Използване на OpenMP. Част 3.

Курс „Паралелно програмиране"

ИНСТИТУТ *за* СЪВРЕМЕННИ
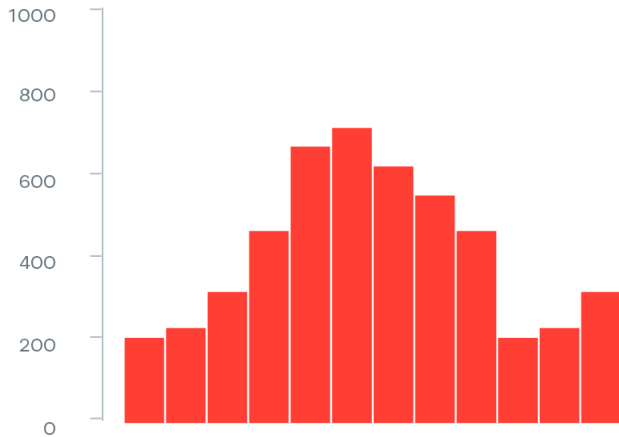ФИЗИЧЕСКИ ИЗСЛЕДВАНИЯ

Стоян Мишев

Изпълнява се нишката, която държи lock. Останалите изчакват докато се освободи.

```
omp_init_lock()
```

```
omp_set_lock()
```

```
omp_unset_lock()
```

```
omp_destroy_lock()
```

```
#pragma omp parallel for
for(i=0;iNBUCKETS; i++){
   omp_init_lock(&hist_locks[i]);   hist[i] = 0:
}
#pragma omp parallel for
for(i=0;iNVALS; i++){
   ival = (int) sample(arr[i]);
   omp_set_lock(&hist_locks[ival]);
      hist[ival]++;
   omp_unset_lock(&hist_locks[ival]);
 }

for(i=0;i<NBUCKETS; i++)
 omp_destroy_lock(&hist_locks[i]);
```

```
omp_set_num_threads()

omp_get_num_threads()

omp_get_thread_num()

omp_get_max_threads()

omp_in_parallel()

omp_set_dynamic()

omp_get_dynamic()

omp_num_procs()
```
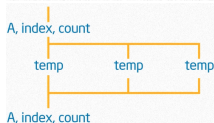
```
#include <omp.h>
void main()
{  int num_threads;
   omp_set_dynamic( 0 );
   omp_set_num_threads( omp_num_procs() );
#pragma omp parallel
  {    int id=omp_get_thread_num();
#pragma omp single
       num_threads = omp_get_num_threads();
    do_lots_of_stuff(id);
  }
}
```

```c
double A[10];
int main() {
    int index[10];
    #pragma omp parallel
        work(index);
    printf("%d\n", index[0]);
}
```

```c
extern double A[10];
void work(int *index) {
    double temp[10];
    static int count;
    ...
}
```

A, index, count

| temp | temp | temp |

A, index, count

```
shared

private

firstprivate

lastprivate

default(private|shared|none)
```

```
void wrong() {
    int tmp = 0;
#pragma omp parallel for private(tmp)
    for (int j = 0; j < 1000; ++j)
            tmp += j;
    printf("%d\n", tmp);
}
```

```
void wrong() {
    int tmp = 0;
#pragma omp parallel for private(tmp)
    for (int j = 0; j < 1000; ++j)
            tmp += j;
    printf("%d\n", tmp);
}
incr = 0;
#pragma imp parallel for firstprivate(incr)
for (i = 0; i <= MAX; i++) {
        if ((i%2)==0) incr++;
        A[i] = incr;
}
```

```c
void sq2(int n, double *lastterm)
{
   double x; int i;
   #pragma omp parallel for lastprivate(x)
   for (i = 0; i < n; i++){
     x = a[i]*a[i] + b[i]*b[i];
     b[i] = sqrt(x);
   }
   *lastterm = x;
}
```

```
#include <omp.h>
static long num_steps = 100000;
double step;
void main ()
{  int i;   double x, pi, sum = 0.0;
#pragma omp parallel for private(x) reduction(+:sum)
  step = 1.0/(double) num_steps;

  for (i=0;i< num_steps; i++){
  x = (i+0.5)*step;
  sum = sum + 4.0/(1.0+x*x);
  }
  pi = step * sum;
}
```

от *Introduction to OpenMP 11 part 2 Module 6* до *Introduction to OpenMP 13 Discussion 5*
Разучаване на примера Mandelbrot