**1. Can we implement a computer solution in hardware? If yes, why do we need software then?**

Yes, because software refers to an accumulation of instructions that will run different work on the system of a computer. Without software, the user is not able to interact with the hardware. And it is easier to operate and execute in software.

**2.) i. How many bytes are in 1 megabyte (MB)?**

There are or one million bytes in one megabyte.

bytes = 1MB (megabyte)

**ii. How many kilobytes are in 1 megabyte (MB)?**

There are or one thousand kilobytes in one megabyte.

kilobytes = 1MB (megabyte)

**3. Briefly explain two breakthroughs in the history of computing.**

1st generation computer (1945-1953) - A type of computer that has logic circuits built with vacuum tubes.

* Colossus [1944] = It was used during World War II to break the complex Lorenz ciphers used by the Nazis.
* ENIAC [1946] = During World War II, the military used it for ballistic analyses. It had 18000 vacuum tubes and 6000 switches.
* UNIVAC [1946] = The first computer used for commercial and governmental purposes.

2nd generation computer (1954-1965) - A type of computer that uses discrete transistors instead of vacuum tubes, which are more durable, smaller, and require less voltage.

* Can switch from 0 to 1 state in microseconds.
* 10x faster, 1/10 power consumption, 1/10 required space.
* Computer Science has been started in this generation.
* The first mainframe computer to use transistors was the IBM7000. Presented by IBM.

**4. In the von Neumann model, explain the purpose of the:**

**a) processing unit**

The purpose is to execute the instructions that are stored in the memory of the computer.

**b) program counter**

The primary objective of the program counter is to store the address of the upcoming instructions to be executed.

**5. Based on the concept of the *von Neumann* model of computer, do you think the music streaming from the service provider (e.g. Spotify) is under this model or not? Why?**

The answer is no. The von Neumann model is made up of a central processing unit (CPU), a main memory system, and an I/O system that all work together in a single data path. However, the question refers to the streaming program, which is a parallel pathway that relies on the internet and other servers, so it is non-von Neumann.

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