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**COSC 5352 - Advanced Operating System**

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**Part 3:**

Program calculates the sum of the first 1024 integers with any given number processes. The program was tested by 1, 2, 4, 7, 8, 12, 13, 16, 32, 35, 63, 64, 125, 128 processors. The 1024 numbers was distributed to p (the number of processors) parts. Processor rank (the number of processor) only calculate the sum of these numbers, which have the same 1024%p (=rank). After calculated the sum of numbers in the local, each processor sends its local sum to processor 0 to get the total sum, which is the sum of the first 1024 integers. This process uses MPI\_Reduce() function. The program was hard coded to execute five times.

**Performance:**

1. When only one processor was used, the program cost the shortest time.
2. When more than one processor was used, the shortest time came out on using eight processors.
3. When the number of processors is less than eight, the time decreased by the number of processors increasing.
4. When the number of processors is more than eight, the time increased by the number of processors decreasing.

**Conclusion:**

1. The parallel computing is not suitable for small problems.
2. The parallel computing cannot guarantee the time reducing.
3. The communication cost a lot of time.
4. When the number of processors increased, the communication increased either. Therefore, simply increasing the number of processors cannot get the optimal solution.