Worksheet 1: Terms and Interrupts

1. **OS Terminology**
   For each term below indicate the number of (human) users, CPUs, and operating systems that is/are active at the same time. You answers should be one of the following: 0 (none), 1 (exactly one), >=1 (one or more), or >1 (more than one). Be ready to Justify or explain each answer. OS's should be interpreted as complete copy of an OS (rather than type of OS). Assumptions: no virtualization, no dual-booted systems. (Extra credit – remove these assumptions.)

<table>
<thead>
<tr>
<th>Number of Users</th>
<th>Number of CPUs</th>
<th>Number of OS Types</th>
<th>Number of OS Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiprogrammed uniprocessor</td>
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<tr>
<td>Time-shared uniprocessor</td>
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<tr>
<td>Multi-programmed multiprocessor</td>
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<tr>
<td>Multi-core Processor</td>
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<td>Compute cluster or Grid</td>
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<tr>
<td>An iMac in Room 100 Deschutes</td>
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2. **Multiprogramming**
   Is there a limit to the number of processes that can be executing concurrently in a uniprocessor multiprogrammed system? Consider both performance and resource usage issues.

3. **Interrupt Basics**
   If process A is currently running, which of the following interrupts can occur? why did they occur? which ones are most likely to occur?
   - ______ a clock interrupt
   - ______ an I/O interrupt
   - ______ an arithmetic fault interrupt
   - ______ an illegal instruction interrupt
   - ______ a memory protection interrupt
4. **Interrupts**

When an interrupt occurs, the PC gets loaded with a new value. For each of the answers below, write "+" if it describes a value that would very likely be loaded into the PC just after the interrupt occurs. Write "0" if it describes a value that would not likely be loaded into the PC just after the interrupt occurs (e.g. never or far fetched scenario). Assume interrupts are enabled (not masked).

_____ address of the next instruction in memory

_____ address of the first instruction in the interrupt handler

_____ address in the user's program

_____ address in the operating system kernel

_____ an address that it has loaded in the past

_____ address of your CIS 415 professor