Report on Labwork 4

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November 24, 2019

1 Explain how you improve the labwork?

- Redefine the grayscaling kernel

```
__global__ void grayscale2D(uchar3 *input, uchar3 *output,
                                    int width, int height) {
    int globalIdX = threadIdx.x + blockIdx.x * blockDim.x;
    if (globalIdX >= width)
        return;
    int globalIdY = threadIdx.y + blockIdx.y * blockDim.y;
    if (globalIdY >= height)
        return;
    int tid = globalIdY * width + globalIdX;

    output[tid].x = (input[tid].x + input[tid].y +input[tid].z) / 3;
    output[tid].z = output[tid].y = output[tid].x;
}
```

- Redefine blockSize and gridSize

```
dim3 blockSize = dim3(32, 32);
dim3 gridSize = dim3((inputImage->width + blockSize.x -1) / blockSize.x,
                     (inputImage->height + blockSize.y -1) / blockSize.y);
grayscale2D<<<gridSize, blockSize>>>(devInput, devOutput,
                                     inputImage->width, inputImage -> height);
```

2 Try experimenting with different 2D block size values?

3 Compare speedup with previous 1D grid

It is faster compared to previous 1D grid.

Block size	64	128	256	512
Time elapsed (ms)	11.5	10.4	10.7	11.0