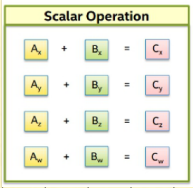
Speedup

SIMD: Single instruction, multiple data

SIMD – Single Instruction, Multiple Data



Intel® Architecture currently has SIMD operations of vector length 4, 8, 16

- Intel: MMX, SSE, SSE2, AVX, AVX2, AVX512
- ARM: NEON
- RISC-V: RVV (RISC-V Vector Extension)

OpenMP

```
#include <omp.h>

#pragma omp parallel for
for (size_t i = 0; i < n; i++)
{
  c[i] = a[i] + b[i];
}
```

Thread 0	Thread 1	Thread 2	Thread 3	Thread 4
i=0-199	i=200-399	i=400-599	i=600-799	i=800-999
a[i]	a[i]	a[i]	a[i]	a[i]
+	+	+	+	+
b[i]	b[i]	b[i]	b[i]	b[i]
=	=	=	=	=
c[i]	c[i]	c[i]	c[i]	c[i]

Where should #pragma be? The 1st loop or the 2nd?

```
#include <omp.h>

#pragma omp parallel for
for (size_t i = 0; i < n; i++)
{
  //#pragma omp parallel for
  for (size_t j = 0; j < n; j++)
  {
    //...
  }
}
```

在最外层比较好，因为效果较好