CSCI 631 Computer Networks - Fall 2014

Section 1 Lecture Outline

1 UNIX System Calls

2 TCP/IP Reference Model

- A Simple Daytime Client

- Protocol Independence

- Error Handling: Wrapper Functions

- A Simple Daytime Server

3 The Transport Layer: TCP, UDP, and SCTP

- User Datagram Protocol (UDP)

- Transmission Control Protocol (TCP)

- Stream Control Transmission Protocol (SCTP)

- TCP Connection Establishment and Termination

- TIME_WAIT State

- SCTP Association Establishment and Termination

- Port Numbers

- TCP Port Numbers and Concurrent Servers

- Buffer Sizes and Limitations

4 Sockets in General

- Socket Address Structures

- Value-Result Arguments

- Byte Ordering Functions

- Byte Manipulating Functions

- inet_pton and inet_ntop Functions

- sock_ntop and Related Functions

- readn, writen, and readline Functions

5 Elementary TCP Sockets

- socket Function

- connect Function

- bind Function

- listen Function

- accept Function

- fork and exec Functions

- Concurrent Servers

- close Function

- getsockname and getpeername Functions

6 TCP Client/Server Model

- TCP Echo Server: main Function

- TCP Echo Server: str_echo Function

- TCP Echo Client: main Function

- TCP Echo Client: str_cli Function

- Normal Startup

- Normal Termination

- POSIX Signal Handling

- Handling SIGCHLD Signals

- wait and waitpid Functions

- Connection Abort before accept Returns

- Termination of Server Process

- SIGPIPE Signal

- Crashing of Server Host

- Crashing and Rebooting Server Host

- Shutdown of Server Host

- Data Format

7 I/O Multiplexing: The select and poll Functions

- I/O Models

- select Function

- Batch Input and Buffering

- shutdown Function

- poll Function

8 Elementary UDP Sockets

- recvfrom and sendto Functions

- UDP Echo Server: main Function

- UDP Echo Server: dg_echo Function

- UDP Echo Client: main Function

- UDP Echo Client: dg_cli Function

- Lost Datagrams

- Verifying Received Response

- Server Not Running

- connect Function with UDP

- Lack of Flow Control with UDP

- Determining Outgoing Interface with UDP

- TCP and UDP Echo Server using select

9 Name and Address Conversions

- Domain Name System (DNS)

- gethostbyname Function

- gethostbyaddr Function

- getservbyname and getservbyport Functions

- getaddrinfo Function

- gai_strerror Function

- freeaddrinfo Function

- getaddrinfo Function: IPv6

- host_serv Function

- tcp_connect Function

- tcp_listen Function

- udp_client Function

- udp_connect Function

- udp_server Function

- getnameinfo Function