Program-11

Write an OpenACC program to implement  two-dimensional Jacobi

#include <sys/time.h>

#include <stdio.h>

#include<math.h>

#include<string.h>

#define MAX\_TEMP\_ERROR 0.00001

#define ROWS 5000

#define COLUMNS 5000

float A[ROWS][COLUMNS],A\_new[ROWS][COLUMNS];

void main(){

float dt=876788;

int max\_iterations=1000;

int iterations=0;

int i,j;

// float A[ROWS][COLUMNS],A\_new[ROWS][COLUMNS];

struct timeval tim;

double t1, t2;

memset(A, 0,((long)ROWS) \*COLUMNS \* sizeof(float));

gettimeofday(&tim, NULL);

t1=tim.tv\_sec+(tim.tv\_usec/1000000.0);

while(dt>MAX\_TEMP\_ERROR && iterations<=max\_iterations){

#pragma acc kernels

for(i=1;i<ROWS-1;i++){

for(j=1;j<COLUMNS-1;j++){

A\_new[i][j] = 0.25f\*(A[i+1][j]+A[i-1][j]+A[i][j+1]+A[i][j-1]);

}

}

dt = 0.0;

#pragma acc kernels

for(i=1;i<ROWS-1;i++){

for(j=1;j<COLUMNS-1;j++){

dt = fmax(fabs(A\_new[i][j]-A[i][j]),dt);

A[i][j]=A\_new[i][j];

}

}

iterations++;

}

gettimeofday(&tim, NULL);

t2=tim.tv\_sec+(tim.tv\_usec/1000000.0);

printf("%.6lf seconds with OpenACC \n", t2-t1);

}



