Zak
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Topic: 1.3.2 Main memory

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                          MEMORY
                  ┌──────────┴──────────┐
                  ▼                     ▼
            ┌───────────┐         ┌──────────────┐
            │    ROM     │         │     RAM       │
            │(Read Only  │         │(Random Access │
            │  Memory)   │         │   Memory)     │
            └─────┬─────┘         └──────┬───────┘
                  │                ┌──────┴──────┐
                  ▼                ▼             ▼
       ┌──────────────────┐  ┌─────────┐  ┌──────────┐
       │ PROM – Programmable│  │  SRAM   │  │  DRAM    │
       │ Read Only Memory  │  │(Static  │  │(Dynamic  │
       │ EPROM – Erasable  │  │  RAM)   │  │  RAM)    │
       │ Programmable Read │  └─────────┘  └──────────┘
       │ Only Memory       │
       │ EEPROM – Electrically│
       │ Erasable Programmable│
       │ Read Only Memory  │
       └──────────────────┘
```

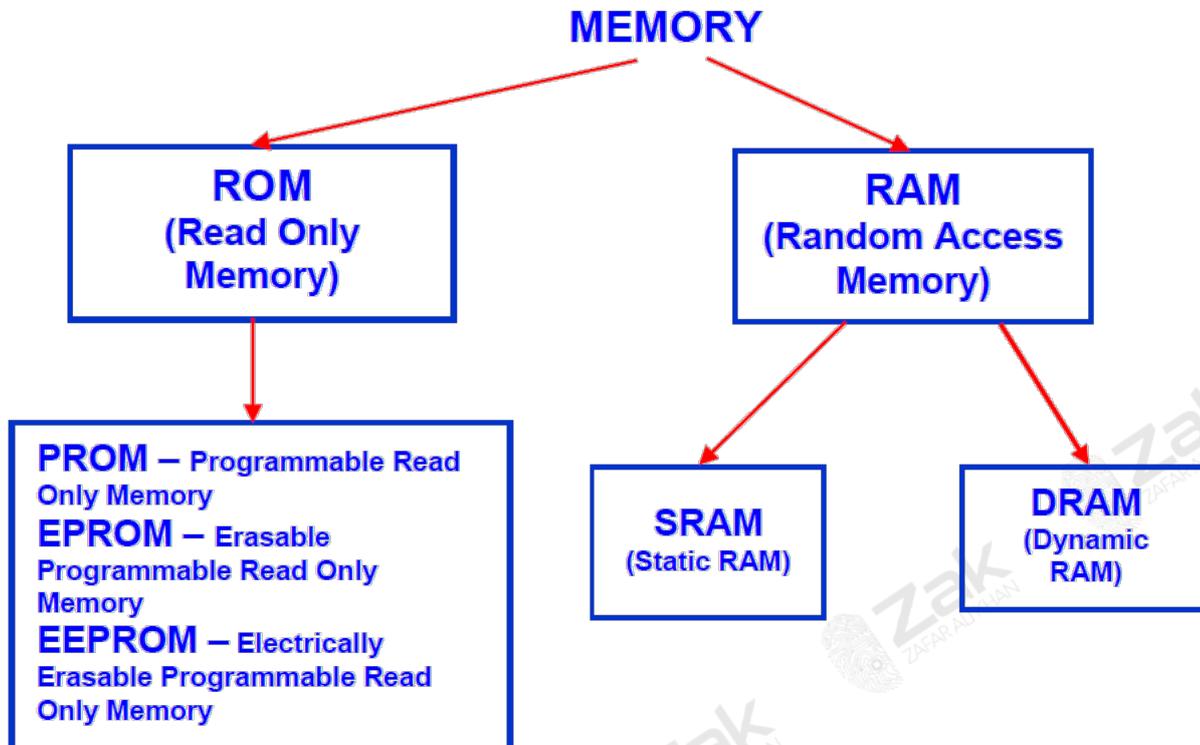### Read only memory (ROM)

ROM holds the instructions for starting up the computer. This type of memory can only be read and cannot be altered (i.e. deleted or written to) and is non-volatile (i.e. it doesn't lose its contents when the computer is switched off).

Programmable read only memory (PROM)

A PROM is a memory chip on which data can be written only once. Once a program has been written onto a PROM, it is permanent. Unlike RAM, PROM's retain their contents when the computer is turned off. The difference between a PROM and a ROM (read only memory) is that a PROM is manufactured as a blank memory, whereas a ROM is programmed during the manufacturing process. To write data onto a PROM chip, a special device called a PROM programmer or PROM burner is required.

Erasable programmable read only memory (EPROM)

This is a special type of PROM that can be erased by exposing it to ultraviolet (UV) light. Once it has been erased, it can be re-programmed using an EPROM burner.

Topic: 1.3.2 Main memory

Electrically erasable programmable read only memory (EEPROM)

An EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge. Like other types of PROM, EEPROM retains its contents even when the power is turned off. Also, as with other types of ROM, EEPROM access time is not as fast as RAM. EEPROMs are similar to flash memories (sometimes called flash EEPROM). The principal difference is that an EEPROM requires data to be written or erased one byte at a time, whereas a flash memory allows data to be written or erased in whole blocks.

Random access memory (RAM)

This is a volatile memory (i.e. contents are lost when the computer is switched off). A user can write or delete data as well as read the contents. Before a program can be ran it must first be loaded into RAM which allows the CPU to access the program. Battery-backed RAMs overcome data loss on switching power off, but are outside the scope of these booklets.
(NOTE: For completeness, it is worth mentioning that two types of RAM exist called SRAM (static RAM) and DRAM (dynamic RAM) – SRAM doesn't need to be constantly refreshed to retain its memory unlike DRAM. Also note that computers use *cache* which is a portion of memory made from SRAM. Memory *caching* works since programs usually access the same data or instructions over and over again. By retaining as much information as possible in SRAM, the computer operates more quickly (*cache* is usually termed level 1, 2 or 3 (termed L1, L2 or L3)).

Page **2** of **2**

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