**Foundation** (reading material for this section is available at iCollege, Week4, Project:

Assignment folder, Introduction\_to\_Parallel\_Computing\_and\_the\_Raspberry\_Pi\_A2.pdf)

**Identifying the components on the raspberry PI B+**

Raspberry PI B+’s components are Power, Central Process Unit, Random Access memory, USB, Display, HDMI and Camera. It allows you to use wireless internet by connecting WIFI, but Ethernet , and Ethernet Controller are also included as the components .

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**How many cores does the Raspberry Pi’s B+ CPU have**

Raspberry Pi B+’s CPU has 4 cores.

**List three main differences between X86 (CISC) and ARM Raspberry PI (RISC). Justify you answer and use your own words (do not copy and past)**

X86 have a CISC structure for their processor which make you to process faster by having a larger and more feature-rich instruction set. This mean the X86’s CPU would have more operations, address mode. The trade off for this process is that ARM would have more registers/memories than the X86.

Second, Unlike X86, ARM used RISC processor. On above paragraph, we said that the CISC has more instruction set, and we could confirm that statement since RISC has 100 instructions at most. By doing this , we could have more “general” purpose registers. Due to lack of instructions, only “load” and “store” can access to the memory.

Overall, the difference in number of instructions has pros and cons. For having less instruction, the processor would executes the program more faster and efficiently. But, having less instruction means there is less tool to use, which gave a huge problems to the programmers.

**What is the difference between sequential and parallel computation and identify the practical significance of each?**

Sequential computing have a consecutive order when processing. This means the processor would compute one after another. The processor never stops until the program is terminated.

The parallel compute the program at the same time using a different thread. It compute a multiple instruction at the once, but in order to do this, we needs a mutli-core CPU. Since it compute concurrently , it is way faster than sequential computing.

In general parallel are used in database, and data mining where lots of data is being computing, and sequential usually done when programs needs to be safely(and stable) compute

**Identify the basic form of data and task parallelism in computational problems.**

Data parallelism is a executions of a data assigned by the computer. In works concurrently, but it could compute the different functions across the processor.

The task parallelism executes the same function on multiple cores. It should be fast to compute since we are using a equitant functions to compute different data.

**Explain the differences between processes and threads.**

Processor’s running program is a abstraction on running program. This makes the process to prohibit to share the memory.

Threads are lightweight process which allows to performs a single process to be decomposed to smaller, and makes into independent parts. It shares the common memories of the process .

**What is OpenMP and what is OpenMP pragmas?**

OpenMP is a library/language which the compiler’s directives enable the compiler to generate threaded code.

**What applications benefit from multi-core (list four)?**

1.Database servers

2.Web servers

3.Compilers

4.Multimedia applications

5.Scientific applications

In general, applications with thread-level parallelism

**Why Multicore? (why not single core, list four)**

The most advantage on multicore processor is that it is easier to make the CPU itself compares to the single core clock. Also, multicore would helps to creates the more multithreads which increase the computer proformance.

Difficult to make single-core clock frequencies higher

Many new applications are multithreaded

General trend in computer architecture(parallelism is preferred)