**Benchmarks Homework**

**CPU-Z**

**Introduction to CPU-Z**

CPU-Z is a freeware monitoring application designed to provide detailed information about various components of a computer system, primarily focusing on the CPU (Central Processing Unit), but also including information about other key hardware components like RAM, motherboard chip-set, and other hardware features of a modern personal computer or Android device.

**Process of testing**

AlthoughCPU-Z itself does not conduct benchmarks, it serves as a tool to gather detailed information about various hardware components in a computer system. However, CPU-Z is often used in conjunction with other benchmarking software to provide baseline information about the system's hardware configuration before running benchmarks.

**Functionalities**

1. CPU Information: CPU-Z gathers detailed information about the CPU installed in the system, including the processor's name, model, architecture, clock speed, number of cores, and manufacturing technology (e.g., Intel or AMD).
2. Cache Information: It provides details about the CPU's cache hierarchy, including the size and configuration of the L1, L2, and L3 caches.
3. Mainboard Information: CPU-Z also gathers information about the motherboard, including the manufacturer, model, chipset, BIOS version, and supported technologies (e.g., PCIe version).
4. Memory Information: Additionally, CPU-Z displays information about the system's memory (RAM), including the type, size, frequency, and timings of the installed memory modules.

**Results Displayed**

The information gathered by CPU-Z is presented organized into several tabs, each focusing on different aspects of the system's hardware:

1. CPU Tab: Displays detailed information about the CPU, including its name, model, architecture, clock speed, number of cores, and cache configuration.
2. Caches Tab: Provides information about the CPU's cache hierarchy, including the size and configuration of the L1, L2, and L3 caches.
3. Mainboard Tab: Shows details about the motherboard, including the manufacturer, model, chipset, BIOS version, and supported technologies.
4. Memory Tab: Displays information about the system's memory (RAM), including the type, size, frequency, and timings of the installed memory modules.
5. Graphics Tab: Provides information about the graphics card installed in the system, including the GPU model, clock speeds, and memory size.

**MemTest86**

**Introduction to MemTest86**

MemTest86 is a comprehensive memory testing software designed to diagnose and test RAM (Random Access Memory) modules for errors, by writing test patterns to most memory addresses, reading back the data, and comparing for errors. MemTest86 is known for its thoroughness, reliability, and ability to detect various types of memory errors.

**Process of testing**

1. Memory Address Testing: MemTest86 tests memory modules by writing data patterns to different memory addresses and then reading them back to verify accuracy.
2. Pattern and Data Testing: MemTest86 uses various data patterns, such as sequential patterns, random patterns, and alternating patterns, to stress different aspects of the memory modules. It verifies the integrity of data read from memory by comparing it to the expected data pattern.
3. Error Detection: During testing, MemTest86 detects errors by comparing the data read from memory to the expected data pattern. It identifies discrepancies and logs errors, including the memory address of the error, the type of error, and additional diagnostic information

**Functionalities**

1. Memory Testing: MemTest86 conducts thorough tests on RAM modules to detect errors, including issues like bad sectors, data corruption, and stability problems
2. Diagnostic Capabilities: MemTest86 is capable of detecting a wide range of memory errors, including but not limited to, stuck bits, intermittent errors, parity errors, address conflicts, and data corruption and provides detailed diagnostic information
3. Bootable Environment: MemTest86 is typically run from a bootable USB drive or CD/DVD, allowing users to test the memory subsystem independently of the operating system. This ensures a clean testing environment and eliminates potential interference from software running within the operating system.
4. Comprehensive Testing Algorithms: MemTest86 utilizes a variety of memory testing algorithms, including moving inversions, walking ones, walking zeros, and block moves, to stress different aspects of the memory subsystem. These algorithms are designed to detect different types of memory errors and ensure thorough testing coverage.

**Results Displayed**

1. Test Progress: MemTest86 displays the progress of memory testing in real-time, indicating the current test iteration, the number of passes completed, and the percentage of memory tested.
2. Error Reporting: If errors are detected during testing, MemTest86 provides detailed error reports indicating the type of error, the memory address of the error, and any additional diagnostic information.
3. Summary Report*:* Upon completion of testing, MemTest86 generates a summary report summarizing the test results, including the number of errors detected, the memory address range tested, and the overall health of the memory subsystem.

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<https://en.wikipedia.org/wiki/Benchmark_(computing)>

<https://www.loadview-testing.com/learn/benchmark-testing/>

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