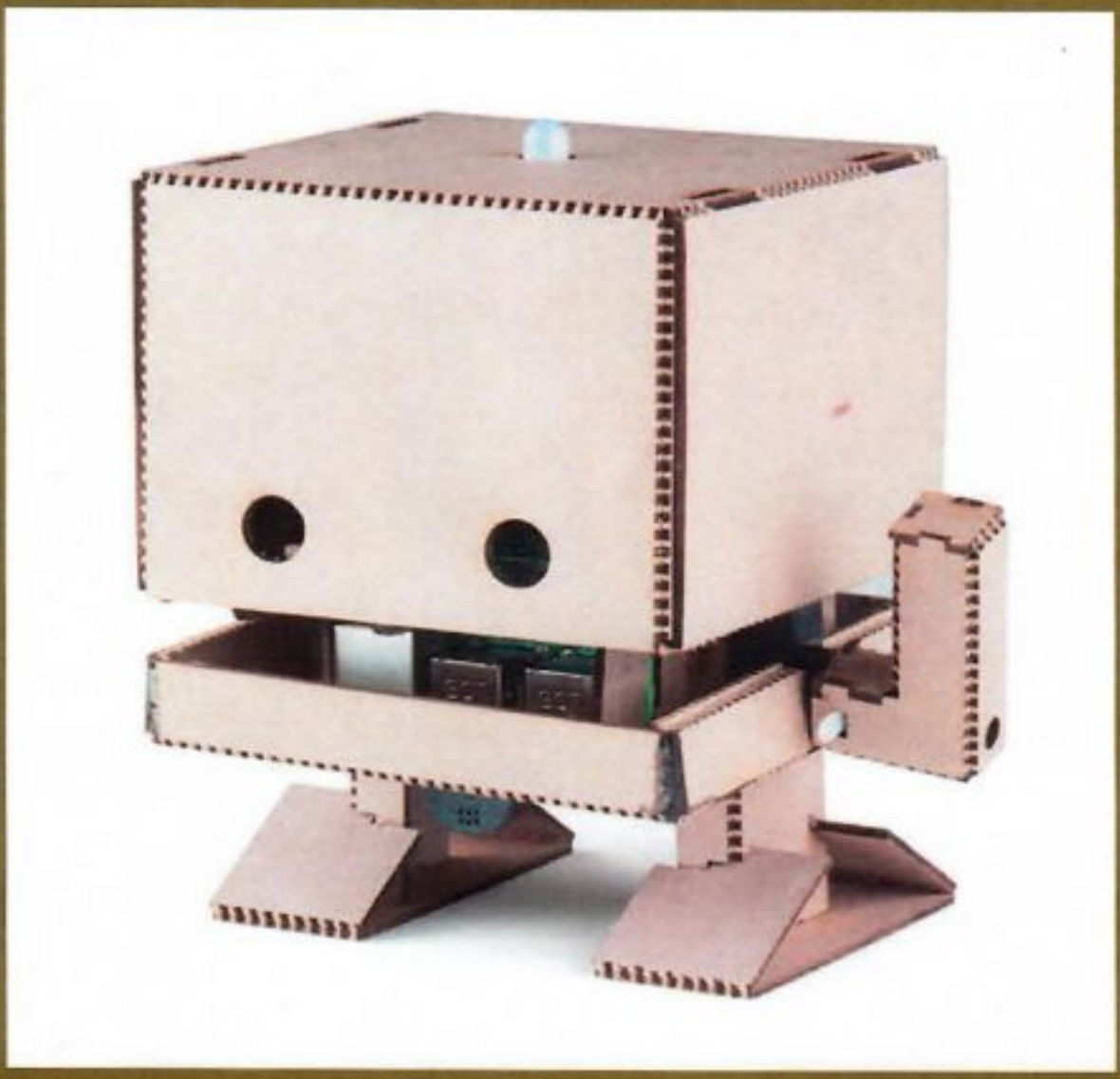


STEPS TO CREATE YOUR OWN TJ BOT

A Step-By-Step Manual

IBM

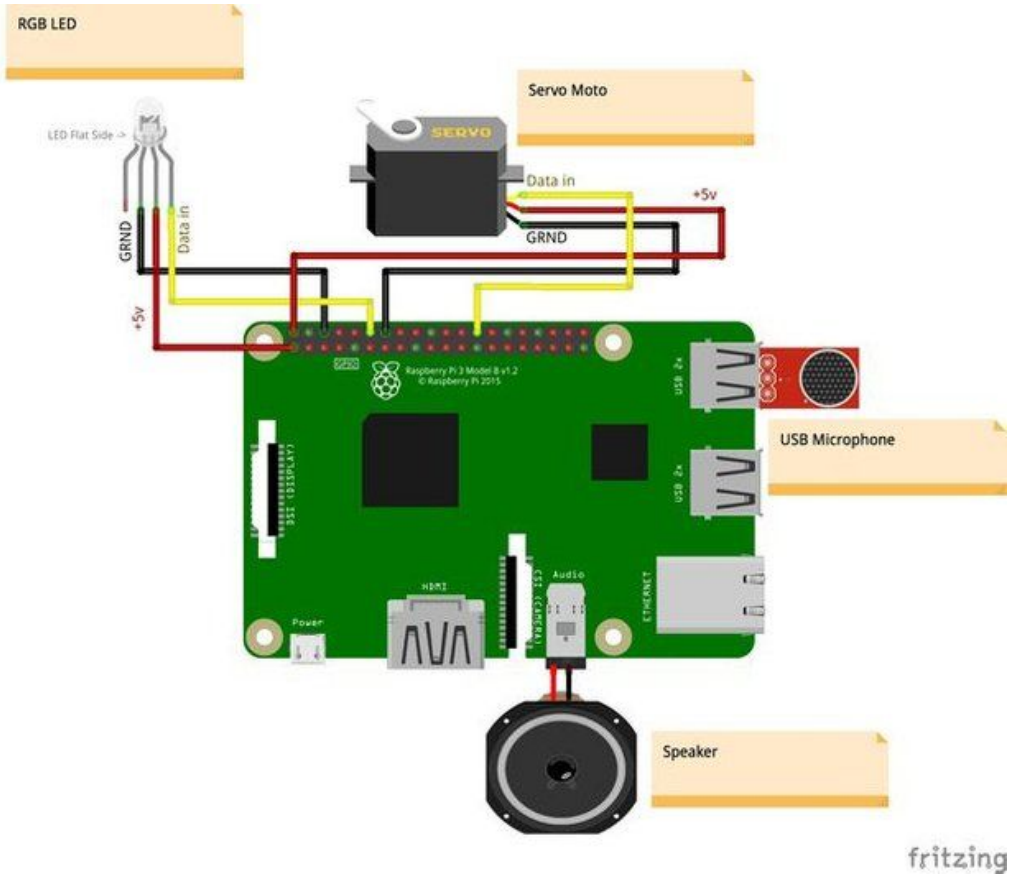
theWONDRY

TJBOT STEP-BY-STEP MANUAL

MODULE 1: BUILD THE TJBOT & BLUEMIX ACCOUNT

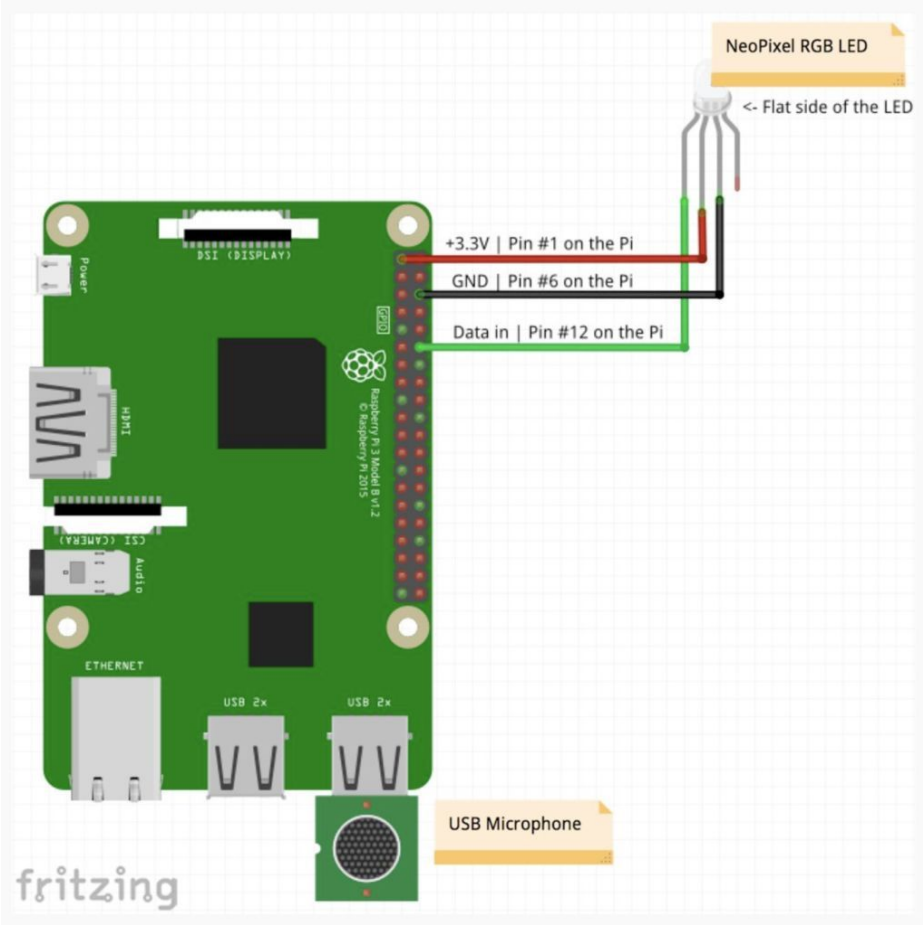
- You should have your TJbot laser-cut cardboard layout with you.
- Using this video, https://www.youtube.com/watch?v=k928MQmD0oc, you should follow a set of instructions to assemble and build a stable TJbot.
- Create a bluemix account using this link: https://cloud.ibm.com/login
- You will be needing credentials from your bluemix account to set up your TJbot.
- When building your TJbot make sure your wiring for the servo and the LED to the raspberry pi looks like this.

FOR THE SERVO:



- RED (+5V, PIN 2)
- BROWN (GROUND, PIN 14)
- YELLOW (DATA IN, PIN 26, GPIO7)

FOR THE LED:



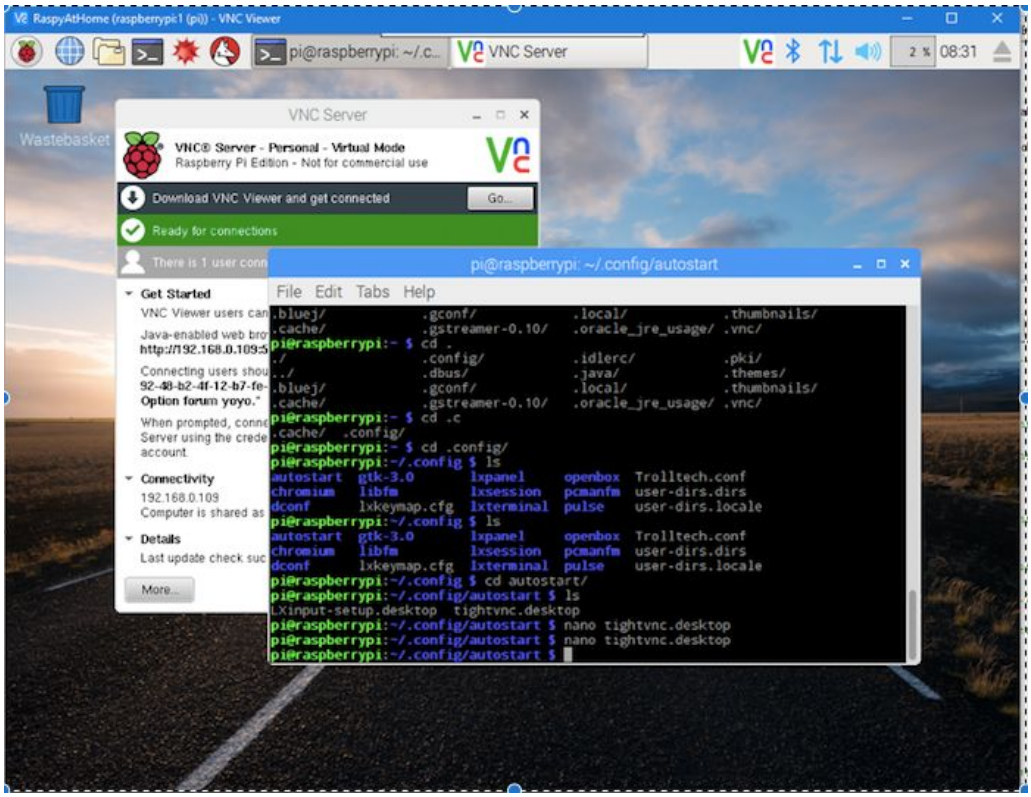
- RED (PIN 1)
- BLACK (PIN 6)
- GREEN (PIN 12)
- THE PIN CLOSEST TO THE FLAT SIDE OF THE LED IS NOT CONNECTED

MODULE 2: SETTING UP YOUR TJBOT

In order to connect your tjbot to a laptop, firstly, you have to connect it to a desktop, install the raspbian OS and run a few commands to be able to access it on a laptop. Below, is a step-by-step procedure for connecting it to the computer:

- Once you have assembled your TJbot, you should connect the USB port to a power source.
- Connect the mouse and the keyboard from the desktop to the TJbot.
- Project it on the desktop with the use of an HDMI cable.
- The raspberry pi will boot on the desktop screen.
- After booting, there will be a bunch of icons on the top of the screen including a wi-fi icon.
- Connect to the wi-fi network.
- Select and install only the raspbian OS (because installing other apps/OS could be detrimental to the raspberry pi's functionality)
- Then create a password for your raspberry pi. The custom password is raspberry.
- The coding terminal is a black icon coated with blue edge on the top left of the screen.
- Once installation is complete, open up the coding terminal and type: `sudo apt-get update`
- After running that command, run this one: `sudo apt-get install realvnc-vnc-server realvnc-vnc-viewer`
- Then run this command: `sudo raspi-config`
- Navigate to interfacing options.
- Then, scroll down to click on VNC, choose yes.
- You will be directed back to the homepage where you'll navigate and click on finish.
- Then, run this command: `vncserver`

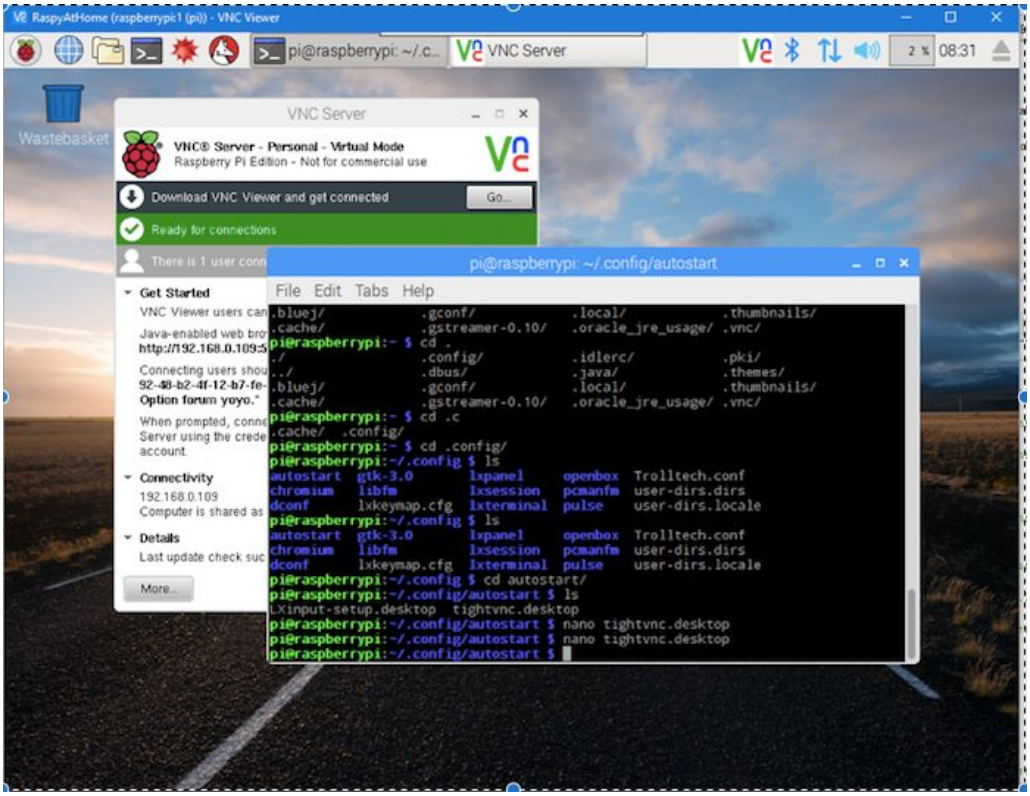
- After running the code, you shall see your IP address which will look like this: `192.167.5.149:1 but only take note of 192.167.5.149 and ignore :1`
- On your laptop, use this link, https://www.realvnc.com/en/connect/download/viewer/, to download the RealVNC app. RealVNC is the application you will use to run the raspberry pi on your laptop.
- Once installed on your laptop, you shall see a part of the page demanding an IP address in the top search bar. Once, your TJbot is connected to a power source with the use of the USB cable, type in the IP address.
- The custom username is **pi** and the password is **raspberry.**
- From now on, you can now connect your TJbot to your laptops or any other devices that have VNC server.
- Once you've put in the username and the password, you get access to a screen that looks like this:



- Then click on the coding terminal (the black icon with a blue shell) on the top left of the screen and start coding.

MODULE 3: INSTALLING VNC VIEWER ON YOUR COMPUTER

- On your laptop, use this link, https://www.realvnc.com/en/connect/download/viewer/, to download the RealVNC app. RealVNC is the application you will use to run the raspberry pi on your laptop.
- Once installed on your laptop, you shall see a part of the page demanding an IP address in the top search bar. Once, your TJbot is connected to a power source with the use of the USB cable, type in the IP address and press enter.
- The custom username is **pi** and the password is **raspberry.**
- Once you've put in the username and the password, you get access to a screen that looks like this:



- From now on, you can now connect your TJbot to your laptops or any other devices that have VNC viewer with the **same Wi-Fi network** as the TJbot.
- If the computer does not have the **same Wi-Fi network** as the TJbot, you can use the instructions under **module2: setting up your TJbot** to configure it.
- Then click on the coding terminal (the black icon with a blue shell) on the top left of the screen and start coding.

NOTE FOR CODING

**** If you use a Mac, use command + C to copy from pdf and try either ctrl + shift + V or ctrl + V to paste into the coding terminal or files in the VNC viewer.**

MODULE 4: DOWNLOADING THE PACKAGES FOR RUNNING TJBOT

- For installation of nodejs, open up the coding terminal and type in this code:

curl -sL https://deb.nodesource.com/setup_9.x | sudo -E bash -

- Then, press the enter button on your keyboard and let it run. - After the previous command has finished running, type in:

sudo apt-get install -y nodejs

- type enter and let it run. - After the previous command has finished running, type in: *curl -sL http://ibm.biz/tjbot-bootstrap | sudo sh -* and type enter and let it run. While this code is running, you will be asked a bunch of yes/no questions in the format y/n.
- Type in y/n based on the recommendations of the coding platform.
- At some point it will ask you to clone your tjbot into a folder, just copy and paste what appears as an example of a default folder which is: /home/pi/Desktop/tjbot
- For some of the questions, I have put the right responses that will make the TJbot operate properly, the questions you don't see here should be replied to with "y":

  disable ipv6: y

  Enable google dns: y

  sound kernels: n

  Would you like to run hardware tests at this time?: n

  Reboot?: y

- The computer should reboot after the previous command

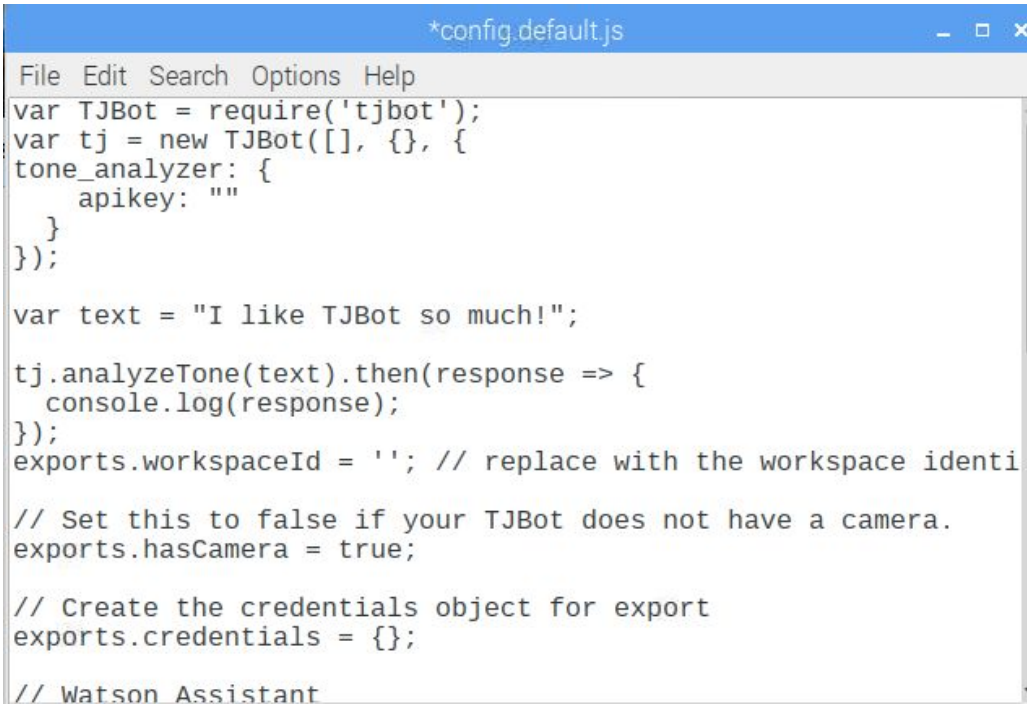
- Once it is done rebooting, type in: git clone https://github.com/ibmtjbot/tjbot.git into the coding platform.
- Then your TJbot should be ready to carry out specific tasks.

MODULE 5: CHATTING WITH YOUR TJBOT

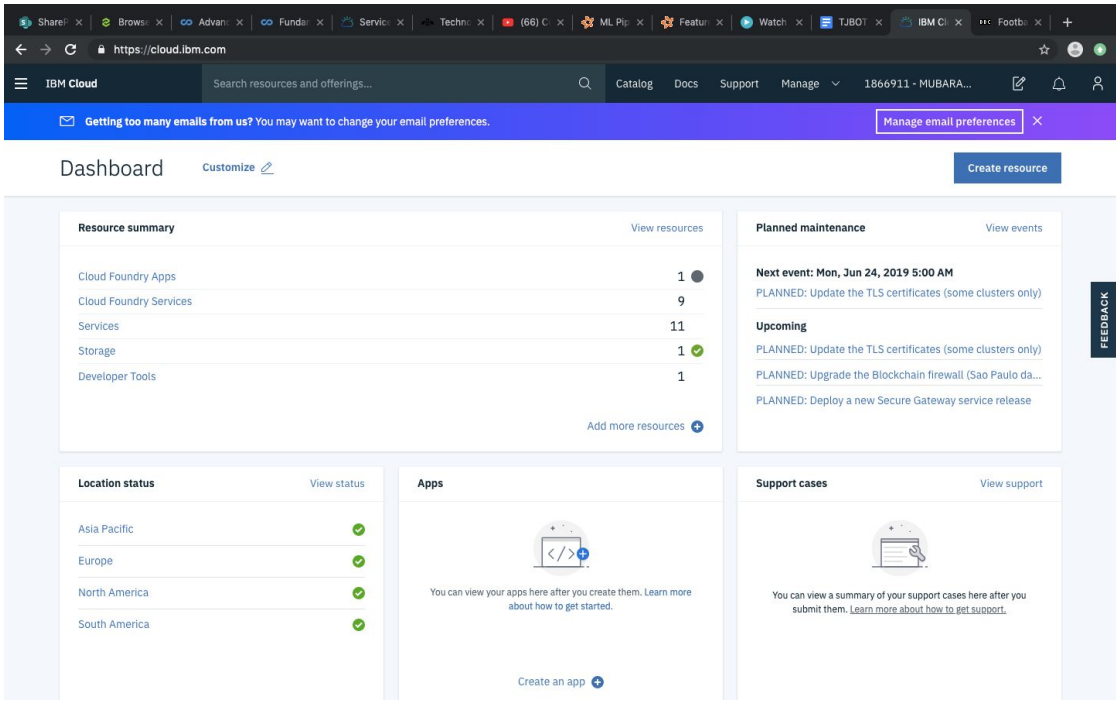
- If you are interested in using earphones or loudspeaker to listen to your TJbot. go to this link: https://www.instructables.com/id/Build-a-Talking-Robot-With-Watson-and-Raspberry-Pi/ and carry out the command on **HDMI/3.5mm Audio Jack** part under step 3 and connect headphones or speaker into the audiojack. Once done with this set-up, do not do any of the following steps in the instructables, proceed to the next instructions on this manual
- Once you are done, do not do any of the following steps in the instructables, instead do the ones here.
- Open the coding terminal and run these codes one by one:

```
cd tjbot/recipes/conversation
npm install

cp config.default.js config.js
```

- Once you are done with running the codes, click on the file symbol with two files on the toolbar.
- Then, open the config.js file on the by navigating **/home/pi/tjbot/recipes/conversation/config.js.**
- This is what the config.js file should look like:



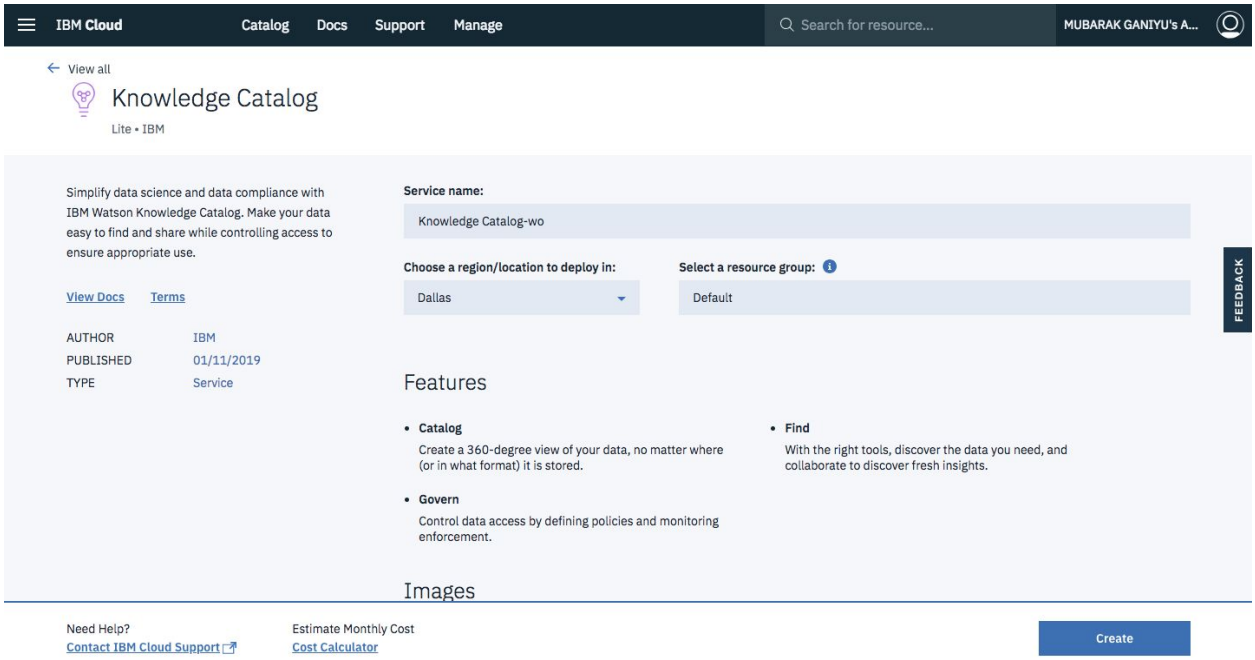
- Replace the entire code on the file with the code in this link, https://github.com/MUbarak123-56/tjbot/blob/master/recipes/conversation/config.default.js.
- Once you have replaced the codes with the with the ones above, use this link to go on https://console.bluemix.net/ and obtain the api keys. Here is a guide on how to do it.
- Once you've gotten on the page, login and you'll have access to a screen like the one in the next page:



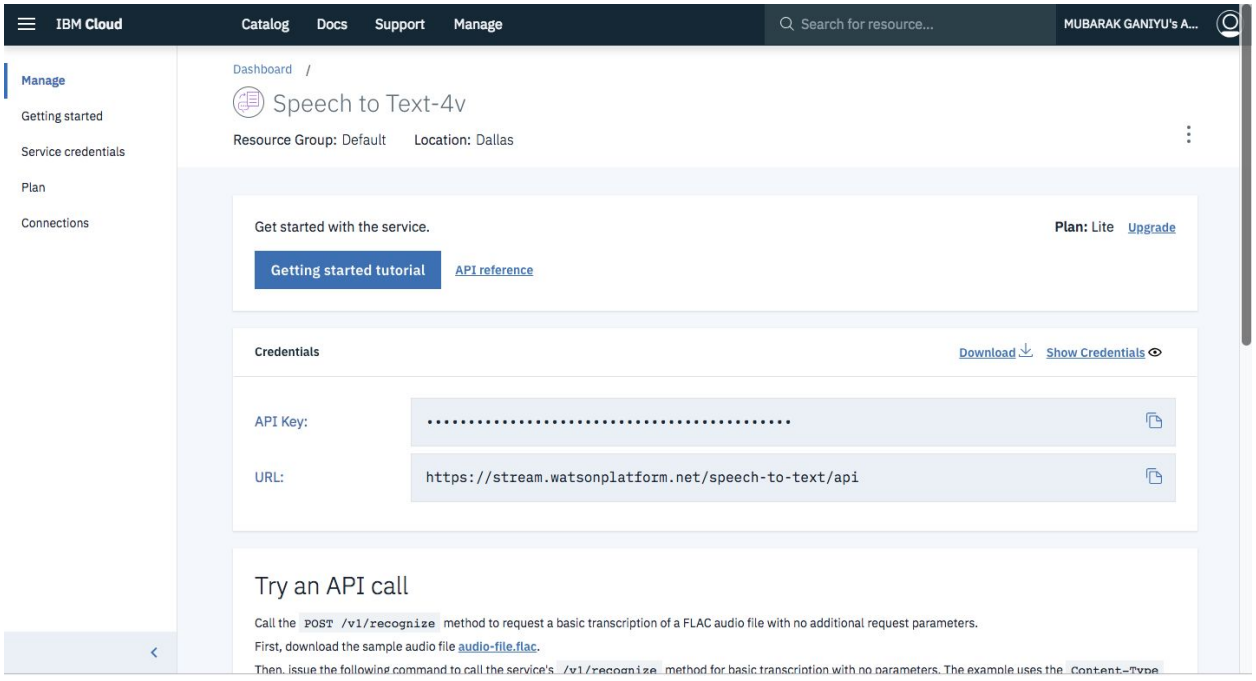
- For each apikey, you'll notice there is a code like

```
exports.credentials.whatever = {
apikey: "" };
```

- Search for the service that is put in place of **whatever** in the search bar on the top of the page and you'll get access to a page like this:



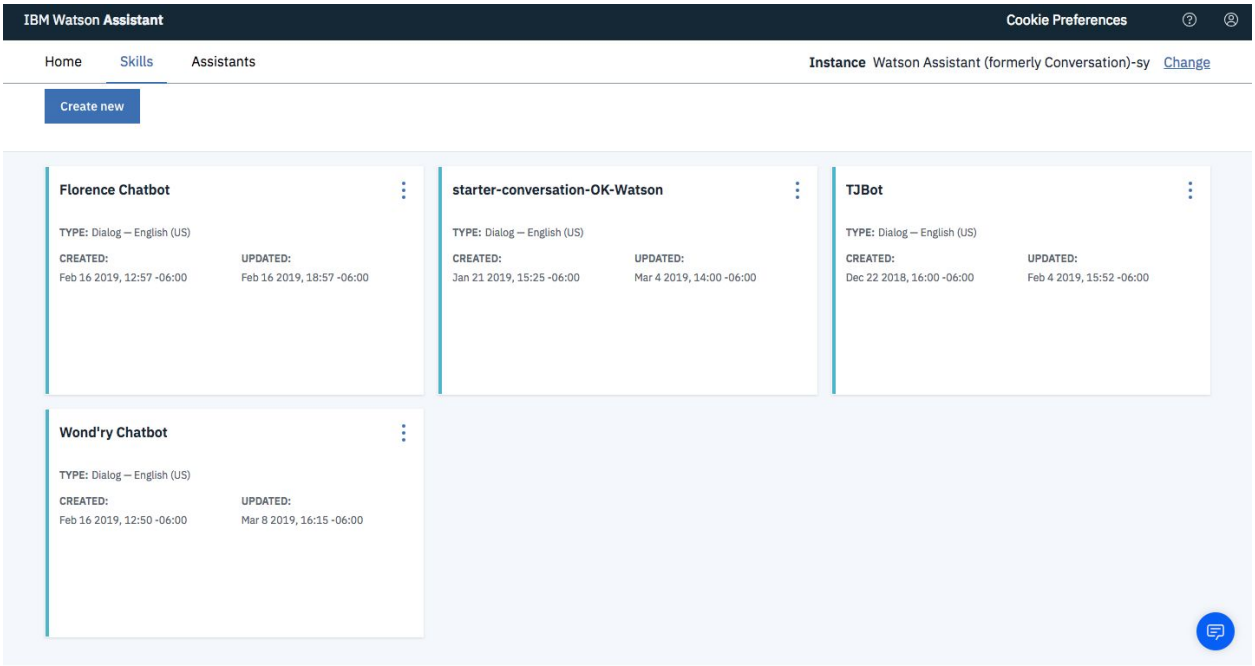
- Click on create and it'll take a few seconds to create. Do not change anything, just click on create.
- Once created, click on the manage button on the top left corner right on top of getting started. You'll have access to a page like this:



- Then, click on the **show credentials** to show your credentials and plug your api key into the code like:

  exports.credentials.tone_analyzer = { apikey: "TfL6kx8Vy9dCGyaP1YsTOak_guM1jynq8buZd9NDMrVr"};

- Repeat this process for every service/credential and obtain its apikey.
- For the workspace id, you'll need to use the browser on the vnc viewer by clicking on the web browser logo which is on the top left corner.
- Then, go on this website, https://www.ibm.com/cloud/watson-assistant/ and log in using your bluemix credentials.
- Once logged in, click on **skills** and navigate to **create new**. Then, click on **import skill,** then **choose JSON file** and navigate your way through **/home/pi/tjbot/recipes/conversation/** and you shall see two .json files.
- Choose the one that says **workspace-sample.json** and open it. Your webpage should look like this with the **TJbot folder visible** (that's what we need).



- Then, click on the three dots on the TJbot folder and click on **view api details.**
- This will take you to a page with a bunch of credentials. Then copy and paste the **workspace id** credential into the config.js file.

- Then, save your changes by exiting the config.js file.
- Then, run the code on the coding terminal using: sudo node conversation.js

- Follow the **Troubleshooting** instructions under Step 7 in this link, **https://www.instructables.com/id/Build-a-Talking-Robot-With-Watson-and-Raspberry-Pi/** if the codes are not working.

- Next time, you run the code, just plug in:

  cd tjbot/recipes/conversation
  npm install

  sudo node conversation.js

- You can speak to the TJbot by saying:

  Watson, hello

  Watson, tell me a joke

  Watson, what can you see?

  Watson, what can you do?

  Watson, wave your arms.

  Watson, how are you doing.

Note: Watson is its trigger word just like Siri for apple

MODULE 6: CHANGING THE COLOUR OF THE LED LIGHT

- Open the coding terminal and run these codes one by one:
  cd tjbot/recipes/speech_to_text
  npm install

  cp config.default.js config.js

- Once you are done with running the codes, click on the file symbol with two files on the toolbar.
- Then, open the config.js file on the by navigating **/home/pi/tjbot/recipes/speech_to_text/config.js**
- This is what the config.js file should look like:

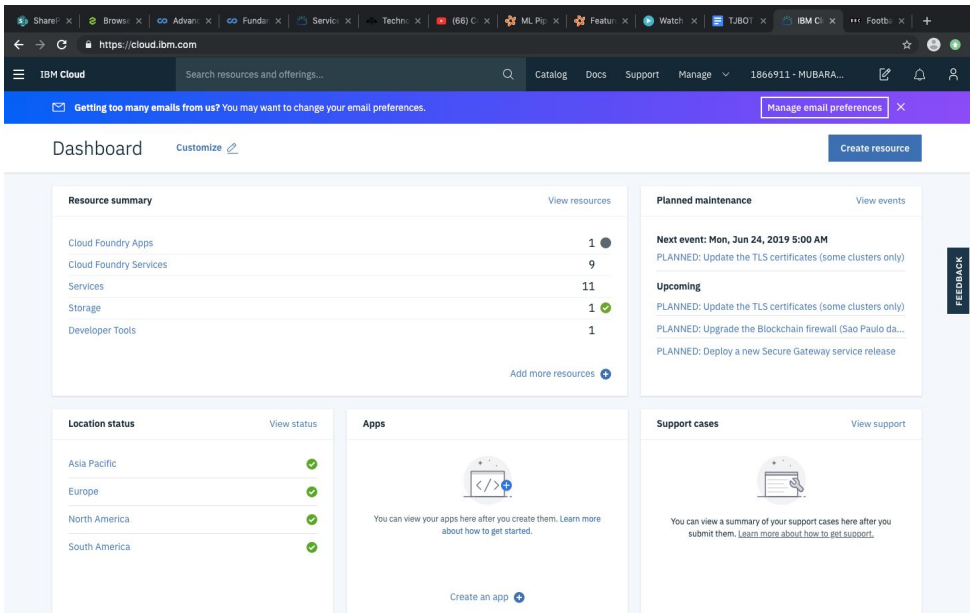
*config.default.js

File Edit Search Options Help

```
var TJBot = require('tjbot');
var tj = new TJBot([], {}, {
tone_analyzer: {
    apikey: ""
  }
});

var text = "I like TJBot so much!";

tj.analyzeTone(text).then(response => {
  console.log(response);
});
exports.workspaceId = ''; // replace with the workspace identi

// Set this to false if your TJBot does not have a camera.
exports.hasCamera = true;

// Create the credentials object for export
exports.credentials = {};

// Watson Assistant
```

-

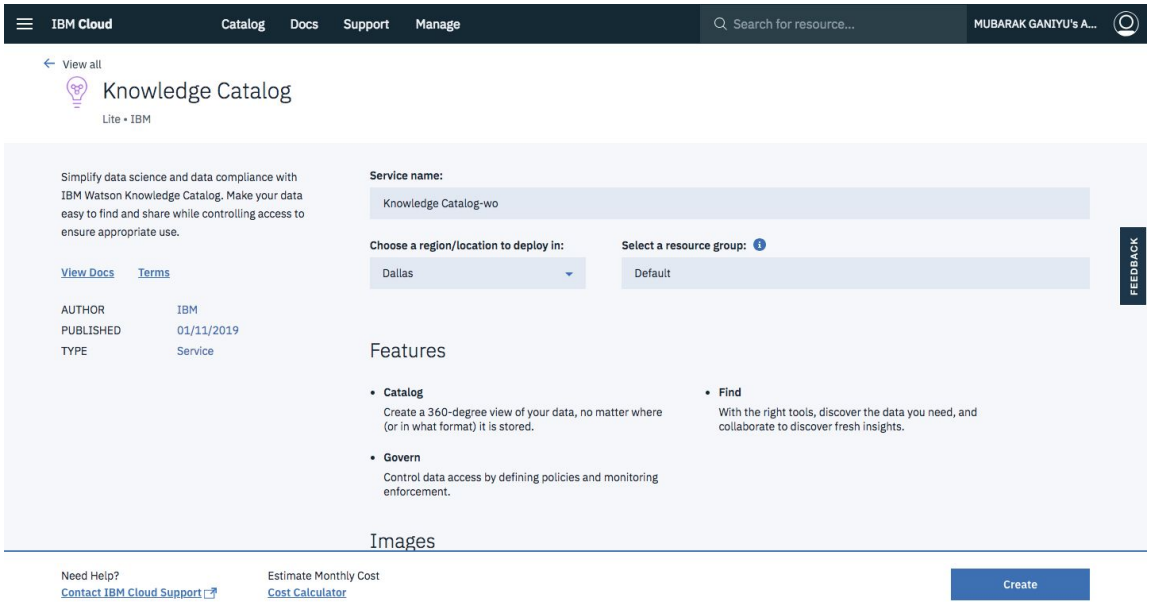
- Replace the code on the file with this code in this link, https://github.com/MUbarak123-56/tjbot/blob/master/recipes/speech_to_text/config.default.js.
- Once you have replaced the codes with the with the ones above, use this link to go on https://console.bluemix.net/ and obtain the api keys. Here is a guide on how to do it.
- Once you've gotten on the page, login and you'll have access to a screen like this web page:



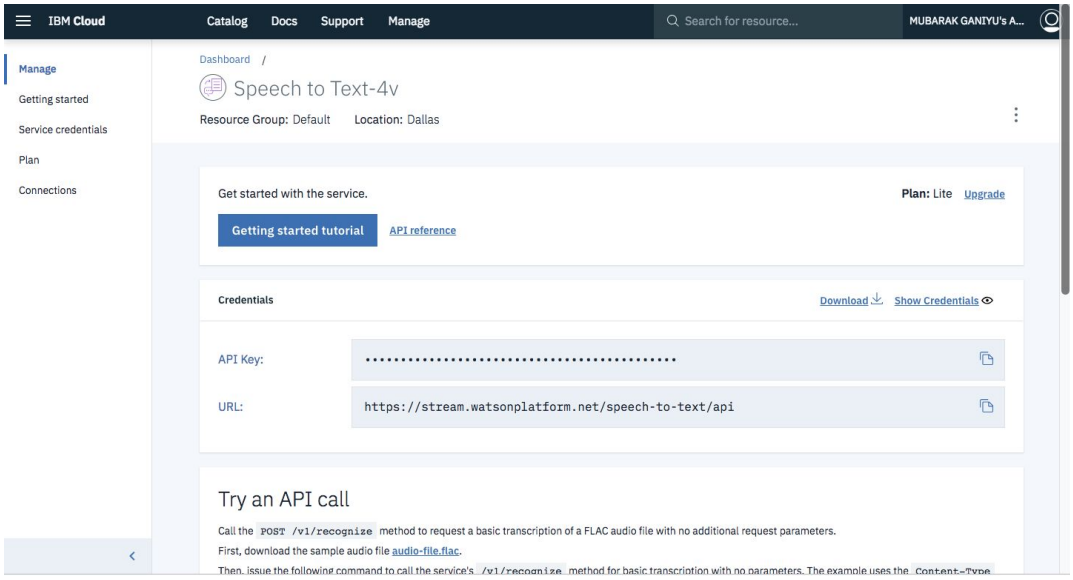
- For each apikey, you'll notice there is a code like

```
exports.credentials.whatever = {
apikey: "" };
```

- Search for the service that is put in place of whatever in the search bar and you'll get access to a page like this:



-
- Click on create and it'll take a few seconds to create. Do not change anything, just click on create.
- Once created, click on the **manage** button on the top left corner right on top of **getting started.** You'll have access to a page like this:



- Then, click on the **show credentials** to show your credentials and plug them into the code like:

  exports.credentials.tone_analyzer = { apikey: "HyL6kx5HO9dC9yb21YsTpaj_guW1jrnqp9uZdUNDMrVe"};

- Repeat this process for every service/credential and obtain the other api keys.
- Then, save your changes by exiting the config.js file.
- Then, run the code on the coding terminal using: sudo node stt.js
- If you are having problem with turning on the LED light, you should move thered wire from pin 1 to either pin 2/pin 3. - There are other instructions for fixing the LED light if it is not working well under **Troubleshooting** in Step 6 on this link: https://www.instructables.com/id/Use-Your-Voice-to-Control-a-Light-With-Watson/
- Next time you run the entire sequence, Just type in the following commands:

  cd tjbot/recipes/speech_to_text

  npm install

  sudo node stt.js

- You can speak to the TJbot by saying:

  turn the lights on

turn the lights off

turn the lights red

turn the lights blue

turn the lights [to any other color]

MODULE 7: MODIFYING/CREATING YOUR OWN CONVERSATION STREAM WITH THE TJBOT

- If you want to learn how to create your own conversation flow with the TJbot, you will go ahead to this website: https://cognitiveclass.ai/.
- Login using your bluemix credentials or you might have to create an account for the website.
- Once you have logged in, you will see an icon called courses on the top of the page. Select it and it will direct you to another page.
- In this new page, you shall click on the **Build your own chatbot** and enroll in it. Then, navigate to courseware, which is on the top left corner of the page and take the course from Module 1 to Module 4. Those are the modules that are needed for building a chatbot for the TJbot.
- With the knowledge you have gained from this online class, you can create your own chatbot and use its credentials on TJbot to chat with it.