

## Parallel and Distributed Programming

### Laboratory 2

#### Steps:

1. Create a working directory (eg. Lab2).
2. Analyze the [sample program](#). What is the value of this variable at the end? Check the version with enabled and disabled mutexes.
3. On the basis of the [sample program](#) and the previous laboratories implement a simulation of the supermarket:
  - Shopping baskets are shared resources and there is pre-determined number of them.
  - Customers are represented by threads
  - To enter the shop every client needs to have a basket
  - Every client is spending a random amount of time in the store
  - A customer walks into a supermarket many times, each time taking the shopping basket
  - The program terminates when each customer visits the shop twice

Simulation parameters are: number of clients, number of shopping baskets, the maximum time that the customer spends in the store. The simulation can be implemented using any synchronization mechanism such as:

- barriers
- mutexes
- condition variables

#### A sample output:

*Client no. 5 is taking the shopping cart no. 10*

*Client no. 16 is taking the shopping cart no. 2*

*Client no. 6 left the shop after 11 time units releasing the basket no. 5*

#### Tip:

To check if the program works correctly, make sure that two customers do not have the same basket at the same time - therefore baskets should be represented by a numbered table. A specific waiting time can be added between individual customer inputs to avoid taking the cart too quickly (e.g. `sleep(1)`).