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الفرقه الثالثه

* The time taken to process the database with GPU is shorter than the time taken to process without GPU

-the time taken with GPU =43.9 µs

-the time taken without GPU=638 µs

* Because CPU follow this steps to perform the tasks in the program:

1. The CPU fetches the next instruction from memory. The program counter (PC) holds the address of the instruction to be fetched. The CPU reads the instruction from memory and increments the program counter to point to the next instruction.
2. The CPU identifies the instruction's operation and the locations of the operands, preparing for the next steps.
3. then ensures that the necessary data is available for the instruction's execution. If the instruction requires additional data, such as values or memory addresses, the CPU fetches them from the appropriate memory locations.
4. The CPU performs the actual computation or operation specified by the instruction.
5. After the execution of the instruction, the CPU writes the result back to the appropriate location, such as a register or memory location.

6-Finaly update Program Counter to point to the next instruction to be fetched

--These steps are repeated for each instruction in the program sequential until the task is completed

* While the GPU follow this steps to perform the tasks in the program:

1. copying the data needed for the GPU task, instructions, and any necessary supporting structures to the GPU.
2. The GPU executes a kernel, which is a function specifically written for parallel execution on the GPU

3-The GPU assigns threads to different execution units within its streaming multiprocessors

4-The assigned threads are executed in parallel by the GPU cores

1. The GPU threads access data from the GPU's device memory or shared memory.

7-the results computed by the GPU threads are written back to the GPU's device memory.

--The GPU performs these steps in a highly parallel and pipelined manner

Conclusions:

The GPU is faster than CPU in executing the program, because it is distinguished from CPU in that it executes the steps and tasks within the program in parallel

Since The parallel execution of multiple threads allows the GPU to process large amounts of data simultaneously, providing significant performance gains over traditional CPUs for parallelizable tasks.

Link of GPU programming in python

<https://colab.research.google.com/drive/1TFnuj1rd_9wid0Z9x5RCv5r65qybENCS?usp=share_link>