

Laboratory training in “Operating Systems and Systems Programming”

Programming using Linux system calls

List of laboratory works:

1. Processing of strings
2. Creating processes
3. Inter process communication
4. Clint-server communication via IP sockets

Laboratory work 1: Processing of strings

Task: develop a command line application which implements a given operation over string(s); a given operation should be implemented as a function called from the main program; data exchange is organized using the command line parameters; do not use standard libc functions for string processing.

Remarks: compile, link, and start the program from the command line; run a few tests; create intermediate codes: after preprocessor, assembler, object.

Variants:

- 1) Concatenate two strings
- 2) Find a substring
- 3) Replace a substring
- 4) Compare two strings
- 5) Reverse a string
- 6) Swap two parts of string
- 7) Extract a substring using specified position and length
- 8) Remove letters specified in the second string
- 9) Insert a substring from the specified position
- 10) Remove a substring

Laboratory work 2: Creating processes

Task: create a child process to implement the required string processing (according to lab1) and wait its completion: a) with a child process in the same file; b) with a child process in other file.

Remarks: run a few tests.

Laboratory work 3: Inter process communication

Task: run two processes (client and server) in parallel; implement as a server the required data processing (lab1) and as a client data input/output and interconnection with the server via: a) pipes; b) messages; c) semaphores and common memory areas.

Remarks: run a few tests; possible using a starter (supervisor) process to launch client and server and organize their communication.

Laboratory work 4: Clint-server communication via IP sockets

Task: create client and server communicating via IP sockets; implement as a server the required data processing (lab1) and as a client data input/output and interconnection with the server in: a) datagram mode; b) stream mode.