***Project Proposal***

**Project title:**

Exploration of Multiprocessing and Multithreading in Python.  
  
  
**Group members**

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**Project description:**

**Thread: (Ersum)**A thread is a light-weight smallest part of a process that can run concurrently with the other threads of the same process. Threads are independent because they all have separate path of execution that’s the reason if an exception occurs in one hand thread, it doesn’t affect the execution of other threads.  
  
**Multithreading: (Saad)**

Multithreading is a type of execution model that allows multiple threads to exist within the context of a process such that they execute independently but share their process resources. A thread maintains a list of information relevant to its execution including the priority schedule, exception handlers, a set of cpu registers, and stack state in the address space of its hosting process.

**Multiprocessing: (Omer)**  
In computing, a mode of operation in which two or more processors in a computer simultaneously process two or more different portions of the same program (set of instructions). Multiprocessing is typically carried out by two or more microprocessors, each of which is in effect a central processing unit (CPU) on a single tiny chip. Supercomputers typically combine thousands of such microprocessors to interpret and execute instructions.

**Advantages of Multithreading: (Usama)**

There are many advantages some of them are as follows:

* **Improved performance and concurrency**  
    
  For certain applications, performance and concurrency can be improved by using multithreading and multicontexting together. In other applications, performance can be unaffected or even degraded by using multithreading and multicontexting together. How performance is affected depends on your application.

* **Simplified coding of remote procedure calls and conversations**

In some applications it is easier to code different remote procedure calls and conversations in separate threads than to manage them from the same thread.

* **Reduced number of required servers**  
    
  Because one server can dispatch multiple service threads, the number of servers to start for your application is reduced. This capability for multiple dispatched threads is especially useful for conversational servers, which otherwise must be dedicated to one client for the entire duration of a conversation

**Advantages of Multiprocessing: (Raheel)**

There are many advantages some of them are as follows:

* **Increased Throughput**   
    
  By increasing the number of processors, more work can be completed in a unit time.
* **Cost Saving**

Parallel system shares the memory, buses, peripherals etc. Multiprocessor system thus saves money as compared to multiple single systems. Also, if a number of programs are to operate on the same data, it is cheaper to store that data on one single disk and shared by all processors instead of using many copies of the same data

* **Increased Reliability**In this system, as the workload is distributed among several processors which results in increased reliability. If one processor fails then its failure may slightly slow down the speed of the system but system will work smoothly.