SET UP WINDOWS 10 for COMS10008

This is a brief tutorial on how to setup your personal Windows 10 64bit Home or Professional system to be ready for the COMS10008 unit. The below steps represent one out of many ways of setting up your Windows 10 system for the unit. Many of the steps can be shortened and they are outlined as is for clarity. We will help you with the below steps in the labs if needed, however, we will not support arbitrary setups of your choice. Before you start make sure Windows 10 is up-to-date with respect to updates and features. It is your responsibility to keep your personal system and passwords safe.
NOTE: *As an alternative to the below steps or if your system is not compatible, install Virtual Box, then create a Linux virtual machine and install Ubuntu by mounting the installation DVD from its ISO file, then follow the System Setup for Ubuntu.*

1) CHECK SYSTEM COMPATIBILITY

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "about" in the searchbox
- left-click on "About your PC" in the results and the system specifications window will open
- your system is compatible only if your "System type" is "64-bit operating system, x64-based processor"
- your system is not in S-Mode and ready to go further in this tutorial if the "Edition" is either just "Windows 10 Home" or "Windows 10 Professional" without "S Mode"
- in case you need to switch out of S-Mode follow the instructions on the Microsoft Support Page

2) ACTIVATE LINUX-SUBSYSTEM IN WINDOWS 10

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "powershell" in the search box
- right-click on "Windows PowerShell" in the results
- select "Run as administrator"
- click yes the consent prompt and an elevated PowerShell will open

- type "Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux" and press enter
- restart your computer if prompted... then Windows 10's Linux subsystem should be activated

3) INSTALL THE LINUX UBUNTU DISTRIBUTION

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "store" in the searchbox
- left-click on "Microsoft Store" in the results and the Microsoft Store window will open
- left-click on "Search" at the top right of the window and a search box will open
- type "Ubuntu" and a red app symbol will appear in the list, left-click on the app called "Ubuntu"
- left-click on "Get" the app and then "Install" and the installation will begin
- after the installation left-click on "Launch" and a terminal window will open
- after a while enter a UNIX username and press enter, then enter (and remember) a password and press enter
- once ready, Ubuntu should now be installed
- type "exit" and press enter to close the Linux terminal window

4) INSTALL THE CLANG COMPILER

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "Ubuntu" in the searchbox
- left-click on "Ubuntu" in the results and a Linux terminal window will open
- type "sudo apt update", then press enter and the update process will begin
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- once ready, type "sudo apt-get install clang", then press enter and the installation will begin
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- once ready, the clang compiler should be installed
- type "exit" and press enter to close the Linux terminal window

5) INSTALL THE ATOM EDITOR

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "edge" in the search box
- left-click on "Microsoft Edge" in the results and a browser window will open
- type "atom.io" in the browser bar, then press enter and the atom website will open
- left-click on the "Download" button on the website, then left-click "Run" when asked so the download and setup starts
- once ready, the atom editor should be installed

At this point your system is ready for most of the COMS10008 unit and you are ready to start programming in C. We recommend that you now work your way through the introductory lab next. During the last part of the unit we will use graphics, and for this we will need the SDL2 graphics libraries and a Linux desktop environment...

6) INSTALL THE SDL2 DEVELOPMENT PACKAGE

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "Ubuntu" in the searchbox
- left-click on "Ubuntu" in the results and a Linux terminal window will open
- type "sudo apt update", then press enter and the update process will begin
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- once ready, type "sudo apt-get install libsdl2-dev", then press enter and the installation will begin
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- once ready, the SDL2 library should be installed
- type "exit" and press enter to close the Linux terminal window

7) INSTALL THE VCXSRV WINDOWS X-SERVER

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "edge" in the search box
- left-click on "Microsoft Edge" in the results and a browser window will open
- type "sourceforge.net/projects/vcxsrv/files/latest/download" in the browser bar, then press enter

- left-click on "Run" when asked so the download and setup starts
- in case your windows administrator password is required provide it and press enter to confirm
- the installation window will open, left-click on the "Next" button, then "Confirm" and finally "Close"
- the windows x-server should now be installed

8) INSTALL THE LXDE LINUX DESKTOP

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "Ubuntu" in the searchbox
- left-click on "Ubuntu" in the results and a Linux terminal window will open
- type "sudo apt upgrade", then press enter, enter your password, press enter again and the upgrade process will begin
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- during the installation select "YES" for restarting services without further queries
- once ready, type "sudo apt install lxde" in your terminal, then press enter and the installation will start
- in case you are queried about disk usage during the installation type "Y" and press enter to confirm
- after some significant installation time, once ready, the LXDE Linux desktop should be installed
- type "exit" and press enter to close the Linux terminal window

9) RUNNING THE LINUX DESKTOP AND CHECKING SDL2

- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "xlaunch" in the searchbox
- left-click on "XLaunch" in the results and a display settings window will open
- select "One large window" and left-click "Next"
- select "Start no client" and left-click "Next"
- make sure "Clipboard", "Primary Selection", and "Native opengl" are ticked, then left-click "Next"
- left-click "Finish" and a black VcXsrv window will open
- hold the Windows key down and simultaneously press "s" so that a search box appears
- type "Ubuntu" in the searchbox

- left-click on "Ubuntu" in the results and a Linux terminal window will open
- type "export DISPLAY=:0" and press enter
- type "export LIBGL_ALWAYS_INDIRECT=1" and press enter
- type "startlxde" and press enter
- the Linux desktop should appear in the VcXsrv window
- open a terminal on the Linux desktop by going to "System Tools" and selecting "LXTerminal"
- download the program hellosdl.c
- compile the program, for instance via "clang -std=c11 -Wall hellosdl.c -lSDL2 -o hellosdl"
- run the program, for instance via "./hellosdl" - if you see a sky blue window appear then SDL2 is working properly
- note that some ports of the SDL library unfortunately have memory leaks, which may be reported back to the terminal...you have to live with it