Homework: Benchmarks – What, How, and Why

## What are Benchmarks?

Benchmarks are standardized tests designed to evaluate the performance of hardware or software systems. They are used to measure speed, efficiency, and capabilities under controlled conditions.

## How do Benchmarks Work?

1. Run Fixed Tasks: Benchmarks execute predefined tasks to stress or test specific components.

2. Measure Performance: They monitor how quickly and efficiently the system handles these tasks.

3. Output Results: The results are numeric scores or performance graphs, which can be used for comparison.

## Why are Benchmarks Important?

- To compare performance between devices or software versions.

- To identify bottlenecks and optimize system performance.

- To assist in buying decisions (e.g., best CPU for the price).

- To test system stability under stress (useful for overclocking or quality control).

## Benchmark Examples

### 1. Cinebench (Hardware Benchmark – CPU & GPU)

• Functionality: Tests the performance of CPUs and GPUs by rendering a 3D scene using Cinema 4D engine.

• How it Works: Uses all available cores and threads to render an image, also measures GPU OpenGL or Metal performance.

• Results:

- CPU: Single-core and multi-core performance scores.  
 - GPU: Frames per second (FPS) or render time.  
 - Higher score = better performance.

### 2. PassMark PerformanceTest (Full-System Benchmark)

• Functionality: Benchmarks the entire PC including CPU, GPU, RAM, and disk drives.

• How it Works: Runs synthetic tests like CPU math operations, 2D/3D graphics rendering, memory speed, and disk performance.

• Results:

- Individual scores for each component.  
 - Overall "PassMark Rating" to rank system.  
 - Compare your system against thousands of others in PassMark’s database.