

CSCI-P 538 Fall 2016 Project 3 (Research Track)

A Deadline

December 2 2016 23:59:59 EST. This is a hard deadline and no extension will be given. Any clarification queries should be sent to `p538fall16-1@list.indiana.edu`.

B Teamwork

Up to two students can work together on this project. In other words, a team may consist of one or two students. In the latter case, **both students must contribute to the project**, and a detailed description of each student's role must be submitted (§F).

C Problem Description

This is a research project, which means that the goal is to experiment with **new research ideas and solutions**. You are free to choose any topic that is relevant to computer networks and data communication. The topics include but are not limited to the following.

- Content distribution *e.g.*, CDN, peer-to-peer
- Design, analysis, and evaluation of network architectures
- Internet measurement and modeling
- Networking aspects of data centers and cloud computing
- Networking aspects of operating systems
- Network control and management, including SDN and network programmability
- Network economics
- Network, transport, and application-layer protocols
- Networking aspects of mobile and ubiquitous computing, including Internet-of-Things
- Networking aspects of online social networks
- Reliability and availability of networks, protocols, and applications
- Routing

- Security and privacy aspects of networks, protocols, and applications
- Topics at the interface between networking, communications, and information theory
- Topics at the intersection of energy-efficient computing and networking
- Wireless and cellular networks

Your project can be either of the following types: design/implementation, measurement, and analysis. I will describe some concrete project ideas in class. Of course, you are encouraged to brainstorm your own idea as well as to talk with me about your ideas. You are also welcome to perform interdisciplinary research: leverage your expertise in other areas of computer science (*e.g.*, machine learning, HCI, data mining) to attack a computer networking problem.

Regardless of the topic you choose, before starting working on the project, the following should be clear in your mind.

- What is the problem you are solving?
- What are the motivations and challenges; why is this problem important and difficult?
- **What are the novelties of this project?** Your project must have something new (*e.g.*, the problem itself, the design, the analysis, or the expected findings) otherwise it is not a research project. For example, both projects of the engineering track are not research because **they were done by others before**.
- What is the related work and how your work advances the state-of-the-art?
- What is your high-level solution direction?
- What is your plan of attacking milestones and the deadline? Note the deadline is firm.

D Research Paper

The research paper is the key deliverable of this project. Your final paper should have the following components (similar to a common conference paper in computer science):

- *An appropriate title and abstract.*
- *Introduction.* Introduce the problem in a big context and state its importance. Describe your high-level approach and findings. List your key contributions.
- *Related Work.* Summarize existing solutions/findings and briefly state why your work advances the state-of-the-art.
- *Proposed Approach.* Describe in detail your proposed approach (system design, measurement study, or analysis). Also describe how you address various challenges of the problem.

- *Implementation.* If you have built something real, describe here how you implemented it.
- *Evaluation.* Show the experimental results that demonstrate the effectiveness of your solution. If you are doing measurement/analysis, describe your findings/analysis results.
- *Conclusion.* Be brief. Having one short paragraph is sufficient.
- *References.*

Note that depending on the type of the work, the structure of your paper may differ. For example, if you are proposing a new system, you will need solid implementation and evaluation; if you are conducting a measurement study, you will need to thoroughly describe your measurement methodology and findings.

E Format of the Paper

Your research paper must comply with the following format.

- Submit papers of **at least six (6)** single-spaced pages. There is no upper limit on the number of pages.
- List the authors on the first page.
- Submit papers using a 10pt font on 12pt leading formatted for printing on Letter-sized (8.5" by 11") paper. Paper text blocks must follow ACM guidelines: double-column, with each column 9.25" by 3.33", 0.33" space between columns. **Use the L^AT_EX template or Word template provided to you to ensure compliance.**
- Ensure that labels and symbols used in graphs and figures are legible, including the font sizes of tick marks, axis labels, legends, *etc.*

F Submit Your Work

Your submission package must include the following.

- The research paper in PDF or Word format.
- If you use L^AT_EX, you must also include the L^AT_EX source.
- All source code and data that have been produced during your research. The bottom line is **all results in your paper must be reproducible using the source code and data you provide.**
- Other supplementary materials you think are useful.

Also, you must provide a short text file (name it `readme.txt`) explaining the following (this `readme.txt` is not a part of your paper).

- Describe items in your submission package (*e.g.*, “the `src` folder contains the C++ source code of our XYZ system”).
- If your team involves two students, write a paragraph that gives a detailed description of each student’s contribution. **Please be specific on who did what.** A single sentence like “both students contributed equally” is not sufficient. The final grade will take this description into consideration.

Compress everything above into a single file called `project3C.zip`, `project3C.bz2`, or `project3C.tar.gz` (depending on the compression program you use). Submit it to Canvas. Contact the professor if your file is too large to upload to Canvas. If a team involves two students, only one student (either one) needs to submit the team’s package. If we receive submissions from both students, we will only grade the latest version (based on its timestamp) submitted before the deadline.

G Sample Research Papers

Two sample research papers are appended. See the next page. They are research papers published at decent conferences and workshop of computer networks. Note the second paper uses 9pt font. In your project please use 10pt font instead. **You are strongly encouraged to read them to get a sense of how a good research paper looks like.**

H Honor Code

Students must follow the IU honor code (<http://www.iu.edu/~code/code/responsibilities/academic/index.shtml>). **In no case may your code or project report be copied from another student or a third-party source on Internet.** We will use an anti-plagiarism software to detect code or project report “shared” among students. Any violations of the honor code will be dealt with strictly, including but not limited to receiving no credit for the entire project.