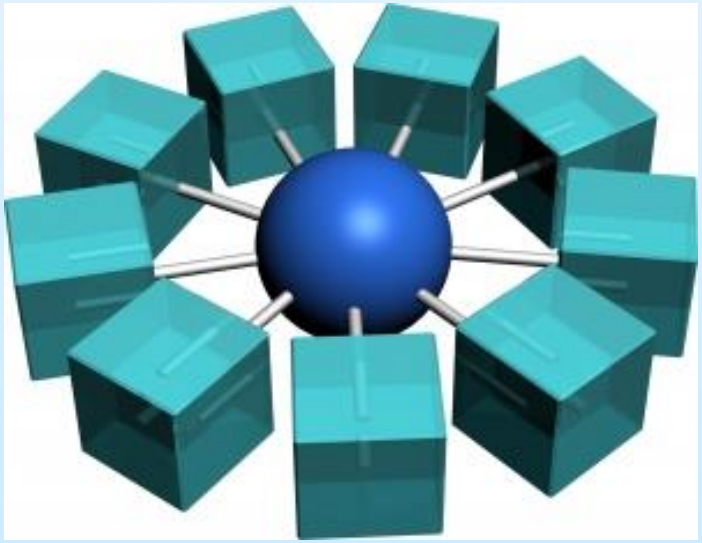
Client Server and Parallel Programming

31666

Spring 2013, Ort Braude College
Electrical Engineering Department



http://www.sxc.hu/photo/1357762 (public domain image)

Course Program

- **Lecturer:** Dr. Samy Zafrany
- **Credits:** 5.0
- **Hours:** 3 lecture, 2 laboratory
- **Grade Composition:**
  - 20% - mid-term exam
  - 30% - laboratory projects
  - 50% - final exam
- **Prerequisites:** 31616 (Programming)

Course Web Site

https://www.samyzaf.com/braude/CLISERV/index.html

This is a temporary location until we move
To the college Moodle system

Slides and most figures and images are based on the Slides of Tanenbaum Book:
Computer Networks, Fourth Edition, Andrew S. Tanenbaum, Prentice Hall 4th Edition, Teacher Complimentary Materials

Course Description

- Client/server application architecture
- Interface, Protocols, Basic Networking Concepts (TCP/IP, UDP) and basic networking tools
- Socket programming
- Internet, WWW, SQL, and client/server systems
- Multitasking, multithreading, and distributed programming
- Database systems, distributed systems, distributed programming
- Client technologies, languages and tools
- Server technologies, languages and tools
- Security and social issues of client/server systems.

Course Outline

- Client/Server systems overview: www client/server, email, ftp, File Server (NFS), DBMS, SQL, RPC
- Networking concepts: protocols, TCP/IP, UDP, MIME, POP, SMTP, DNS, HTML, HTTP, XML
- Networking concepts: OSI model
- Operating systems, processes, and threads Overview. Multithreading models. Threading issues.
- Socket Programming. Synchronous vs. Asynchronous socket calls.
- Networking testing tools: ping, nslookup, ipconfig, traceroute, netstat
- Distributed system structures. Network Structure. Network Topologies. Communication Structure. Communication Protocols.
- Client/Server system design: chat client/server, simple DBMS client/server, Poker game client/server
- Client/Server system implementation: chat client/server, simple DBMS client/server, Poker game client/sever
- Communication Security. Social issues. Cryptography. SSL.

Lab Projects

- Multi processing and multithreading (parallel programming)
- File system search/indexing using single process, multiple processes, and multithreading
- Client communication with server
- Multiple clients communicating with server (Chat server, simple DBMS, Poker game server)
- RPC client/server
- Implement a simple distributed parallel algorithm

Expected Learning Outcomes

- Students will get familiar with basic networking concepts, the basic structure and organization of networking
- Common types of networking paradigms, and common Internet applications and protocols
- Particular emphasis will be put on the prevalent client/server model, and its associated parallel programming computing methods
- Multitasking, multithreading, and distributed programming
- Ability to apply solid engineering principles and methods in building network-aware applications.

Bibliography

- *Silberschatz and Galvin*. Operating Systems Concepts. 8th edition, 2008, John Wiley & Sons, Inc.
- *Andrwes S. Tanenbaum*. Computer Networks, 5th Edition, 2010, Prentice Hall.
- *W. Richard Stevens, Bill Fenner, Andrew Rudoff*. UNIX network programming, 3rd edition, 2003, Prentice Hall.
- *Allen B. Downey*. Think Python, O'Reilly 2012, http://www.greenteapress.com/thinkpython
- *Mark Pilgrim*. Dive into Python, Apress 2004, http://www.diveintopython.net
- *John Goerzen, Brandon Rhodes*. Foundations of Python Network Programming. 2nd Edition, 2010, Apress.
- www.python.org

Software

- All needed software should be downloaded from

  https://www.samyzaf.com/braude/PYTHON/index.html
- Into a personal flash drive (diskonkey)
  - at leas 2GB drive is needed
- All software can be executed from the flash drive on any standard Windows PC
- So you can do all your coding work at home and everywhere you have an access to a windows PC
- We may however need a session or two in the College Linux labs