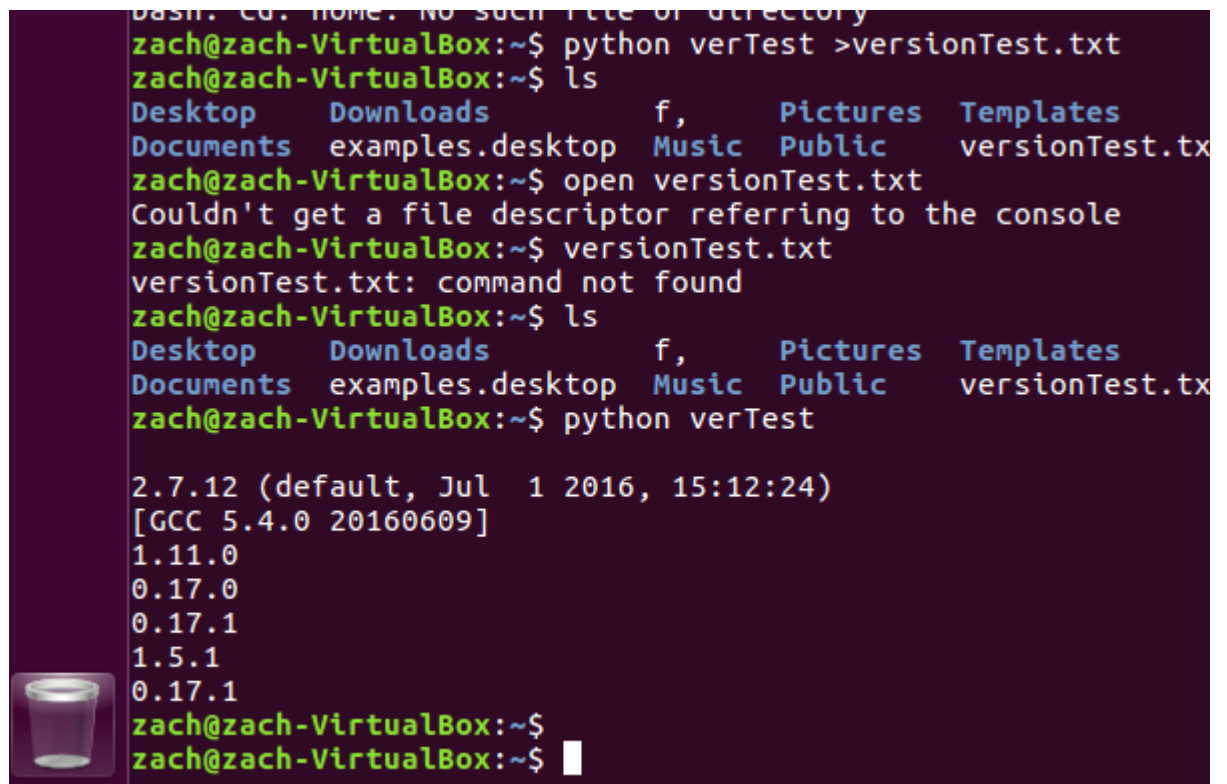


Homework 0

Zach Stecher


Due: 9/6/16

A terminal window with a dark purple background. The prompt is 'zach@zach-VirtualBox:~\$'. The user enters 'python verTest >versionTest.txt'. The prompt changes to 'zach@zach-VirtualBox:~\$'. The user enters 'ls'. The output shows a directory listing: Desktop, Downloads, f, Pictures, Templates, Documents, examples.desktop, Music, Public, versionTest.tx. The user enters 'open versionTest.txt'. The output is 'Couldn't get a file descriptor referring to the console'. The user enters 'versionTest.txt'. The output is 'versionTest.txt: command not found'. The user enters 'ls'. The output is the same directory listing as before. The user enters 'python verTest'. The output shows the Python version: '2.7.12 (default, Jul 1 2016, 15:12:24)', the GCC version: '[GCC 5.4.0 20160609]', and a list of versions: '1.11.0', '0.17.0', '0.17.1', '1.5.1', '0.17.1'. The prompt returns to 'zach@zach-VirtualBox:~\$'.

```
bash: cd: HOME: no such file or directory
zach@zach-VirtualBox:~$ python verTest >versionTest.txt
zach@zach-VirtualBox:~$ ls
Desktop    Downloads      f,      Pictures  Templates
Documents  examples.desktop  Music  Public   versionTest.tx
zach@zach-VirtualBox:~$ open versionTest.txt
Couldn't get a file descriptor referring to the console
zach@zach-VirtualBox:~$ versionTest.txt
versionTest.txt: command not found
zach@zach-VirtualBox:~$ ls
Desktop    Downloads      f,      Pictures  Templates
Documents  examples.desktop  Music  Public   versionTest.tx
zach@zach-VirtualBox:~$ python verTest

2.7.12 (default, Jul 1 2016, 15:12:24)
[GCC 5.4.0 20160609]
1.11.0
0.17.0
0.17.1
1.5.1
0.17.1
zach@zach-VirtualBox:~$
zach@zach-VirtualBox:~$
```

Screenshot of Python package version test. The output is also hosted on GitHub.

 zachstecher / MSCS550

<> Code

! Issues 0

🔗 Pull requests 0

📖 Wiki

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Options


Collaborators

Branches

Webhooks & services

Deploy keys

Collaborators

 **Pablo Rivas**
Awaiting pablorp80's response

Search by username, full name or email

Screenshot of Professor Rivas added as GitHub Collaborator.

Username: zachstecher

Link: <https://github.com/zachstecher/MSCS550>



Zach Stecher

Joined 3 minutes ago · last seen in the p

Home

Competitions (0)

Kernels (0)

Discussion (0)

Da

Competitions Novice



Kernels Novice

Unranked

Unranl

Screenshot of kaggle account created with marist e-mail address.

Username: zstecher

Link: <https://www.kaggle.com/zstecher>

Problems:

- 1) Find the value for x that maximizes $g(x)$.

Using $\frac{-b}{2a}$ we compute that $x = 4$ will maximize $g(x)$.

$$x = 4$$

- 2) What are the partial derivatives of $f(x)$ with respect to x_0 and x_1 ?

With respect to x_0 : $9x_0^2 - 2x_1^2$

With respect to x_1 : $-4x_0x_1 + 4$

- 3) Questions about given matrices:

- a) Can you multiply the two matrices?

No. The number of rows from matrix A do not match the number of rows from matrix B.

- b) Multiply $A^T \times B$ and give its Rank:

$$C = \begin{bmatrix} -2 & -2 & 13 \\ -8 & 1 & 16 \\ 6 & -3 & -3 \end{bmatrix}$$

Matrix C has a Rank of 2.

- c) $AB^T + C^{-1} =$

$$\begin{bmatrix} -16 & -16 \\ 11 & 13.5 \end{bmatrix}$$

- 4) Give the mathematical definitions of the simple Gaussian, multivariate Gaussian, Bernoulli, binomial, and exponential distribution.

simple Gaussian:
$$f(x) = ae^{-\frac{(x-b)^2}{2c^2}}$$

multivariate Gaussian:

$$p(x; \mu, \Sigma) = \frac{1}{(2\pi)^{n/2} |\Sigma|^{1/2}} \exp \left(-\frac{1}{2} (x - \mu)^T \Sigma^{-1} (x - \mu) \right)$$

Bernoulli: $P(n) = P^n (1 - p)^{1-n}$

$$f(k; n, p) = \Pr(X = k) = \binom{n}{k} p^k (1 - p)^{n-k}$$

binomial:

$$f(x; \lambda) = \begin{cases} \lambda e^{-\lambda x} & x \geq 0, \\ 0 & x < 0. \end{cases}$$

exponential:

5) What is the relationship between the Bernoulli and binomial distributions?

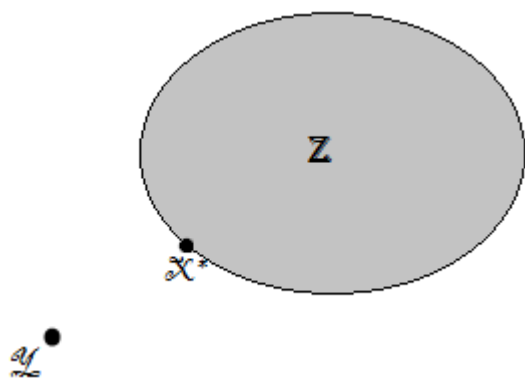
A Bernoulli distribution is a when a random variable X has two possible outcomes: 0 and 1. A binomial distribution is when we take the sum of n independent Bernoulli random variables.

6) The expected value is 2.5.

7) Answer a) and b) for the given optimization problem.

a) $x^* = 1$

b) Locate x^* in the picture (added location):



8) Couldn't figure out these problems in time...