# ***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 sharing application in groups of threes. File sharing refers to the transmission of a file or data through a communication channel from one computer system to another. File sharing 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 sharing 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 sharing 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 Sharing 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.

# ***Features***

When the server is first run, it keeps an open thread that keeps accepting connections from clients. When the client socket is running and connected to the server a GUI screen pop ups to prompt the user on how to user the File Sharing Networking Application. The client selects the option they want to use (download, upload and query). The server accepts the user option and makes the proper protocol response.

The list of features we have included for our File Sharing Network Application are as follows:

1. The Client is able to upload file to the Server.

* This functionality is allowed by the Client class, it gives the user a pop up screen where the user can search for the file they want to upload, and selected to upload to the server. The file is then saved on the server.
* The restriction added to this feature is that a client is allowed to upload one file at a time which is stored on the Server.
* This helps the user keep the file on the server and allow for sharing with other clients that are connected to the server, as well as have a copy of the file saved on the Server as a back-up for the original.

1. The Client is able to download file from the Server.

* This functionality is allowed by the Client class, it prompts the user to enter the filename of the file they want to download from the Server. The file is then retrieved from the Server and store within the client’s files on the devices which the client is using to connect to the network.
* The restriction added to this feature is that the client is allowed to download on file at a time from the Server and stored on the Client system.
* This helps the user retrieve files from the server, possibly be able to read files upload by other clients, share file with different clients on the system, as well as update information on previous stored files.

1. The Client is able to query the list of files on the Server.

* This functionality is allowed by the Client class, the client sends the query to the Server and the Server responds with printing a list of files saved on the Server.
* The restriction added to this feature is that it only prints files that are not hidden on the server. Only the public are displayed on the list for sharing.
* This helps the user find the file they wants to download and check whether they have upload the files correctly. The user can use this query option before downloading to check whether the file exist on the system. The user can use query option to make sure not to name files in the same way.