Task № 3

(Calculation of the integral using Posix threads)

Statement of the problem.

$$\iint\limits_{\Omega} xy\,dxdy, \tag{1}$$

$$\text{where } \Omega = \begin{cases} 0 \le x \le \pi, \\ 0 \le y \le \sin(x). \end{cases}$$

Solve the definite integral (1) by the Monte Carlo method.

The task:

1) Compute the value of a double integral using a shared variable into which several threads write their calculation results. Provide access to this shared variable through the critical section.

2) On the one Cartesian coordinate plane, plot graph of the speedup *S* dependence on amount of threads *p*, where *p = 1,2,3,…,8, 12, 16* for the total number of random points equal to 10^9.

3)* Compute the integral value using value return mechanism from thread function (pthread_exit – pthread_join).

Notes:

1) Think about why when creating multiple threads, thread number is passed to the thread function using an array.

2)* Think about the mechanism for passing the return value in thread function.