Questions on Raspberry Pi:

1. Identify the components:
2. **ARM CPU/GPU** -- This is a Broadcom BCM2835 System on a Chip (SoC) that's made up of an ARM central processing unit (CPU) and a Videocore 4 graphics processing unit (GPU). The CPU handles all the computations that make a computer work (taking input, doing calculations and producing output), and the GPU handles graphics output.

**b) GPIO** -- These are exposed general-purpose input/output connection points that will allow real hardware hobbyists the opportunity to tinker.

**c) RCA** -- An RCA jack allows connection of analog TVs and other similar output devices.

**d) Audio out** -- This is a standard 3.55-millimeter jack for connection of audio output devices such as headphones or speakers. There is no audio in.

**e) LEDs** -- Light-emitting diodes, for all of your indicator light needs.

1. **USB** -- This is a common connection port for peripheral devices of all types (including your mouse and keyboard). Model A has one, and Model B has two. You can use a USB hub to expand the number of ports or plug your mouse into your keyboard if it has its own USB port.
2. **HDMI** -- This connector allows you to hook up a high-definition television or other compatible device using an HDMI cable.
3. **Power** -- This is a 5v Micro USB power connector into which you can plug your compatible power supply.
4. **SD cardslot** -- This is a full-sized SD card slot. An SD card with an operating system (OS) installed is required for booting the device. They are available for purchase from the manufacturers, but you can also download an OS and save it to the card yourself if you have a Linux machine and the wherewithal.
5. **Ethernet** -- This connector allows for wired network access and is only available on the Model B.
6. How many cores does it have:

It has 4 cores

1. 4 differences between x86 (CISC) and ARM raspberry pi (RISC)

CISC RISC

|  |  |
| --- | --- |
| Has more operations and addressing modes, but one register set | Has lesser operations and addressing modes, but multiple register sets |
| Follows little-endian format | Follows big-endian format, but can switch between big – and little - endian |
| Instruction set has a variety of diff instructions that can be used for operations. | Instruction set is reduced, very few instructions and most are primitive |
| Execution time is high | Execution time is less |

1. differences between sequential and parallel processing

sequential parallel

|  |  |
| --- | --- |
| Involves a consecutive and ordered execution of processes one after the other | Involves the concurrent computation or simultaneous execution of processes or threads at the same time. |
| Processes are run one after another in a successful fashion | Multiple processes execute at the same time. |

Examples of parallel computation : Array/ Matrix processing

Examples of sequential computation:

1. Basic form of data and task parallelism:
2. Diff between processes and threads:

Processes Threads

|  |  |
| --- | --- |
| They are heavyweight operations | They are lightweight operations |
| Each process has its own memory space | Threads use the memory of the process to which they belong |

1. Open Mp and Open mP pragmas:
2. Applications benefitting from Multicore:

a) Database servers

b) Web servers (web commerce)

c) Compilers

d) Multimedia applications

1. Why multicore?
2. They can run multiple processes (hence multiple threads) at the same time.
3. Many new applications are multithreaded
4. Circuits are deeply pipelined (heat problems, speed of light problems)