实验：Intel SIMD 指令

徐薪-519021910726

Exercise1：熟悉 SIMD intrinsics 函数

1. Four floating point divisions in single precision:
```
__m128 _mm_div_ps (__m128 a, __m128 b)
```
2. Sixteen max operations over unsigned 8-bit integers:
```
__m128i _mm_max_epu8 (__m128i a, __m128i b)
```
3. Arithmetic shift right of eight signed 16-bit integers:
```
__m128i _mm_sra_epi16 (__m128i a, __m128i count) or
__m128i _mm_srai_epi16 (__m128i a, int imm8)
```
（没有弄明白两者的区别，认为均可满足题目要求）

Exercise2: 阅读 SIMD 代码

1. SIMD 操作的指令如下：
Pxor, movsd, movapd, addpd, mulpd, movaps, unpckhpd, movq

Exercise3: 书写 SIMD 代码

1.
性能得到了改善，结果如下：

```
root@xin-VirtualBox:/mnt/shared/Computer_Organization/lab5# ./sum
              naive: 6.04 microseconds
           unrolled: 4.68 microseconds
         vectorized: 1.82 microseconds
 vectorized unrolled: ERROR!
```

Exercise4: Loop Unrolling 循环展开

1.
性能得到了改善，结果如下：

```
root@xin-VirtualBox:/mnt/shared/Computer_Organization/lab5# ./sum
              naive: 6.01 microseconds
           unrolled: 4.69 microseconds
         vectorized: 1.84 microseconds
 vectorized unrolled: 1.26 microseconds
```