CS 4390/5390: Computer Networks

Project 2

(This is a group assignment)

Total Points: 100

**Goal:** To make us familiar with (a) TCP, (b) Ethernet and ARP, (c) Wireshark tool, (d) automated email sending, and (e) OAUTH protocol for security.

**Motivation**: So far in this course we have been gaining some technical background of computer networking. We have been mainly following the textbook. Now it is time for you to take the next step to verify things hands-on by doing project 2. You may do this with 2-3 other students as a group. If you prefer to work alone, that is also ok.

**An overarching constraint**. This project consists of 3 tasks and for each task you need to demonstrate your work by submitting a video recording (with screen capture of your computer) of about 3 minutes long. **Each member in your group has to demo** (via recording their voice and their computer screen) at least one task (of these 3 tasks).

**[Additional work for CS 5390 students**: If you are a CS 5390 student, then you (individually) also need to submit a three-page (1500 words) writeup for the project, highlighting major findings, weaknesses, and suggestions for improvement.]

**Task 1**. (**34 points**) Verifying fundamentals of TCP protocol with Wireshark.

The task with details is attached, which is adopted from the textbook resource. However, you have to generate the packet trace yourself. Furthermore, note that instead of working with original alice.txt file (<http://gaia.cs.umass.edu/wireshark-labs/alice.txt> which is referred in the task) you will first append your group members’ names 20 times at the beginning of the original alice.txt (after you download it), and then you will do the whole task with this modified alice.txt file.

The point distribution is as follows.

1. Submit your self-generated packet trace, which has to match with your work. Note that if your work does not match with the submitted trace, then you lose 15 points.
2. Correctness and completeness of your work. 18 points. You need to submit screenshots (with echoing your name at top like what instructor Roy discussed in class) to show that you were able to complete each step.
3. Make a video recording of your work in which you demo the major items of the task. 16 points. The audio and video quality of the recording should be clearly understandable. Length of the recording should be about 3 mins.

**Task 2**. (**33 points**) Ethernet and ARP exploration with Wireshark. The task with details is attached, which is adopted from the textbook resource. However, you have to generate the packet trace yourself.

The point distribution is as follows.

1. Submit your self-generated packet trace, which has to match with your work. Note that if your work does not match with the submitted trace, then you lose 15 points.
2. Correctness and completeness of your work. 18 points. You need to submit screenshots to show that you were able to complete each step.
3. Make a video recording of your work in which you demo the major items of the task. 15 points. The audio and video quality of the recording should be clearly understandable. Length of the recording should be about 3 mins.

**Task 3**. (**33 points**) Automated sending of emails via Gmail server with the App Passwords scheme or OAuth2 scheme.

You might recall that in Project 1 you already used one of the two schemes (App Passwords or OAuth2) to enable a python program to send email via Gmail service. Now you use the other scheme and then compare these two schemes’ operational ease and security strength.

How to use App Passwords scheme can be found at the following link: <https://support.google.com/accounts/answer/185833?hl=en>

On the other hand, the CS department admin Lisa Weihl (lweihl@bgsu.edu) has written a step-by-step guideline for you on how to use OAUTH2, which is attached.

The point distribution of Task 3 is as follows.

1. Correctness and completeness of your work. 15 points. You need to show that your program is able to send an email without an attachment and is also able to send an email with an attachment. You need to submit screenshots to show that you were able to complete each step.

Further note if you are doing OAuth2 in project 2. There are two steps as Lisa’s document describes. Step 1 (in which you get your Gmail account ready for OAUTH2) carries 8 points whereas Step 2 (in which you complete the given python program to send an email via Gmail API) carries 7 points.

1. Make a video recording of your work in which you demo the major steps of the task. 14 points. The audio and video quality of the recording should be clearly understandable. Length of the recording should be about 3 mins.
2. Compare the operational ease and security strength of these two alternative ways (App Passwords vs. OAuth2) of sending an email via Gmail. The expected length of your answer is about 100 words. 4 points

*To-submit*: Only one copy from each group needs to be submitted. Put all files (answer documents, packet traces, screenshots, video recordings) in a zip and submit. If the video recordings are too big, then upload them to OneDrive and include the link in Canvas submission.