A certain computer can be equipped with 1,073,741,824 bytes of memory. Why would a manufacturer choose such a peculiar number, instead of an easy-to-remember number like 1,000,000,000?

Step 1:

Computer memory is a storage space used to temporarily or permanently store programmes (sequences of instructions) and data for use in electronic digital computers. Information is stored in computers as binary code, which is composed of 0s and 1s.

Step 2:

The utilised number is a precise power of 2,230.

The significance of this fact lies in the fact that all contemporary computers use binary arithmetic, making calculations much simpler provided the memory location is available and adds to an exact power of two.

Because of this, manufacturers provide RAM modules in multiples of two, including 256, 512, 1024, 2048, 4096, 8192, 16384 and others.

Anyhow, they are urged to use terms like 4GB, 8GB, etc. because they are easier for us humans to remember in order to avoid confusing users.

As one goes down the five-level memory hierarchy discussed in the text, the access time increases. Make a reasonable guess about the ratio of the access time of optical disk to that of register memory. Assume that the disk is already online.

Step 1:

Speed and the cost of memory are inversely related in the Memory Hierarchy. The devices are set up in this instance from fast to slow, or from register to secondary memory. Inside the CPU are the registers. They have the shortest access time because they are built within the CPU.

Step 2:

Five-level memory hierarchy: As one descends the memory hierarchy's tiers, the access time gets longer until it is only a few nanoseconds.

Next, the access time of the optical disc to that of the register memory is a few hundred milliseconds, which is approximately a ratio of 108