

Windows Systems Programming (WSP)

Course Objective

This course discusses most important areas of Windows operating system, which helps developers in designing performance efficient systems. This class discusses key components of system like thread scheduling, I/O, memory management, security etc. A very important aspect of course, debugging using WinDbg exploits lots of windows internals. In particular, this course covers key operating system mechanisms, principles important for designing device drivers.

Course Content

Concepts & Tools Overview

WinDbg/ SoftIce
Process Explorer
Tools from Sysinternals
Microsoft Support tools

System Architecture

Architecture Overview
Environment Subsystems
Kernel Mode Vs. User Mode
Kernel Mode components
User-To-Kernel Call Implementation
Object Manager Overview
Windows Registry
Services overview
System threads/ processes

Processes & Threads

Process Internals
Thread Data Structures
Thread Scheduling
Thread Priorities
Priority Inversion
Context Switching
Synchronization Primitives
Performance Counters

Memory Management

X86 Memory Management schemes
Memory Manager Components and overview
Physical memory management
Virtual memory implementation
Working Sets, Demand Paging
Shared Memory, DLLs
System memory pools

Subsystems Overview

I/O Subsystem,
Storage Subsystem,
Cache Manager Overview
File Systems,
Networking Architecture

Security

Protecting Objects
Access Control Lists
Account Rights and Privileges

Inside Boot Sequence

X86 Boot sequence
Startup/ Shutdown
Kernel and Subsystems Initialization

Windows Vista codename "Longhorn"

New Features

Prerequisite:

Algorithms & Data Structures
Understanding of basic operating system principles
Experience of using or administering windows operating systems