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J1A3 Computer Memory

1. **How is data represented in main memory?**

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2. **How is data represented in secondary memory?**

   In both main and secondary memory, data is represented as bit patterns.

3. **List 5 different ways that bits can be represented.**

   Five different ways bits can be represented are:

   - A mechanical electrical switch (like a light switch.)
   - Voltage on a wire.
   - A single transistor.
   - A tiny part of the surface of a magnetic disk.
   - A tiny part of the surface of a magnetic tape.

4. **Does the information change when a bit is copied from one form of storage to another? For example, does the information change when a bit implemented as a voltage level on a wire is copied to a tiny part of a disk?**

   No. The different ways of storing a bit do not change the information that is being stored.

5. **Does information stored in binary form change when it is copied from one medium to another?**

   Information stored in binary form does not change when it is copied from one medium to another.

6. **Does information stored in binary form change when it is copied from one medium to another many times?**

   Information stored in binary form does not change when it is copied from one medium to another many times, thus allowing for an unlimited number of such copies to be made.

7. **Analog data (continuously changing signals) such as on LP records or audio tape also can be copied from medium to medium. Does the information of analog data change when it is copied to a different medium?**

   Usually we don't want it to (and for audio data use "high fidelity" electronics to minimize the change.) But always some information is lost.

8. **How many bits in a byte of memory?**

   There are 8 bits in a byte of memory.

9. **Locations in a digital image are specified by a row number and a column number. Say that a particular digital image is 1024 rows by 1024 columns, and that each location holds one byte. How many megabytes are in that image?**

   1024 * 1024 = 210 * 210 = 2(10+10) = 220 = one megabyte.

10. **Does each byte of main memory have a unique address?**

   Main memory consists of a very long list of bytes. In most modern computers, each byte has an address that is used to locate it. The picture shows a small part of main memory:
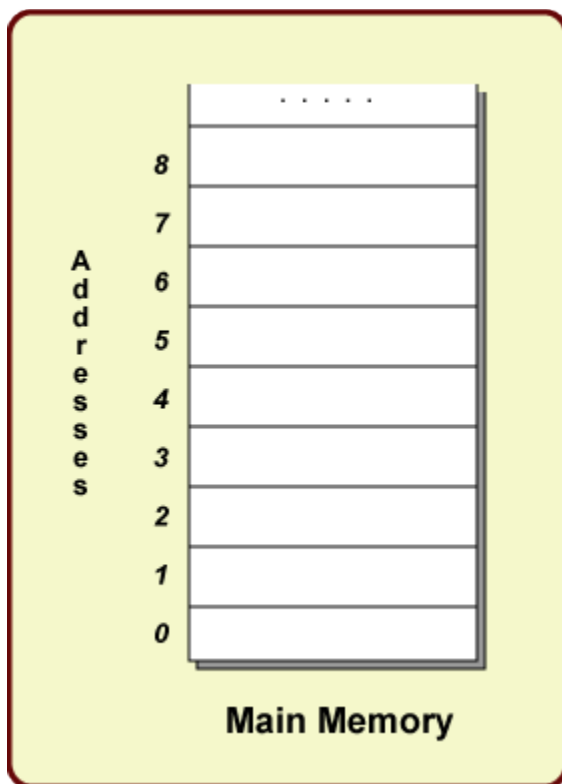
11. **What is a file?**

   A file is a collection of information that has been given a name and is stored in secondary memory. The information can be a program or can be data.

12. **What are the two types of files?**

   The two types of files:

Sequential Access — The data are placed in the file in a sequence like beads on a string. Data are processed in sequence, one after another. To reach a particular item of data, all the data that proceeds it first must be read.

Random Access — The data are placed into the file by going directly to the location in the file assigned to each data item. Data are processed in any order. A particular item of data can be reached by going directly to it, without looking at any other data.