



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

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Project Title Prizefight Processors vs. Muscular Memory	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This experiment tests the performance speed gains or losses in a computer between doubling the CPU clock speed and doubling the amount of RAM.</p> <p>Methods/Materials -One 2.8GHz AMD dual-core CPU -One 2.8GHZ AMD single-core CPU -One Compaq PC and one Self-Built PC containing the following: *Windows XP Pro, SP3 *WinZip 11.2 *MATLAB *Microsoft Office 2007 PowerPoint *Windows Defender *AppTimer *PC Boot Timer *One folder of 62,500 identical text files *One 12.9MB PowerPoint Presentation with 30 slides *One MATLAB script that records the time elapsed to run itself; With the AMD single-core CPU and only one RAM module in each PC, run PC Boot Timer, AppTimer, Windows Defender, and MATLAB to observe the computers' startup times, file opening times, scan times, and data processing times. Repeat the tests two more times, and add one RAM module to each computer. Repeat the tests three times on the new hardware. Change the processor to the dual-core CPU and remove a RAM module. Repeat the tests three times on the new hardware. Rerun all of the steps two more times. A total of 216 tests should have been performed.</p> <p>Results Overall, the dual-core CPU hardware configuration was faster than the configuration with 2GB of RAM. This statement is true in most circumstances, with a few exceptions such as MATLAB tests on the Self-Built PC. On average, the dual-core CPU hardware configuration outperformed the configuration with more RAM by a range of 1.1% to 38.6%.</p> <p>Conclusions/Discussion The test results prove the hypothesis that "doubling the CPU clock speed is more effective in gaining computer speed performance than doubling the amount of RAM." This is most likely due to the methods that software use to access hardware resources. It can then be concluded that a computer system depends more on its CPU than RAM for most of its tasks. Third-party benchmark tests by ZDNet and Tom's Hardware support the results too, indicating that RAM upgrades often show minute improvement regarding a computer's performance. A further study of CPU and RAM upgrade options could include synthetic benchmarks, multitasking and multimedia tests. Super-scaling and cache sizes could be taken into consideration. All of the tests can help consumers determine the best upgrade to match budget and performance needs.</p>	
Summary Statement This experiment compares the performance benefits between doubling the CPU clock speed and doubling the amount of RAM in a computer.	
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