Today

• Outline
  • What this course is about

• Logistics
  • Course structure, assignments, evaluation
  • What is expected from you
  • What you want to know

• Computer networks & society
  • Overview, science of networks
  • Brief overview of areas we are going to study
What is This Course About?

- Undergrad course

Computer Networks or Society?
- Emphasis on computer networks
- Understanding the impact of computer networks on our lives
- How to improve this impact?
Topics Covered (tentative)

- **Part I:** Introduction to computer networks
  - High level, no technical details

- **Part II:** Science of networks
  - How computer networks change our society
  - Modeling, analysis

- **Part III:** Impact of computer networks on
  - Communications
    - Phone, e-mail, ...
  - Business
    - Stock market, banking, ...
  - Entertainment
    - TV, music, ...
  - Healthcare
    - Electronic health records, sensor networks, diagnosis, ...
  - Social relations
    - Social activities, friendships, ...
  - Privacy, spam, ...
Logistics – Prerequisites, Readings

- No prerequisites
  - Can be taken by all first year students

- Readings
  - Will be posted on course schedule
  - Read before class
Logistics – Textbooks

- No textbook required

- Recommended books (not required to buy)
Logistics – Hours, Web, TA

- **Office hours**
  - Tue. 3-4 PM
  - Wed. 3-4 PM
  - Or by appointment
  - Location: Bahen 5238

- **Course web page**
  - Please check regularly for announcements.
Logistics – Mailing List, Bulletin Board

- Bulletin board
  - Post any questions related to the course.
  - Check previous posts before asking a question.
  - We guarantee to respond within 48 hours.

- Class mailing list
  - sii199-announce@cs.toronto.edu
  - Based on email address you have on ROSI.
  - Send me an e-mail to be added to the list.
  - The TA and I will use this list for announcements only.
  - *Do not send e-mails to this list!*
Logistics – Grading

- Grading
  - Assignments: 40%
    - Three assignments each 10%
    - Lecture notes 10%
  - Participation in class and discussions: 10%
  - Final projects: 50%
    - Proposal: 5% - 1 page, due Oct. 14th
    - Intermediate report: 10% - 2 pages, due Nov. 4th
    - Presentation: 10% - Last week of classes
    - Final report: 25% - 5 pages, due Dec. 2nd
Logistics - Deadlines

• Assignment deadlines
  • One free late submission of 24 hours
    • Use on assignment of your choice
    • E-mail TAs before the deadline
  • 10% deduction for each date late
    • Up to 20%
    • Assignment not accepted after two days
Logistics – Academic Integrity

• Academic Integrity
  • All submissions must present original, independent work.
  • We take academic offenses very seriously.
  • Your goal is to learn. No one learns by cheating!
  • Please read
    • Handout # 1 (course information sheet)
    • “Guideline for avoiding plagiarism”
    • “Advice about academic offenses”
      http://www.cs.toronto.edu/~clarke/acoffences/
Logistics - Accessibility

• Accessibility Needs

• The University of Toronto is committed to accessibility. If you require accommodations or have any accessibility concerns, please visit http://studentlife.utoronto.ca/accessibility as soon as possible.
Quick Survey

• How many people do you know in this room?
  • Two
  • Three
  • Four
  • Five
  • Six
  • Seven
  • Eight
  • Nine
  • Ten
  • More than ten

• Hint: you should know at least two! 😊
Survey – Cont’d

- Which online social networks do you belong to?
  - Facebook
  - Messenger (FB)
  - Google Plus
  - Telegram
  - WhatsApp
  - Viber
  - IMO
  - Twitter
  - LinkedIn
  - ...

Survey – Cont’d

• How many friends do you have in your top online social network?
  • Less than 10
  • Between 10-50
  • Between 50 and 100
  • Between 100 and 500
  • Between 500 and 1000
  • More than 1000?
Questions?

What else do you want to know about this course?
Let’s Begin

- Computer networks and society
  - Overview, science of networks
- Life areas that computer networks have changed
  - Healthcare
  - Business, remote collaboration
  - Entertainment, content sharing
  - Cloud computing, storage
  - Cyber security, privacy
- Computer networks
  - An introduction to the mail system
  - An introduction to the Internet
Communications Media

- **Communications in the past**
  - Meeting in person
  - Mail
  - Phone

- **Today**
  - Phone, chat (text, voice over IP, video)
  - E-mail
  - Online social networks
  - Blogs, YouTube, ...
  - ...

SII 199 - Computer Networks and Society

University of Toronto – Fall 2015
Computer Networks and Communications

- Computer networks make communications
  - More convenient
    - All done while you sit on your couch
  - Cheaper
    - Phone costs decreasing, free voice chat, ...
  - Faster
    - Compare mail and e-mail
  - Better
    - New ways of communication, video, e-mail, blogs, ...
- ...

SII 199 - Computer Networks and Society

University of Toronto – Fall 2015
Not Just Another Medium ...

- Computer networks make communication better, but that’s not all.
- They also impact our social networks
  - We have more friends
    - People who know “us”
    - And, people who know “of us”
  - We produce more content, and share more
    - Blogs, YouTube, Twitter, ...
    - Broadcasting and multicasting
  - And consume more
    - Not just TV and radio

This is what this course is about.
Science of Networks

- We can model networks as graphs
- Nodes
  - People
  - Web pages, ...
- Edges, or links
  - Relationships
  - Any sort of connection, communication, ...
Characteristics of Social Networks

- What do social networks look like today?
  - Are they completely random?
  - Is there a pattern we can find?

- Properties of social networks
  - Average number of friends
  - Average path length between any two people
  - How does information propagate?
    - News, fashion, ...
  - Who are the most influential people?
    - Fastest to distribute info, best target for advertisement
  - How can we detect communities?
Evolution of Social Networks

- How are social networks evolved?
  - How does our friendships evolve?
  - How do we form communities?
  - How do communities evolve?
- How do computer networks change that process?
- How can we change the evolution process?
  - Take advantage for marketing, fashion, news, ...
- What are core technologies that help today?
- And, what are technologies that we can envision for the future?
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Impact on Healthcare

- Electronic Health Records (EHR)
  - Global access to your health information
  - Better decisions by your doctor

- Sensor networks
  - Monitoring health

- Homecare for elderly people
  - Increased life expectancy

- Remote diagnosis
  - Under-developed regions
Impact on Business

- Online retail
  - Amazon, Netflix, ...
  - eBay, craigslist, ...

- Advertising
  - Completely revolutionized
  - Google effect

- Financial sector
  - Online banking, currency exchange, stocks, ...
  - E-Commerce

- Global competition
  - Outsourcing
Remote Collaboration

- A lot of people work from home these days
- Long distance collaborations
  - Researchers, students/mentors, ...
- Tons of tools to make this possible
  - Voice/video conferencing and presentations
  - Online sharing of documents
  - Collaborative writing
    - Google docs, MS OneNote, ...
- Energy savings, impact on environment
- Makes sense financially as well; gas prices going up
Entertainment

• New ways to distribute content
  • Improvement to traditional systems
    • IPTV, TiVo, AppleTV, ...
  • New forms of content distribution
    • On-demand content, more flexibility
    • YouTube, WebCams, ...

• Easier to share, even illegally
  • Piracy and its impact on entertainment industry

• Opens room for small players
  • You can create content and broadcast in minutes ...
Content Sharing

- File sharing services
  - Napster: centralized directory
    - Legal issues
  - Gnutella: decentralized
  - KaZaA, BitTorrent, ... many to follow

- Peer-to-peer networks
  - Skype
    - Trying to secure communication
  - Tons of research on detecting and hiding
Cloud Computing/Storage

- Desktop model
  - You store everything locally
  - Run application locally
- Cloud model
  - Data stored on the cloud
    - Dropbox
  - Applications run on virtual machines
    - Amazon’s EC2
- Convenient, efficient
- Many problems to solve
  - Data and VM management, security, ...
Cyber Security

- Viruses and worms
- Hacking: gain illegal or unauthorized access to a file, computer, or a network
  - Why: power, control, fame, ...
- Political hacking (Hacktivism)
- Denial-of-service (DoS) attacks
- Identity theft, phishing
  - Financial incentives: credit card fraud
- Click fraud, forgery, scams,
Privacy

- Too easy to reach people
  - Spam in e-mail
  - Telemarketing
- Global access makes it easy to leak private information
- Lack of awareness/concern about privacy
  - Will you accept friendship requests from unknown people?
  - More than 50% of people do
General Approach

- For each area we will roughly follow the same methodology
- Study impact of computer networks on that area
- Study technical advances/tools that made it possible
- Try to do a deeper analysis and find patterns/causes
- Creative thinking to
  - Make predictions on how things will change
  - Make things better in the future