Task 0.1 - Software Installation

This file contains the instructions to install the following software/ libraries:

1. **Python**
2. **Numpy**
3. **Sympy**
4. **Octave**
5. **Octave Symbolic Package**
6. **Arduino IDE**

Note:- Installation of software is tested on Ubuntu 16.04

1. Python

- Before Installing Python 3.7, some packages are needed to build. To install these packages, run following command in the terminal.
  - sudo apt update
  - sudo apt install build-essential zlib1g-dev libncurses5-dev libgdbm-dev libnss3-dev libreadline-dev libffi-dev wget

- Next step is to download the source code from python's download page.
  - cd /tmp
  - wget https://www.python.org/ftp/python/3.7.4/Python-3.7.4.tar.xz

- After downloading, run following commands to extract and install Python 3.7
  - tar -xf Python-3.7.4.tar.xz
  - cd Python-3.7.4
  - ./configure --enable-optimizations
  - sudo make altinstall

Caution: Do not use standard make install as it overwrites the default python3 binary.

- To test if python is installed, type following command in terminal.
  - python3.7 --version

Note - All programming in Stage 1 is to be done in Octave Programming Language. Python is required because some libraries of Octave require Python to be installed.

2. Numpy

- To install any python package, you first need to install the pip which is a package management system used to install and manage software packages written in python. To install pip for python3.7, type following command and press Enter:

- sudo apt install python3-pip
- sudo pip3.7 install --upgrade pip

- To install Numpy, open the command prompt and type the following command and press Enter:

  - sudo pip3.7 install numpy

- In order to verify the installation, type the following command in command prompt and press Enter:

  - python3.7 -c "import numpy; print("numpy.__version__")"

- You should see the command prompt as shown in Figure 1.

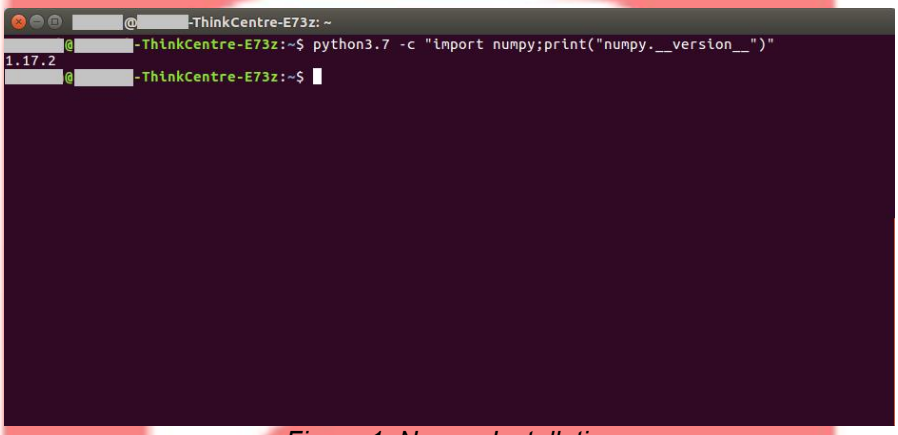

Figure 1: Numpy Installation

3. Sympy

- To install Sympy, open the command prompt and type the following command and press Enter:

  - sudo pip3.7 install sympy

- In order to verify the installation, type the following command in command prompt and press Enter:
  - python3.7 -c "import sympy; print("sympy.__version__")"

- You should see the command prompt as shown in Figure 2.

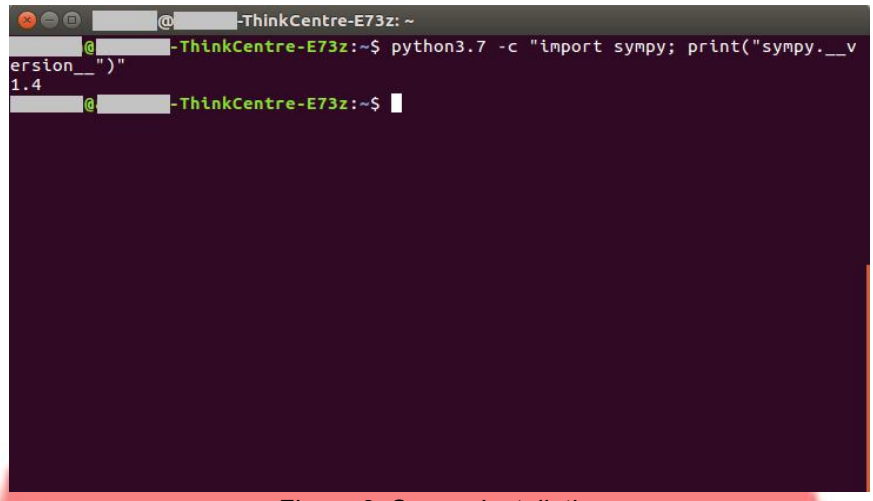

Figure 2: Sympy Installation

4. Octave

- Run following commands to install package flatpak to assist in installing Octave 5
  - sudo add-apt-repository ppa:alexlarsson/flatpak
  - sudo apt update
  - sudo apt install flatpak
  - Flatpak remote-add --if-not-exists flathub https://flathub.org/repo/flathub.flatpakrepo
  - flatpak install flathub org.octave.Octave
  - flatpak run org.octave.Octave --gui
- Restart the system, if required. Then, Click on the Octave installer. You will see the window as given in Figure 3.

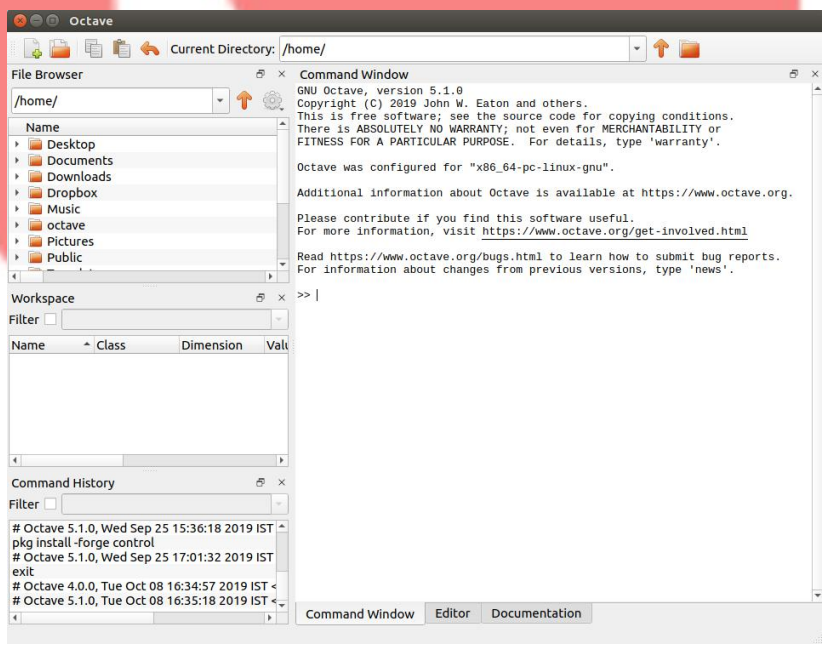

Figure 3: Octave 5

5. Octave Symbolic Package

- Open the Octave software installed in your system. Type the following command in the command window and Press Enter:

```
>>pkg install -forge symbolic
```

- Type the following command to check if symbolic has been installed correctly.

```
>>pkg load symbolic
```

- If symbolic has been properly been installed, the command should execute without any error. You will see the window as given in Figure 4.

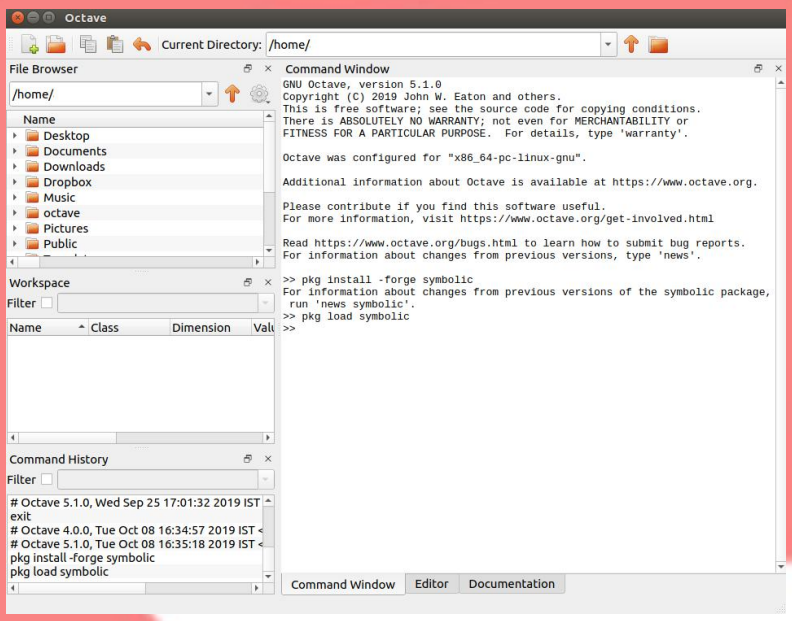

Figure 4: Install Symbolic

6. Octave Control Package

- Open the Octave software installed in your system. Type the following command in the command window and Press Enter:

```
>>pkg install -forge control
```

- Type the following command to check if control has been installed correctly.

```
>>pkg load control
```

- Type the following command to see if the proper version of control is installed.

```
>>pkg list
```

- The total list of packages and their versions should show up. Control Package latest version that needs to be installed is 3.2.0. You will see the window as given in Figure 5.

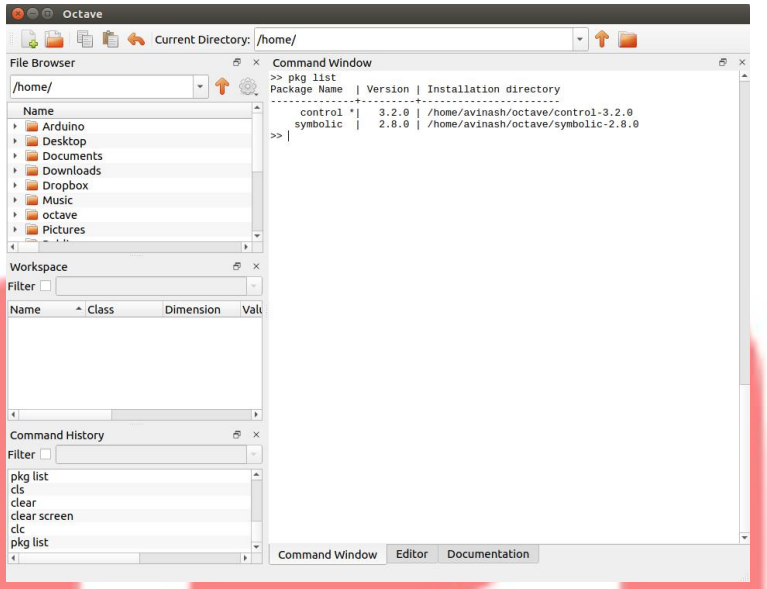

Figure 5: Package Lists

7. Arduino IDE

- Download the Web Installer for Arduino from here. And open the terminal and change directory to the location of downloaded file.
- Run the installer and Install the Arduino Software on your system by typing following command:

  - tar -xf arduino-1.8.10-linux64.tar.xz
  - cd arduino-1.8.10/
  - sudo chmod +x ./install.sh
  - sudo ./install.sh

- Now Launch the arduino from the launcher. You will see the window as given in Figure 6.

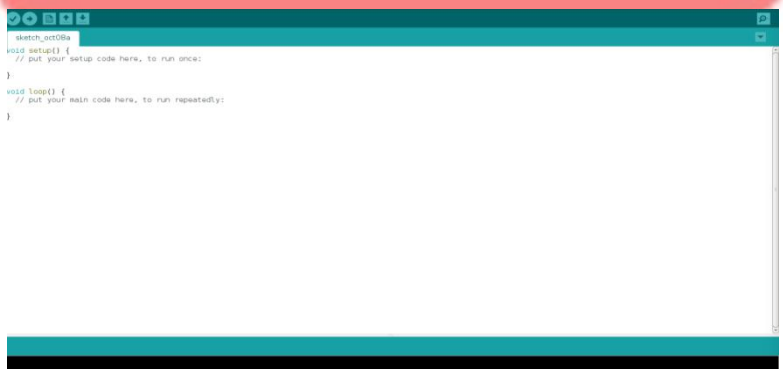

Figure 6: Arduino Installation