**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);