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1RV17CS125

PADP

LAB PROGRAM: 11

Code:

```
#include <math.h>
#include <string.h>
#include <openacc.h>
#include <sys/time.h>
#include<stdio.h>
#define NN 1024
#define NM 1024
float A[NN][NM];
float Anew[NN][NM];
int main(int argc, char** argv)
{
 int i,j;
 const int n = NN;
 const int m = NM;
 const int iter_max = 1000;
 const double tol = 1.0e-6;
 double error = 1.0;
 struct timeval tim;
 double t1, t2;
 memset(A, 0, n * m * sizeof(float));
 memset(Anew, 0, n * m * sizeof(float));
 for (j = 0; j < n; j++)
 {
```

```
A[j][0] = 1.0;
Anew[j][0] = 1.0;
}
printf("Jacobi relaxation Calculation: %d x %d mesh\n", n, m);
//StartTimer();
gettimeofday(&tim, NULL);
t1=tim.tv_sec+(tim.tv_usec/1000000.0);
int iter = 0;
#pragma acc data copy(A, Anew)
while ( error > tol && iter < iter_max )
{
error = 0.0;
#pragma acc parallel loop reduction(max:error)
for( j = 1; j < n-1; j++)
{
for( i = 1; i < m-1; i++ )
{
Anew[j][i] = 0.25 * ( A[j][i+1] + A[j][i-1]
+ A[j-1][i] + A[j+1][i]);
error = fmax( error, fabs(Anew[j][i] - A[j][i]));
}
}
#pragma acc parallel loop
for( j = 1; j < n-1; j++)
{
for( i = 1; i < m-1; i++ )
{
A[j][i] = Anew[j][i];
}
```

```
 }
 if(iter % 100 == 0) printf("%5d, %0.6f\n", iter, error);
 iter++;
 }
 gettimeofday(&tim, NULL);
 t2=tim.tv_sec+(tim.tv_usec/1000000.0);
 printf(" total: %f s\n", t2-t1);
 return 0;
}
```

OUTPUT: