Chat Application Report.

The chat application is divided between 3 main classes. ChatServer.java, ClientSession.java (Server-side), and ChatClient.java (Client-side). ChatServer creates a ServerSocket and waits for clients from ChatClient to connect. On a successful connection ChatServer creates a new ClientSession and passes it into a new Thread. ClientSession implements the Runnable interface which allows it to be run on a separate Thread to the main server thread.

ClientSession itself also creates a thread. The main thread within ClientSession used for writing messages contained as objects to an ObjectOutputStream. Before writing the messages the output stream is reset so new values can be written to the stream and then after the object is written the stream is flushed.

Reading objects from the client is put onto a separate thread since reading objects from ObjectInputStream is blocking which would prevent the ClientSession from writing new objects to the client until an object is written to the input stream. This would be a problem for the chat application as a user wouldn't be able to see messages until they themselves have written a message, and they would have to do that every time they wanted to see new messages.

Messages are stored in a Message Class which stores who sent the message the message body and the time they sent the message. The Message Class implements the Serializable interface which turns the object into a stream of bytes so it can be sent over a connection. All messages are stored in a ConcurrentLinkedDeque. This allows the application to not worry if the main deque is out of sync between threads. A Deque is used so that we can accessed both ends of the collection.

The ChatClient also uses two main threads. One for reading objects and displaying them onto the TextArea, and the main thread takes text from the input fields creates a Message object from that information and writes it into a stream to send to the server. Since the ChatClient is a Java Swing application which is Java's main GUI framework, it also has an eventloop thread. This allows us to to run methods when the user interacts with the GUI in a certain way, such as pressing a button ,or pressing a certain key.