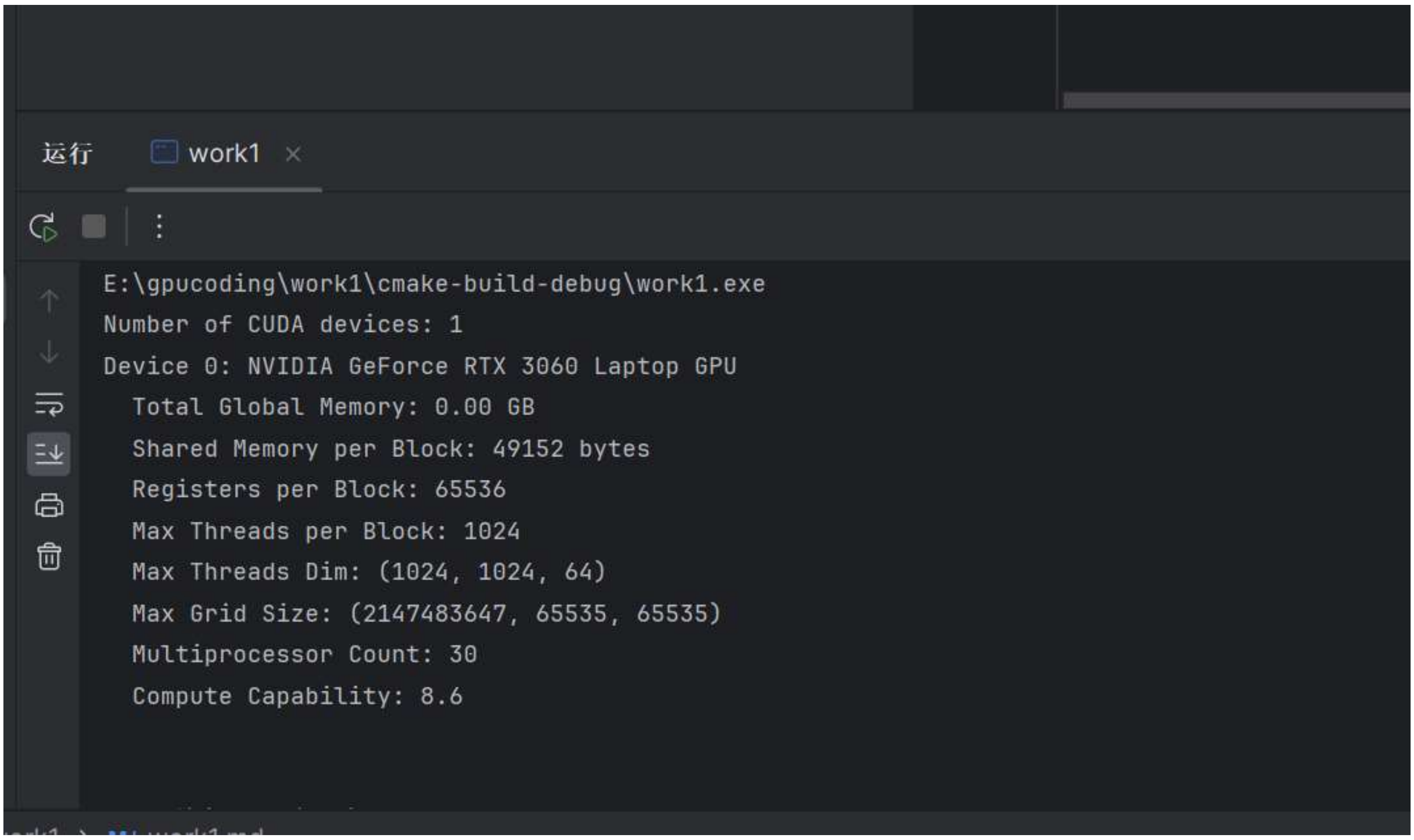
作业1

1. 查询你机器上GPU设备的参数

```
#include <stdio.h>
#include <cuda_runtime.h>

int main() {
int deviceCount = 0;

    cudaGetDeviceCount(&deviceCount);
    printf("Number of CUDA devices: %d\n", deviceCount);

    for (int i = 0; i < deviceCount; ++i) {
        cudaDeviceProp prop;
        cudaGetDeviceProperties(&prop, i);

        printf("Device %d: %s\n", i, prop.name);
        printf("  Total Global Memory: %.2f GB\n", prop.totalGlobalMem / (1 << 30));
        printf("  Shared Memory per Block: %d bytes\n", prop.sharedMemPerBlock);
        printf("  Registers per Block: %d\n", prop.regsPerBlock);
        printf("  Max Threads per Block: %d\n", prop.maxThreadsPerBlock);
        printf("  Max Threads Dim: (%d, %d, %d)\n", prop.maxThreadsDim[0], prop.maxThreadsDim[1], prop.maxTh
        printf("  Max Grid Size: (%d, %d, %d)\n", prop.maxGridSize[0], prop.maxGridSize[1], prop.maxGridSize
        printf("  Multiprocessor Count: %d\n", prop.multiProcessorCount);
        printf("  Compute Capability: %d.%d\n", prop.major, prop.minor);
        printf("\n");
    }

    return 0;
```

运行结果：

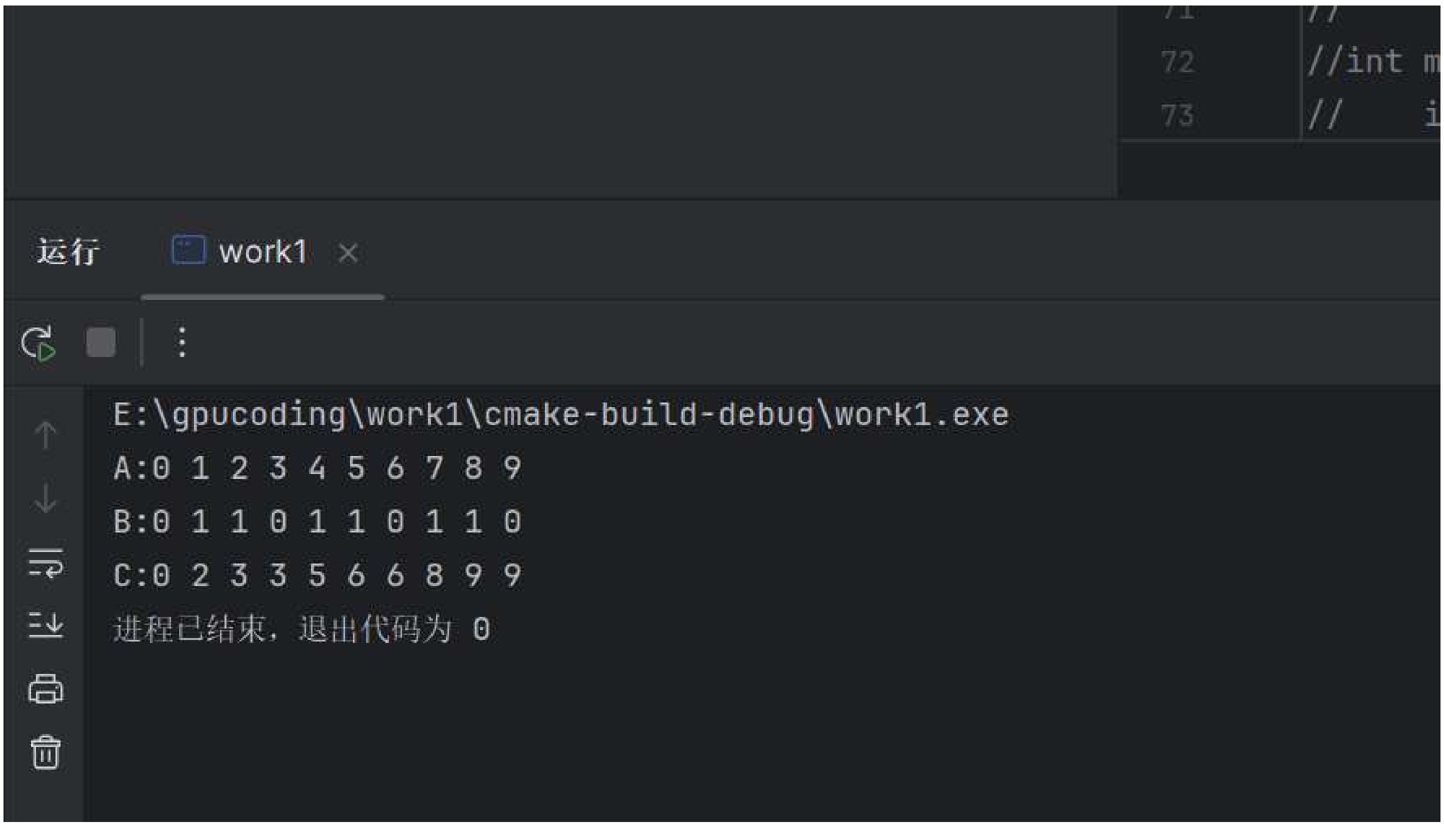


```
E:\gpucoding\work1\cmake-build-debug\work1.exe
Number of CUDA devices: 1
Device 0: NVIDIA GeForce RTX 3060 Laptop GPU
  Total Global Memory: 0.00 GB
  Shared Memory per Block: 49152 bytes
  Registers per Block: 65536
  Max Threads per Block: 1024
  Max Threads Dim: (1024, 1024, 64)
  Max Grid Size: (2147483647, 65535, 65535)
  Multiprocessor Count: 30
  Compute Capability: 8.6
```

2. vectorsum 代码如下

```
    #include <stdio.h>
#include <cuda_runtime.h>
#include <iostream>
#include "vector"
#define N 10
using namespace std;

__global__ void add(double *A,double *B,double *C,int n)
{
    int index = blockDim.x*blockIdx.x + threadIdx.x;
    //blockdim  numbersof threads in block
    //blockidx  index of block in grid
    //threadidx index in block

    int stride = blockDim.x*gridDim.x;
    //stride thread numbers

    for(int i = index;i < n;i += stride)
    {
        C[i] = A[i] + B[i];
    }

}
int main()
{
    int n =N;
    double *dev_A,*dev_B,*dev_C;
    double A[N],B[N],C[N];

    for(int i = 0;i < n;i ++)
    {
        A[i] = i;
        B[i] = i*i%3;
    }

    cudaMalloc(&dev_A, n * sizeof(double));
    cudaMalloc(&dev_B, n * sizeof(double));
    cudaMalloc(&dev_C, n * sizeof(double));

    cudaMemcpy(dev_A,A,n*sizeof(double),cudaMemcpyHostToDevice);
    cudaMemcpy(dev_B,B,n*sizeof(double),cudaMemcpyHostToDevice);

    int blocksize = 32;
    int numblocks = (n + blocksize - 1)/blocksize;
    add<<<numblocks,blocksize>>>(dev_A,dev_B,dev_C,n);
    //<<<numBlocks, blockSize>>>

    cudaMemcpy(C,dev_C,n*sizeof(double),cudaMemcpyDeviceToHost);

    cout << "A:";
    for(int i = 0;i < n;i ++)
    {
            cout << A[i] << " ";
        }

        cout << "\nB:";
        for(int i = 0;i < n;i ++)
        {
            cout << B[i] << " ";
        }

        cout << "\nC:";
        for(int i = 0;i < n;i ++)
        {
            cout << C[i] << " ";
        }

  }
```

运行结果:



```
E:\gpucoding\work1\cmake-build-debug\work1.exe
A:0 1 2 3 4 5 6 7 8 9
B:0 1 1 0 1 1 0 1 1 0
C:0 2 3 3 5 6 6 8 9 9
进程已结束，退出代码为 0
```