

Доскоч Роман 3 курс 13 группа 2 лабораторная работа

```
#include <windows.h>
#include <process.h>
#include <stdio.h>
#define p 2
double pi[p];
int n = 1000000;

double f_1(double x) {
    return x * x;
}

double f_2(double x) {
    return x * x * x;
}

double f_3(double x) {
    return x * x * x * x;
}

typedef double (*f)(double);

typedef struct func_params {
    f f;
    int k;
} func_params;

DWORD WINAPI ThreadFunction(void* pvParam)
{
    func_params* func = (func_params*)pvParam;

    int i, start;
    double h, sum, x;
    h = 1. / n;
    sum = 0.;
    start = func->k;
    for (i = start; i < n; i += p)
    {
        x = h * i;
        sum += func->f(x);
    }
    pi[func->k] = h * sum;
    return 0;
}

int main()
{
    f func_array[] = { &f_1, &f_2, &f_3 };

    for (int j = 0; j < 3; j++)
    {
        LARGE_INTEGER liFrequency, liStartTime, liFinishTime;
        QueryPerformanceFrequency(&liFrequency);
        QueryPerformanceCounter(&liStartTime);

        HANDLE hThreads[p];
        int k;
        double sum;

        for (k = 0; k < p; ++k)
        {
            func_params tmp_func = { .f = func_array[j], .k = k };
            void* tmp = &tmp_func;
```

```

        hThreads[k] = (HANDLE)_beginthreadex(
            NULL, 0, ThreadFunction, tmp, 0, NULL);

        if (hThreads[k] == NULL) {
            printf("Create Thread %d Error=%d\n", k, GetLastError());
            return -1;
        }
    }

    WaitForMultipleObjects(p, hThreads, TRUE, INFINITE);
    for (k = 0; k < p; ++k)
        CloseHandle(hThreads[k]);

    sum = 0.;
    for (k = 0; k < p; ++k)
        sum += pi[k];
    printf("integral = %.16f\t", sum);

    QueryPerformanceCounter(&liFinishTime);
    double dElapsedTime = 1000. * (liFinishTime.QuadPart -
        liStartTime.QuadPart) / liFrequency.QuadPart;

    printf("Time = %.16f\n", dElapsedTime);
}

return 0;
}

```

Вычисление на 1 000 000 разбиении и 2 потоках

```

integral = 0.1666666666664971    Time = 22.851099999999989
integral = 0.1249999999997500    Time = 24.024300000000002
integral = 0.0999999999996664    Time = 22.932999999999998

```

Вычисление на 10 000 000 разбиении и 2 потоках

```

integral = 0.1666666666666728    Time = 187.725599999999858
integral = 0.1249999999999972    Time = 158.865399999999940
integral = 0.0999999999999960    Time = 169.814400000000062

```

Вычисление на 100 000 000 разбиении и 2 потоках

```

integral = 0.1666666666666534    Time = 1769.0541000000000622
integral = 0.1249999999999832    Time = 1718.8297000000000025
integral = 0.1000000000000055    Time = 1756.1732999999999265

```

	x^2	x^3	x^4
количество разбиений	время 1 функции	время 2 функции	время 3 функции
1 000 000	22.851099999999989	24.024300000000002	22.932999999999998
10 000 000	187.725599999999858	158.865399999999940	169.814400000000062
100 000 000	1769.0541000000000622	1718.8297000000000025	1756.1732999999999265