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1RV17CS125

PADP

LAB PROGRAM: 10

Code:

```
#include <sys/time.h>

#include<stdlib.h>

#include <stdio.h>

#define MAX 1000

int SIZE;

double a[MAX][MAX];

double b[MAX][MAX];

double c[MAX][MAX];

double d[MAX][MAX];

int main(int argc, char* argv[])

{
 SIZE=atoi(argv[1]);

 int i,j,k;

 struct timeval tim;

 double t1, t2;

 double tmp;

 // Initialize matrices.

 for (i = 0; i < SIZE; ++i) {

 for (j = 0; j < SIZE; ++j) {

 a[i][j] = (double)(i + j);

 b[i][j] = (double)(i - j);

 c[i][j] = 0.0f;

 d[i][j] = 0.0f;
```

```c
    }
  }
for (i = 0; i < SIZE; ++i) {
 for (j = 0; j < SIZE; ++j) {
tmp=0.0f;
//#pragma acc loop reduction(+:tmp)
 for (k = 0; k < SIZE; ++k) {
tmp += a[i][k] * b[k][j];
 }
 d[i][j] = tmp;
 }
 }
 // Time stamp t1
 gettimeofday(&tim, NULL);
 t1=tim.tv_sec+(tim.tv_usec/1000000.0);
 // Compute matrix multiplication.
#pragma acc data copyin(a,b) copy(c)
#pragma acc kernels
#pragma acc loop tile(32,32)
 for (i = 0; i < SIZE; ++i) {
 for (j = 0; j < SIZE; ++j) {
 tmp=0.0f;
#pragma acc loop reduction(+:tmp)
 for (k = 0; k < SIZE; ++k) {
tmp += a[i][k] * b[k][j];
 }
 c[i][j] = tmp;
 }
 }
```
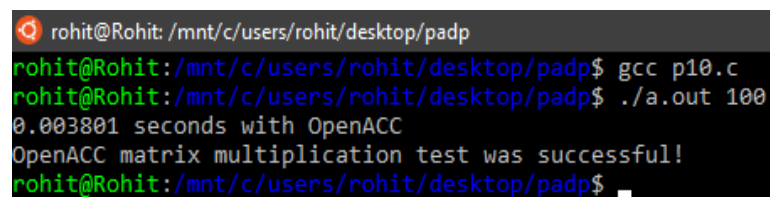
```c
// Time stamp t2, elapsed time OpenACC

gettimeofday(&tim, NULL);

t2=tim.tv_sec+(tim.tv_usec/1000000.0);

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

// Check the OpenACC result matrix

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

for (j = 0; j < SIZE; ++j)

if(c[i][j] != d[i][j]) {

printf("Error %d %d %f %f \n", i,j, c[i][j], d[i][j]);

exit(1);

}

printf("OpenACC matrix multiplication test was successful!\n");

return 0;

}
```

OUTPUT: