Introduction to Computer Networks

0512.4462

Lectures: Tuesdays 14-17, Samueli (Broadcom) 102
Recitations:
Group 1: Mondays 13-14, Wolfson 406
Group 2: Wednesdays 17-18, Tochna 104
Staff:
Lectures: Prof. Boaz Patt-Shamir.
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Objective of the course

In this course we cover the basic concepts of computer networks, with emphasis on the Internet. Topics covered include multi-access channels, LANs, switching, routing, scheduling, flow control, and socket programming. The course includes significant programming assignments. It is assumed that students have working knowledge of programming in C or C++. A course in operating systems is a prerequisite.

Homework and Grading

The grading in the course will be based on theoretical homework assignments, and programming assignments. The breakdown will be 65% for the final exam, 15% for homework, and 20% for the programming assignments. Programming assignments are to be done in pairs.
Lateness. Every student has a budget of 7 days for submitting late throughout the course, no questions asked. Surpassing the lateness budget will result in deduction of points: 10% a day.
Ethics. Homework (and, of course, exam) is to be done individually. Programming assignments are to be done in pairs. You may discuss your work with another student, but if you borrow a substantial idea from somebody else, you should acknowledge him or her explicitly in your work. In any case, you should write your work on your own. Cheating will result with serious consequences.

Communication in the Course

Other than lectures and recitations, the main means of communication in the course will be the Moodle system and email. It will be assumed that you read e-mail at least twice a week.
Homework should be submitted electronically via Moodle only. Theoretical assignments should be submitted as PDF files, and programming assignments as zip archives.

Bibliography

1. *Computer Networks: A system Approach* by Larry Peterson and Bruce Davie (free online edition). This will be the main textbook of the course.
2. *Computer Networking: A Top-Down Approach Featuring the Internet* by James F. Kurose and Keith W. Ross (8th ed., 2022).
3. *Data Networks (2nd ed.),* by Dimitri Bertsekas and Robert Gallager, Prentice Hall (1992). A little outdated, still one of the best sources for multi-access channels and delay models.
4. Multiple Access Protocols by R. Rom and M. Sidi. 1990. Springer-Verlag
5. *Unix Network Programming, Vol. 1 (3nd ed.)*. W. Richard Stevens, third edition (2003), full pdf freely available. The best text on its subject. Extremely useful in practice.

Tentative Schedule 2023

Date	Lecture	Date	Recitation	Homework
14.3	Introduction; Physical layer	13,15 .3	Socket programming	
21.3	NO CLASS	20,22 .3	Socket programming	PA1 out
28.3	Error-correcting codes; some queuing theory	27,29. 3	Codes	
4.4	PASSOVER BREAK			
11.4	PASSOVER BREAK			
18.4	Multiple access channels; ethernet and wifi	17,19. 4	Queuing theory	PA1 due
21.4 Friday Samueli 001	Hubs, bridges, spanning tree protocol			PS1 out
25.4	Yom Atzmaut		Multiple access (24.4)	
2.5	Switch structure	1,3. 5	Spanning tree protocol	PS1 due PS2 out
9.5	Switch scheduling	8,10. 5	Switch structure	
16.5	Scheduling congested links	15,17. 5	Traffic streams, scheduling	PS2 due
23.5	Routing	22,14. 5	Scheduling, WFQ	PA2 out
30.5	IP: addresses, protocols, forwarding	29,31. 5	Routing principles	
6.6	Reliable transmission	5, 7. 6	Routing implementations	PS3 out
13.6	UDP; TCP	12,14. 6	Reliable transmission	
20.6	Congestion control	19,21. 6	TCP	PS3 due
27.6	Security	26,28. 6	TCP congestion control	PA2 due
July 12	**FINAL EXAM**			