**CSCE4312 Project**

**Networking Protocols and Socket Programming**

**Due Date: Monday 26th November, 2018**

The goal of this project is to introduce the students to the File Transfer Protocol (FTP) and Trivial File Transfer Protocol (TFTP) networking protocols using different means. TFTP is an Internet software utility for transferring files that is simpler to use than the FTP, but less capable. This project is divided into **three parts** in order to ensure full understanding of the different aspects of the TFTP and FTP protocols. In addition, you will be able to learn and demonstrate different networking and programming skills.

**First Part:** willfocus on the TFTP protocol. Using GNS3, you will be asked to build and emulate a simple TFTP server that serves certain networks. Then, you will use Wireshark to capture the generated TFTP packets. Hence, you can inspect these TFTP packets and develop a deeper insight into how the TFTP protocol actually works.

**Second Part:** has emphasis on the FTP protocol. In this part, you will create an FTP session. However, unlike part one; you will not use GNS3. This part will rely on your machine, command prompt, internet connection, and Wireshark. After capturing the FTP packets, you will be asked to provide a comprehensive analysis on how these two different protocols work and highlight the similarities and major differences between them.

**Third Part:** will utilize the networking experience you have gained from part one and part two along with your programming background. This part will introduce you to the socket programming APIs and operating system concepts which are essential to deploy networked applications. You are required to build an FTP-like server socket. This could be realized through implementing two programs. First, a server socket that listens for any incoming connections. The server provides read and write operations that you will tailor to meet your application needs. Second, a client that connects to the server. Both the client and server must be written in **C/C++** and operate under windows or Linux.

**The following are the learning outcomes for this project:**

1. Understand the basic fundamentals of the TFTP and FTP protocols.
2. Extensive use of the GNS3 and Wireshark.
3. Understand socket programming and its role in computer networks.
4. Understand sockets and ports.
5. Program Sockets in C/C++.
6. Create comprehensive network applications using sockets.

**Project Requirements:**

1. Create a TFTP server that serves certain networks and exclude others, using GNS3.
2. Create an FTP session on your machine and analyze the generated packets.
3. Create a basic TCP/IP (server-single client communication) in C/C++.
4. Create an FTP file transfer application using socket programming.

**Project Logistics:**

1. Each team consists of two students only.
2. **Deliverables:**
   1. Technical report summarizing the results and major findings (5 points)
   2. GNS3 config files and Wireshark pcap files (5 points)
   3. Project C/C++ files (Server.c and Client.c.) (5 points)
   4. Demo with 10 minutes Q&A session (10 points) (The discussion session will be scheduled at a later date)