# ***Introduction***

One of the skills required from a 3rd year computer science student is familiarization with network applications as well as networking as a whole. In this assignment we were required to develop a client server file transfer application in groups of threes. File transfer refers to the transmission of a file or data through a communication channel from one computer system to another. File transfer is mediated by a communications protocol. This assignment teaches the basics of programming design and socket programming for TCP connections in Java. We learned to create a socket, bind it to a specific address as well as send and receive messages or files.

# ***Application Design***

In this assignment, we are required to design and implement a client-server file sharing application that makes use of TCP sockets. We first had to create the basic working program that connect one client to the server and transmit messages, there after configure such that it allows for the transfer of files/data. The client should be able to upload and download files (one at a time) to the server, and also to query the server for a list of files available. The network application is then upgraded to a multithreaded network to allow multiple clients to communicate with the server at the same time. As this is a network application, the clients and the server have the ability to run on different hosts.

# ***Protocol Specification***

In this assignment, the pattern of communication will be client-server-based, meaning that a server will be responsible for the overall control and coordination of the file/data transfer process. The pattern of communication also specifies if transmission mode for files/data is unicast, multicast, or broadcast. The transmission modes may be used in different aspects of the protocol. We were required to use file/data transfer in this application protocol design.

The protocol that has been set up accepts data before it is received. Before the client can upload, download or query for files/data the server need to be started first. When the server is started it creates a socket (ServerSocket) that the clients can use to connect to the server with. It starts the thread that keeps listening for any client that wants to connect to the server. All file transferring happens via the server.

## ***File Transfer Protocol***

The client files is operated using the GUI which is initiated by the client connecting to the running server. When this is done the client starts a thread to listen to the command prompts. The GUI screen then offers the client option to upload, download and query files from the server. When the user wants to upload files/data the client creates a pop-up screen to show available documents and runs the correct protocol to save the file on the server. When the user wants to download the file/data the user inputs the filename and the client retrieves the file from the server. When the client wants to query the server the client sends the request to the server for the list of all the files on the system and prints it back on the GUI screen.