Computer Networks and Programming (ECE 5650)

Project 3

Winter 2017

Deadline: Tuesday, March 28 by 11:59 PM. No late submissions will be accepted.

Instructions:

- **Team Work**: you may work individually or with one other student. **If you work with another student, you must submit only one copy with both your names.**
- If you have questions, please contact the **GTA** during his office hours. You may also contact him by e-mail if you cannot make it to his office hours. His contact information is included in the online syllabus.
- **You must submit all the following files**:
  - Python program(s) with .py extension
  - **Report in pdf format, including a copy of the source code, testing procedure used to verify the correctness of the program, the screenshots and their explanations, the performance evaluation methodology, comparative results, and their analysis. Make sure that you include your name(s) on the report. The report must include the URLs that you tested your program with.**
- **File Naming:** the filenames must contain your last name(s): yourlastname. properExtension (if you work alone) or yourlastname1-yourlastname2.properExtension (if you work with another student).
- **Required details in the beginning of the program(s):** The beginning of the python program must include the team names and must indicate whether your program is interpreted correctly and whether it produces the correct results. If it does not produce the correct results, you must provide the necessary details.
- **Comments and Documentation:** the program must be well documented and commented.
- Do NOT put "#" in the file name(s).
- Upload your file(s) using to this Assignment page. Make sure that you attach the files and hit the "Submit" button.
- **To verify your submission**, go to grading center and make sure that there is "!" in the entry for this assignment.
- **Assessed Penalties:**

Situation	**Penalty**
Late submission	No accepted
Plagiarism or disallowed collaboration	At minimum negative grade
Not using socket programming for all networking	Not accepted
Not using Python 2.7.x	Not accepted
Failure to include the full report with **thoughtful screenshots** verifying the programs work(s) correctly	Up to 10%
Failure to include all required information at the beginning of the program(s)	Up to 10%
Failure to have a well commented and documented program(s)	Up to 10%
Failure to include the URLs that you tested the program(s) with	Up to 10%

Policy on Cheating, Fabrication, and Plagiarism:

Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct will result in at least failing the course. Therefore, avoid all appearance of improper behavior! Students who witness cheating should report the incident to the instructor as soon as possible.

Assignment:

This project will involve both research and programming. In this project, you will modify your webpage downloader program in Project 2 by supporting multithreading. Currently, the program makes one request at a time. Modify the program to implement a multithreaded webpage downloader capable of receiving multiple objects simultaneously. You will then conduct **thoughtful and detailed experiments** to compare the performance of this multithreaded webpage downloader with the basic webpage downloader in Project 2.

- You will first need to read carefully and understand the technical details, specification, and the examples of multithreading at https://docs.python.org/2/library/threading.html. The following tutorial will be helpful: http://www.tutorialspoint.com/python/python_multithreading.htm.

- (**50 Points**) Now, enhance your webpage downloader in Project 2 by supporting multithreading. Your new webpage downloader must have **ALL required features** of that in Project 2.

- (**50 Points**) Conduct thoughtful and detailed experiments to compare the performance of this multi-threaded webpage downloader with that you developed in Project 2. You must decide on the proper performance metric to use, the type of experiments to be conducted, and how to conduct these experiments to quantitatively and adequately compare the performance of the two downloaders. In the report, you must specify your performance evaluation methodology, include the results in both well-formatted and presented tables and graphs, and briefly analyze the results.

What to Submit

- You must submit the complete python code.
- You must also submit a **detailed report in pdf format,** including a copy of the source code, testing procedure used to verify the correctness of the program, the screenshots and their explanations, performance evaluation methodology, comparative results, and their analysis. You must provide **thoughtful screenshots** to prove that your code works as expected. You must also demonstrate by the screenshots that the **multithreading aspect** works. You may want to introduce intentional time delays in the program in certain cases. **Be creative!**

Good Luck!