1 Membench

The *membench* programs are run to obtain the following plot in Fig. 1 for the effect of array length and stride length on type of memory access, and time to access. The following script *calc.sh* in the appendix was used to calculate the average processor speed for the 36 processors on GreatLakes to be 3000 MHz. This speed will be used to calculate the number of processor clock cycles required to access the various types of memory,

$$\text{\# cycles per memory access} = \text{clock speed} \ \times \ \text{memory access time}.$$
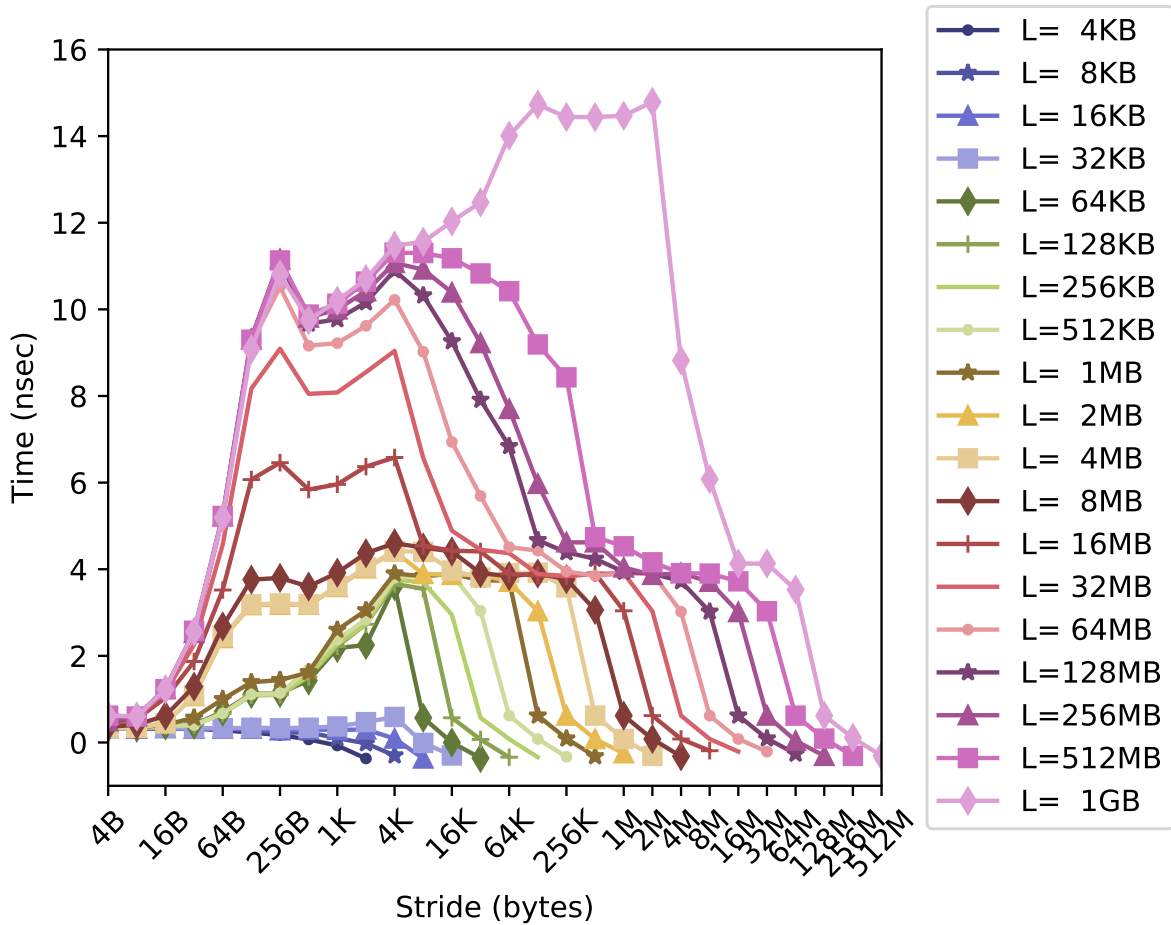

Figure 1: Memory access times for various array sizes and stride lengths

2 SIMD Instructions

2.1 AVX Support

- The commands used to verify if the current machine/processor supports AVX are:

    grep -E "avx[^0-9]" /proc/cpuinfo

    and if the current machine/processor supports AVX2 are:

    grep -E "avx2" /proc/cpuinfo

These searches will show whether the supported AVX fields are in the flags section of the processor info from /proc/cpuinfo. This command will show all processors (36 $\times$ Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz, for GreatLakes compute nodes).)