for encrypting messages. Messages encrypted with the public key can only be decrypted using the private key. Signature can be added to the message using private key
Used for authentication. Pubic key will be used to encrypt data
Following steps are involved:

- Write message.
- Check the message length.
- Convert message into fixed size packets
- Compress the message.
- Encrypt the compressed message using RSA algorithm.
- Add signature to the message.
- Send the secure message.
- Message will be extracted and decrypted using compression algo and private key at recipient

NOTE: Student may use some new compression technique to enhance the performance.



Key Generation

Select p, q	p, q both prime, $p \neq q$
Calculate $n = p \times q$	
Calculate $\phi(n) = (p-1) \times (q-1)$	
Select integer e	$\gcd(\phi(n), e) = 1;\ 1 < e < \phi(n)$
Calculate d	
Public key	$KU = \{e, n\}$
Private key	$KR = \{d, n\}$

Encryption

Plaintext:	$M < n$
Ciphertext:	$C = M^e \pmod n$

Decryption

Ciphertext:	C
Plaintext:	$M = C^d \pmod n$

Draft List of Requirements for Virtual Raid Simulator

The following are the core requirements of this project.

A simulator is a program run on a computer for the purpose of simulating some sort of system, in order to get a better idea how the system functions. Simulator is often used to test new software on a wide range of hardware configurations, without actually having to use the physical computer resources. At its most fundamental level, a computer simulator is used to recreate a real-life situation where testing many different states wouldn't be easy or safe. In this case, using a computer simulator saves a great deal of time and resources, and may actually allow for in-depth testing that would be physically impossible or at least difficult in the real world.

RAID, an acronym for redundant array of independent disks or redundant array of inexpensive disks, is a technology that provides increased storage reliability through redundancy, combining multiple low-cost, less-reliable disk drives components into a logical unit where all drives in the array are interdependent.

Main Features:

- Graphic representation of each step
- Show all the disks.
- Show Partition of the disks
- All RAID Levels (Level 0, 1, 2, 5 etc) simulation
- Description of each volume i.e. Capacity, Type, Free Space,
- Features of each level i.e. striping, Mirroring, Stripe Set with Parity etc
- Control the generation of simulation objects
- Save the State of Array.
- Logical Formation of any RAID Volume.

Application Type:

Desktop Application

Tools:

Front End tool: Dot net

Back End Database: SQL Server

Note: These are the least requirements which must be fulfilled for the approval of project. More features can be included according to the supervisor's instructions in future too.