**Computer Experiment Analysis Report**

**Abstract:** ON PC more voltage, more clock speed = more better performance because higher thermal head room + higher ram speed in MHz more better performance, then on laptop lower voltage higher clock speed more better performance because of thermally constrained chassis

**Introduction:**

After building my own computer, I wanted to optimize my computer to maximize the performance while also keeping the heat output manageable. In order to optimize my computer, I focused on two major components: the central processing unit (CPU) and the random-access memory (RAM). In addition to testing my custom-built PC, I wanted to see how optimizing CPU performance changed when working with a laptop that has a much smaller chassis.

**Background:**

When measuring CPU performance there are a variety of variables to consider such as clock speed, voltage, and temperature. Typically, as you increase the amount of voltage to your CPU it will be able to achieve a higher clock speed and achieve higher performance. However, this increase of voltage to boost performance comes at the cost of higher temperatures. When a PC component gets too hot, it will ‘thermal throttle’ by lowering voltage and clock speed in order to protect the device from sustaining any damages. So, while thermal throttling is a wonderful safety measure to protect your computer, we will need to straddle the each of not producing so much heat that the CPU then artificially limits itself.

When looking at RAM kits to buy for your computer, one of the easiest metrics to compare performance across kits is to look at “memory speed”. Typically, memory speeds will be written like “DDR4-3200” where the first part indicates the generation of RAM followed by the actual speed of the RAM in MHz. However, this marketing technique is disingenuous on the part of the manufacturer because if you bought that kit of RAM and installed it in your computer the RAM speed would not automatically be set to 3200 MHz. Instead, the RAM would most likely run at 2666 MHz, something significantly different than what you paid for. This discrepancy happens RAM manufacturers are advertising the potential overclocked speed of the RAM, not it’s default settings when you boot it up first time. To “overclock” your RAM you have to go into the basic input output system (BIOS) of your motherboard to change the “Extended Profiles for Overclocking” (EXPO) for AMD CPUs or the “Extreme Memory Profile” (XMP) for Intel CPUs. Once you know what you’re looking for it’s a relatively simple procedure that can have a significant impact on the performance of your PC. Especially since otherwise you would be leaving extra performance you paid for on the table.

**Methodology**:

Because I’m testing a variety of components on two different systems

**Results**:

**Discussion**:

**Conclusion**: