Booting

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Starting the system

- The process of starting the OS after the computer's power has been turned on is call "bootstrapping" or "booting" for short
- The term reflects the structure of the startup process, which was likened to "lifting oneself up by one's boot straps"

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Starting the system - 2

- When power is off, the main memory is empty
- Objective: load the file “kernel.exe” from the disk and jump to its first instruction
- But the read-file operation is not yet available because the kernel is not yet loaded
- How to do this?

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Starting the system - 3

- The load takes place in stages:
  - Stage 1: Start executing the BIOS code. BIOS code requests the disk to load the code in Master Boot Record (MBR), the first record on the disk. When done, jump to the first address of the MBR code.
  - Stage 2: MBR code contains the disk start address of kernel.exe. It issues commands to load that file into memory. When done, jump to the first address of that code.
  - Stage 3: Kernel does its own internal initialization, including creating a login process attached to the keyboard and display.
- Example on next page

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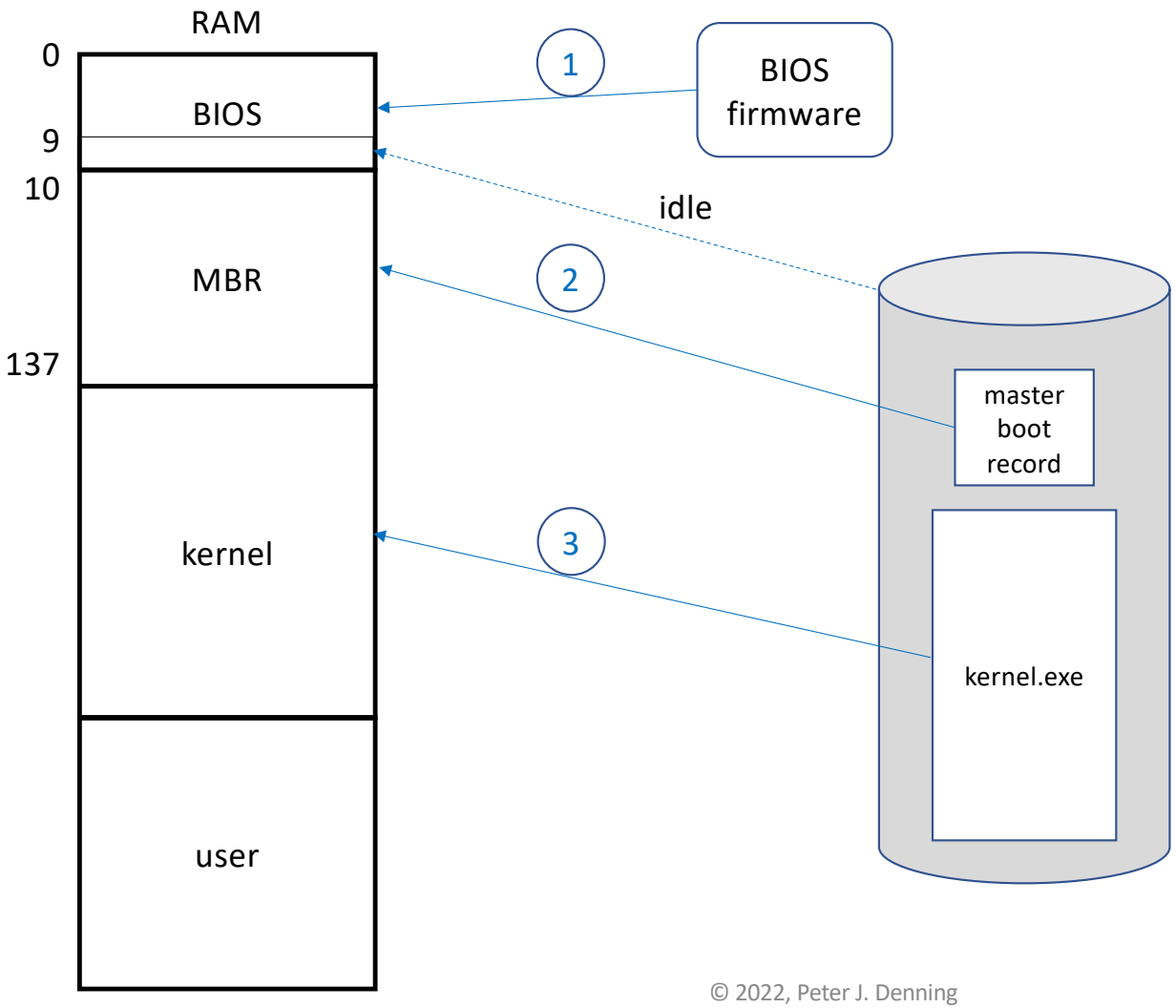

1: BIOS firmware permanently resides at Mem[0..8]. Mem[9] is a flag set by the disk to indicate that it is "transferring" or "idle". Start BIOS by setting IP to 0. BIOS code requests disk to load MBR into memory starting at Mem[10]. CPU loops on Mem[9] until the flag says "idle". Jump to Mem[10].

2: MBR code requests disk to load file "kernel.exe" starting at Mem[138]. Loop on Mem[9] until the flag says "idle". Jump to Mem[138].

3: Kernel codes starts internal initialization and configuring a login process attached to the keyboard and display.

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