CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)	Project Number
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Project Title

Cycle Speed: Testing Computer Processing Speed

Abstract

Objectives/Goals

In this project, computer processing speeds were tested while changing memory size and CPU variables to see which had a greater impact on the computer's processing speed.

Methods/Materials

This project is divided into two parts, the hardware test using a Z80 based CP/M computer I built, and the virtual machine (VM) test. Due to connectivity difficulties with the serial connection on the Z80 based CP/M computer (which I am in the process of resolving) I completed testing in a virtual environment. In the virtual environment, I ran tests on the processing speed of a computer while changing memory size and CPU utilization resources. For instance, in one test I analyzed how long the computer took to calculate to the 5000 digit of pi while changing the processing utilization levels, and the memory size.

Results

The memory did not have a major effect on the computer's speed until the CPU utilization was significantly reduced. During the test, the CPU utilization was reduced from 100% to 25%, in 25% increments. My theory is that since modern processors in the virtual testing environment are so fast, they do not need memory as much as older computers with slower processing speeds.

Conclusions/Discussion

In the end, I concluded that my hypothesis was partially correct. The processing resources affect computers more than memory at smaller processing loads. With a larger processing load, the memory size has some impact on the computer's speed; however, not as great as the CPU utilization.

Summary Statement

This project tests whether a computer's memory or CPU has a larger impact on the computer's processing speed.

Help Received

A family friend has been a resource on troubleshooting. A graphic artist allowed me to use his printer to print my display board.