ORT Braude College
Department of Electrical and Electronic Engineering

31666 Client Server Systems and Parallel Programming

Lecturer: Dr. Samy Zafrany
Credits: 4.0
Hours: 3 lecture, 2 laboratory
Grade Composition: 20% - mid-term exam, 30% - laboratory, 50% - final exam
Prerequisites: 31616

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 Contents

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

Laboratory Projects

1. Forking and multithreading
2. File system search/indexing using single process, multiple processes, and multithreading
3. Client communication with server
4. Multiple clients communicating with server (Poker game server)
5. RPC client/server
6. Implement a simple distributed parallel algorithm

Bibliography

1. *Silberschatz and Galvin.* Operating Systems Concepts. 8th edition, 2008, John Wiley & Sons.
2. *Andrwes S. Tanenbaum*. Computer Networks, 5th Edition, 2010, Prentice Hall.
3. *W. Richard Stevens, Bill Fenner, Andrew Rudoff*. UNIX network programming, 3rd edition, 2003, Prentice Hall.
4. *John Goerzen, Brandon Rhodes*. Foundations of Python Network Programming, 2nd edition, 2010, Apress.

Software: Windows 7 and Linux operating systems

Expected Learning Outcomes

Students will get familiar with basic networking concepts, 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.

Last Update: January 30, 2013.