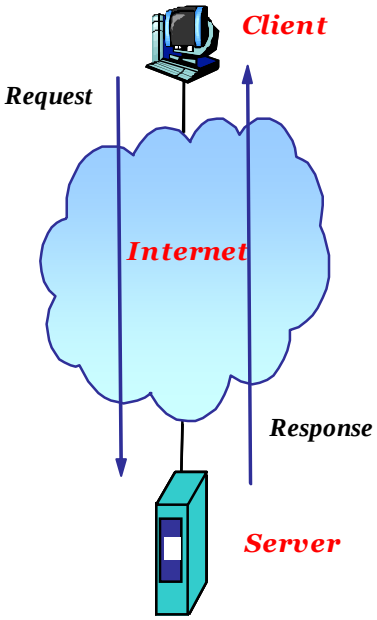
ICS 571: CLIENT-SERVER PROGRAMMING



Fall Semester 2016 (2016-1)

Getting Started

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Course Objectives & Learning Outcomes

- Course Objectives
  - To learn how the Internet is structured into layers and the various protocols at each layer with emphasis on the transport and application layers
  - To master the development of client-server Internet applications using the sockets and other higher-level APIs.
- Learning Outcomes
  - Demonstrate understanding of the TCP/IP model and relevant protocols at each layer.
  - Understand the operations and related issues of various common Internet applications and protocols including: HTTP,FTP, SMTP,POP.
  - Develop client-server applications using the socket interface.
  - Use effectively software development tools and packet analyzers.

Tentative Topics

- Overview of MS ASP.Net Web Pages and .NET Framework
- Programming Basics, OOP, Delegates, Events, Multithreading
- TCP/IP Protocols and Client-Server Model
- Network Programming using .NET Helper Classes
- Socket Programming
- Asynchronous and Multithreaded C/S Programming
- Application-Layer Programming: HTTP and Web Applications, SMTP, POP/MIME, FTP, ICMP
- UDP Broadcast and Multicast
- REST, Web Services, RSS, WebSockets
- Overview of Cloud Computing and Virtualization

Grading Policy

- Programming assignments (hosted on the web): 30%
- Project (Presentation and live demo): 15%
- Midterm Exam: 25%
- Final Exam: 30%
- Lecture attendance: -1% per 2 unexcused absences

Required Programming Tools

- We will be developing ASP.NET Web Pages using C# programming language
  - You can use the latest full VS if you want; However, it is huge and overkill; **A better option is to use *Microsoft WebMatrix***.
  - Also, you need to get an ASP.NET hosting account (e.g., **www.somee.com**)
- Also we will learn and use the now popular Node.js (an open source JavaScript server-side environment)
  - Install Node.js from http://nodejs.org
  - Online editors (and workspace hosting) for Node.js
    - http://C9.io (Highly Recommended, supports debugging)
    - http://runnable.com (Awesome!)
    - http://codeio.com (Intellisense not working properly, lacks debugging)
    - http://jsapp.us

Recommended Programming Books

- ASP.NET Books using WebMatrix
  - Mike Pope, Introducing ASP.Net Web Pages 2, Microsoft (2012)
  - Bride and Spaanjaars, Beginning ASP.NET Web Pages with WebMatrix, Wrox (2011).
- Node.js
  - Cantelon, et. al., Node.js in Action, Mannings (2013). [Ideal Ref.]
  - Shelley Powers, Learning Node, O'reilly (2013). [Very Good]
  - Pedro Teixeira, Richard Blum, Professional Node.js, Wrox(2013).
  - Colin Ihrig, Pro Node.js for Developers, APress (2013).
- HTTP and Browsers
  - High Performance Browser Networking, O'reilly (2013).
  - HTTP- The Definitive Guide, O'reilly (2002).

Useful Resources for Network Programming

- Resources & links on the course web page, http://faculty.kfupm.edu.sa/ics/darwish/ICS571-2016/
- Network Programming How-to, http://msdn.microsoft.com/en-us/library/ms172307(v=vs.110).aspx
- Internet Programming on CodeProject, http://www.codeproject.com/KB/IP/
- Books
  - Understanding TCP/IP, Packt Publishing (2006).
  - Richard Blum, C# Network Programming, Sybex 2002.
  - Professional .NET Network Programming, APress (2002).