#include <stdio.h>

#include <conio.h>

#include <stdlib.h>

#include <time.h>

#include <cuda.h>

#include <math.h>

#include <omp\_kernel.cu>

#define row 250

#define col 256

#define id(m,n,ld) (((n)\*(ld)+(m)))

double sign(double x);

int s=90;

int main()

{int n,m,MN=row\*col,k,size=256,i,j,\*h\_m,h\_max[90],h\_i[90],o;

double h\_Phi[250][256],\*h\_x,a,dtime,x[256][1],\*h\_y,h\_r[250][1],h\_Phit[256][250],\*h\_u,\*h\_d,jj=250;

double norm=sqrt(jj),\*d\_a,\*d\_b,\*d\_y,\*d\_Phit,\*h\_X;

cudaMalloc((void\*\*)&d\_a,row\*col);

cudaMalloc((void\*\*)&d\_b,col\*1);

cudaMalloc((void\*\*)&d\_y,row\*1);

cudaMalloc((void\*\*)&d\_Phit,col\*row);

dim3 dimGrid(2,2,1);

dim3 dimBlock(128,128,1);

srand(time(NULL));

clock\_t start=clock();

for(n=0;n<row;n++)

{

for(m=0;m<col;m++)

{

a=sign(2.0\*rand()/(double)RAND\_MAX-1.0)/norm;

h\_Phi[id(m,n,col)][id(m,n,row)]=a;

}

}

h\_X=(double\*)calloc(col,sizeof(double));

for(k=0;k<col;k++)

{

a=2.0\*rand()/(double)RAND\_MAX-1.0;

h\_X[rand()%col]=a;

}

for(i=0;i<256;i++)

{ x[i][0]=0;

}

for(i=1;i<=45;i++)

{

for(j=1;j<=i\*2;j++)

{x[(int)h\_X[j]][0]=1;

}

cudaMemcpy(d\_a,h\_Phi,row\*col,cudaMemcpyHostToDevice);

cudaMemcpy(d\_b,x,col\*1,cudaMemcpyHostToDevice);

matr\_mul<<<dimGrid,dimBlock>>>(d\_a,d\_b,d\_y,250,256);

cudaMemcpy(h\_y,d\_y,250\*1,cudaMemcpyDeviceToHost);

for(i=0;i<250;i++)

h\_r[i][0]=h\_y[i];

matr\_trans<<<dimGrid,dimBlock>>>(d\_a,d\_Phit,256,250);

for(int l=0;l<90;l++)

{matr\_mul<<<dimGrid,dimBlock>>>(d\_Phit,d\_b,d\_y,256,250);

cudaMemcpy(h\_u,d\_y,256\*1,cudaMemcpyDeviceToHost);

for(i=0;i<256;i++)

{int max=h\_u[i];

int k=i;

for(j=i+1;j<256;j++)

{if(max<h\_u[j])

{ max=h\_u[j];

k=j;}

}

h\_d[k]=h\_u[i];

h\_d[i]=max;

}

h\_max[l]=h\_d[i];

for(int p=0;p<256;p++)

{if(h\_d[0]==h\_u[p])

int m=p;

h\_i[l]=m;

}

}

}

for(i=0;i<90;i++)

{printf("Index=%d\n",h\_i[i]);

printf("Value=%d\n",h\_d[i]);

}

cudaFree(d\_a);

cudaFree(d\_b);

cudaFree(d\_y);

cudaFree(d\_Phit);

}

double sign(double x)

{return (x>=0)-(x<0);}