NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA SURATHKAL
DEPARTMENT OF INFORMATION TECHNOLOGY
IT301 : Parallel Computing Lab
PC Lab 10 [Total marks = 10]
Date 26th October 2021

CUDA Programs in Google Colab

Goto -> https://colab.research.google.com/notebooks/intro.ipynb
Open New Notebook.
Change Run time type to GPU

Setup the environment for running CUDA program as given in following link.
https://www.geeksforgeeks.org/how-to-run-cuda-c-c-on-jupyter-notebook-in-google-colaboratory/

After setting up the notebook for running CUDA execute the following programs.

Program 4: To understand device variables execute the following program and analyse the result for following. [5 x 2= 10 marks]

//Program

```
%%cu
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
__global__ void SingleLoop()
{
//int id = blockIdx.x+blockIdx.x*blockDim.x;
int idx = blockIdx.x*blockDim.x+threadIdx.x;
int idy = blockIdx.y*blockDim.y+threadIdx.y;
int idz = blockIdx.z*blockDim.z+threadIdx.z;
int id = idx + idy *blockDim.x+idz*blockDim.x*blockDim.y;
printf("GPU-i=%d Tx=%d Ty=%d Tz=%d Bx=%d By=%d Bz=%d\n",id,threadIdx.x,threadIdx.y, threadIdx.z,
blockIdx.x,blockIdx.y, blockIdx.z);
}
int main(int argc, char **argv)
{
for(int i=0;i<32;i++){
printf("CPU-i=%d\n",i);
}
dim3 grid(1,1,1);
dim3 block(4,4,2);
printf("..................\n");
SingleLoop <<<grid, block>>>();
cudaDeviceSynchronize();
return 0;

}
```

Excercises
Note: Write screenshot of the output.

a) Consider following dimentions and observe result. Threads in x direction is 32.

```
dim3 grid(1,1,1);
dim3 block(32,1,1);
```

b) Consider following dimentions and observe result. Threads in x direction is 16. y is 2

```
dim3 grid(1,1,1);
dim3 block(16,2,1);
```

c) Consider following dimentions and observe result. Threads in x direction is 4. y is 4 and z is 2

```
dim3 grid(1,1,1);
dim3 block(4,2,4);
```

d) Consider following dimentions and observe result. Mention the Threads in each direction.

```
dim3 grid(1,1,1);
dim3 block(8,4,1);
```

e) Consider following dimentions and observe result. Mention the Threads in each direction.

```
dim3 grid(1,1,1);
dim3 block(2,8,2);
```