Prelab 0.1 Introduction

0.1 Notation and rule

In the lab manuals, variables, menu, filename, command, code, and so on are written in a tilted font within single quotation marks (like *'example'*) to distinguish other text in the manual. Command for figuring out the IP address of Windows computer, for example, instruction will be 1) Open *'Command Prompt'*, 2) Type *'ipconfig'*. Or it is instructed as followed so that you can copy and paste the command when it is too long and complicated. Tips or comments will be given after a bullet point or pound mark (#).

Windows - Command Prompt

```
ipconfig
```

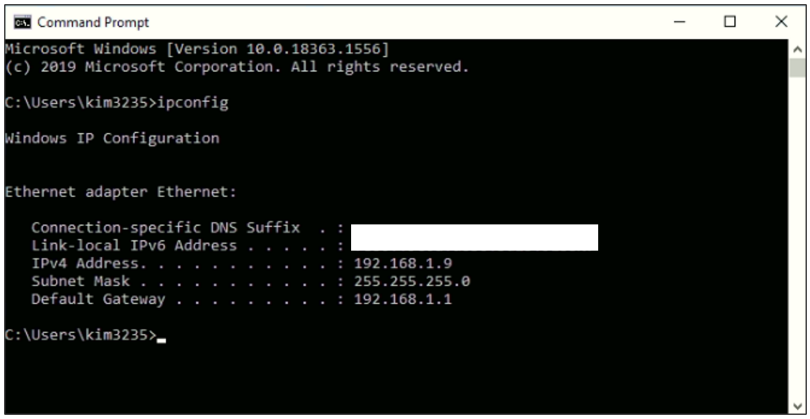


Figure 1 Check IP address using Windows Command Prompt

In case of Raspberry Pi, your IP address can be checked by 1) Open '*Terminal*', 2) Type '*ifconifg*'.

Raspberry Pi - Linux - Terminal

```
ifconfig
```

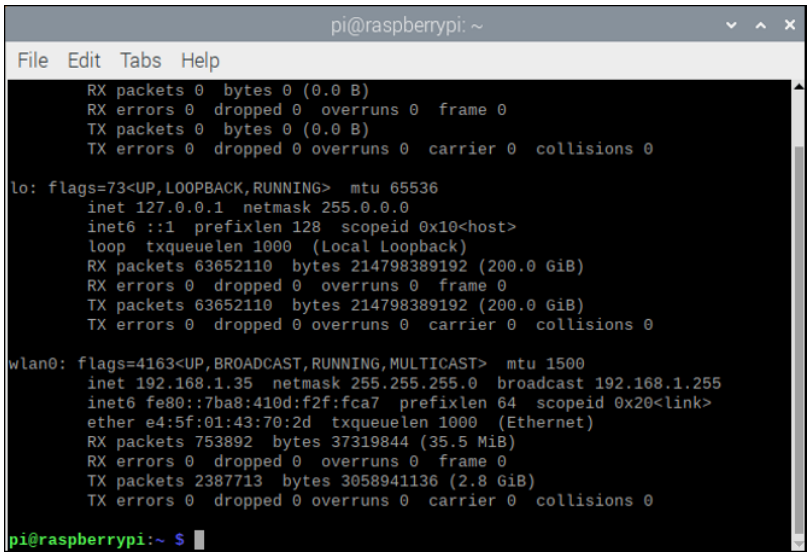


Figure 3 Check IP address of Raspberry Pi Terminal

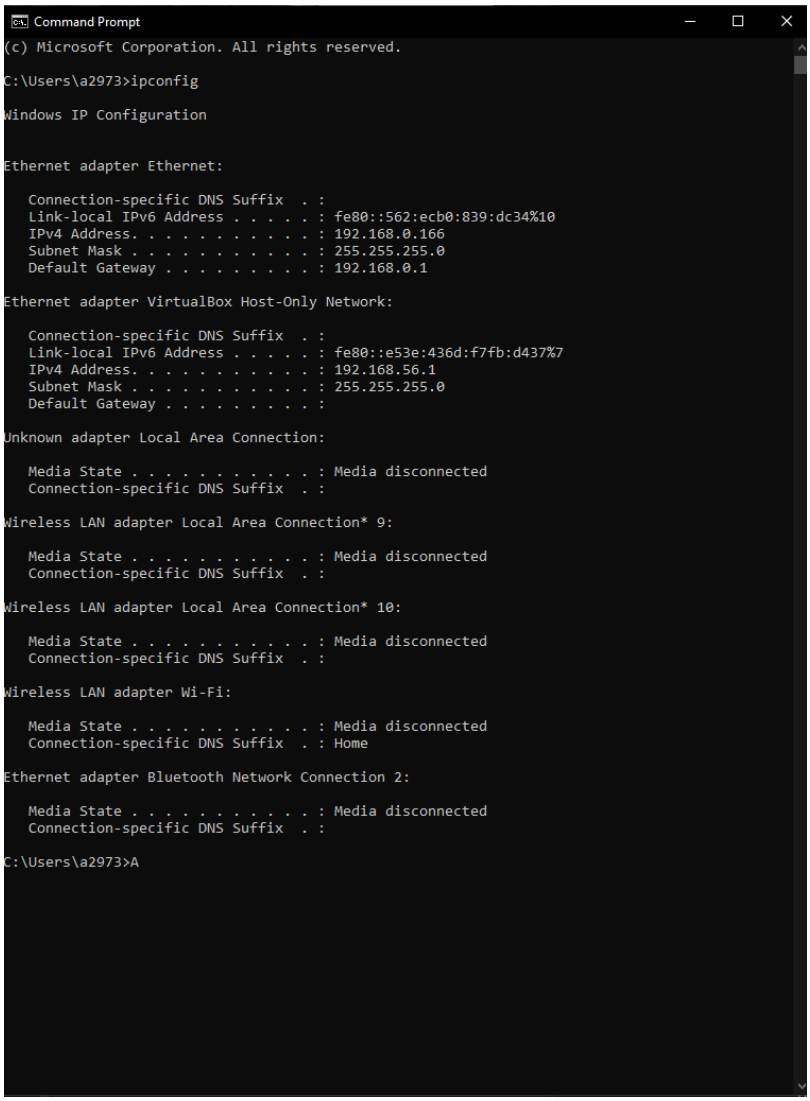
In the prelab and lab manuals, there will be 'Task' directions. You should include **task** outcomes or answers to the question according to the directions in your prelab and lab report.

- Below are examples of various **tasks**, you do not need to complete these.

Examples:

Task 0.1

In [ ]:
```
#@title 1) Capture your Terminal window and attach it to the report below: {display
```



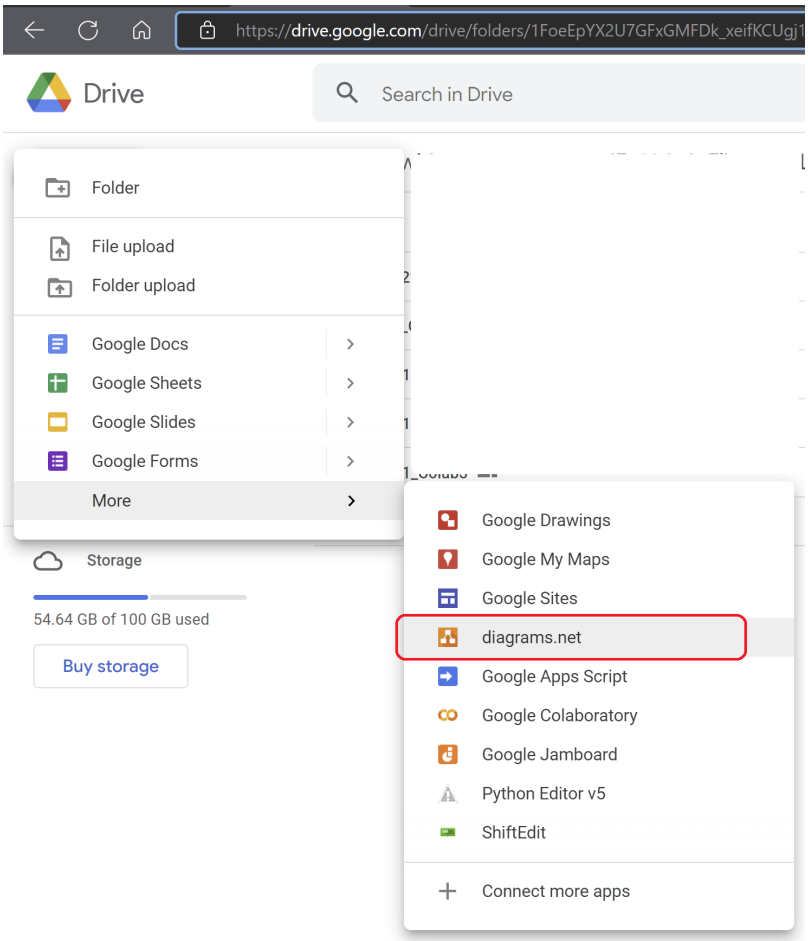
In [ ]:
```
#@title 2) What is your IP address? {display-mode: "form"}
T1 = '192.168.0.166' #@param {type:"string"}
print(T1)
```

```
192.168.0.166
```

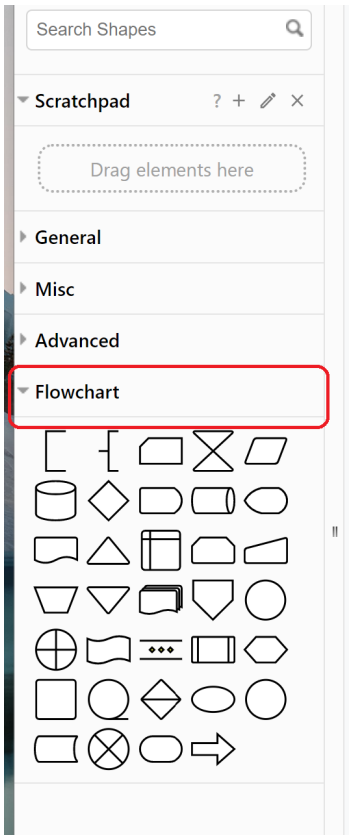
0.2 Flow Diagrams

For some tasks, you will be asked to create a flow diagram to illustrate the major sequences and logic of concepts and learning goals. For this lab material, please utilize the https://app.diagrams.net/ platform (formerly 'draw.io', 07/02/2022).

To create a new diagram, you can go to the website and click "Create New Diagram" or go to Google Drive, click New, and select Diagram.net from the drop down. Please see the screenshot below.



You can choose the Flowchart template to create a new blank diagram. To place new shapes or objects on the flow diagram, find the "Flowchart" section of the shapes. See screenshot below.



Here is an example of a flowchart created for Prelab 0:

https://drive.google.com/file/d/14KVvUGmqMFRTZcqp-JLn3cSKMe3sv4yv/view?usp=sharing

When sharing a completed diagram, use the "publish" feature of diagrams.net. To do this,

1. Click "file" in the top left
2. Select "Publish" and click "Link"
3. Click "Create"
4. Click "Copy" to copy the published URL
5. Paste the Flow diagram URL in the Google Colab Notebook

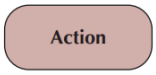
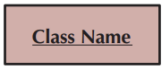
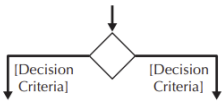
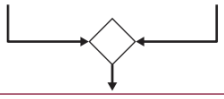
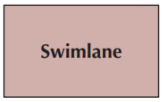
The size of the flow diagram is context dependent. You will be asked to create a flow diagram:

- At the end of a Lab, where you will model the entirety of that Unit (Prelab + Lab).
- For significant code blocks that are run on the Raspberry Pi device.

When creating a flow diagram for an entire lab, you may "zoom out" on the details (feel free to be very detailed, though). However, when modeling a block of code, make sure to include the details and logic operations.

0.3 Flow Diagram Syntax

Please refer to the picture below for the syntax used in a Flow Diagram. This syntax is the same for an Acitivity Diagram, which you may be familiar with. The standards used are UML version 2.0.

An action: ■ Is a simple, nondecomposable piece of behavior. ■ Is labeled by its name.	
An activity: ■ Is used to represent a set of actions. ■ Is labeled by its name.	
An object node: ■ Is used to represent an object that is connected to a set of object flows. ■ Is labeled by its class name.	
A control flow: ■ Shows the sequence of execution.	
An object flow: ■ Shows the flow of an object from one activity (or action) to another activity (or action).	
An initial node: ■ Portrays the beginning of a set of actions or activities.	
A final-activity node: ■ Is used to stop all control flows and object flows in an activity (or action).	
A final-flow node: ■ Is used to stop a specific control flow or object flow.	
A decision node: ■ Is used to represent a test condition to ensure that the control flow or object flow only goes down one path. ■ Is labeled with the decision criteria to continue down the specific path.	
A merge node: ■ Is used to bring back together different decision paths that were created using a decision node.	
A fork node: Is used to split behavior into a set of parallel or concurrent flows of activities (or actions)	
A join node: Is used to bring back together a set of parallel or concurrent flows of activities (or actions)	
A swimlane: Is used to break up an activity diagram into rows and columns to assign the individual activities (or actions) to the individuals or objects that are responsible for executing the activity (or action) Is labeled with the name of the individual or object responsible	

source: Dennis, A., Wixom, B. H., & Tegarden, D. P. (2020). *Systems Analysis & Design: An object-oriented approach with UML version 2.0* (4th ed.). Wiley.

Task 0.2 (example)

1. Model the prelab by creating a flow diagram that illustrates the logic, sequence, and processes of the prelab.

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https://drive.google.com/file/d/14KVvUGmqMFRTZcqp-JLn3cSKMe3sv4yv/view

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- *This was already completed for you as an example. There is no need to do this, and is placed here as an example.*

Please continue to Prelab 0.2 here.