./

Linux OS & Programming



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| **Ver. Rel. No.** | **Release Date** | **Prepared. By** | **Reviewed By** | **Approved By** | **Remarks/Revision Details** |
| 1 | 02/03/2021 | 99003585 |  |  |  |
| 2 | 03/03/2021 | 99003585 |  |  |  |
| 3 | 04/03/2021 | 99003585 |  |  |  |
| 4 | 05/03/2021 | 99003585 |  |  |  |
| 5 | 06/03/2021 | 99003585 |  |  |  |

**Document History**

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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

**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>