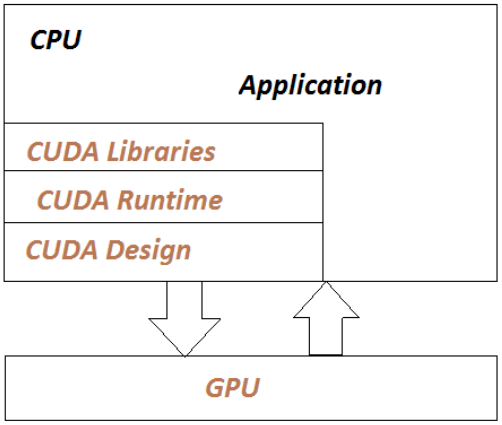
- CUDA Architecture:



- Programming Structure of GPU & CPU:

- CUDA Kernel:

The function which are executed on GPU are called as kernels.Kernels are full program or function invoke by the CPU and executed on GPU.A kernal is executed N number of times in parallel on GPU by using N number of threads.

Invocation: kernel_name<<<grid,block>>>(argument,list);

kernel is defined as:

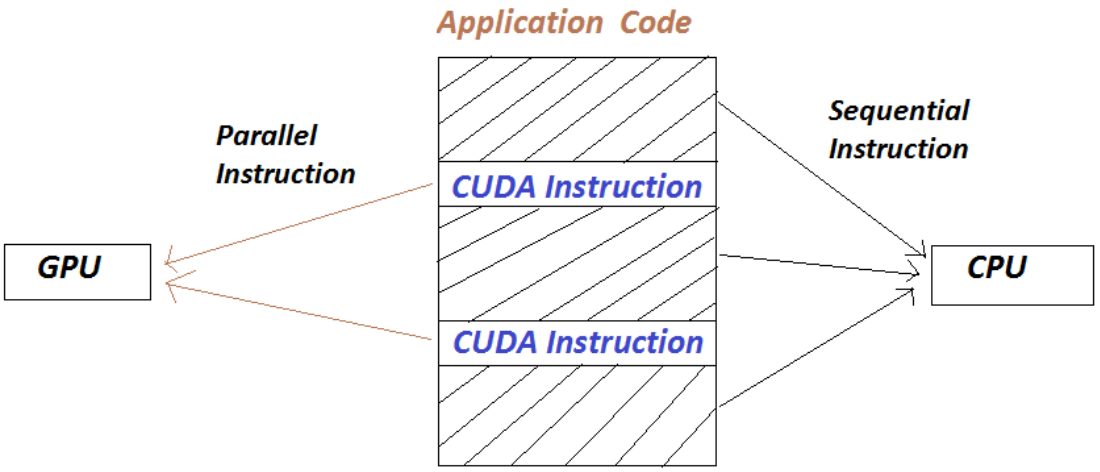
_global_voidk

ernel_name(arguments)

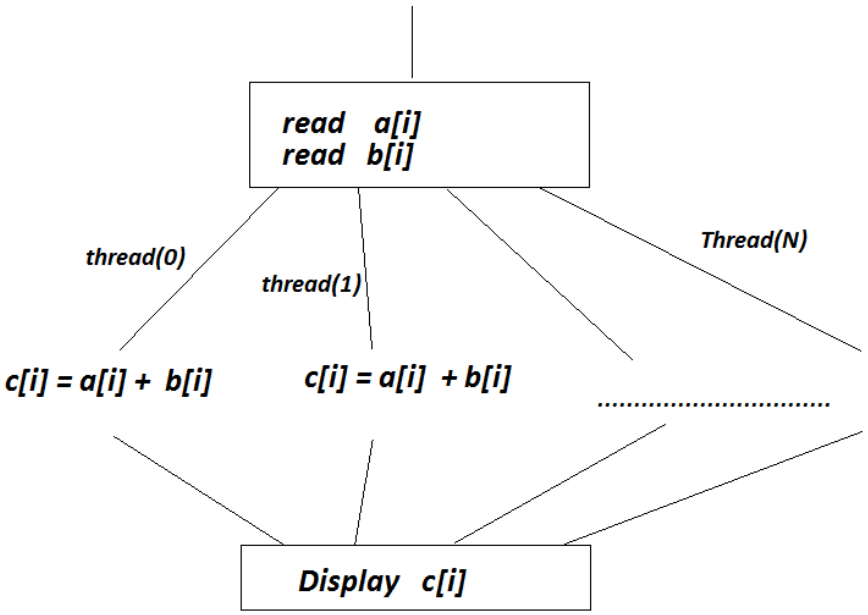
{

.....

}



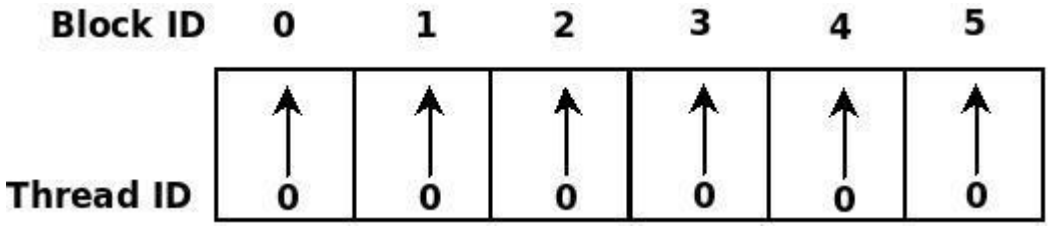
- Parallel Vector Addition:



Here three cases are considered for addition of two arrays:

1. n blocks and one thread per block.
2. 1 block and n threads in that block.
3. m blocks and n threads per block.

1. n blocks and one thread per block (n=6)

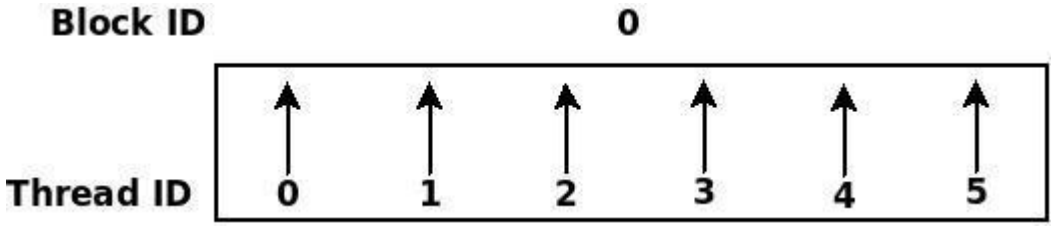



```
int id=blockIdx.x;

/* blockIdx.x gives the respective block id which starts from 0 */

arradd<<<6,1>>>(d,e,f);
```

2. One block and n threads in that block (In=6)

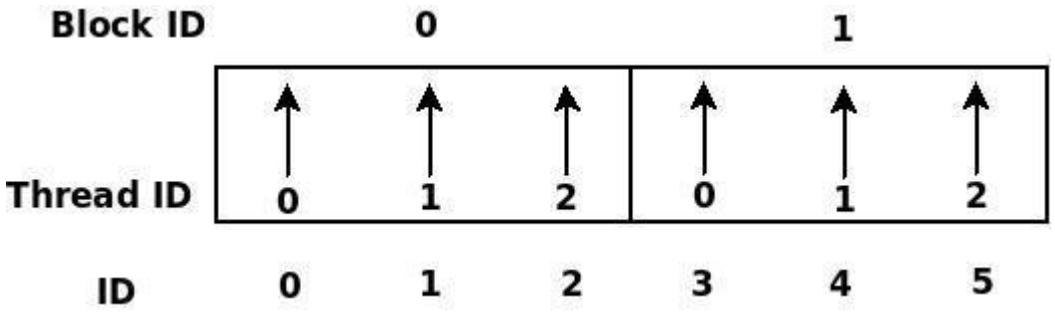


int id=threadIdx.x;

* threadIdx.x gives the respective thread id which starts from 0 */

arradd<<<1,6>>>(d,e,f);

3. m blocks and n threads per block (m=2 and n=3)



int id=blockIdx.x * blockDim.x+threadIdx.x;
/* blockIdx.x gives the respective block id which starts from 0 */
/* threadIdx.x gives the respective thread id which starts from 0 */
/* blockDim.x gives the dimension of block i.e. number of threads in one block */

arradd<<<2,3>>>(d,e,f);