Low Level Design – MileStone 1(Submission 2)

Detailed description of the Classes (fields and methods):

Solution Files

Classes:

Program

Methods:

- **void Main (String[] args)** : Main method. Calls Launch() method.
- **void Launch()** : Calls ChatRooms and GUIs Initiate methods to start main components of chat room.

Presentation Layer

Classes:

GUI

Methods:

- **void Initiate (string chatRoomStatusMessage):** Starts a user interactive menu(EntryMenu or Menu) determined by current user logged status (logged in or not).
- **void Menu():** Creates an interactive menu for logged users in which you can take all chat related actions. (calls ChatRoom class in order to perform all different operations).
- **boolean EntryMenu():** Creates an interactive menu for non-logged users in which you can take basic actions to enter the chat room . (calls ChatRoom class in order to perform all different operations).
- **string DisplayMessages (string messages):** Prints and displays a given string that represents user messages.
- **void ClearMessages():** Calls ChatRooms MessageFrame module method DeleteMessages() to delete all previous local stored messages. Shows notifications to user about the deletion process.
- **boolean Exit():** Shows notification to user about exiting the program.
- Calls ChatRooms loggedInUser method to perform Logout() and closes the program.
- **boolean Logout():** Shows user a notification aabout logging out of the program and calls ChatRoom Logout() method.
- **boolean Login(boolean logged):** Gets current user status (logged in\logged out) and shows notification according to it. If user is logged out, asks for user details to log in using ChatRooms Login() method.
- **boolean Register():** Shows notifications regarding registration process. Asks user details in order to perform registration using ChatRoom Register() method.
- **void WriteAndSend():** Asks for user input to be sent as a new message. Calls ChatRooms SendUserMessage() method.
- **void NewScreen():** A helper method which clears current screen and displays the programs title in the newly opened screen.
- **void MarkerMessage(int markedColor, string str):** A helper method that color text(string str) in marker notification color determined by the markedColor integer.
- **void ErrorMessage(int severity, string err):** A helper method that color text(string str) in error notification color determined by the severity integer.

Business (logic) Layer

Classes:

ChatRoom

Fields:

- **User loggedInUser** : the current user using the system.
- **MessageFrame messages** : A MessageFrame type holds and handles all message related occurrences.
- **EventLogger logger** : A logger responsible of logging and documenting all system important events.
- **String url** : Chat room IP\http address.
- **List<User> registeredUsers** : A list that holds all current registered users to the chat room.
- **UserHandler userHandler** : A handler responsible for all local system user related management.
- **CONT String GROUP_NUM** : Authors constant group number.

Methods:

- **string Initiate()** : Initiates all ChatRoom Components, initializes all class fields and reads SystemFiles/Users.bin to get Registered users list from local system.
- **boolean Login(string username, string password)** : Validates user registration according to given user details (username and password) and logs in user to the system.
- **boolean Register(string username, string password, string groupID)** : Registers a new user with the following user details: username, password and group ID.
  Checks if user with the same registration details already exist beforehand.
  If user successfully registers writes updated Users list to SystemFiles/Users.bin.
- **User CheckRegisteredUser (string username, string password)** : Checks if a user with the given password and username is registered to the chat room using the registeredUsers list.
- **String CheckUserDetails (string username, string password)** : Checks user details (password and username) are valid according to following demands:
  - A username can only contain only English ABC, digits and spaces.
  - A valid username needs to be 2-15 characters only.
  - A valid password needs to be 4-15 characters only and no spaces.
- **String SendUserMessage (string msgBody)**: Calls loggedInUser (current logged in user) and uses the SendMessage method to send a message with the content of string msgBody.
- **String RetrieveTenMessages()** : Calls MessageFrame messages and retrieves last 10 messages from server using the RetrieveTenMessages method in messages. Returns a string that indicates the number of messages retrieved.
- **void displayMessages(int number)** : Calls MessageFrame messages and gets a string representing last (int amount) messages using the messages DisplayMessages method.
- **void dispalyAllMessages()** : Calls MessageFrame messages and gets a string representing all current messages available in message cache using the messages DisplayAllMessages method.

MessageFrame

Fields:

- **Queue<Message> messages** : a stack type that contains all current messages saved in RAM.
- **MessageHnadler messageHnadler :** A handler used to manage all local message file integration.

Methods:

- **void NewUserMessage (Message message)** : Initiated when a user sends a message, after sending to server. Enqueues the message to the current message queue.
  Writes updated message list to local SystemFiles.
- **int RetrieveTenMessages()** : Retrieves 10 last messages from server. Checks messages do not exist already and enquques them to local message list.
  Writes updated message list to SystemFiles/Messages.bin.
- **string DisplayMessages(int amount)** : Gets last (int amount) messages from messages queue and creates and returns a string representing all the last messages.
- **string DisplayAllMessages()** : Gets all messages from messages queue and creates and returns a string representing all the messages.
- **boolean DeleteMessages() :** Resets local message list. Deletes and recreates SystemFiles/Messages.bin

User : IComparable<User>

Fields:

- **string username** : User unique username chosen by the user.
- **string password :** User password chosen by the user.
- **boolean logged :** A status indicator to determine if the user is currently logged in or not.
- **string groupID :** A group ID associated with the user.

Methods:

- **string sendMessage(string msgBody)** : Checks user message validity and sends the message to the server.
- **boolean Logout() :** Checks if the user is logged in, loggs user out.   if the user is not logged in the method is will do nothing.
- **Int CompareTo (User user) :** Compares users by their usernames.

Message : IEquatable<Message>

Fields:

- **string body** : the message body.
- **DateTime time** : Message date and time.
- **User user** : A user associated with the specific message.
- **Guid guid :** A unique message identifier.

Methods:

- **boolean CheckMessageValidity(string msg)** : Checks the validity of message content according to the following demands :
  - `A valid message can only contain 1-150 characters.`
- **string ToString()** : A ToString Method represents a message. Produces the following output:

  -
    ```
    username says >> msgBody
    Details :: Sent in: msgTime :: Group ID: userGroup ::
    ```

- **boolean Equals(Messge msg) :** Checks if to messages are equal by comparing their GUID. A method of the IEquatable<Message> interface.

Persistent Layer

FileWriteRead<T>

- **void WriteToFile(String path, List<T> dataType)** : Write a list of objects to file in specified path.
- **List<T> ReadFromFile(string path)** : Reads a file from given path and returns data read.
- **boolean DeleteFiles(string path)** : Deletes file from given path.

IHandler<T> <<interface>>

- **void Write(T list)** : implementation varies.
- **T Read()** : implementation varies.

MessageHandler : IHandler<List<Message>>

Fields:

- **FileWriteRead<Message> writeRead** : Uses FileWriteRead Type to write and read files.
- **CONST string PATH** : A Constant path location on local system where the messages files is saved. (SystemFiles\Messages.bin).

Methods:

- **void Write(List<User> users)** : Write a list of messages to local file path.
- **List<User> Read()** : Reads from local file path a list of messages.
- **boolean Delete()** : Deletes local messages file.

UserHandler : IHandler<List<User>>

Fields:

- **FileWriteRead<User> writeRead** : Uses FileWriteRead Type to write and read files.
- **CONST string PATH** : A Constant path location on local system where the registered users files is saved. (SystemFiles\Users.bin).

Methods:

- **void Write(List<User> users)** : Write a list users to local file path.
- **List<User> Read()** : Reads from local file path a list of users.

EventLogger

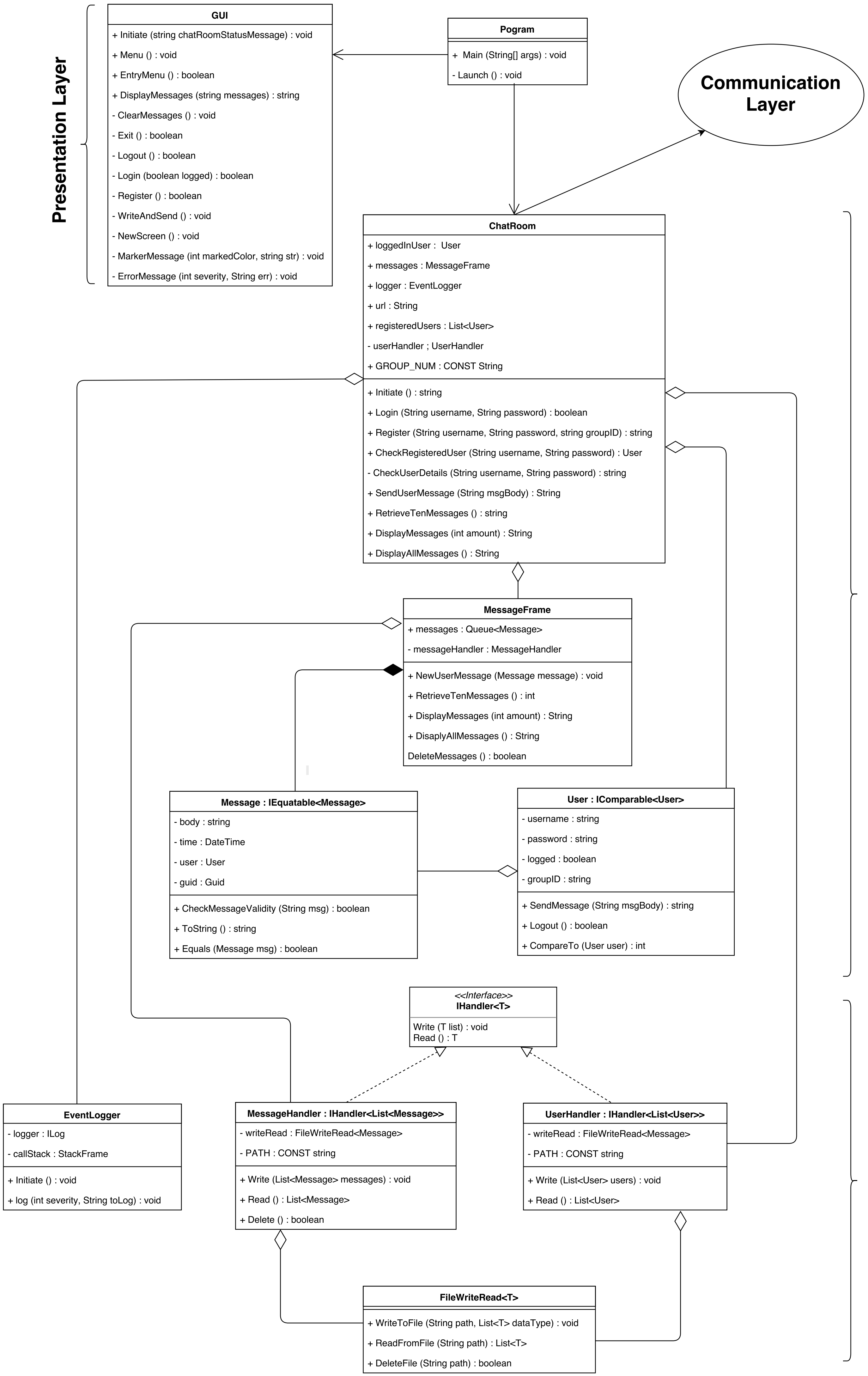
Fields:

- **ILog logger**: A logger implemented with log4net.
- **StackFrame callStack** : A call stack to record logging file name, location and line number.

Methods:

- **void Initiate()** : Starts callStack and loads logger xml configurations from log4net.config
- **void log (int severity, string toLog)** : A helper method to log events to SystemFiles/Log/EventLog.log with a relevant callStack association.

UML LLD FlowChart - MileStone1



GUI

+ Initiate (string chatRoomStatusMessage) : void
+ Menu () : void
+ EntryMenu () : boolean
+ DisplayMessages (string messages) : string
- ClearMessages () : void
- Exit () : boolean
- Logout () : boolean
- Login (boolean logged) : boolean
- Register () : boolean
- WriteAndSend () : void
- NewScreen () : void
- MarkerMessage (int markedColor, string str) : void
- ErrorMessage (int severity, String err) : void

Pogram

+ Main (String[] args) : void
- Launch () : void

ChatRoom

+ loggedInUser : User
+ messages : MessageFrame
+ logger : EventLogger
+ url : String
+ registeredUsers : List<User>
- userHandler ; UserHandler
+ GROUP_NUM : CONST String

+ Initiate () : string
+ Login (String username, String password) : boolean
+ Register (String username, String password, string groupID) : string
+ CheckRegisteredUser (String username, String password) : User
- CheckUserDetails (String username, String password) : string
+ SendUserMessage (String msgBody) : String
+ RetrieveTenMessages () : string
+ DisplayMessages (int amount) : String
+ DisplayAllMessages () : String

MessageFrame

+ messages : Queue<Message>
- messageHandler : MessageHandler

+ NewUserMessage (Message message) : void
+ RetrieveTenMessages () : int
+ DisplayMessages (int amount) : String
+ DisaplyAllMessages () : String

DeleteMessages () : boolean

Message : IEquatable<Message>

- body : string
- time : DateTime
- user : User
- guid : Guid

+ CheckMessageValidity (String msg) : boolean
+ ToString () : string
+ Equals (Message msg) : boolean

User : IComparable<User>

- username : string
- password : string
- logged : boolean
- groupID : string

+ SendMessage (String msgBody) : string
+ Logout () : boolean
+ CompareTo (User user) : int

<<Interface>>
IHandler<T>

Write (T list) : void
Read () : T

EventLogger

- logger : ILog
- callStack : StackFrame

+ Initiate () : void
+ log (int severity, String toLog) : void

MessageHandler : IHandler<List<Message>>

- writeRead : FileWriteRead<Message>
- PATH : CONST string

+ Write (List<Message> messages) : void
+ Read () : List<Message>
+ Delete () : boolean

UserHandler : IHandler<List<User>>

- writeRead : FileWriteRead<Message>
- PATH : CONST string

+ Write (List<User> users) : void
+ Read () : List<User>

FileWriteRead<T>

+ WriteToFile (String path, List<T> dataType) : void
+ ReadFromFile (String path) : List<T>
+ DeleteFile (String path) : boolean