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Learning Report

Linux OS and programming



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**Details**

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# Learning Objectives of the Module

* Knowledge on features of shell and commands to handle files and directories in Linux
* Apply the knowledge of GNU tools to build, debug and analyze C/C++ programs
* Apply and analyze concepts of Process management and IPC to develop system programs
* Apply the knowledge of commands to analyze, signal the running processes from CLI.

**Capture Brief on the below aspects for each activity:**

* Major Stages of Learning while going through the activity
* Challenges Faced and how were they overcome.
* Good Learning resources.
* Observations and learning from Peer review for each activity

Note:

* Provide links to SharePoint folder and public repository wherever applicable
* Include progress related links on online courses if any.
* Other links to the work done related to the module.

## **Activity 1** – Individual and Collaborative Learning

* Understanding each component in Learning Outcomes
* Share Good resources that would be beneficial for all.
* Posting questions in the communication channels.
* Help peers with their queries.
* Reviewing the assignment of peers.

## **Activity 2** – Linux Commands

* Practice Questionnaire provided by faculty with the material

## **Activity 3** – Development tools

* Assignments provided by faculty with the material
  + GNU tools, Libraries and Makefiles
  + Git (Repo, Github Actions, CI/CD)
  + Cppcheck & Valgrind

## **Activity 4** – Shell Script

* Micro project - [Details](file:///C:\Users\Pinu\Downloads\•%09https:\www.yammer.com\lnttsgroup.onmicrosoft.com\threads\877742871961600)

## **Activity 5** – Process, Threads and IPC

* Assignments provided by faculty with the material
  + Apply the concepts learnt in the previous activities

## **Activity 6** – Mini project

* Apply concepts learnt in the previous activities + SDLC concepts learnt during STEPin
* Topic Checklist - [Details](https://www.yammer.com/lnttsgroup.onmicrosoft.com/threads/868801342513152)
* Implementation Guidelines - [Details](https://www.yammer.com/lnttsgroup.onmicrosoft.com/threads/864420698865664)

## **Activity 1** – Individual and Collaborative Learning

1.     Learned the fundamentals of the Linux operating system and C++.

2.     Operating system components, types of operating system essential of operating system and synchronization and scheduling principles.

3.     Surfed online different contents for OS tutorial.

4.     Online resources shared and discussed for the said topics.

5.     Done all the installation upgrade the Linux operation system to recent version.

6.     Practice hands on for shell script and Linux commands.

7.     Done with peer reviews for assignments and compare different approach and style.

8.     Learn to backtrack and play with different format of execution on command line.

## **Activity 2** – Linux Commands

1.    Work with different set of Linux commands for accessing file, retrieving content from file. and for different set of I/O operation from command line.

2.    Commands for helping like MAN command and its purpose.

SharePoint link for Linux Commands: [Link](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/EoIIY82CAmhDoSpF3LFNq34BdnFTeqa4tzIX3QSMbODdWQ?e=tnmm2g)

## **Activity 3** – Development tools

1.     Dynamic Library and static library implementation.

2.     Make file creation and directory implementation

SharePoint link for Development tools: [Link](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/EswlE0auT2lAk0B2acMl2vgBRIN69TWGorLrDyUtyWzZZQ?e=iT5Fc5)

## **Activity 4** – Shell Script

1.     Data accessing from online repository from git

2.     Extracting data from Input.csv file and retrieve the result report.

3.     Check for Valgrind, CPP check, Build-Essentials, Make file.

4.     Extracting the report to a csv holding all the details.

5.     Detailed report on a text file.

SharePoint link for Shell Script: [Link](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/Erfef6IKaRpBsPtSe14eT5wBX26aDPBusfOwtEt0-oQMKQ?e=lrEcfy)

## **Activity 5** – Process, Threads and IPC

1.     Read about process synchronization tools and different approach.

2.     Critical section, Race condition real-time implementation.

3.     Importance of Semaphore: Signaling mechanism and Mutex: Locking mechanism.

4.     Implementing different problems using fork () system call.

5.     Parent and child process and their thread execution.

6.     Difference between multi-process and multi-tasking system.

7.     Details about light weight process and implementation

8.     Details of process, process id, stack and program counter.

9.     Different CPU scheduling algorithm. {FCFS, SRTF/SJF, RR}

10. Priority scheduling, ageing its merit, demerit and their characteristics.

SharePoint link for Process, Threads and IPC: [Link1](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/EkwKVpOWa7ZNhKIg50PHURIBf4_3L14_CTFOgcGGeT7p2w?e=RIWFdU) & [Link2](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/EsnO2WJtfNxOsS_88HRjdlcB2t-XqpUbs5evUCdOg636tg?e=wcvPR1)

## **Activity 6** – Mini project

1.     Applied the concept of process synchronization semaphore and mutex.

2.     Implement the C++ project using STL concepts and Inheritance.

SharePoint link for Mini Project (Cinema Ticket Recording System): [Link](https://lnttsgroup.sharepoint.com/:f:/s/GEA/Global%20Engineering%20Academy/GEA%20Insights/Genesis/EoR8KPv_WZtIgtitdo8eC78BWg-uCay7XoFy1dMWD8z1Kw?e=zcNcQA)