ROM

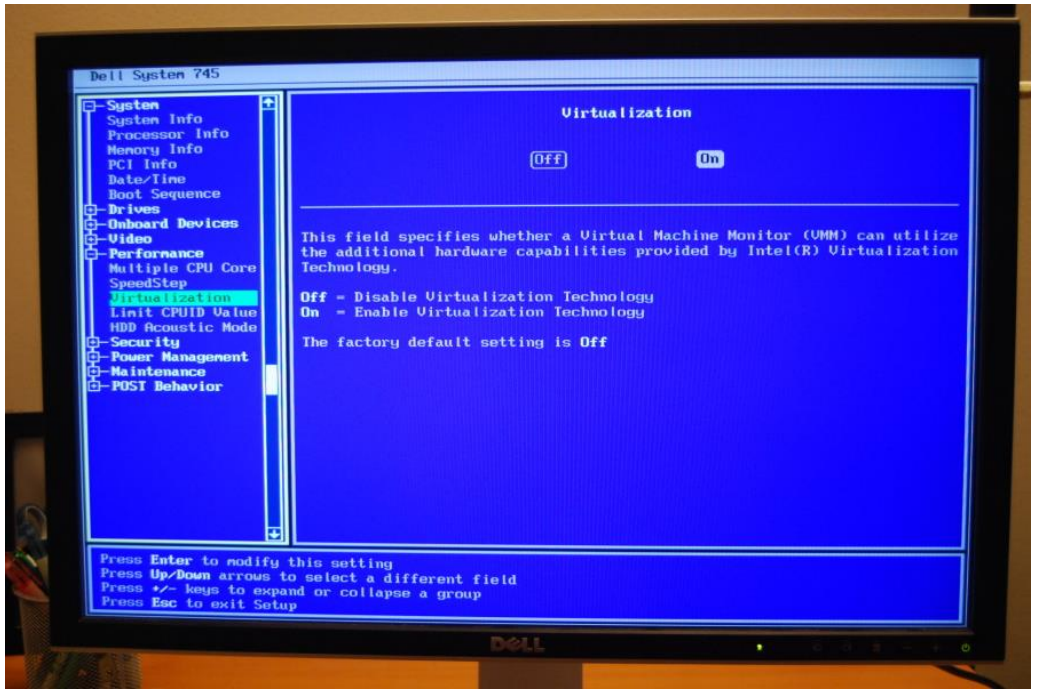
Describe the principles and operation of ROM

Attribution: a lot of the text taken from Youtube by Liam McQuay

Read-**O**nly **M**emory (**ROM**) is non-volatile memory used to store the start-up instructions for a computer system (eg. the BIOS). It can only be read from.

Image source: http://ic3mvhs.wikispaces.com/Understanding+Memory

- ROM is a type of **primary memory**
- ROM is non-volatile
- It can only be **read from**, **not written to**



The BIOS firmware

- For this reason, the program on it (the BIOS) it is known as **firmware**, instead of software. All normal PCs have this.
- Some ROM firmware can be updated though
  - This process is known as **flashing** the ROM
  - This type of ROM is called **EPROM** (**E**rasable **P**rogrammable **R**ead-**O**nly **M**emory)

Purpose of ROM:

- In a **special-purpose computer**, ROM might be the only storage
  - These computers are also known as **embedded computers**
  - This would be because these computers don't need new software and files to be installed or deleted.

Embedded computer

- In a **general-purpose computer**
  - It is used as a boot-loader
  - Used to configure settings of motherboard
  - Comes with the motherboard (not detachable)

A motherboard

Image source: https://en.wikipedia.org/wiki/File:MicroATX_Motherboard_with_AMD_Athlon_Processor_2_Digon3.jpg

Application of RAM and ROM

Example:

- A toy car has circuitry that contains RAM and ROM chips
- The ROM chip stores:
  - **The factory settings** (BIOS)
  - **The start-up routines** (bootstrap loader)

- The RAM chip stores:
  - The **instructions** sent from the controller

Image source: http://thepurplejournal.wordpress.com/2008/09/28/the-joys-of-eid-shopping/

Application of RAM and ROM

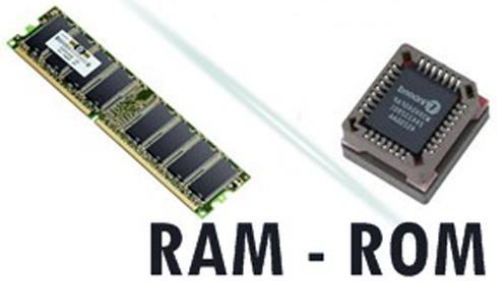
- Additionally, if the car contains a **S**olid-**S**tate **D**rive (**SSD)**, it can be used to store the instructions to operate the car.

- A suitable input device, such as a touch screen or keypad, could be used for the controller.

    - The reasons these input devices could be suitable is that they are easy to use and have a limited number of options.

a solid-state drive

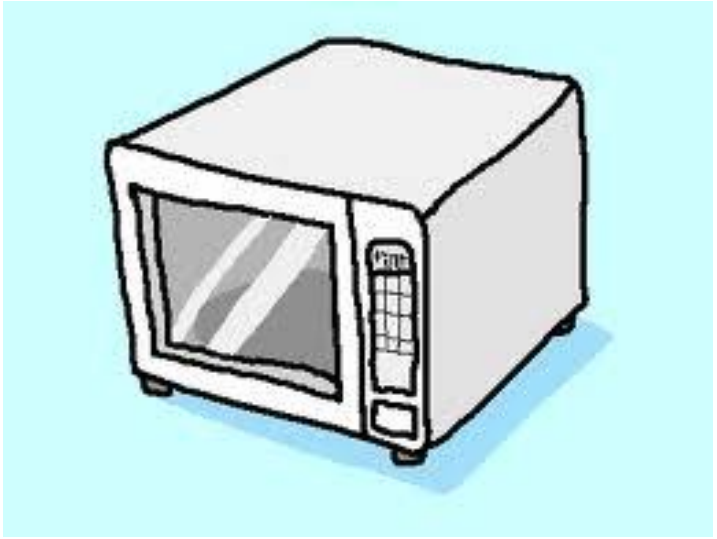
Comparing RAM and ROM



RAM	ROM
Primary Storage	Primary Storage
Volatile	Non-volatile
Can be read from and written to	Can only be read from
Holds data currently in use	Holds bootstrapper and hardware settings
Normally larger capacity (1 to 16GB)	Normally very small capacity (such as a few megabytes)

Key terms:

- **special-purpose computer / embedded computer**, has only one function, like a calculator



- **general-purpose computer** is a normal PC / laptop / phone that we can install different software on

Image sources: http://suburbancorrespondent.blogspot.co.za/2012_06_01_archive.html, https://openclipart.org/detail/34087/computer

Key terms

- **BIOS** – stored on ROM, this is settings for hardware. BIOS stands for Basic Input / Output System.
- **Bootstrap loader** – stored on ROM, it starts up (boots) the computer.
- **Firmware** – software that can be read from but not overwritten.
- **Primary memory / storage** – a type of memory / storage that can be accessed directly by the CPU.

Test your knowledge:

What does ROM stand for? _____

Is ROM primary, secondary, or offline storage? _____

Is ROM volatile or non-volatile? _____

Can ROM be read from, written to, or both? _____

What is a "special-purpose" and "embedded" computer? _____

What is a "general-purpose" computer? _____

In a regular computer, what are the 2 functions of ROM?

- _____
- _____

What is the name of the program stored on the ROM? _____

What is "firmware"? _____

What is a "bootloader"? _____

What is a good description of ROM? _____

Test your knowledge:

Describe "Primary Memory" _____

Give 3 differences between RAM and ROM

- _____
- _____
- _____

RAM vs ROM Image source: http://ngeposta.blogspot.co.za/2013/09/mengenal-ram-random-access-memory-dan.html