



Linux OS & Programming



GLOBAL
ENGINEERING
ACADEMY

Genesis



L&T Technology Services



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Activity 1: Linking static & shared libraries

Type of Activity: Individual

Goal of Activity: Perform different functions for string, numbers & bit and link static and dynamic libraries.

Topics covered:

- Architecture of linux OS
- OS Types
- GCC & Build Process
- Kernel
- Static and Dynamic Libraries
- Makefile creation.

Learning Outcomes: Able to add perform static and dynamic linking of libraries.

Challenges: Difficulty in writing Makefile.

Learning Resources:

- https://www3.ntu.edu.sg/home/ehchua/programming/cpp/gcc_make.html
- https://www.tutorialspoint.com/operating_system/os_quick_guide.htm

References:

- <https://web.microsoftstream.com/video/9a2b1eba-61a3-4547-8292-374b2eeb5265?channelId=04fdad23-021c-4e64-bb7c-06b2469801f9>
- <https://web.microsoftstream.com/video/5cc492de-e71c-4c15-98ff-53727580a5b6?channelId=04fdad23-021c-4e64-bb7c-06b2469801f9>

Activity 2: Interrupts, System calls, Signals and Processes.

Type of Activity: Individual

Goal of Activity: Understanding Interrupts concepts, System calls, Signals and Processes.

Topics covered:

- Interrupts
- System calls
- File Operations
- Signals
- Scheduling
- Process Life Cycle
- Context Switch
- Pre-emption

Learning Outcomes: Understanding the working of system calls and signals, structure of Linux OS, stages in scheduling of processes, Context saving and loading and process related commands.

Learning Resources:

- <https://opensource.com/article/20/10/linux-kernel-interrupts>
- <https://www.tutorialspoint.com/unix/unix-signals-traps.htm>

References:

- <https://linuxhint.com/linux-exec-system-call/>

Activity 3: Shell commands and Threads.

Type of Activity: Individual

Goal of Activity: Understanding Shell commands and Threads concepts.

Topics covered:

- Context switch
- Processes
- Zombie process
- Orphan process
- Daemon Process
- grep, pgrep, kill commands
- Fork process

Learning Outcomes: Understanding the thread concepts & learning thread concepts.

Learning Resources:

- <https://www.geeksforgeeks.org/zombie-and-orphan-processes-in-c/>
- <https://www.tutorialspoint.com/unix/unix-signals-traps.htm>

References:

- <https://opensource.com/article/20/10/linux-kernel-interrupts>
- <https://www.cs.cmu.edu/afs/cs/academic/class/15492-f07/www/pthreads.html>

Activity 4: IPC

Type of Activity: Individual

Goal of Activity: Understanding IPC concepts.

Topics covered:

- IPC
- Semaphores
- Mutex
- Files
- Race condition
- Sequencing
- Context switching
- Critical Section

Learning Outcomes: Understanding the concepts to prevent race around conditions and scheduling issues

Learning Resources:

- <https://www.guru99.com/semaphore-in-operating-system.html>

References:

- <https://www.guru99.com/semaphore-in-operating-system.html>

Activity 5: Message queue & pipes

Type of Activity: Individual

Goal of Activity: Understanding Message queue & pipe concepts.

Topics covered:

- Pipes
- Deadlock
- Producer-consumer problem
- Inline inputs
- Shared memory
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Learning Outcomes: Understand the concepts of pipes and working of inline inputs, working of shared memory

Learning Resources:

- https://www.tutorialspoint.com/inter_process_communication/inter_process_communication_shared_memory.htm
- <https://www.geeksforgeeks.org/ipc-using-message-queues/>

References:

- https://www.tutorialspoint.com/inter_process_communication