Lab 1

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Answers:

1. How many total thread blocks do we use?

As we choose

$$\dim\_block = 256$$

$$\dim\_grid = (n + \dim\_block - 1) / \dim\_block$$

The number of total thread blocks we use is

$$\dim\_grid \times \dim\_block$$

For $n = 1000$

$\dim\_grid = 4$

$\dim\_block = 256$

So,

The number of total thread blocks we use is 1024

2. Are all thread blocks full? That is, do all threads in thread blocks have data to operate on?

We only have 1000 elements to operate. And we have 1024 thread blocks. So, there are 24 blocks that are not full. Not all threads in thread blocks have data to operate on.

Assume we have n elements to deal with.

If n is divisible by $\dim\_block$

There will not be threads left empty.

If n is not divisible by $\dim\_block$

There will be some threads left empty.

3. How can this basic vector add program be improved?

We can choose proper values of dim_grid and dim_block.

If dim_grid and dim_block are divisors of n, it means that all thread blocks are full.

Then, there will be no resource waste in vector add program.