



The CPU is the brains of a computer. The CPU has a few different functions including directing other components of a computer as well as running mathematical calculations. The CPU can also store small amounts of data inside itself in what are called **registers**. These registers hold data that the CPU is working with at the moment.

For example, say you write a program that reads in a 40 MB data file and then analyzes the file. When you execute the code, the instructions are loaded into the CPU. The CPU then instructs the computer to take the 40 MB from disk and store the data in memory (RAM). If you want to sum a column of data, then the CPU will essentially take two numbers at a time and sum them together. The accumulation of the sum needs to be stored somewhere while the CPU grabs the next number.

This cumulative sum will be stored in a register. The registers make computations more efficient: the registers avoid having to send data unnecessarily back and forth between memory (RAM) and the CPU.

QUESTION 1 OF 2

A 2.5 Gigahertz CPU means that the CPU processes 2.5 billion operations per second. Let's say that for each operation, the CPU processes 8 bytes of data. How many bytes could this CPU process per second?

- ☐ 312.5 million bytes per second
- ☐ 3.2 billion bytes per second
- ☒ 20 billion bytes per second
- ☐ I'm not sure how to calculate this

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QUESTION 2 OF 2

Twitter generates about 6,000 tweets per second, and each tweet contains 200 bytes. So in one day, Twitter generates data on the order of:

$$(6000 \text{ tweets / second}) \times (86400 \text{ seconds / day}) \times (200 \text{ bytes / tweet}) = 104 \text{ billion bytes / day}$$

Knowing that tweets create approximately 104 billion bytes of data per day, how long would it take the 2.5 GigaHertz CPU to analyze a full day of tweets?

- ☐ 0.19 seconds
- ☐ 3.5 seconds
- ☒ 5.2 seconds
- ☐ 47 seconds
- ☐ 136 seconds

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