Extra leraning

**Difference between 16 vs 32 vs 64 bit os:**

The difference between **16-bit**, **32-bit**, and **64-bit systems** primarily relates to how much data the **CPU** can handle at once, how much **memory** it can address, and how it processes instructions. Here's a clear comparison:

**🔍 1. Word Size (Data Width)**

| **System** | **Word Size** | **Meaning** |
| --- | --- | --- |
| **16-bit** | 16 bits (2 bytes) | Processes 16 bits at a time |
| **32-bit** | 32 bits (4 bytes) | Processes 32 bits at a time |
| **64-bit** | 64 bits (8 bytes) | Processes 64 bits at a time |

**🔢 2. Maximum Addressable Memory (RAM Limit)**

| **System** | **Max Addressable Memory** |
| --- | --- |
| **16-bit** | 64 KB (2¹⁶ = 65,536 bytes) |
| **32-bit** | 4 GB (2³² = 4,294,967,296 bytes) |
| **64-bit** | ~18.4 exabytes (2⁶⁴ bytes) |

🧠 Real-world OS/hardware limits are lower. For example, Windows 10 Home 64-bit supports up to **128 GB** of RAM.

**In Simple Terms:**

* 16-bit = old tech (used in MS-DOS, early microcontrollers).
* 32-bit = older PCs, limited to 4GB RAM.
* 64-bit = modern standard — more speed, power, and memory capacity.

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