

Configs Cheatsheet

1D Grid & 1D Block



Figure 1: img

- Block along x axis

```
1 int gId = threadIdx.x;
```

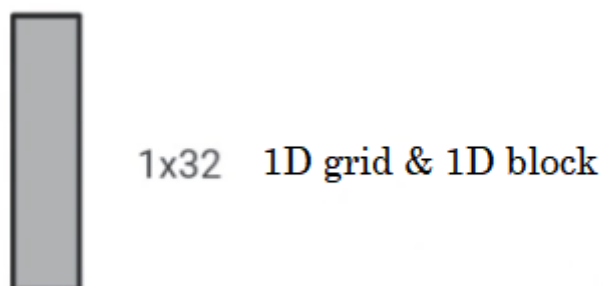


Figure 2: img

- Block along y axis

```
1 int gId = threadIdx.y;
```

1D Grid & N 1D Blocks

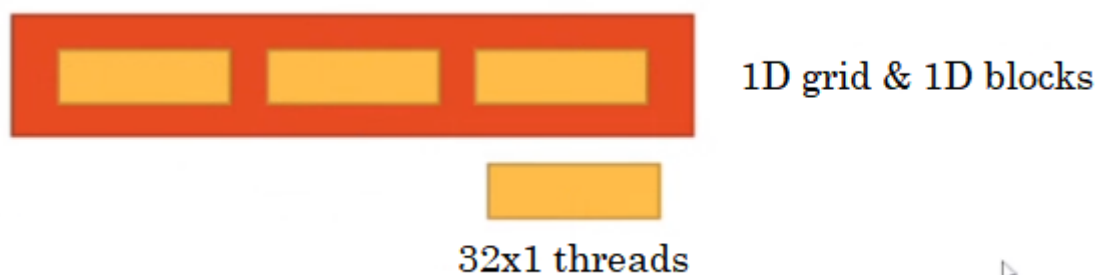


Figure 3: img

- N 1D blocks along x axis

```
1 int threadsPerBlock = blockDim.x;  
2 int blockOffset = threadsPerBlock * blockIdx.x;  
3 int idInsideBlock = threadIdx.x;  
4 int gId = blockOffset + idInsideBlock;
```

1D Grid & N 2D Blocks

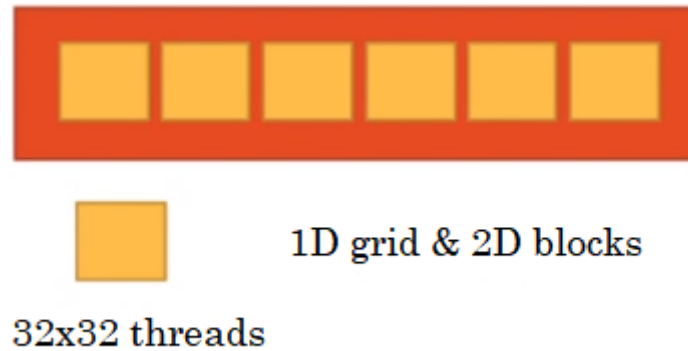


Figure 4: img

- N 2D blocks along x axis

```
1 int threadsPerBlock = blockDim.x * blockDim.y;  
2 int blockOffset = threadsPerBlock * blockIdx.x;  
3 int idInsideBlock = blockDim.x * threadIdx.y + threadIdx.x;  
4 int gId = blockOffset + idInsideBlock;
```

1D Grid & N 1D Blocks

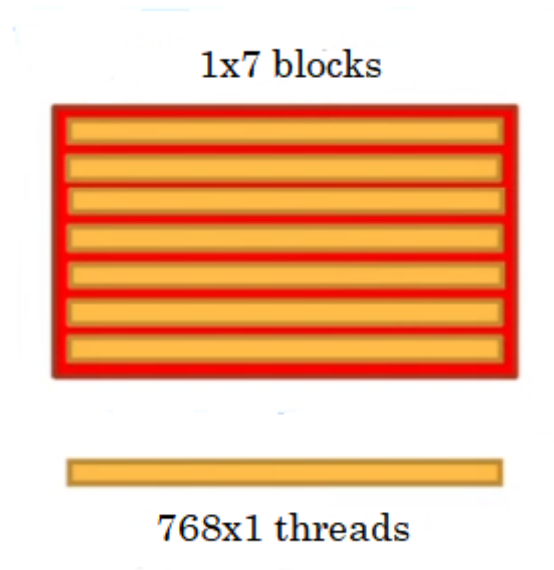


Figure 5: img

- N 1D blocks along y axis

```
1 int threadsPerBlock = blockDim.x;  
2 int rowOffset = threadsPerBlock * blockIdx.y;  
3 int idInsideBlock = threadIdx.x;  
4 int gId = rowOffset + idInsideBlock;
```

1D Grid & N 1D Blocks

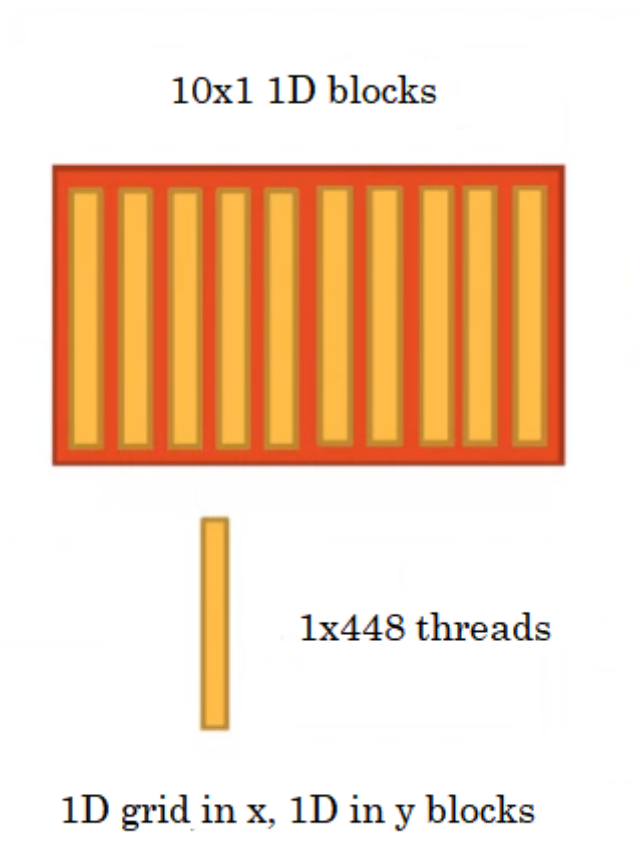


Figure 6: img

- 1D grid along x and 1D blocks along its y

```
1 int threadsPerBlock = blockDim.y;  
2 int blockOffset = threadsPerBlock * blockIdx.x;  
3 int idInsideBlock = threadIdx.y;  
4 int gId = blockOffset + idInsideBlock;
```

2D Grid & 2D Blocks

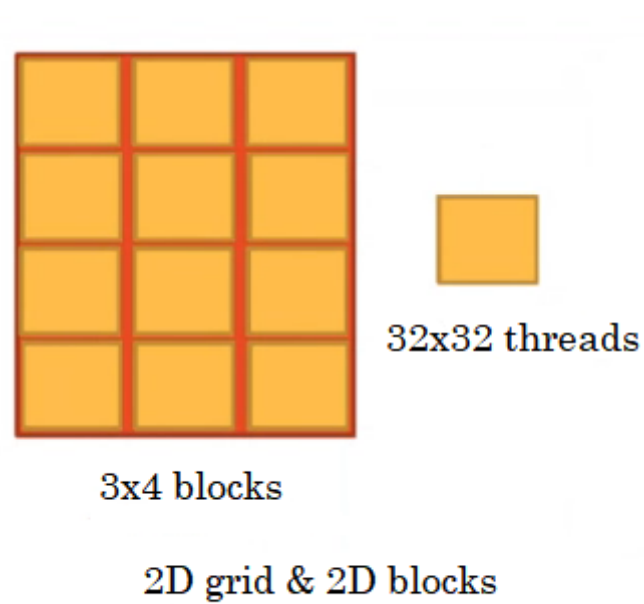


Figure 7: img

- 2D grid (x and y) and 2D blocks (x and y)

```
1 int threadsPerBlock = blockDim.x * blockDim.y;
2 int threadsPerRow = threadsPerBlock * gridDim.x;
3 int rowOffset = threadsPerRow * blockIdx.y;
4 int blockOffset = threadsPerBlock * blockIdx.x;
5 int idInsideBlock = blockDim.x * threadIdx.y + threadIdx.x;
6 int gId = rowOffset + blockOffset + idInsideBlock;
```

3D Grid & 2D Blocks

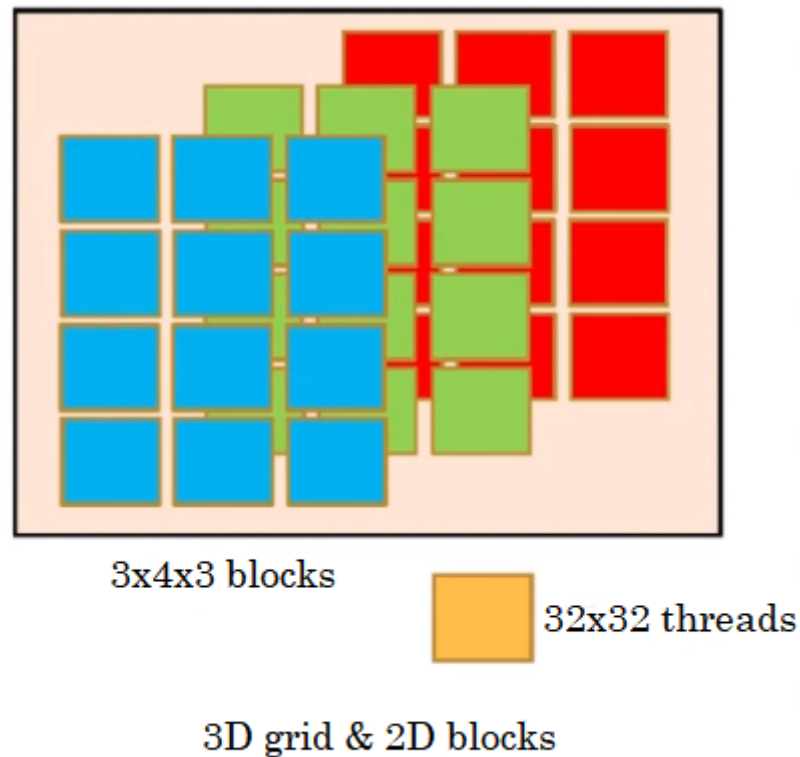


Figure 8: img

- `dim3 grid(3, 4, 3)` and `dim3 block(32, 32, 1)`

```

1 int threadsPerBlock = blockDim.x * blockDim.y;
2 int threadsPerRow = threadsPerBlock * gridDim.x;
3 int rowOffset = threadsPerRow * blockIdx.y;
4 int blockOffset = threadsPerBlock * blockIdx.x;
5 int idInsideBlock = blockDim.x * threadIdx.y + threadIdx.x;
6 int threadsPerGrid = threadsPerBlock * gridDim.x * gridDim.y;
7 int gridOffset = threadsPerGrid * blockIdx.z;
8 int gId = gridOffset + rowOffset + blockOffset + idInsideBlock
;

```

Exercises

What would be the `gId` formula for the configs below?

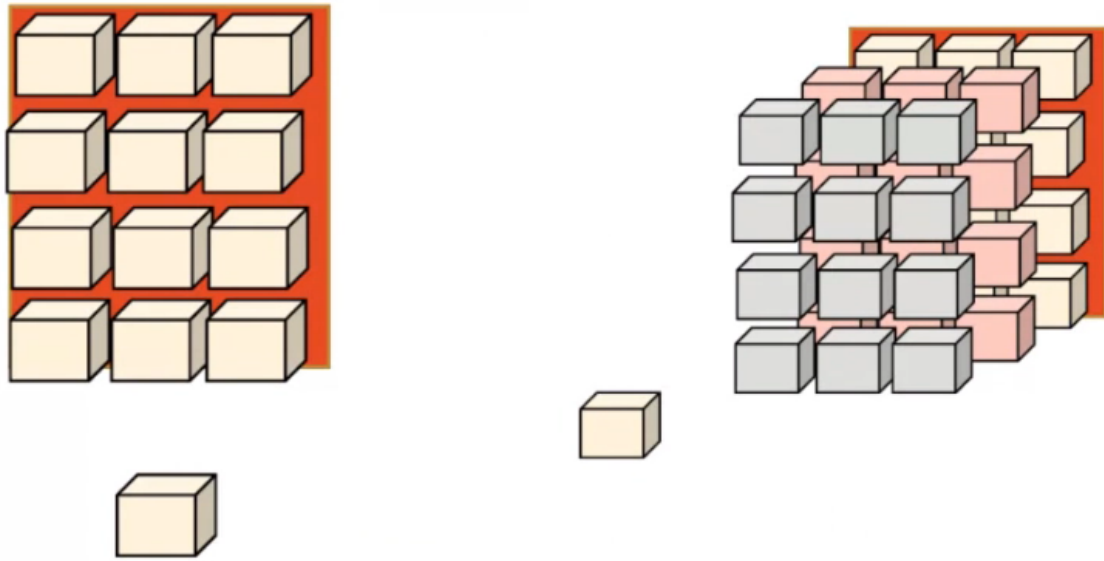


Figure 9: img