Lecture

Review of Last Lecture

- Thread synchronisation
- Kernel Objects: Synchronisation Objects

Introduction to Network Programming

- Concept of a packet of information
- IP addresses and ports
- The structure of an IP packet
- What is a protocol?
- Connection-oriented vs. datagram protocols
- IP, TCP and UDP
- HTTP, other ***wrapper*** protocols

Well-known port numbers

- 80 http
- 25 SMTP
- 110 POP3
- 43 WHOIS
- 53 DNS
- 21 FTP

Introduction to Network Programming

- DNS: Domain Name System example http://www.vu.edu.pk/ could be
- http:// 58.27.140.133 /
- Hostnames of machines
- Address resolution: ARP and RARP

Well-known hostnames on the internet

- www.vu.edu.pk 203.215.177.33
- www.yahoo.com 64.58.76.179
- www.most.gov.pk 66.96.232.41
- www.pak.gov.pk 66.197.42.253
- www.google.com 216.239.53.100
- www.whois.net 128.121.95.59

Windows Sockets

- An object that represents an endpoint for communication between processes across a network transport. Sockets have a datagram or stream type and can be bound to a specific network address. Windows Sockets provides an application programming interface (API) for handling all types of socket connections in Windows.
- The BSD sockets on UNIX
- Concept of client and server

Windows Sockets: HTTP

- Web browser as an HTTP client application
- What is HTTP?
- Structure of URL: protocol, hostname, document name
- http://www.vu.edu.pk/default.htm

Basic socket operations

- Create an unbound socket
- Server — Client
- bind — connect
- listen
- accept
- send — receive
- receive — send

Windows Sockets Library

File	Purpose
ws2_32.dll	Main WinSock 2 DLL
wsock32.dll	For WinSock 1.1 support, 32-bit applications
mswsock.dll	MS extensions to WinSock
winsock.dll	For WinSock 1.1 support, 16-bit applications
ws2help.dll	WinSock2 helper
ws2tcpip.dll	WinSock 2 helper for TCP/IP stacks

Initialise WinSock

```
int WSAStartup(
  WORD wVersionRequested,
  LPWSADATA lpWSAData
);
```

- WinSock version: high-order byte specifies the minor version (revision) number; the low-order byte specifies the major version number.

Initialise WinSock

```
SOCKET socket(
   int af,
   int type, SOCK_STREAM, SOCK_DGRAM
   int protocol   IPROTO_TCP, IPROTO_IP
);
```

- The socket descriptor: SOCKET is in fact, a simple 2-byte integer