

Learning by Making

UNIT 0

My Chromebook 3



Hardware and Software



Learning Objectives:

- Students will be able to identify components of a computer (mouse, keyboard, screen, storage media)
- Students will be able to locate and identify computer ports and switches
- Students will know how to use a mouse to navigate
- Students will know how to manipulate windows
- Students will understand the difference between files and folders
- Students will know how to find the folder that stores their code

Materials

For each group of 2 students

- Computer
- Mouse

For each student

- Worksheet
- Challenge sheet
- Double Dare Sheet

Vocabulary:

- Application Program
- Desktop
- File
- Folder
- Hardware
- Icon
- Memory
- Operating System
- Ports
- Processor
- Serial
- Software

Getting Started

Computers are used in many jobs. In this class, you will use your computer as a tool to learn about science, computational thinking, and gather information from the world around you. In this lesson you will learn about the **hardware** and **software** on your computer. Hardware refers to the physical components of the computer, including the screen, storage media and the mouse. Software refers to the code that the computer runs, including the programs that operate the computer and those you will write yourself. You will learn to use a mouse and keyboard to explore the organization of information on your computer, to navigate between windows that perform different tasks, and to save your files to external storage media.

In this course, we have chosen the Samsung Chromebook as the computer for you to use. It originally ran the Chrome operating system, but we have replaced that with custom software running under Ubuntu, which is a Linux operating system. The properties of this computer are summarized in the table.

Model	Samsung Chromebook 3
Processor	Intel® Celeron N3060 1.7 GHz Core i5
Memory	4 GB
Storage	16 GB
Screen	11.6-inch diagonal
Screen Resolution	1366 x 768 pixels
Weight	3.65 lbs
Battery Life	10 hours

The **processor** is the hardware element that runs programs. Programs are stored in **memory** when they are running,



but in storage when they are not running. This computer has a solid state disk (SSD) which stores programs and data. Computer screen resolution is given by the number of individual picture elements (pixels) defined in each direction, and also by their size along the diagonal.



Tasks you need to perform



Answer questions in your Worksheet, Challenge & Double Dare sheets

In addition, computers have a variety of input and output plugs (called “ports”) that allow you to connect to networks and to various devices. Your computer has the following ports:

- HDMI
- Audio (headphone/mic combination)
- USB (2.0 and/or 3.0)
- Power

Other hardware features include Wi-Fi, and a webcam.

Instructions

STEP 1. Identify the ports and switches on your computer.



Look at the keyboard, and all sides of the laptop to see where each port or switch is located. Ports and switches are defined by standard symbols called icons (shown on the worksheet).



On your worksheet, write down where you found each port or switch.

STEP 2. Exploring the USB port



The USB (Universal Serial Bus) port is very commonly used for a wide variety of computers. **Serial** communications occur when all the information is moved sequentially through a cable. Small computers (like tablets) often use a micro-USB style that has the same electrical connections. As technology has improved, USB ports have gotten faster at handling data. They can also be used to provide power to attached devices (such as charging your cell phone or running a light).



Here are some examples
and regular USB plug an



USB 2.0 ports run as fast as 480 megabits per second, while USB 3.0 can run at a maximum rate of 5 gigabits per second. One mega = 1,000,000 (10^6 or one million) while 1 Giga = 1,000,000,000 (10^9 or one trillion). On your worksheet, calculate how much faster USB 3.0 is compared to USB 2.0 (calculate ratio of speeds).

STEP 3. Turn on the computer




Press down on the computer's power button that you located in STEP 1. When you power up the computer, it automatically runs software that you will not be using in this unit.

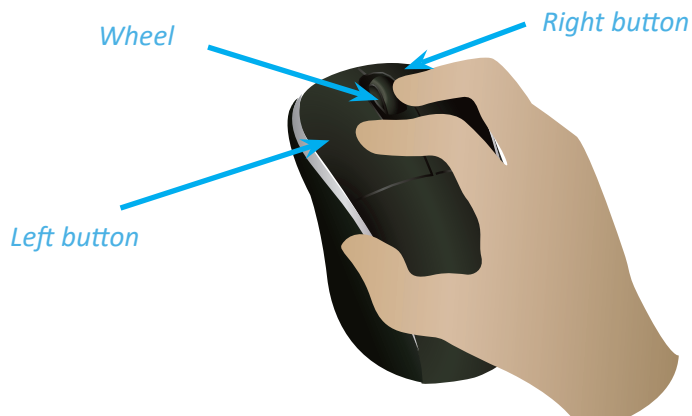


On your worksheet, describe what you see when the computer is finished with its startup processes.

STEP 4. Learn how to use the mouse



Plug the mouse into one of the USB ports on the computer. If you are right handed, hold the mouse in your right hand. Your thumb should be on the left side of the mouse and your pinky on the right side of the mouse with the two big buttons pointing away from you. There should also be a roller in between the two buttons. Find the button with an "x",  that is located in the upper right hand corner of the black screen, and click on it.



Now practice moving the mouse on the table while watching the computer screen. You should notice the mouse pointer moving around the screen. It should look like an arrow. Practice the following actions.

"Click" means to use the left mouse button

You can also **"right click"** with the right mouse button.



Right click on the desktop and click on Change Desktop Background. When you have made your selection, close the window. On your worksheet, write the name of the photo that you chose for the new background.

STEP 5. Explore the Dock



Move the mouse to the bottom of the screen and the **Dock** should appear (if it is not already there). Hover the mouse over each icon on the Dock.

Click on the icon that looks like a filing cabinet ("Caja"). Find the +Student folder and double click on it.

"Double clicking" is two rapid clicks of the left mouse button.

The mouse can also **"hover"** over an icon on the screen by moving the cursor over the icon without clicking it.

STEP 5. Continued



On your worksheet:

Before opening Caja, write down how many icons appear on the Dock and the names of the icons that appear when the mouse cursor hovers on top of each icon.

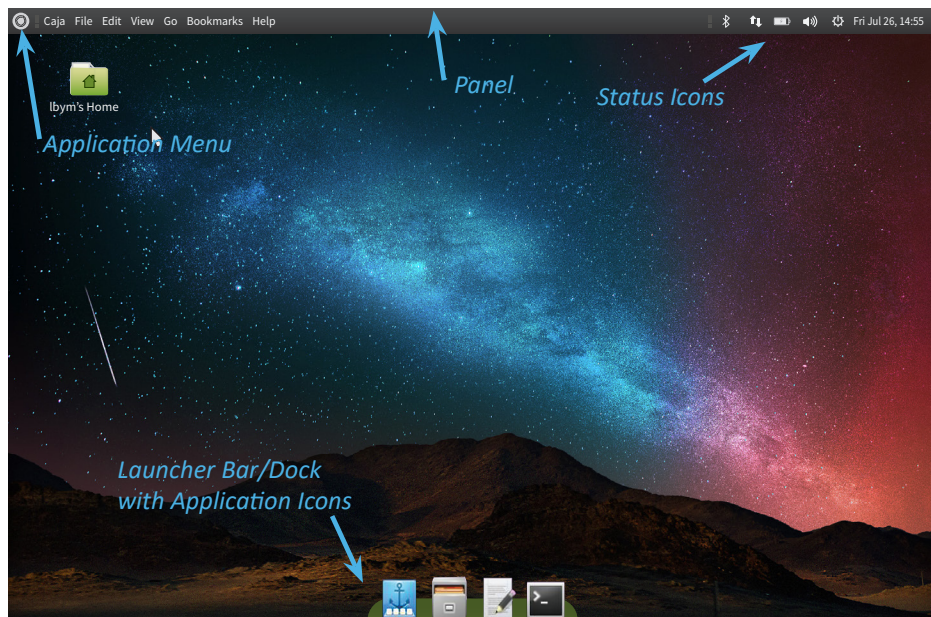
After opening Caja, write the names of at least two of the files that are in this folder. Then close the +Student folder.

The central roller can be used to “scroll” through a file or web page.

STEP 6. Explore the Desktop



The screen that you are now seeing is known as the “desktop”. It has a variety of useful **icons** (little graphical pictures). The desktop is your main workspace and it is here that you can open, run, and rearrange multiple programs and applications.



Item	Description
	Displays menus with icons of all applications
Panel	Displays status icons and application menu items (hover mouse to view)
Desktop	Allows changing Desktop and System settings
Files	Links to various places on the computer and on the network
Documents	Shows contents of Documents Folder
Status Icons	Wi-Fi, Bluetooth, battery, sound, date and time indicators. Suspend, shutdown, or restart the computer.
Launcher Bar (Dock)	Displays icons of active applications. Click on icons to view individual windows



a) Click on the in the upper left hand corner of the panel bar at the top of the screen. Use the scroll function to explore the icons listed under the menu entitled “All”. Write the name of two entries on your worksheet. Then close this page by clicking the again.

b) Check the charge on the battery in the Status Icon area. Write the battery status on your worksheet.




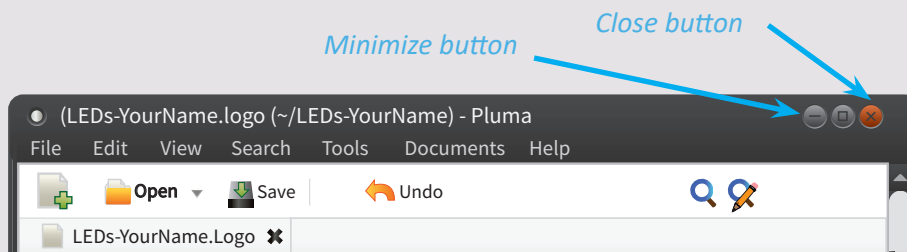
Click the gear icon in the top right corner of the screen to shut down, restart or suspend your computer. When you close the lid, the computer will automatically suspend operations.

If the dock is not visible, move your mouse to the bottom of the screen and it should reappear.

STEP 7. Learn how to open and minimize windows




Applications open in windows on your desktop. In STEP 1, you learned how to close an unwanted window by clicking the  button. In this step, you will learn how to open and minimize windows.




Click on the icon on the dock that looks like a filing cabinet. This is the file system (known as Caja) which organizes how the files are stored on the computer, similar to how files could be stored in a filing cabinet.



On your worksheet, identify at least 3 folders that are listed inside the Home Folder.

Now minimize the window that opened when you launched Caja by clicking the  button.



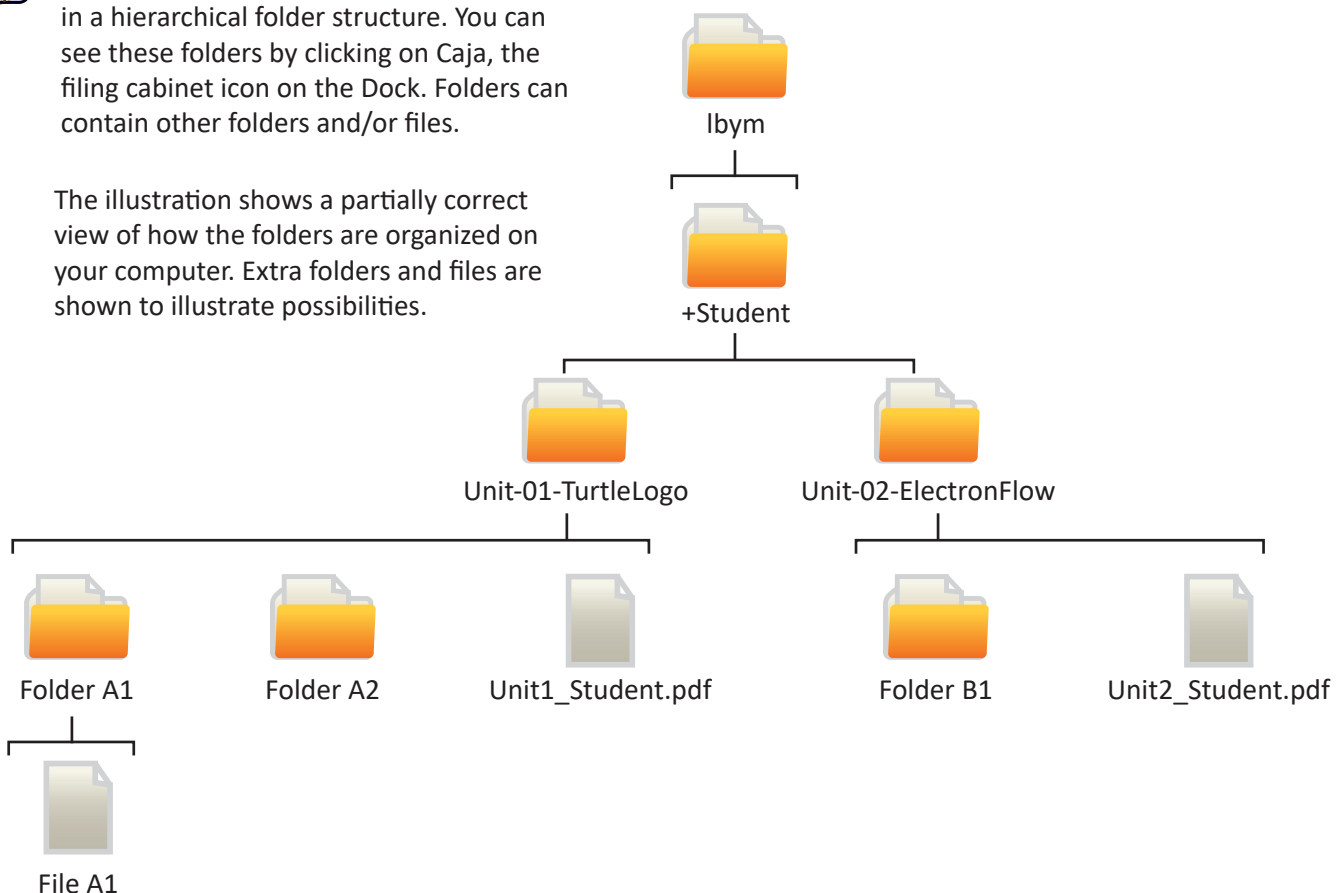
Minimizing a window on your desktop will move it out of view but will not shut down the application that is running in the window. To minimize a window, click on the  icon. To reopen that window, find its icon on the Dock and click on it.

STEP 8. Explore the File System



Information on this computer is organized in a hierarchical folder structure. You can see these folders by clicking on Caja, the filing cabinet icon on the Dock. Folders can contain other folders and/or files.

The illustration shows a partially correct view of how the folders are organized on your computer. Extra folders and files are shown to illustrate possibilities.



Find the +Student folder and double click on it. On your worksheet, write down the name of at least 2 folders in this folder.

STEP 9. Exploring the Contents of Folders



Files usually contain data or documents. Files can include information in many different formats, and readable by specific programs. The filename has an extension (typically three letters) that indicates its format and provides information as to how to access the information.



Open the *Unit-02-ElectronFlow* folder. Then open the file whose name includes “*LogoTipSheets*”. On your worksheet, write down two entries from the fourth page of the file.



Files will open using the default application that is installed for that file. If that application is not installed, the file will not open.



To open a folder, double-click its icon to view its contents.

To open a file, double-click its icon or name, and it should open.

STEP 10. Working with Files and Folders using the mouse only



You can do a lot with files using just mouse operations.

Close the “*LogoTipSheets*” file.

Select the file by right clicking on it.

Choose the desired action by clicking on copy

Right click in the *Unit-02-ElectronFlow* folder on an empty part of the folder

Choose the desired action by clicking on paste

Right click on the copy of the file you made

Choose the desired action by clicking on rename

Type in a new name

Hit enter to finish the naming process



On your worksheet, write down the name you gave the copy of the file you made.

Write down all the commands you can find when you right click on a file.

To “**drag**” a file or folder with the mouse, click on the file, hold the left button down and move the mouse.

To “**drop**” a file, release the mouse button after dragging

STEP 11. Working with Files and Folders using the keyboard



You can do the same actions that you do with your mouse by using keyboard shortcuts. A file or folder can be copied or moved to a new location by dragging and dropping with the mouse, using the copy and paste commands, or using keyboard shortcuts. You can also rename or delete items. These instructions apply to both files and folders. You can copy and move files and folders in exactly the same way.

Select the file that you created as a copy of the “*LogoTipSheets*” file by clicking on it (just one click with the left mouse button)

Look at your keyboard

Right click and chose “Move to Trash”

Start by clicking on the “*LogoTipSheets*” file (left click) then use the copy and paste keyboard commands in the table to create a copy of the file.

STEP 11. Continued

Command	Shortcut
Copy	Ctrl+c
Cut	Ctrl+x
Paste	Ctrl+v
Move to Trash (Delete)	Right click on icon




Do NOT use **Ctrl+C** if you are in a black MATE terminal window, as it will stop any program that is running in that window..




On your worksheet, write down the steps you used to copy and paste the “LogoTipSheets” file using the keyboard shortcuts.

STEP 12. Putting Application Icons on the Dock



Delete the MATE Terminal icon  on the Dock by hovering over the MATE Terminal icon, then right click. Put the Mouse Cursor over the words “Keep in Dock.” Click on “Keep in Dock.” Note that the MATE Terminal icon disappeared from the Dock.

Add the MATE Terminal icon back on the Dock by hitting the three buttons together: Ctrl+alt+T. The icon will show up on the Dock. Put the Mouse Cursor over the words “Keep in Dock.” Click on “Keep in Dock.”


Close the MATE Terminal by clicking on the  in the MATE Terminal window. Note that the MATE Terminal icon remains on the Dock.

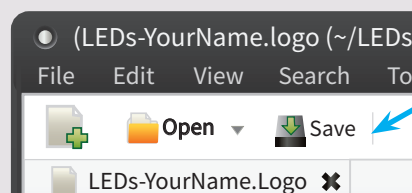


On your worksheet, write down how to put the MATE Terminal icon back on the Dock.

STEP 13. Screenshots



Click on the . Go to the menu labeled All and find the icon for “Take Screenshot”. Click on the Take Screenshot button to save a screenshot of the entire desktop or just a section of the desktop. When the Save Screenshot window appears, you can then rename the screenshot by entering a new file name and choosing a folder, then and clicking “save”.



STEP 14. Complete the Challenges



Now that you have been introduced to the computer’s hardware and software, please continue on to the Challenges for this lesson.



0 Worksheet







Hardware and Software



Name: _____



STEP 1 Write down where you found each port or switch.

Port or Switch	Symbol	Location(s)
Power switch		
Power port		
WIFI switch		
USB port		
Headphone and microphone Jack		
HDMI port	 HDMI	



STEP 2 Calculate how much faster USB 3.0 is compared to USB 2.0 (calculate ratio of speeds).



STEP 3 Describe what you see when the computer is finished with its startup processes.



0 Worksheet *continued*

Hardware and Software



Name: _____





STEP 4 On your worksheet, write the name of the photo that you chose for the new background.



STEP 5 Write down how many icons appear on the Dock and the names of the icons that appear when the mouse cursor hovers on top of each icon.

Write the names of at least two of the files that are in this folder. Then close the +Student folder.



STEP 6 a) Click on the  in the upper left hand corner of the panel bar at the top of the screen. Use the scroll function to explore the icons listed under the menu entitled "All". Write the name of two entries on your worksheet. Then close this page by clicking the  again.

b) Check the charge on the battery in the Status Icon area. Write the battery status on your worksheet.

a)

b)



0 Worksheet *continued*

Hardware and Software



Name: _____



STEP 7 Identify at least 3 folders that are listed inside the Home Folder.



STEP 8 Find the +Student folder and double click on it. Write down the name of at least 2 files in this folder.



STEP 9 Open the *Unit-02-ElectronFlow* folder. Then open the file whose name includes “**LogoTipSheets**”. Write down two entries from the fourth page of the file.



STEP 10 Write down the name you gave the copy of the file you made. Write down all the commands you can find when you right click on a file.



STEP 11 Write down the steps you used to copy and paste the “*LogoTipSheets*” using the keyboard shortcuts.



STEP 12 Write down how to put the MATE Terminal icon back on the Dock.



0 Challenges

Hardware and Software



Name: _____

C-1

Open the Terminal Window

On the desktop, find the application window with the name "Terminal." Open the application. Write the words that you see in the terminal window.

C-2

Find today's date.

On the desktop, find today's date. Write down the date and time as it is displayed on your computer screen. Also write down the name of the desktop item where you found the date.

C-3

Create a folder on the desktop.

Name the folder after your favorite color. Then go into the folder and create a file. Name the file "YourName". Write down details of the steps you took to complete this challenge

Hint: Try right clicking on the desktop to create a file and a folder.



0 Challenges *continued*

Hardware and Software



Name: _____

C-4

Open "YourName" in the text editor

Double click on the file "YourName" to open it in the text editor (Pluma).

Type "Hello World" into the file.

Click the "SAVE" icon to save the file.

Write down details of the steps you took to complete this challenge.

C-5

Save the folder and file on an external USB drive.

Plug the USB drive into the other USB port on your computer.

Copy the file you created and paste it onto the USB drive.

Eject the drive and give it to your teacher.

Write down details of the steps you took to complete this challenge.

Hint: Use Caja (filing cabinet) to find the USB drive once you plug it into the computer.



0 Double Dare Challenges

Hardware and Software



Name: _____

D-1

Many cellphones have built-in cameras that have resolutions with units of Megapixels. Calculate how many Megapixels make up the screen of your computer and compare that to the resolution of the camera in a cellphone that belongs to you or one of your classmates.

D-2

Investigate HDMI. What is this port used for? Compare and contrast HDMI and USB.

D-3

Investigate disk drive technologies: Compare and contrast “hard drive” and “solid state drive”?

D-4

Investigate different file formats. Compare and contrast file types with extensions: .doc, .pdf, and .txt.
