./

Learning Report-Linux Operating System Programming



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# Activity 1:

Introduction to Linux OS Architecture and design

**Type of Activity**: Individual

**Goal of Activity**: Familiarization and practice of Linux OS Architecture

**Topics covered:** GCC & Build Process, Utilities, Static & Dynamic Libraries, Make file creation

**Learning Outcomes:** Performed different functions along with test code & Make file, Link the static & shared libraries with test code

**Challenges:** Difficulties in the implementation of static & Dynamic make file

**LearningResources:-**

[**https://web.microsoftstream.com/channel/04fdad23-021c-4e64-bb7c-06b2469801f9**](https://web.microsoftstream.com/channel/04fdad23-021c-4e64-bb7c-06b2469801f9)

**References:**

<https://www3.ntu.edu.sg/home/ehchua/programming/cpp/gcc_make.html>

**Activity 2:**

Familiarization and perform operations using System calls, Signals and Processes

**Type of Activity:** Individual

**Goal of Activity:** To get practiced and understand programs using System calls, Signals and Processes

**Topics covered:** System calls**,** Signals, Scheduling, Context Switch, Process related commands

**Learning Outcomes:** Implemented the working of Stages in scheduling of processes, Zombie processes system calls and signals, Context switch and structure of Linux OS

**Challenges:** Implementing and remembering of System calls and Processes related commands

**Learning Resources:**

[**https://linuxhint.com/linux-exec-system-call/**](https://linuxhint.com/linux-exec-system-call/)

[**https://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html**](https://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html)

[**https://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html**](https://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html)

[**Understanding Zombie Processes!**](https://www.youtube.com/watch?v=xJ8KenZw2ag)

**References:**

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

**Git-hub link**

[**https://github.com/AiswaryaPS/Linux--OS**](https://github.com/AiswaryaPS/Linux--OS)

**Activity 3:**

Understanding and practicing of IPC

**Type of Activity:** Individual

**Goal of Activity:** To get practiced and understanding IPC concepts

**Topics covered:** IPC, Semaphores, Mutex, Files, Race condition, Sequencing, Context switching. Critical condition

**Learning Outcomes:** Implemented the working of mutex and semaphores of Linux OS and implementing the concepts to prevent race condition and scheduling issues

**Challenges:** Implementing and remembering of commands

**Learning Resources:**

[**Operating System #25 How to Implement Locking: Software Solutions**](https://www.youtube.com/watch?v=B_lH2Xov_g4)

[**Operating System #25 How to Implement Locking: Software Solutions**](https://www.youtube.com/watch?v=B_lH2Xov_g4)

[**Operating System #28 Mutexes, Thundering Herd Problem**](https://www.youtube.com/watch?v=xKqO04SN6C0)

**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:**

Understanding and practicing of IPC

**Type of Activity:** Individual

**Goal of Activity:** To get practiced and understanding IPC concepts

**Topics covered:** IPC, Semaphores, Mutex, Files, Race condition, Sequencing, Context switching. Critical condition

**Learning Outcomes:** Implemented the working of mutex and semaphores of Linux OS and implementing the concepts to prevent race condition and scheduling issues

**Challenges:** Implementing and remembering of commands

**Learning Resources:**

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

References:

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

**Activity 5:**

Understanding and practicing Message queue & pipe

**Type of Activity:** Individual

**Goal of Activity:** To get practiced and understanding Pipes

**Topics covered:** Deadlock, Producer-consumer problem, Inline inputs, Shared memory

**Learning Outcomes:** Implemented and understanding of queue and pipe concept

**Challenges:** Implementing and remembering of commands

**Learning Resources:**

* <https://www.geeksforgeeks.org/ipc-using-message-queues/>

**References:**

* <https://www.tutorialspoint.com/inter_process_communication>