LSN 2
Microsoft Windows OS

ECT362 Operating Systems
LSN 2 – Microsoft Windows Overview

- Windows operating system (NT, 2000, XP, Vista, 7)
  - Modular structure for flexibility
  - Executes on a variety of hardware platforms
  - Supports application written for other operating system
LSN 2 – Microsoft Windows Overview
LSN 2 – Win Microkernel

• Provides objects and threads
• All application programs to be executed must have an associated process object and thread object

![Process Address Space](image.png)
Thread scheduling
- Timesliced, priority based, preemptive scheduler
- Multiple scheduling queues
- Threads inherit their priority from their process
- Threads can be preemptive given their priority
LSN 2 – Windows Executive

- **Object manager**
  - For executive and user objects

- **Process and thread manager**
  - Create / destroy process and threads
  - Resource allocation
  - Synchronization primitives
LSN 2 – Windows Subsystems

• Each layer implements a well defined subset of the total system functionality
  – Functionality at layer $i$ can be designed and tested independently
  – Layer $i+1$ services can simplify the way work is completed using layer $i$ or lower

• Windows API
  – Native API
    • Provides access to some of the executive and kernel functions
  – All windows functionality is provided by the win32 subsystem and supervisor mode DLLs
LSN 2 – Windows Performance Monitoring

• Task Manager
  – Applications
    • Programs currently running
  – Processes
    • Process-centric metrics for computer system
    • Can update priority by right-clicking on process name
  – Performance
    • Processor and memory usage statistics
    • System resource allocations
LSN 2 – Windows Performance Monitoring

![Windows Task Manager](image)

<table>
<thead>
<tr>
<th>Image Name</th>
<th>User Name</th>
<th>CPU</th>
<th>CPU Time</th>
<th>USER Objects</th>
<th>Mem Usage</th>
<th>Page Faults</th>
<th>VM Size</th>
<th>Handles</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>nlnotes.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:22</td>
<td>253</td>
<td>7,416 K</td>
<td>37,390</td>
<td>24,596 K</td>
<td>244</td>
<td>8</td>
</tr>
<tr>
<td>WINWORD.EXE</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:01</td>
<td>64</td>
<td>4,840 K</td>
<td>9,665</td>
<td>12,212 K</td>
<td>222</td>
<td>3</td>
</tr>
<tr>
<td>CIDAEMON.EXE</td>
<td>SYSTEM</td>
<td>00</td>
<td>0:00:00</td>
<td>0</td>
<td>240 K</td>
<td>1,227</td>
<td>832 K</td>
<td>73</td>
<td>2</td>
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<tr>
<td>firefox.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:03:20</td>
<td>127</td>
<td>61,964 K</td>
<td>200,579</td>
<td>53,536 K</td>
<td>561</td>
<td>20</td>
</tr>
<tr>
<td>DLG.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>10</td>
<td>2,824 K</td>
<td>748</td>
<td>1,468 K</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>CTFMON.EXE</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:03</td>
<td>65</td>
<td>3,072 K</td>
<td>11,257</td>
<td>516 K</td>
<td>139</td>
<td>1</td>
</tr>
<tr>
<td>Weather.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:10</td>
<td>76</td>
<td>9,812 K</td>
<td>11,685</td>
<td>11,816 K</td>
<td>293</td>
<td>6</td>
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<tr>
<td>realsched.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>2</td>
<td>136 K</td>
<td>8,383</td>
<td>872 K</td>
<td>109</td>
<td>4</td>
</tr>
<tr>
<td>ViewMgr.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:01</td>
<td>9</td>
<td>8,284 K</td>
<td>2,286</td>
<td>3,376 K</td>
<td>252</td>
<td>6</td>
</tr>
<tr>
<td>iPodService.exe</td>
<td>SYSTEM</td>
<td>00</td>
<td>0:00:00</td>
<td>2</td>
<td>3,564 K</td>
<td>205,865</td>
<td>1,016 K</td>
<td>105</td>
<td>6</td>
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<tr>
<td>iedriver.exe</td>
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<td>00</td>
<td>0:00:00</td>
<td>10</td>
<td>9,524 K</td>
<td>2,978</td>
<td>4,080 K</td>
<td>197</td>
<td>5</td>
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<tr>
<td>iTunesHelper.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>5</td>
<td>4,376 K</td>
<td>1,131</td>
<td>1,192 K</td>
<td>105</td>
<td>4</td>
</tr>
<tr>
<td>qttask.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>4</td>
<td>6,268 K</td>
<td>2,208</td>
<td>3,120 K</td>
<td>178</td>
<td>5</td>
</tr>
<tr>
<td>VPTray.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>11</td>
<td>4,596 K</td>
<td>4,138</td>
<td>2,500 K</td>
<td>121</td>
<td>2</td>
</tr>
<tr>
<td>ccApp.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>3</td>
<td>7,080 K</td>
<td>2,879</td>
<td>3,360 K</td>
<td>234</td>
<td>9</td>
</tr>
<tr>
<td>Directcd.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>17</td>
<td>5,268 K</td>
<td>1,707</td>
<td>1,728 K</td>
<td>109</td>
<td>4</td>
</tr>
<tr>
<td>DSendery.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>1</td>
<td>1,640 K</td>
<td>410</td>
<td>392 K</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>MSPAINT.EXE</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:01</td>
<td>60</td>
<td>908 K</td>
<td>9,403</td>
<td>14,824 K</td>
<td>102</td>
<td>3</td>
</tr>
<tr>
<td>iucheck.exe</td>
<td>sschne1</td>
<td>00</td>
<td>0:00:00</td>
<td>3</td>
<td>5,652 K</td>
<td>1,456</td>
<td>2,360 K</td>
<td>157</td>
<td>3</td>
</tr>
</tbody>
</table>

- Processes: 59
- CPU Usage: 2%
- Commit Charge: 396M / 1249M

End Process Button

- Show processes from all users
LSN 2 – Windows Performance Monitoring

- **MSVS Spy++**
  - Displays a graphical tree of relationships among system objects, including windows, processes, and threads
  - Windows
    - Displays all windows and controls in the system
  - Processes
  - Threads
LSN 2 – Windows Performance Monitoring
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- **Perfmon.exe**
  - Part of the Microsoft Management Console
  - System monitor
    - Provides metric counters to monitor system performance
    - Metrics available in various graphical and report formats
LSN 2 – Windows Performance Monitoring
LSN 2 – Homework

• Assignment – HW 1
  – Complete HMWRK1.pdf

• References: