

# Python – The wonderful language hack





- **Blender** – free open source 3D computer graphics software (C, C++ and Python)
- BitTorrent
- Dropbox
- Ubuntu software manager
- **Xpra** - remote hosting
- GNU Bazaar revision control software



# Software revision control alternatives

“Bazaar is IMO the best tool to use in environments such as scientific programming, where the collaborators are not willing to spend a week learning how to use Git without.”

Tweenk 03/14/2013.



# Bazaar

- Serverless operation. All you need to make a public repository is an SSH or FTP account.
- Decentralized mode and branches.
- Simple command structure.
- GNU Project – free software and mass collaboration.
- Launchpad – code hosting.

The logo for HAWKIN's BAZAAR is displayed on a green rectangular background. The text "HAWKIN's" is in a white, bold, sans-serif font, with the apostrophe in the 's' being a small, stylized mark. Below it, the word "BAZAAR" is written in a larger, white, bold, sans-serif font with a slightly distressed or hand-drawn appearance.

**HAWKIN's  
BAZAAR**



- Mark Shuttleworth
- Free/open-source software or tools designed to improve collaboration between free software developers and contributors.
- Developer of Debian OS
- Funder of Ubuntu
- Shuttleworth Foundation – provides funding for unproven ideas.

# New in Python 3



- Simple arithmetic  $\frac{3}{4} = 0.75$
- Interprets '0'777
- `collections.OrderedDict([items])` Now: 4-100x faster
- The new `subprocess.run()` function provides a streamlined way to run subprocesses.
- `os` module
  - `os.chdir(path) = os.fchdir(fd)`
  - `os.getenvb(key, default=None)` = returns value of variable
  - `os.fsencode(filename)` = encodes data

# Structuring code



```
os.makedirs("a_directory", 0o700, exist_ok=True)
filedata.replace('something', str(pythons_in_a_box))
```

```
os.chdir("/gpfs/home/zgv09gsu/particle/")
with open('a_can_of_snakes', 'w') as anaconda_snakes:
    monty's.write(anaconda_snakes)
```

```
with os.fdopen(os.open(model_name_0), os.O_WRONLY | os.O_CREAT, 0o744), 'w')
as variable:
    write0 = read0.replace('traj_id', str(model_name_0))
    laggy2.write(write0)
```

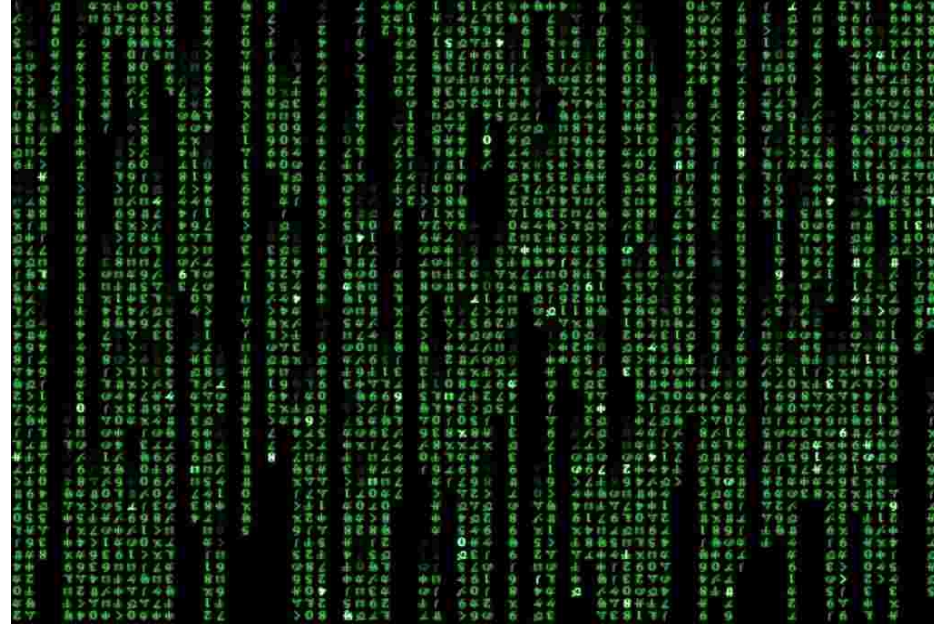
# Larger range of characters

- `>>> résumé = "knows Python"`
- `>>>  $\pi$  = math.pi`





# Matrix Multiplication



```
>>> a = np.array([[1, 0], [0, 1]])  
>>> b = np.array([[4, 1], [2, 2]])  
>>> np.dot(a, b)  
array([[4, 1], [2, 2]])
```

```
>>> a = np.array([[1, 0], [0, 1]])  
>>> b = np.array([[4, 1], [2, 2]])  
>>> a @ b  
array([[4, 1], [2, 2]])
```

# Advanced unpacking

```
>>> a, b = range(2)
```

```
>>> a
```

```
0
```

```
>>> b
```

```
1
```

```
>>> a, b, *rest = range(10)
```

```
>>> a
```

```
0
```

```
>>> b
```

```
1
```

```
>>> rest
```

```
[2, 3, 4, 5, 6, 7, 8, 9]
```



# Chained exceptions



```
def mycopy(source, dest):  
    try:  
        shutil.copy2(source, dest)  
    except OSError: # We don't have  
        permissions. More on this later  
        raise NotImplementedError("automatic  
        sudo injection")
```

```
>>> mycopy('noway', 'noway2')
```

```
>>> mycopy(1, 2)
```

```
Traceback (most recent call last):
```

```
File "<stdin>", line 1, in <module>
```

```
File "<stdin>", line 5, in mycopy
```

```
NotImplementedError: automatic sudo  
injection
```

```
mycopy('noway', 'noway2')
```

```
Traceback (most recent call last):
```

```
File "<stdin>", line 3, in mycopy
```

```
File  
"/Users/aaronmeurer/anaconda3/lib/pyt  
hon3.3/shutil.py", line 243, in copy2
```

```
    copyfile(src, dst,  
    follow_symlinks=follow_symlinks)
```

```
File  
"/Users/aaronmeurer/anaconda3/lib/pyt  
hon3.3/shutil.py", line 109, in copyfile
```

```
with open(src, 'rb') as fsrc:
```

```
PermissionError: [Errno 13] Permission  
denied: 'noway'
```

# Function annotations

- Python doesn't do anything with the annotations other than put them in an `__annotations__` dictionary.

`def f(a: stuff, b: stuff = 2) -> batman:`

