Learning Report-Linux OS and Programming

GLOBAL ENGINEERING ACADEMY

Genesis

L&T Technology Services

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1					
2					
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Document History

Contents

Activity 1: Perform functions along with static and dynamic linking (01.03.2021)

Type of Activity: Individual
Goal of Activity: Perform different functions for different data types and adding static and dynamic libraries.
Topics covered: Architecture of OS, Types of OS, GCC & Build Process, Static and Dynamic Libraries, Makefile creation.
Learning Outcomes: Able to write code without using scanf and printf statements, adding makefiles, static and dynamic linking of libraries.
Challenges: Difficulty in implementing the static and dynamic linking.
GitHub Link:

- https://github.com/GraceJoseph07/Linux_Activities/tree/main/Day1_01.03.2021/Individual_Activity

Learning Resources:

- https://www3.ntu.edu.sg/home/ehchua/programming/cpp/gcc_make.html
- https://embetronicx.com/tutorials/unit_testing/unit-testing-in-c-testing-with-unity/

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: Perform operations using System calls, Signals and Processes (02.03.2021)

Type of Activity: Individual
Goal of Activity: To understand and implement programs using System calls, Signals and Processes.
Topics covered: Linux OS Architecture, Interrupts, System calls, Scheduling, Signals, Process Life Cycle, Context Switch, Process related commands.
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.
Challenges: Remembering all the commands related to System calls and Processes.
GitHub Link:

- https://github.com/GraceJoseph07/Linux_Activities/tree/main/Day2_02.03.2021

Learning Resources:

- https://www.tutorialspoint.com/operating_system/os_quick_guide.htm
- https://www.geeksforgeeks.org/input-output-system-calls-c-create-open-close-read-write/
- https://www.cs.uregina.ca/Links/class-info/330/SystemCall_IO/SystemCall_IO.html#FileIO

References:

- https://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html
- https://linuxhint.com/linux-exec-system-call/

Activity 3: Perform operations using Shell commands and Threads (03.03.2021)

Type of Activity: Individual
Goal of Activity: To understand the concept of threads and shell commands.
Topics covered: Zombie, Orphan and Daemon Process, Threads and Unit testing
Learning Outcomes: Understand thread concepts and it's types, working of CPU during Context Switching and the concepts of Zombie process, Orphan process and Demon process. Implementation of test files
Challenges: Keeping track of different shell commands with syntax.
GitHub Link:

- https://github.com/GraceJoseph07/Linux_Activities/tree/main/Day2_02.03.2021

Learning Resources:

- https://www.geeksforgeeks.org/zombie-and-orphan-processes-in-c/
- https://www.tutorialspoint.com/zombie-vs-orphan-vs-daemon-processes
- https://www.geeksforgeeks.org/basic-shell-commands-in-linux/

References:

- https://www.thegeekstuff.com/2012/03/linux-threads-intro/
- https://www.cs.cmu.edu/afs/cs/academic/class/15492-f07/www/pthreads.html

Activity 4: Inter Process Communication related problems (04.03.2021)

Type of Activity: Individual
Goal of Activity: To understand the concepts of Inter Process Communication.
Topics covered: Semaphores and Mutex.
Learning Outcomes: Understand the concepts to prevent race around conditions and scheduling issues using Semaphores and Mutual Exclusion in critical sections.
Challenges: Difficulty in following through the coding parts in IPC
GitHub Link:

- https://github.com/GraceJoseph07/Linux_Activities

Learning Resources:

- https://www.geeksforgeeks.org/inter-process-communication-ipc/
- https://www.guru99.com/inter-process-communication-ipc.html
- https://www.guru99.com/semaphore-in-operating-system.html

References:

- https://opensource.com/article/19/4/interprocess-communication-linux-storage
- https://www.tutorialspoint.com/mutex-vs-semaphore

Activity 5: Perform operations implementing Message Queues and Pipes (05.03.2021)

Type of Activity: Individual
Goal of Activity: To understand the concept of pipes and message queues.
Topics covered: Pipes and it's limitations, Shared memory and Message Queues.
Learning Outcomes: Understand the concepts of pipes and working of inline inputs, working of shared memory and it's types along with commands and Message Queues.
Challenges: Keeping track of different commands with syntax.
GitHub Link:

- https://github.com/GraceJoseph07/Linux_Activities

Learning Resources:

- https://www.geeksforgeeks.org/pipe-system-call/
- https://www.tutorialspoint.com/inter_process_communication/inter_process_communication_pipes.htm
- https://www.geeksforgeeks.org/ipc-using-message-queues/

References:

- https://www.tutorialspoint.com/inter_process_communication/inter_process_communication_shared_memory.htm
- https://www.tutorialspoint.com/inter_process_communication/inter_process_communication_message_queues.htm