

Windows Subsystem for Linux

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Lesson Plan

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Introduction

- ▶ Windows Subsystem for Linux (WSL) is a feature of Windows that allows developers to run a Linux environment without needing a separate virtual machine or dual booting.
- ▶ There are two versions of WSL namely WSL 1 and WSL 2.
- ▶ WSL 1 was first released in 2016 and acted as a compatibility layer for running Linux binary executables by implementing Linux system calls on the Windows kernel.
- ▶ WSL 1 is available on Windows 10, Windows 11, Windows Server 2016, Windows Server 2019 and Windows Server 2022.

Introduction Cont.

- ▶ WSL 2 introduced important changes such as a real Linux kernel.
- ▶ WSL 2 differs from WSL 1 in that WSL 2 runs inside a managed virtual machine that implements the full Linux kernel. As a result, WSL 2 is compatible with more Linux binaries, as not all **syscalls** were implemented in WSL 1.
- ▶ Since June 2019, WSL 2 has been available to Windows 10 customers through the Windows Insider program, including the Home edition.
- ▶ WSL is not available to all Windows 10 users by default. It can be installed either by joining the Windows Insider program or by manual installation.

Introduction Cont.

With WSL, you can:

- ▶ Choose favourite GNU/Linux distributions (distros) from the Microsoft Store.
- ▶ Run common command-line tools such as grep, sed, and awk.
- ▶ Run Bash scripts and GNU/Linux command-line applications including:
 - Tools : vim, emacs, tmux
 - Languages : NodeJS, JavaScript, Python, Ruby, C/C++, C# & F#, Rust, Go
 - Services : SSHD, MySQL, Apache, lighttpd, MongoDB, PostgreSQL

Introduction Cont.

- ▶ Install additional software using your own GNU/Linux distribution package manager.
- ▶ Invoke Windows applications using a Unix-like command-line shell.
- ▶ Invoke GNU/Linux applications on Windows.
- ▶ Run GNU/Linux graphical applications integrated directly into your Windows desktop.
- ▶ Use GPU acceleration for machine learning, data science scenarios and more.

How to Enable WSL

- ▶ To set up and enabling WSL involves installing a Linux distribution alongside Windows 10. But in a way that allows the two different operating systems to interact with each other.
- ▶ To install WSL on Windows, there is one requirement to meet. You must have a Windows 10 64-bit computer Build 18917 or later.
- ▶ WSL is a cinch to enable. No download is required. It's simply a single Windows feature. To enable WSL, open PowerShell as Administrator and run the following. Once complete, restart the computer.

Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux

How to Start Powershell as Administrator

- ▶ Click on the search box at the taskbar and type powershell. This action will bring up the PowerShell edition of your preference.
- ▶ Look for Windows PowerShell or just PowerShell, if using PowerShell Core, from the search result.
- ▶ Right-click on the menu item and select **Run as administrator**.

Or

- ▶ Press Windows key + R from the keyboard.
- ▶ Then type **powershell** on the Run dialogue box.
- ▶ Hit Shift + Ctrl + Enter keys together to run PowerShell in administrator mode.⁸

Installing Linux in WSL

- ▶ WSL does not install any Linux distribution on its own.
- ▶ First, open the Microsoft Store and search for 'WSL'. A list of Linux distributions shows up.
- ▶ Next, choose your distribution of choice and install it.
- ▶ Following are some of the popular distros available to download and install.
 - Ubuntu 20.04 LTS
 - Ubuntu 22.04 LTS
 - OpenSUSE Leap 15.5
 - OpenSUSE Tumbleweed
 - SUSE Linux Enterprise Server 15 SP4
 - SUSE Linux Enterprise Server 15 SP5
 - Kali Linux Rolling
 - Debian GNU/Linux
 - Fedora Remix for WSL
 - Pengwin
 - Alpine WSL
 - ...

Setting WSL Version

- ▶ Check available distributions online, type `wsl --list --online`.
- ▶ In a PowerShell console:
 1. List which versions of Linux you have installed by running `wsl -l` or `wsl --list`.
 2. Once you have the list, copy the name of the distro you want to run with WSL2 and run `wsl --set-version <Distro> 2`, replacing `<Distro>` with the name you copied earlier.
 3. Confirm the command was successful by running `wsl -l -v` or `wsl --list --verbose`.
This command will return a full list of WSL distros and the version each distro is using.

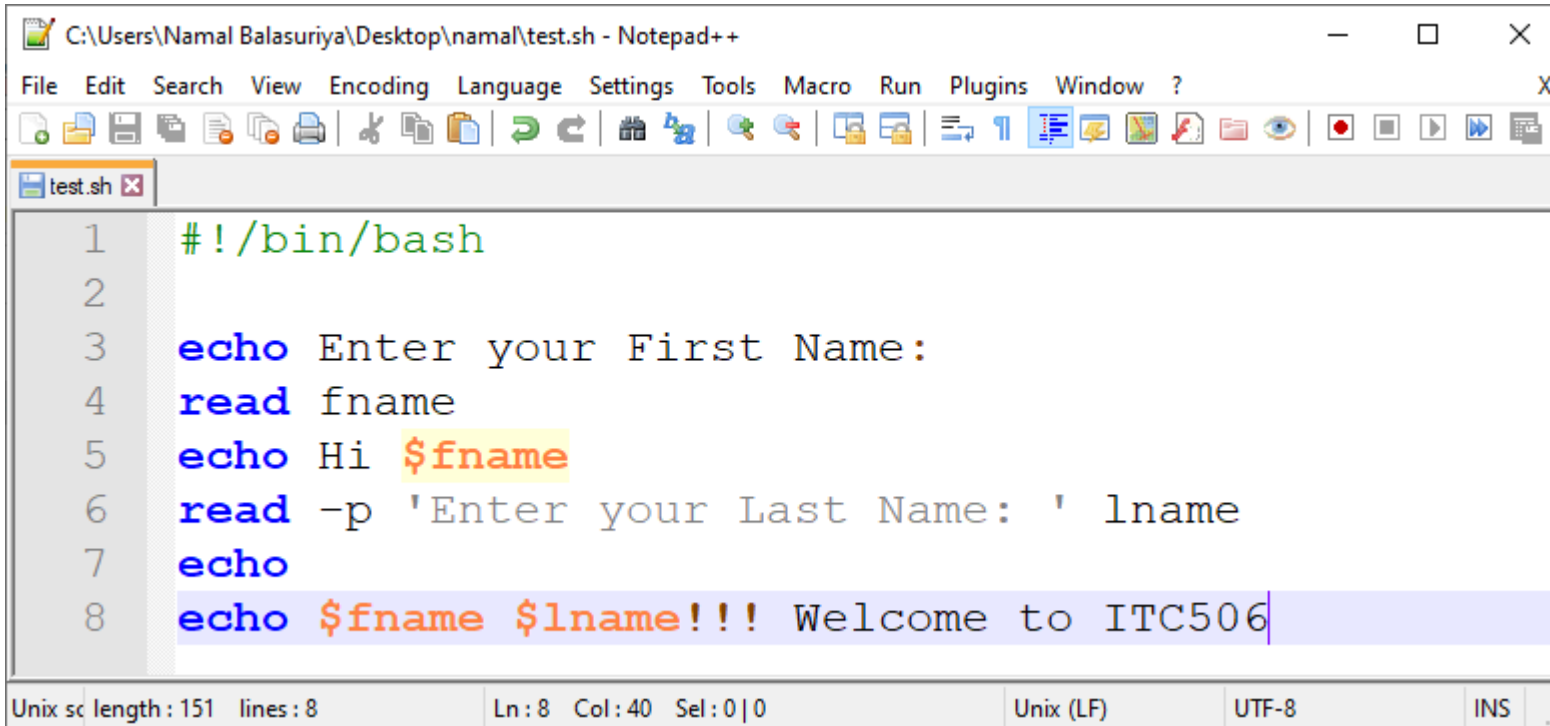
Starting WSL

- ▶ To start using WSL, open a PowerShell terminal and type `wsl`.
- ▶ If you've set up WSL correctly, you'll enter a bash terminal running on the WSL distro of choice.
- ▶ From here, you can run any Linux commands you wish.

Writing Our First Bash Script

- ▶ To start using WSL, open a PowerShell terminal and type `wsl`.
- ▶ Navigate to the Windows user desktop using the `cd` command.
- ▶ Create a new directory with your first name using the `mkdir` command.
- ▶ Navigate to the newly created directory.
- ▶ Type the `editor test.sh` command and hit Enter.
- ▶ Enter the following code snippet and press `Ctrl + O` and then `Ctrl + X` to save and exit from the editor.

Writing Our First Bash Script Cont.



```
C:\Users\Namal Balasuriya\Desktop\namal\test.sh - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
test.sh x
1  #!/bin/bash
2
3  echo Enter your First Name:
4  read fname
5  echo Hi $fname
6  read -p 'Enter your Last Name: ' lname
7  echo
8  echo $fname $lname!!! Welcome to ITC506
Unix sc length : 151 lines : 8 Ln : 8 Col : 40 Sel : 0 | 0 Unix (LF) UTF-8 INS
```

- ▶ Type the ***bash test.sh*** command and hit Enter.
- ▶ Input the First Name and Last Name and obtain the output. Let's discuss...

Q&A

- ▶ Time for your questions and queries ...

Thank you!