**Parallel Computing**

**Big Assignment**

**Proposal**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Sec** | **BN** | **ID** |
| بموا عريان عياد Bemoi Erian Ayad | 1 | 17 | 9202391 |
| مارك ياسر نبيلMark Yasser Nabil | 2 | 14 | 9203106 |
| بيتر عاطف فتحيPeter Atef Fathi | 2 | 18 | 9202395 |

# Map-Reduce

**Map Kernel:**

The Map kernel applies a specified operation or function to each element of an input array in parallel. Utilizing the massively parallel architecture of GPUs, this kernel efficiently distributes the workload across numerous threads, enabling simultaneous computation on multiple data elements. Output is a <key,value> pair.

**Reduce Kernel:**

The Reduce kernel aggregates the results obtained from the Map kernel by performing a reduction operation, such as summation or finding the maximum value. Through parallel reduction techniques, this kernel efficiently combines intermediate results to produce a single output value for each key.

**Shuffle and Sort Kernel:**

The Shuffle and Sort kernel arranges the processed data elements into a desired order, typically sorting them by key based on a specified criterion. By employing parallel sorting algorithms optimized for GPU architectures, this kernel organizes the data efficiently, facilitating subsequent analysis or retrieval operations. The output is <key,[values]>.

**Block Diagram**

**A screenshot of a computer screen

Description automatically generated**