

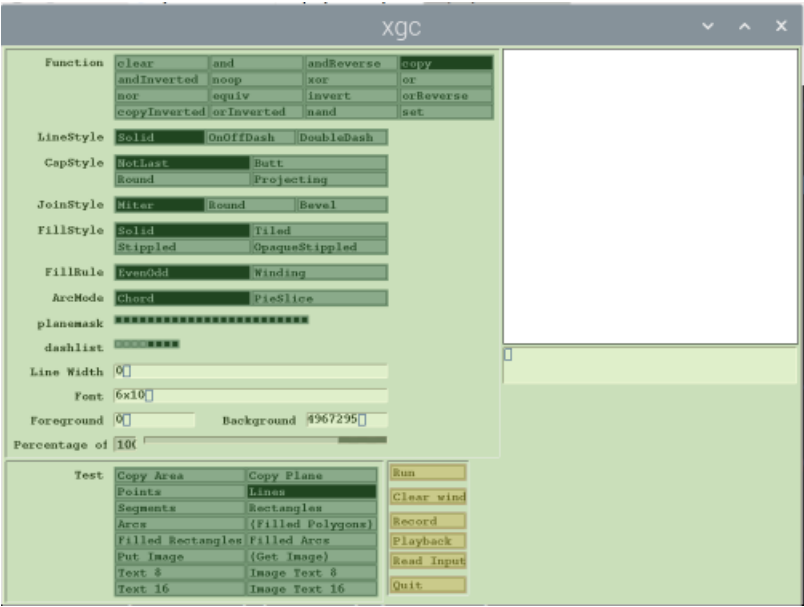
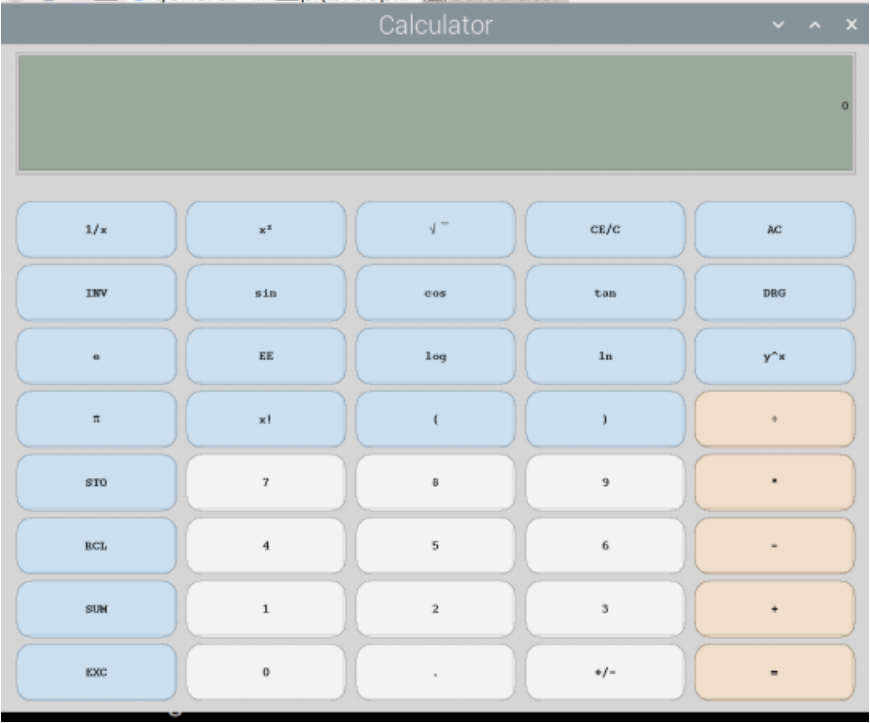
# Lab 8 — Data Analysis

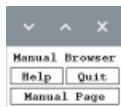
- Study the GitHub [repository](#) Lesson 8
- Install Python packages
- Save the Lab 7 Google sheet in CSV format to ~/demo
- Copy ~/iot/lesson8/plt\_final.py and plt\_cv2.py to ~/demo
- Edit plt\_final.py and plt\_cv2.py to read the CSV file
- Run plt\_final.py and plt\_cv2.py

- # Lab 8 — Data Analysis
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```
pi@raspberrypi:~$ sudo apt install x11-apps xbitmaps mesa-utils
Reading package lists... Done
Building dependency tree... Done
Package x11-apps is already installed.
Package xbitmaps is already installed.
Package mesa-utils is already installed.
The following additional packages will be installed:
  libegl1-mesa libegl1-mesa-dev libgl1-mesa-glx libgl1-mesa-lsb libglx0
  libllvm7 libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-present0
  libxcb-randr0 libxcb-sync0 libxcb-xfixes0 libxxf86vm1 lsb-core
  mesa-common-modules libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2
  libdrm-radeon1 libdrm2 libgbm1 libglvnd0 libglx-mesa0 libhsa-runtime0
  libkms-vaapi1 liblunixmedia-dev liblunixmedia0 libpciaccess0
  libvdpau1 libvulkan1 libwayland-bin libwayland-client0 libwayland-cursor0
  libwayland-server0 libx11-xcb1 libxcursor1 libxdamage1 libxfixes3
  libxi6 libxrandr2 libxshmfence1 libxtst6 libzfp1.0 linux-libc-dev
  mesa-utils-bin mesa-utils-common mesa-utils-extras python3-pygments
  python3-yaml python3-zipp python3-wheel python3-zipstream
Suggested packages:
  mesa-utils-doc python3-setuptools python3-toml python3-click python3-jinja2
  python3-markupsafe python3-sphinx python3-requests python3-urllib3
  python3-flask python3-werkzeug python3-httpx python3-httplib2 python3-idna
  python3-itsdangerous python3-jwt python3-kombu python3-msgpack python3-paramiko
  python3-pexpect python3-psutil python3-pyserial python3-pyssh python3-pymongo
  python3-pynput python3-pyusb python3-qrcode python3-robotframework
  python3-scapy python3-smbclient python3-socks python3-tweepy python3-twilio
  python3-uiautomator python3-websocket python3-wget python3-wireless-network-monitors
  python3-wpacli python3-xmodem python3-yamllint python3-yarl python3-yatag
  python3-yatag-doc python3-yatag-examples python3-yatag-test python3-yatag-trace
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```







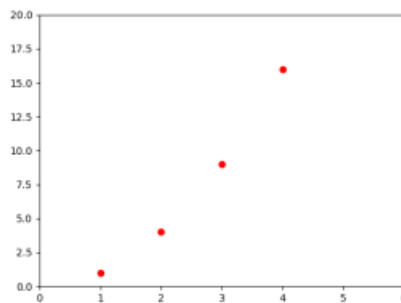
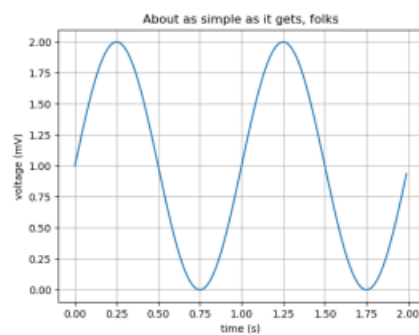
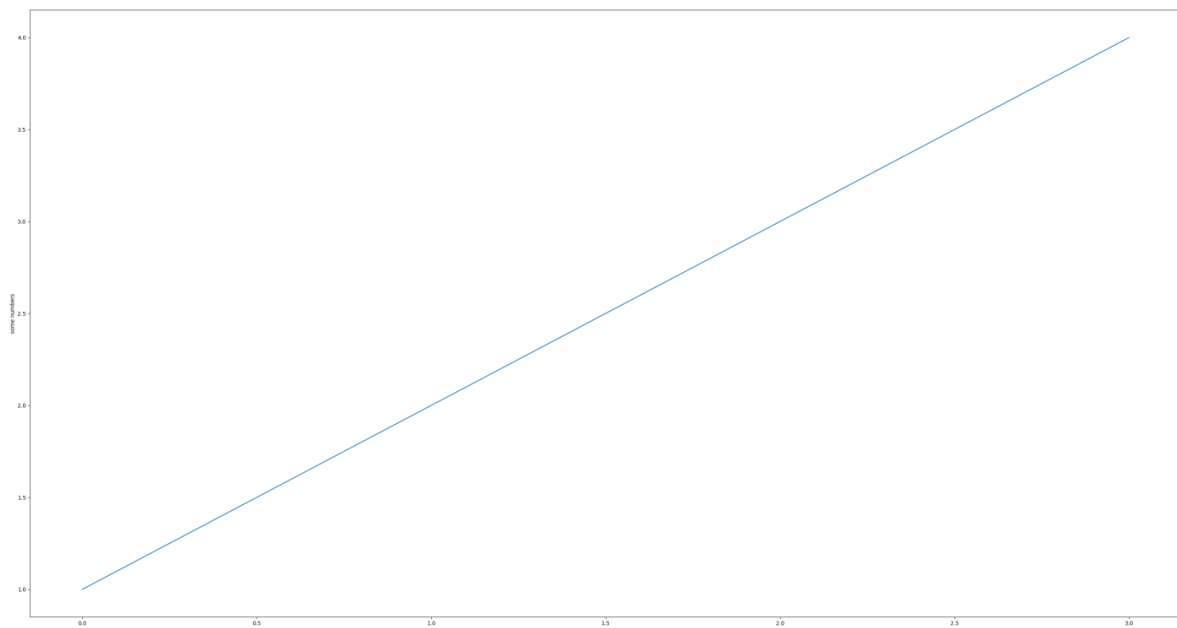
```
$ python3
>>> import numpy as np
>>> a = np.arange(6)
>>> a
>>> b = np.arange(12).reshape(4, 3)
>>> b
>>> c = np.arange(24).reshape(2, 3, 4)
>>> c
>>> b.shape
>>> b.reshape(-1)
>>> b.reshape(-1, 1)
>>> b.reshape(2, -1)
>>> d = np.array([20, 30, 40, 50])
>>> e = np.arange(4)
>>> f = d-e
>>> f
>>> e**2
>>> A = np.array([[1, 1], [0, 1]])
>>> B = np.array([[2, 0], [3, 4]])
>>> A*B
>>> A.dot(B)
>>> np.dot(A, B)
>>> g = np.ones((2, 3), dtype=int)
>>> g
>>> h = np.random.random((2, 3))
>>> h
>>> g *= 3
>>> g
>>> h += g
>>> h
>>> k = np.random.random((2, 3))
>>> k
>>> k.sum()
>>> k.min()
>>> k.max()
>>> m = np.arange(12).reshape(3, 4)
>>> m
>>> m.sum(axis = 0)
>>> m.min(axis = 1)
>>> m.cumsum(axis = 1)
>>> n = np.arange(5)
>>> n
>>> n[[1, 3, 4]] = 0
>>> n
>>> exit()
```

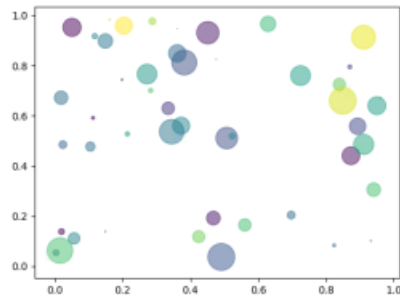
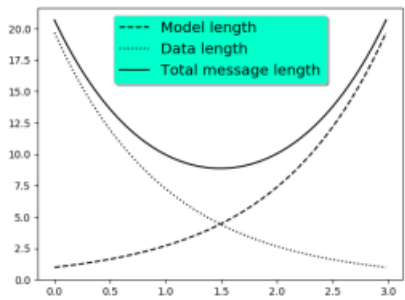
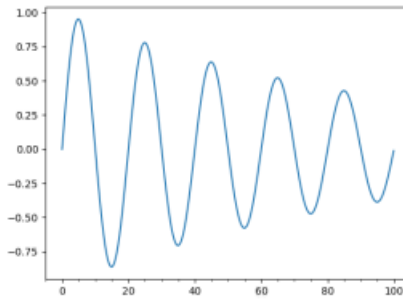
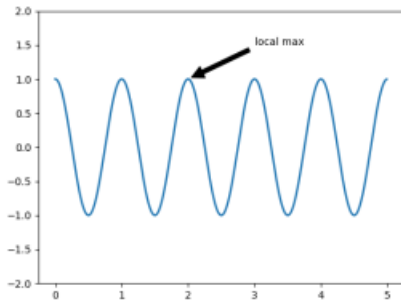
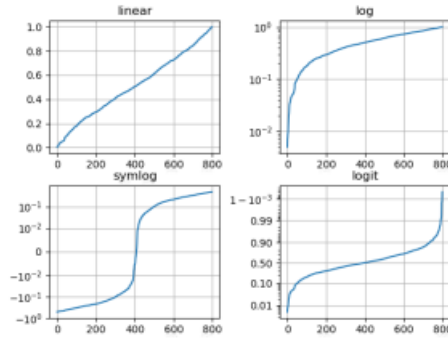
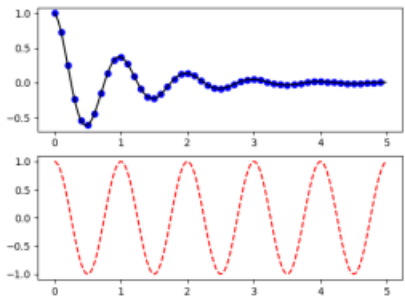
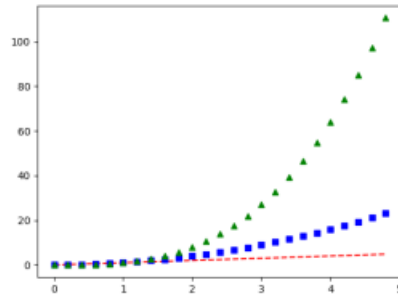
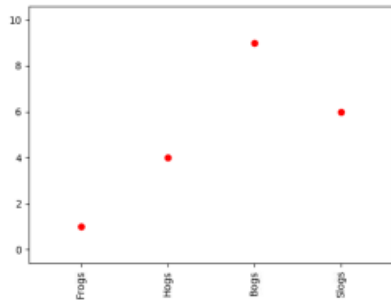
```

>>> g
array([[3, 3, 3],
       [3, 3, 3]])
>>> h += g
>>> h
array([[3.62645876, 3.91983062, 3.27322645],
       [3.25033093, 3.0129131 , 3.21140803]])
>>> k = np.random.random((2, 3))
>>> k
array([[0.233694 , 0.00550868, 0.2250866 ],
       [0.61305934, 0.37214455, 0.72000954]])
>>> k.sum()
2.1695027217435006
>>> k.min()
0.005508683430435091
>>> k.max()
0.7200095425642735
>>> m = np.arange(12).reshape(3, 4)
>>> m
array([[ 0,  1,  2,  3],
       [ 4,  5,  6,  7],
       [ 8,  9, 10, 11]])
>>> m.sum(axis = 0)
array([12, 15, 18, 21])
>>> m.min(axis = 1)
array([0, 4, 8])
>>> m.cumsum(axis = 1)
array([[ 0,  1,  3,  6],
       [ 4,  9, 15, 22],
       [ 8, 17, 27, 38]], dtype=int32)
>>> n = np.arange(5)
>>> n
array([0, 1, 2, 3, 4])
>>> n[[1, 3, 4]] = 0
>>> n
array([0, 0, 2, 0, 0])

```

```
$ cd ~/iot/lesson8
$ python3 pyplot_simple.py
$ python3 simple_plot.py
$ python3 pyplot_formatstr.py
$ python3 ticklabels_demo_rotation.py
$ python3 pyplot_three.py
$ python3 pyplot_two_subplots.py
$ python3 pyplot_scales.py
$ python3 pyplot_annotate.py
$ python3 major_minor_demo1.py
$ python3 legend_demo.py
```





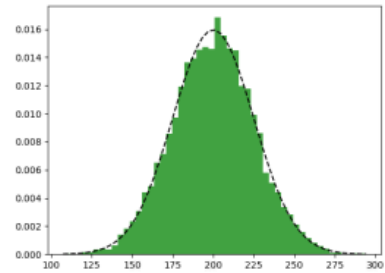
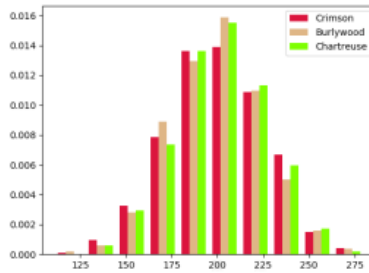
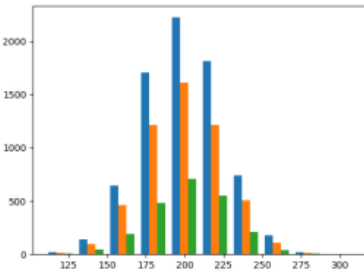
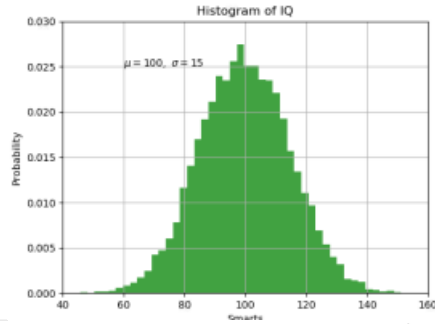
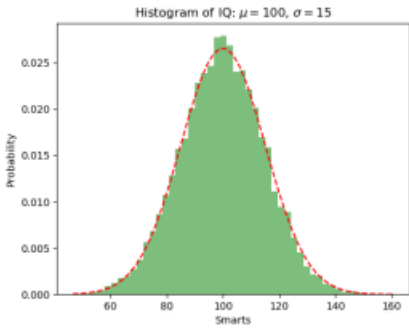


Figure 6

Figure 3

8 projects special\_

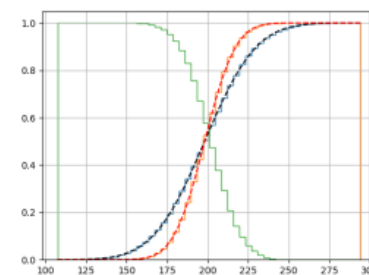
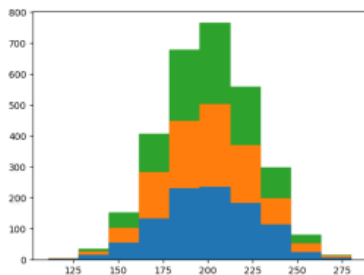
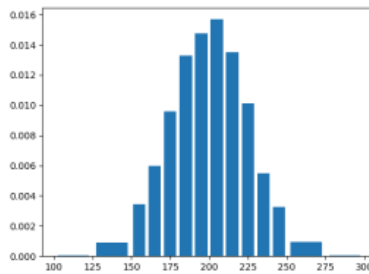
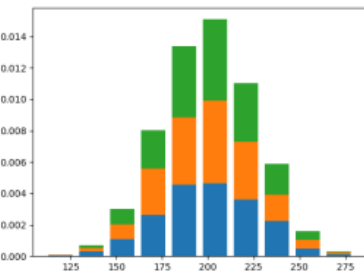
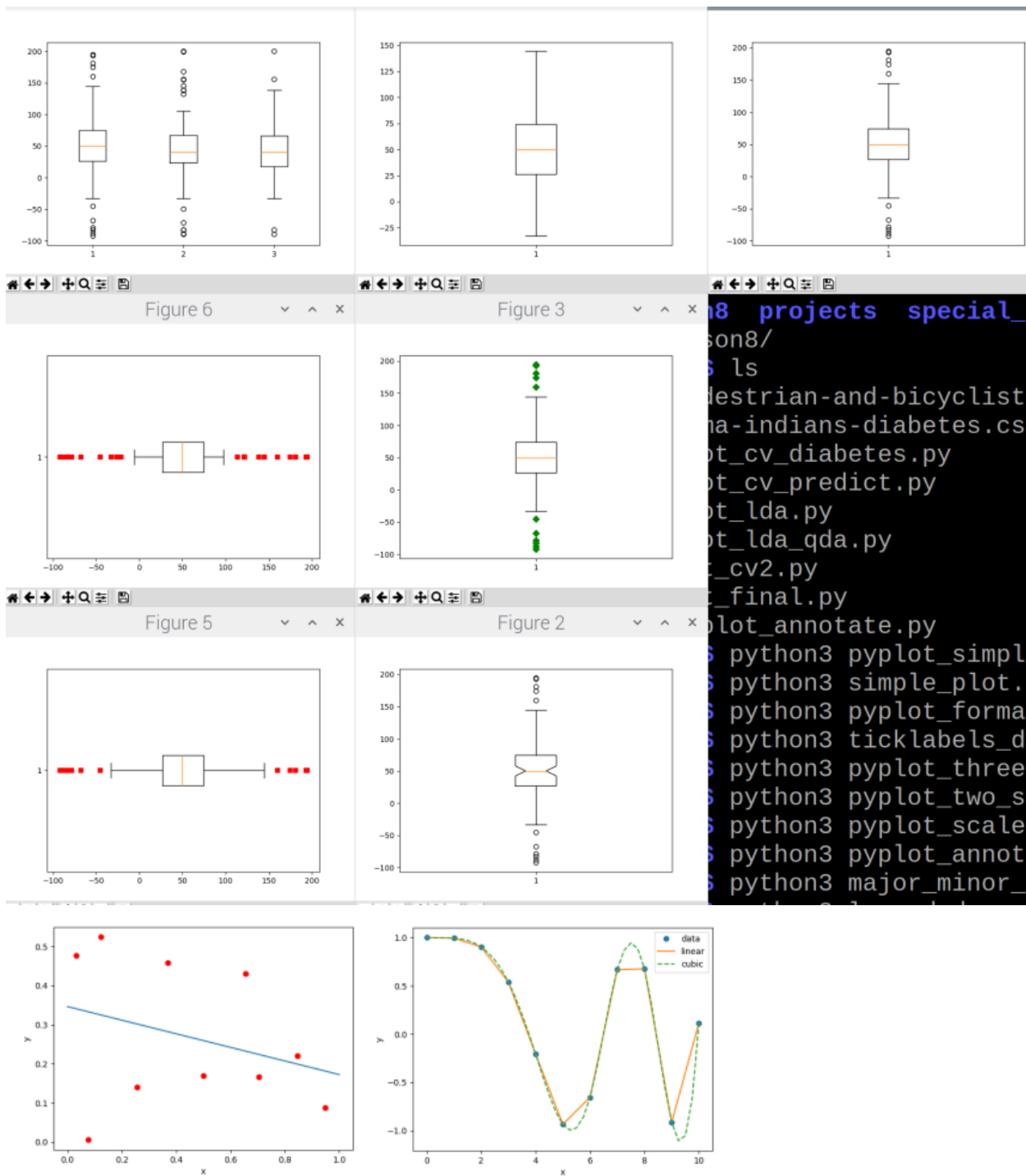


Figure 5

Figure 2

```
son8/
$ ls
destrian-and-bicyclist
na-indians-diabetes.csv
ot_cv_diabetes.py
ot_cv_predict.py
ot_lda.py
ot_lda_qda.py
_cv2.py
_final.py
lot_annotate.py
python3 pyplot_simple
python3 simple_plot.
python3 pyplot_forma
python3 ticklabels_d
python3 pyplot_three
python3 pyplot_two_s
python3 pyplot_scales
python3 pyplot_annota
python3 major_minor_
```





Will update with Lab8 part b (4/29/22)