## Question 4:

For this question, I implemented the solution to the matrix vector multiplication using OpenMP. More information on the code and how to run is provided in the Readme and in the log file. This program was run and tested on the **COE** system.

- The number of processors available to run the program were printed during run time.
- The final resulting vector was also printed.
- OpenMP built-in reduction was used to compute each element of the output vector along with other built functions like parallel for schedule(static) and private.
- The range of numbers used to initialize the input matrix and input vector lies in the range 1-1000.

**Observation:**

- The accuracy and speed of the matrix vector multiplication program was compared between Serial implementation and OpenMP implementation.
- For this(512) dimension, OpenMP implementation is significantly faster compared to the serial implementation.
- For lower dimensions, serial implementation is faster compared to the OpenMP implementation. This is because the overhead in spawning threads overshadows the benefit in parallelization of tasks.
- The number of processors available to run this program: **24**
- Time taken for matrix-vector multiplication(OpenMP): **0.001772** seconds
- Time taken for matrix-vector multiplication(serial): **0.003127** seconds