ECE/CS 438: Communication Networks	**Fall 2024**
Mini Project	
Handed Out: Nov 14th, 2024	*Due: Dec. 13, 2024 23:59*

1 Project requirements

If you are taking ECE/CS 438 for 4 credits, you are required to complete a mini-project as follows.**This project should be done by a group of two**.

In the mini-project, you will select a research paper from the given list below, read this paper and other related work on the same topic (i.e., other papers/articles/tutorials), and finally submit a 15-minute video presentation on that topic. **Both of the group members need to present in the video**.

The topics below have all been introduced in 438, so your video presentation should be thought of as an "enrichment", or a step forward, to what students already know. For example, we have talked at length about basic TCP in class. So, your presentation on TCP Explicit Congestion Notification (ECN), should you decide to pick that one, would explain how congestion control can be further improved, why congestion notification is a good idea, and what are the pros and cons with ECN.

The best videos may feature as "supplementary material" in 438's course calendar next year. This means that your videos will help students of next year go beyond what we cover in class lectures.

Note that the papers listed below are the starting points for exploration, which means you should research on your own around the topic, particularly unfamiliar terms and unfamiliar ideas that are being referenced in the paper. Please bear in mind that your audiences are the students of 438 and thus you know what is familiar to them and what is not.

2 List of topics

Pick any one from the following topics/papers:

- A survey on quality of experience of HTTP adaptive streaming(Seufert):
  Link to the paper
  URL: `https://opus.bibliothek.uni-augsburg.de/opus4/frontdoor/deliver/index/docId/107128/file/107128.pdf`

- TCP: Explicit congestion notification ECN (Floyd):
  Link to the paper
  URL: `https://www.icir.org/floyd/papers/tcp_ecn.4.pdf`

- Router design: A 50 Gbps IP Router (Partridge):
  Link to the paper
  URL: `https://courses.engr.illinois.edu/cs538/sp2019/readings/partridge98router.pdf`

- BGP: Routing policies in ISP networks (Rexford):
  Link to the paper

URL: `https://www.cs.princeton.edu/~jrex/papers/policies.pdf`

- CSMA/CA performance under high traffic conditions: throughput and delay analysis (Ziouva):
  Link to the paper
  URL: `https://www.sciencedirect.com/science/article/pii/S0140366401003693`

- 5G: Tutorial overview on standards, trials, challenges, deployment, and practice:
  Link to the paper
  URL: `https://wides.usc.edu/Updated_pdf/shafi20175G.pdf`

- L2D2: Low Latency Distributed Downlink for Low Earth Orbit Satellites (Deepak):
  Link to the paper
  URL: `https://deepakv.web.illinois.edu/assets/papers/L2D2_SIGCOMM2021.pdf`

- A Scalable, Commodity Data Center Network Architecture (Al-Fares):
  Link to the paper
  URL: `https://dl.acm.org/doi/pdf/10.1145/1402946.1402967`

- Analysis the Increase and Decrease Algorithms for Congestion Avoidance in Computer Networks (Chiu and Jain):
  Link to the paper
  URL: `https://www.cse.wustl.edu/~jain/papers/ftp/cong_av.pdf`

3 What and How to submit

You should submit two things: video and slides for the presentation. The video should be submitted preferably as a Youtube link, or as a link to a network drive. The slides for the presentation should be submitted as a PDF file. You can still use PowerPoint to present, but please export it as a PDF file when you submit.

Submission details: Please put the video link on the first page of your presentation such that we can access the video through your slides. Then, please upload a single PDF file that contains the video link and your actual presentation to **Gradescope**. Both of you should submit to Gradescope.

The deadline for submission is **Dec 13, 11:59 pm**.

Note: Please make sure the course staff have access to your video link. After you upload the slides that contain your video link, it is always a good idea to check whether the video link is working. Please put both of your name and Net ID on the first page of presentation.

To sum up, the first page of the presentation should contain

- Title of your presentation

- Link to your video

- You and your partner's name and NetID. If there is only one name on the presentation, we will count it as soloing the mini-project.

4 Rubric for grading

Below is the rubric for the project.

- **The clarity of the explanations:**
  For example, whether the terminology is defined before it is used, whether it is clearly understandable, whether explanations are lucid, etc.
  Weights assigned: 40%.

- **The richness of the topics covered:**
  For example, whether is it superficial with only sampled material from the paper. Ideally, you should survey other related papers, draw materials from them, and connect the dots.
  Weights assigned: 30%.

- **The quality of presentation:**
  For example, busy slides, poor visualization, and lots of text without visual explanations, etc. can all contribute to poor presentation.
  Weights assigned: 25%.

- **Time constraints of your presentation:**
  In particular, the video should be less than or equal to 15 minutes.
  Weights assigned: 5%.

The course's grading curve will be based on 3 credit students only. Then, 4 credit students will fit on this curve, including your mini-project.

5 Final notes

- Imagine the audience to be undergraduate seniors, so please discuss technical matters (not just high-level trivia or history). Share your personal thoughts and opinions anywhere you see fit.

- Please cite related papers and articles you have read in the last slide(s) of your presentation.