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 10^6 or one million bytes in one megabyte.

10^6 bytes = 1MB (megabyte)

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

There are 10^3 or one thousand kilobytes in one megabyte.

10^3 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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