LABORATORY 1: Ubuntu, Tivaware and Git

Part 1: Ubuntu terminal use:

Theory Concepts

Ubuntu is an OS based on Linux, meaning that it has a strong command line management. For that reason, is important to know the main and most used commands.

What advantages can we get from an CLI OS? What disadvantages it has?

A CLI OS is completely used with a command line, this can be handy if we need a lighter OS to run specific tasks. Another advantage is that we have more control over the system, we can manage users, groups, and permissions with ease.

The biggest disadvantage is the lack of visual elements that guide the user in the use of the OS.

Is important to mention that Linux and Ubuntu are free software and it makes a big difference when a OS is selected.

What is Windows WSL? How can we use it for Linux systems? Which is its difference with dual boot or virtual machines?

Can you mention some of the most important commands for command line? Why do you consider these commands important?

Here is a table of some commands that are handy for our daily use:

#	**Command**	**Use**
1	ls	List of files and directories
2	ls -l	
3	cd	Change directory
4	pwd	Print work directory
5	sudo	Super User does
6	sudo su	
7	mkdir	
8	touch	Create text file
9	sudo apt update	
10	sudo apt upgrade	
11	sudo apt install	Install repositories
12	tree	Shows directory tree (requires installation)
13	rm	Remove directory
14	rm -r	
15	mv	
16	cp	Copy files
17	chown	Change Ownership
18	chmod	
19	adduser	Adds a user

20	usermod	Change user modifications
21	gpasswd	Change group configurations
22	cat, nano, gedit	Text edition

Is there another command that you consider important to mention?

As you can see there are a lot of commands that we can use during our daily work, is important to know the most important and understand how they affect the OS.

Laboratory implementation

Command Line short Exercises

1. An ice cream company wants to develop a product history log for their 2023 sales campaign.
    a. The company needs a main directory called ‘ice cream 2023’. Inside this folder there should exist 2 directories: ‘water flavors’ and ‘milk flavors. Inside the ‘water flavors’ folder 3 additional directories are needed: “Cinnabon’ apple” and “pineapple”. For the milk ice creams the directories are ‘chocolate’ and ‘cappuccino’. Make all the directories tree using one command line and show it using the tree command.
2. Create a text file called ‘color’ with your favorite color, then move that file to a folder called ‘colors and finally add a second color. Use the cat command.
3. Create a txt file called ‘name’ with your first name. Then, make a copy of that file inside a folder called ‘student registry’. Finally, add your last name to the copy file. Use gedit command.

Command Line excercises

1. A canning company wants to use Ubuntu as their main OS for their activities. You have been hired to develop the following features:
    a. Create a user called ‘Company’ with super user privileges.
    b. Create a user called ‘Engineer’.
    c. Create a user called ‘Operator’.
    d. All these users must belong to the ‘Distribution’ group.
2. Using the previous exercise is required to make a route tree with the following features:
    a. Create a main folder called ‘Designed tasks’.
    b. Inside that folder the directories: ‘Maintenance’, ‘Production Line’ ‘Fixes’ and ‘Costs’ must be created.
    c. Each folder must have a file called ‘dates’ which contains specific workers schedules according to their roles. You can select the schedule for each role.

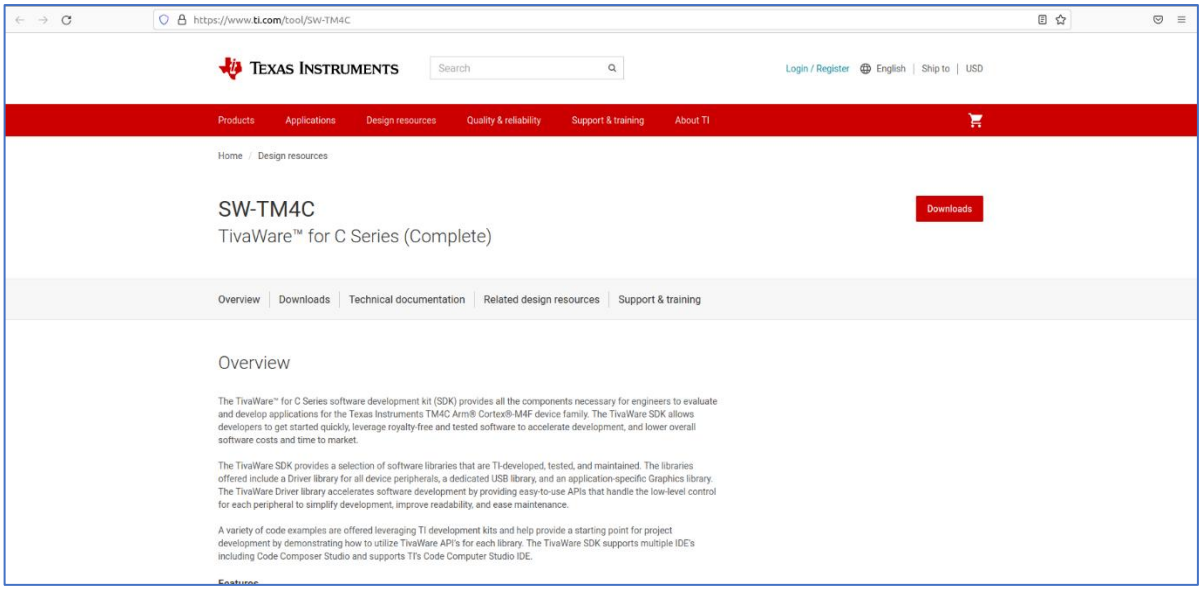
d. Add a file to the ‘Designed tasks’ folder called ‘Products’. This file must contain at least 3 canned products of your choice.
e. Modify the ‘dates’ files adding: ‘Maintenance - Friday, ‘Production line – Monday to Thursday’, ‘Fixes – with 2 days of anticipation’ and ‘Costs – at the end of the month’.

3. After some months you are contacted by the same canned company to make some modifications to the system you developed before:
   a. Create a ‘Supervisor’ user.
   b. Add that user to the ‘Distribution’ group.
   c. Modify the ‘Designed Tasks’ folder owner to be Supervisor.
   d. Modify the permissions of the ‘Designed tasks’ folder. The ‘Distribution’ group must have read, write, and execute permission.

Theory Concepts

A Software Development Kit (SDK) is a piece of software that we can use to implement different solutions based on build tools, libraries, etc. That helps the user to learn some implementations and improve the user learning. For this class we will use TivaWare SDK as the main tool for TIVA development.

Here are some main steps that we can follow to install TivaWare SDK on our



linux OS:

1. Visit Texas Instruments page:

2. Select SDK SW-TM4C and download options:
3. Select the board model (a TI account will be needed):

4. In command line put the following command (sudo apt-get update and upgrade might be needed):

```
sudo add-apt-repository ppa:team-gcc-arm-embedded/ppa
```

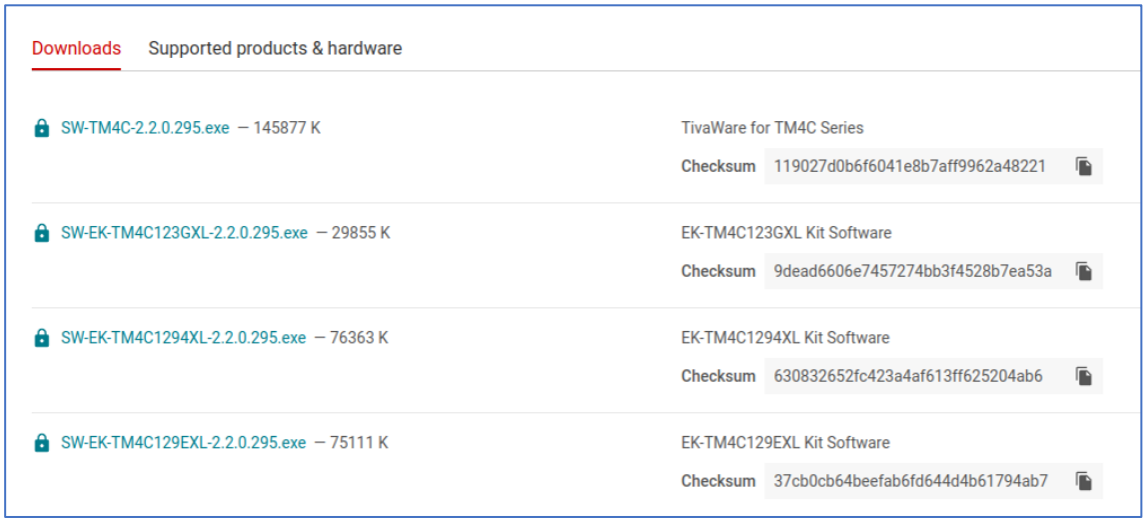
5. Use the following command:

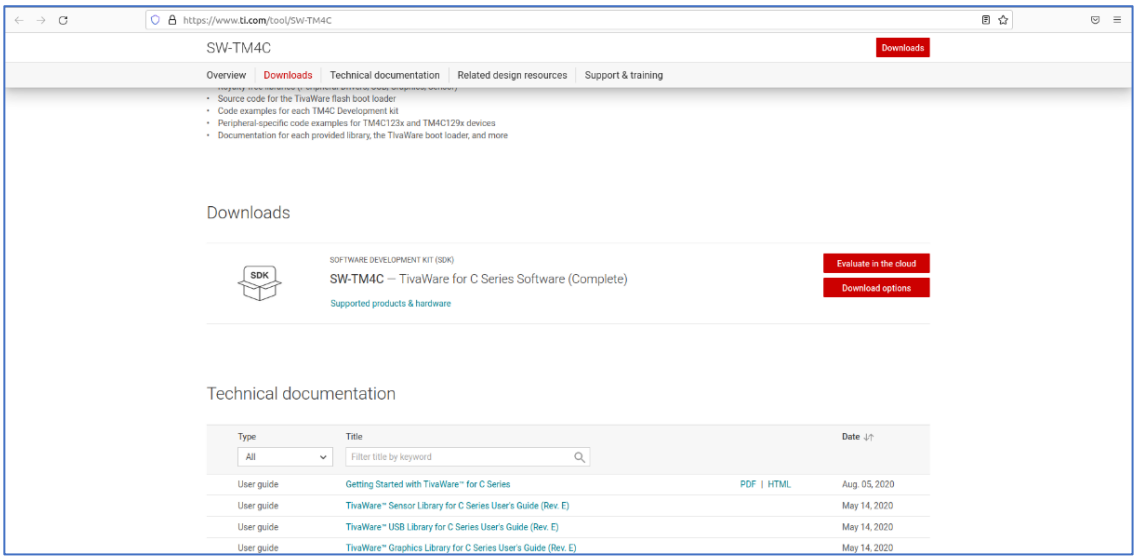
sudo apt-get install gcc-arm-embedded

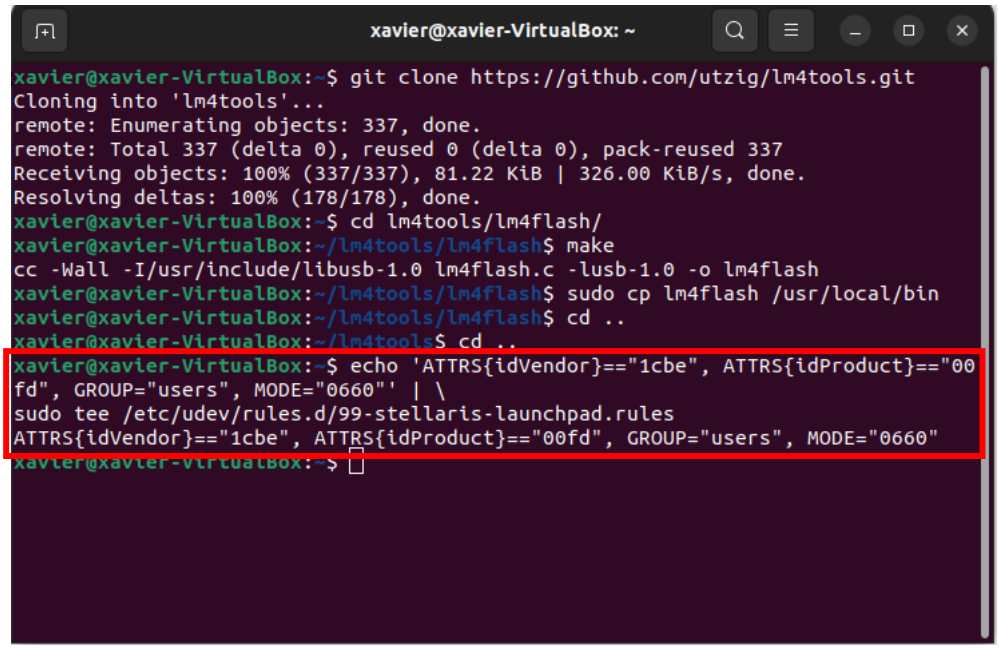
6. Install git if is not installed.
7. Clone the following repository:

git clone https://github.com/utzig/lm4tools.git

8. Access to: lm4tools/lm4flash
9. Use the command marked in red:







10. Use the following commands to unzip the SDK download:

```
mkdir <TivaWarePah>
cd <TivaWarePah>
mv <directory_downloaded>/SW-TM4C-2.1.1.71.exe
unzip SW-TM4C-2.1.1.71.exe
rm SW-TM4C-2.1.1.71.exe
```

11. EXTRA: If there are problems with the make command use the following possible solution:

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> Realtek RTL8723DE module for Linux kernel version 5
>
> Install:

```
git clone https://github.com/smlinux/rtl8723de.git -b current

dkms add ./rtl8723de

dkms install rtl8723de/5.1.1.8_21285.20171026_COEX20170111-1414

depmod -a

reboot
```

Now we have the Tivaware SDK installed correctly. This will be useful to work during all the class with a TM4C1294 board.

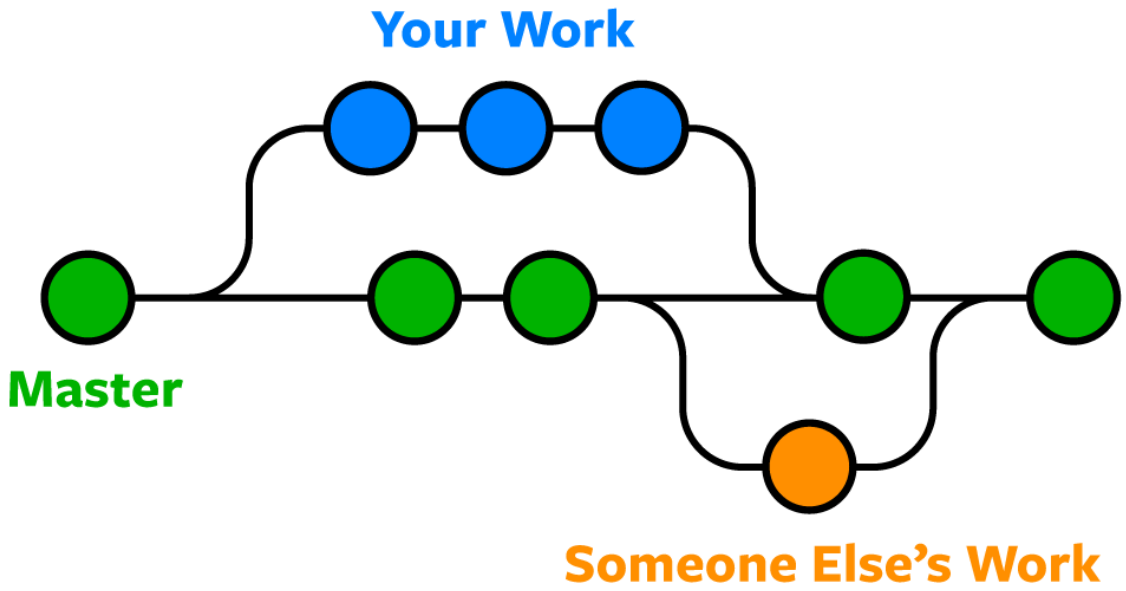
Part 2: TIVAWare SDK Installation

1. Explain the TIVAWare SDK installation in your computer step by step. Address the specific details about it. Did you have any issues during the installation? If so, how did you manage to solve them?
2. What is a make file? Why is it important? Explain its use.

Part 3: Git installation

Git is a modern version control system that allows team collaboration in a fast and efficient pace. Git manages a software system in a way that all the collaborators can contribute to it reducing possible code errors and incoherences.

Git is a powerful tool for modern software development and allows developers to complete specific tasks and focus development without affecting all the system.



- Create an account in https://github.com/
- What is a repository? Why should we use it?
- Create a new repository called "lab_1"
- Invite all the group members to the repository
- Give them write and read permission.

In VSCode there is a Git extension that enables developers to create, modify, merge, delete, rebase, etc. Branches in their local environment and then upload the changes to the remote repository. The following link is a quick guide to start using git in VSCode connecting the account created: https://code.visualstudio.com/docs/sourcecontrol/intro-to-git

- Create a new branch, this can be done using the command **git checkout -b "branch name" "branch source name"** with your last name and name
- In your branch create a python code that 1. Adds n numbers, 2. Gets the inverted numbers ex 619 ->916, 3. Asks the user his name, age and profession and returns it in a custom message, 4. Asks x numbers from a user and returns only unique values.
- Upload your code to your branch, you can do this using the commands:
  - git add .
  - git commit – m "Message of commit"
  - git push origin "branch name"
- **Verify your changes are on github repository.**