An-Najah National University

Faculty of Engineering

جامعة النجاح الوطنية
كلية الهندسة

Computer Engineering Department

Computer Networks 1(66454)

Course Mini-Project & Homeworks

Dr. Raed Alqadi

Instructor Name: Dr. Raed Alqadi
Academic Year:2016/2017
Semester: Fall
Credit Hours: 3
Date: 5/12/2016 (Final Part)
Project Parts:3

Student Name: Ahmad
Registration Number:
Section: 2
Total Project Mark: 30
Project Weight: 15

Student Grades

Part	Description	Points	ILO's	Weight of 30	Part Grade
Part 1	Basic Network Programming	10	2	6.66	
Part 2	Client Server and Peer to Peer chat	10	2	6.66	
Part 3	Client Server and Peer to Peer file transfer	10	2	6.66	
Part 4	Writing reliable Client server file transfer and Integration	10	2	6.66	
Student Grade (of 30)				30	

Project Notes:

1- Submit every part of the Program (Software on time)
2- Use good programming practices and style.
3- Read the specs of the program on the next page carefully.

Project: Network Programming and Reliability:

In this project, you will develop a Reliable Client-Server and Peer to Peer Application that runs on a Network. To simplify the process of developing the application, this project will be composed of 4 assignments and you will be graded on each part. You must submit each part on due time. The due time of each part will be announced to you in class according to the parts covered during the course.

The Four Parts will lead you to develop an Application to chat and send/receive files. Also you will apply the reliable data transfer principles used in the Sliding Window Protocols. In the first part, you will learn the basics of Network programming, particularly UDP peer to peer programming. In the Second and Third Parts, you will learn the Socket Programming and develop a TCP Client-Server and Peer to Peer to Peer UDP program for chatting and file transfer. The TCP server will act as a Registration server to find online peer to peer Clients. In the Fourth part, you will apply the Reliable Data Transfer principles by developing a Reliable File Transfer Application on top of the UDP.

Project Parts (Assignments):

1. **Part 1:** In this part you are required to apply Java Socket programming and also learn the QT environment which should develop basic skills in Network Programming. You are required to develop peer-to peer UDP network program by using Java and also learn how to develop that in QT. Therefore, develop a chat program using Java to gain the skills of Socket programming in UDP. Your program will use GUI with boxes and buttons for Messages to be sent and received. Include Boxes for the source & destination ports and boxed for source & destination IPs. You will also need a send Button.

2. **Part 2:** In this part, you are required to develop an Application that has TCP Client Server interaction as well as peer to peer UDP chat program. You will need to write two programs: The first one is just a TCP server that accepts registration requests from TCP clients in the TCP-Client/UDP-Peer-to-Peer applications. The TCP server keeps track of "who is online" and sends this information to all clients. The second program is the TCP-Client/UDP-Peer-to-Peer. Your TCP-Client/UDP-Peer-to-Peer should first register at the TCP server to get the online clients. Then the user can select the client which it can chat with. Chatting is done using UDP. You will need to rewrite the peer-to-peer application that you developed in part 1 using QT and add boxes to enter the port and IP of the TCP server in addition to the controls already used in part1. The TCP server should also be developed in QT and should have GUI that displays a list of the online clients. Similarly, your TCP-Client/UDP-Peer-to-Peer application should also have a list of the online clients.

3. **Part 3:** In this part you are required to modify the code you developed in part 3 such that it can send/receive a file by using UDP in addition to the chatting. So provide a control to select a file to be transferred. Also develop a simple protocol to inform anther client of the file transfer request.
   You will read a file in chunks and convert each chunk to Packet and transfer it.
   You must develop your program by using the QT programming Environment.

4. **Part 4:** In this part, you will develop a reliable Client Server File Application on top of an unreliable Transport Protocol. Hence, you will combine the skills learned in

parts 1, 2, 3 and add the principles of Stop and Wait Protocol & Sliding window protocol to gain the reliability needed. You must use UDP as your transport layer. Further you must introduce errors, checksum, Acknowledgments and Sequence numbers and collect statistics. The Process of introducing errors, correcting them by retransmission and collecting statistics will be explained to you in Class.
You must develop your program by using the QT programming Environment.