

# PYTHON ON WINDOWS

## STATE OF THE ART

[@nicolaiarocci](#)

# Question

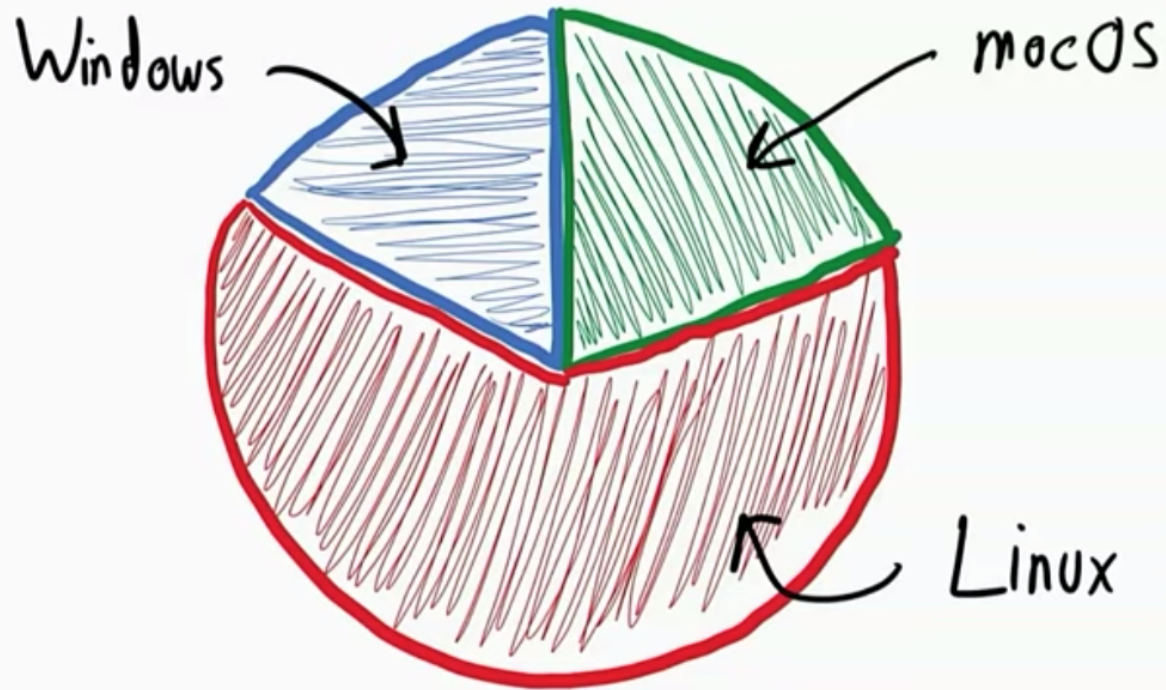
How many of you in this room are on Windows?

# THE GOALS OF THIS TALK

Quite ambitious ones

1. Awareness of Windows relevance for Python
2. Make your code "just work" on Windows
3. Wonders of Python development on Windows

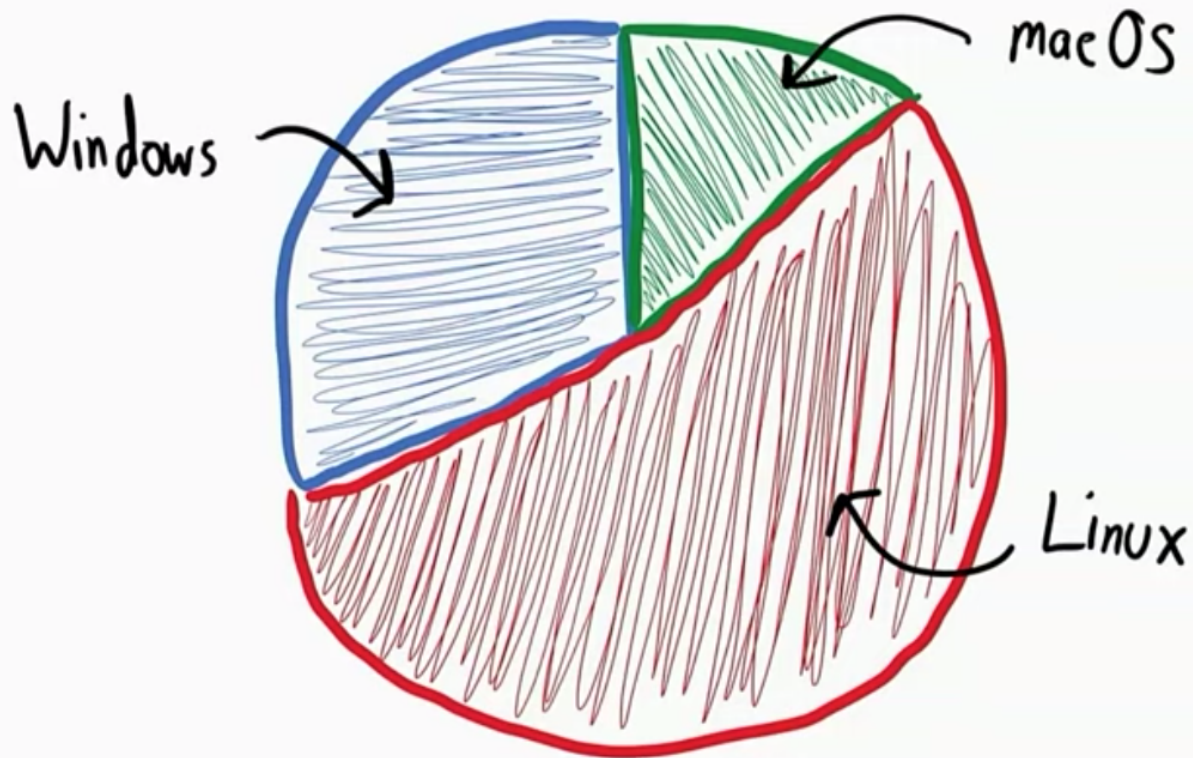
# PyPI DOWNLOADS BY O.S.



Source: Public PyPI.org data

@zooba

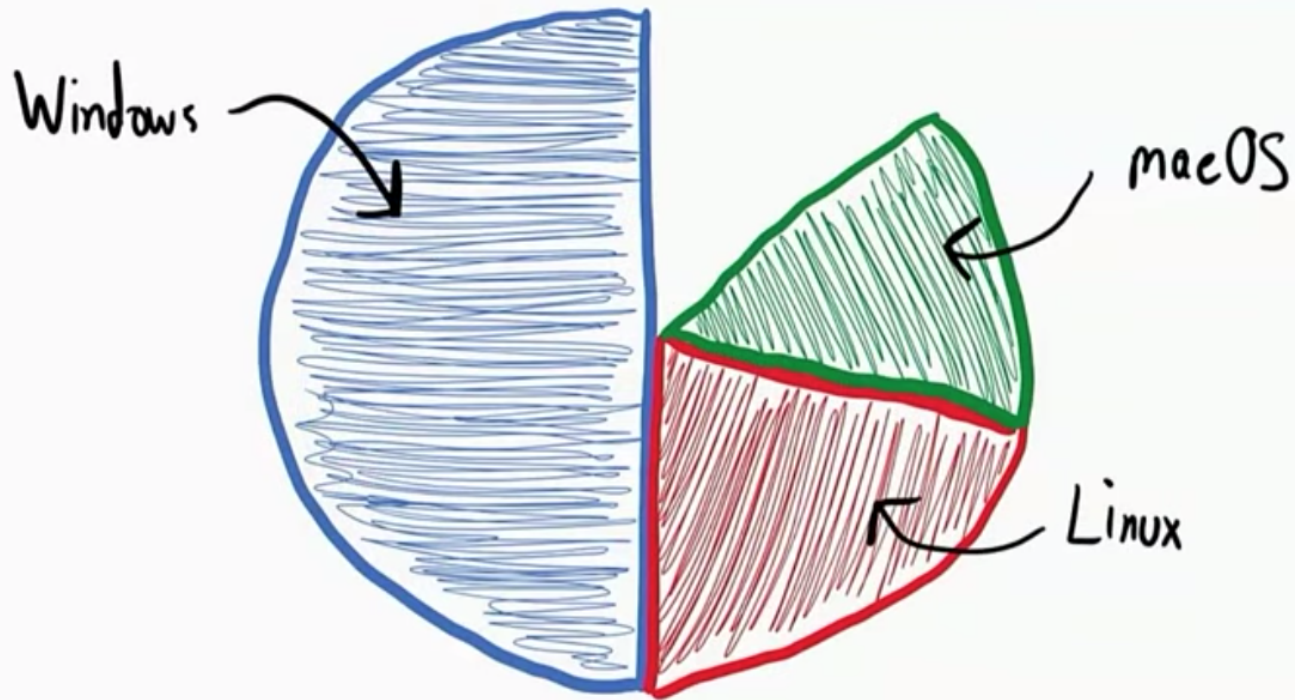
# conda DOWNLOADS BY O.S.



SOURCE: Anaconda Inc.

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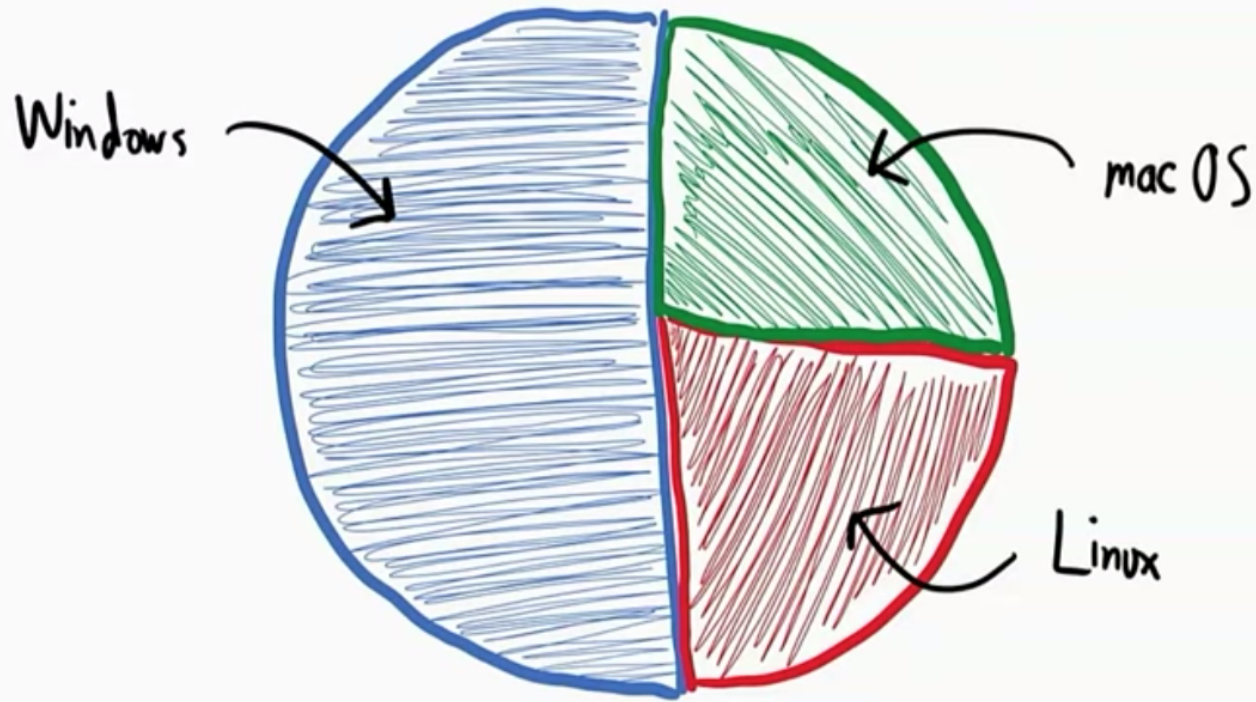
# O.S. CHOICE BY PSF SURVEY



SOURCE: PSF Developer Survey 2017

@zooba

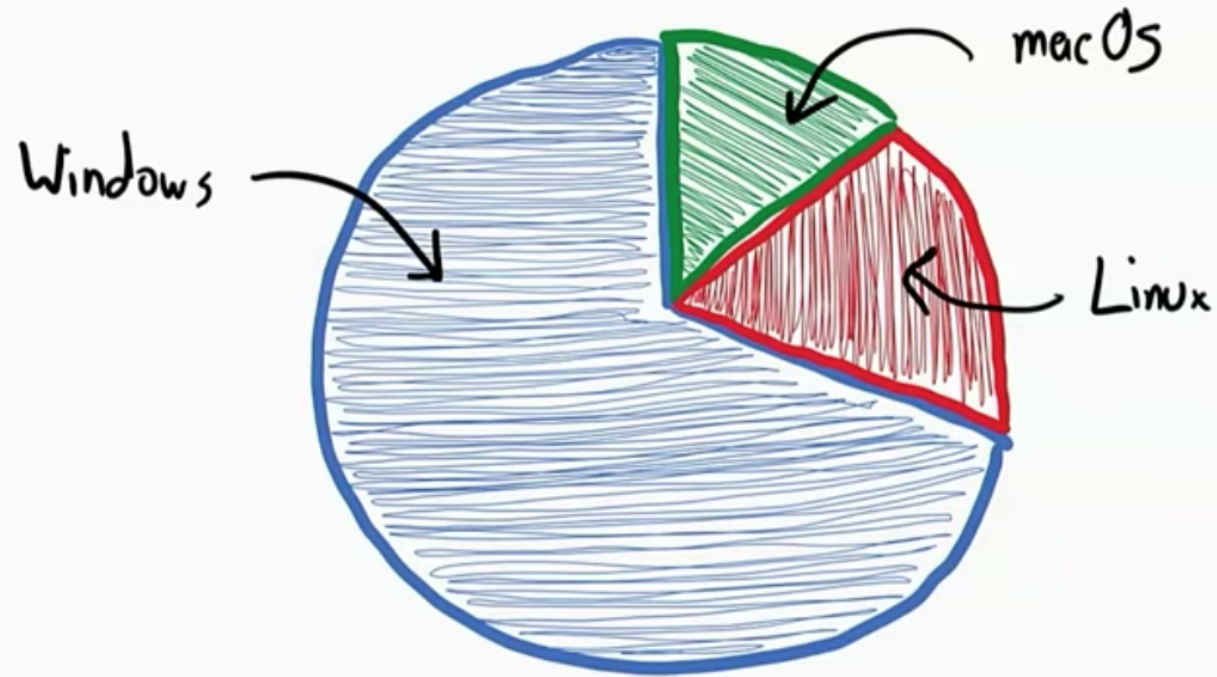
# O.S. CHOICE BY VS CODE USERS



SOURCE: Microsoft

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# O.S. CHOICE BY PYCHARM USERS

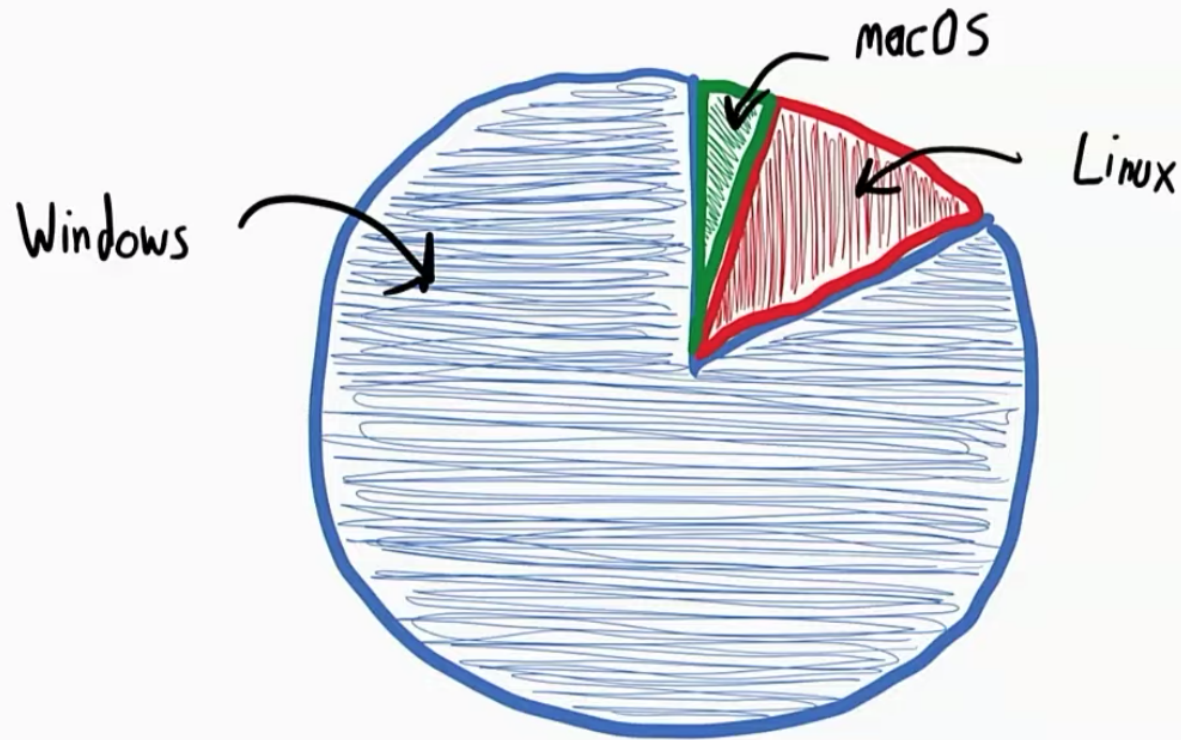


SOURCE: JetBrains

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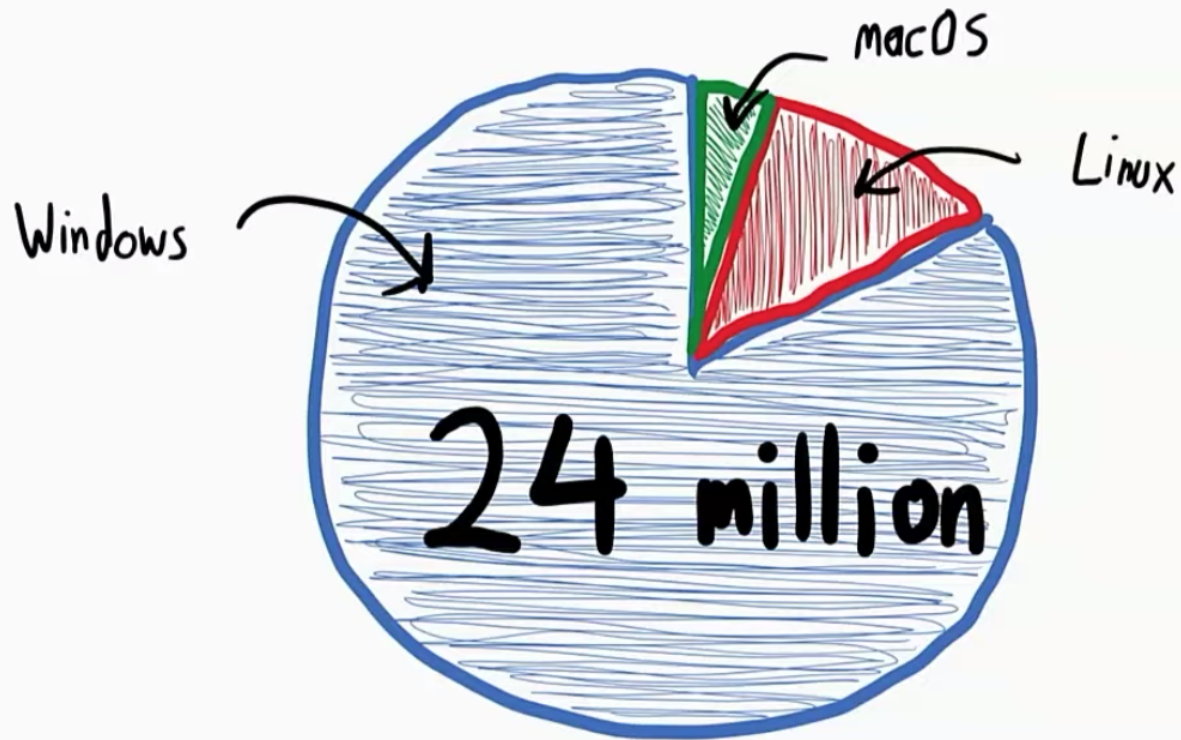
# PYTHON.ORG DOWNLOADS BY O.S.



SOURCE: Selected file in 29M downloads March 2019

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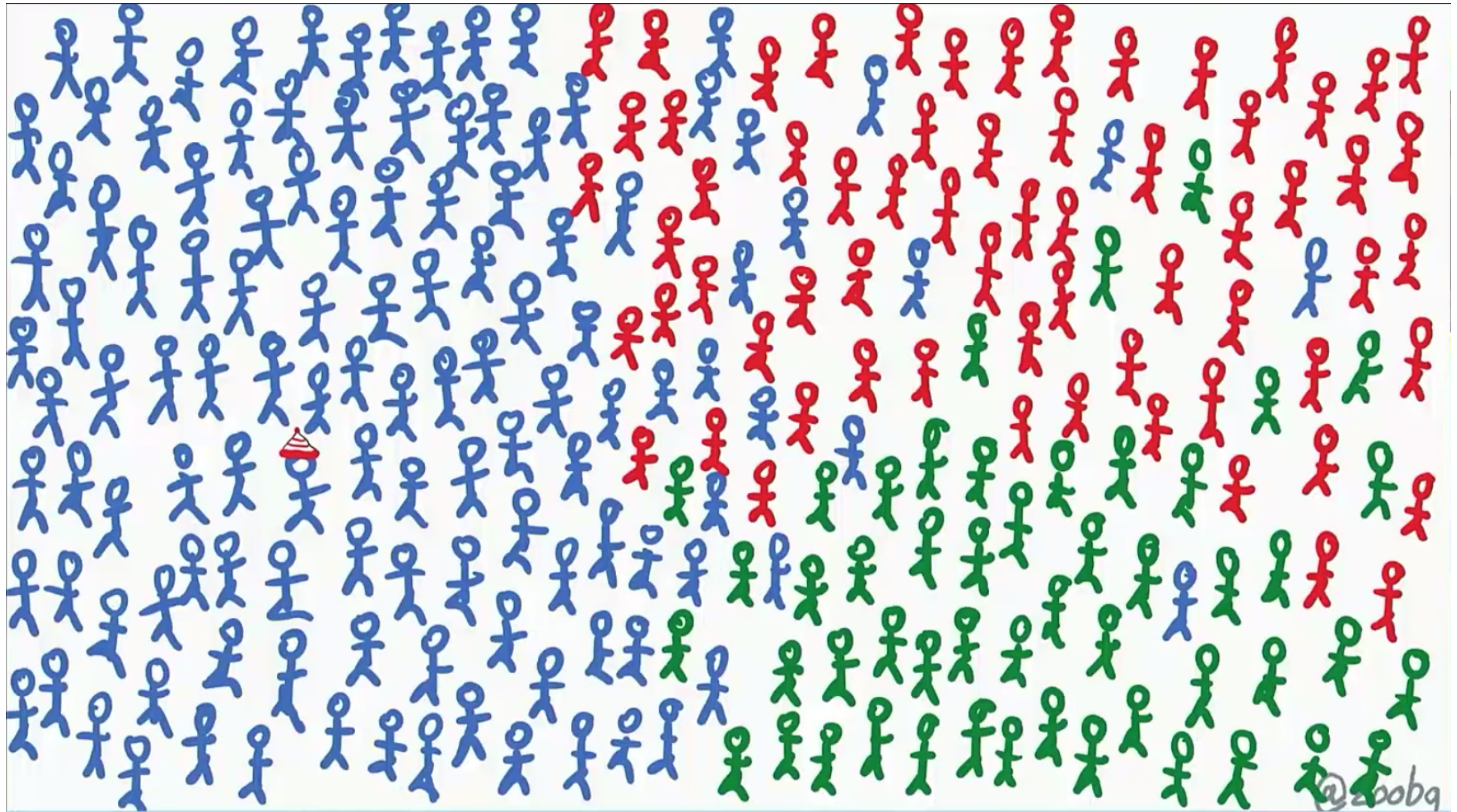
# PYTHON.ORG DOWNLOADS BY O.S.



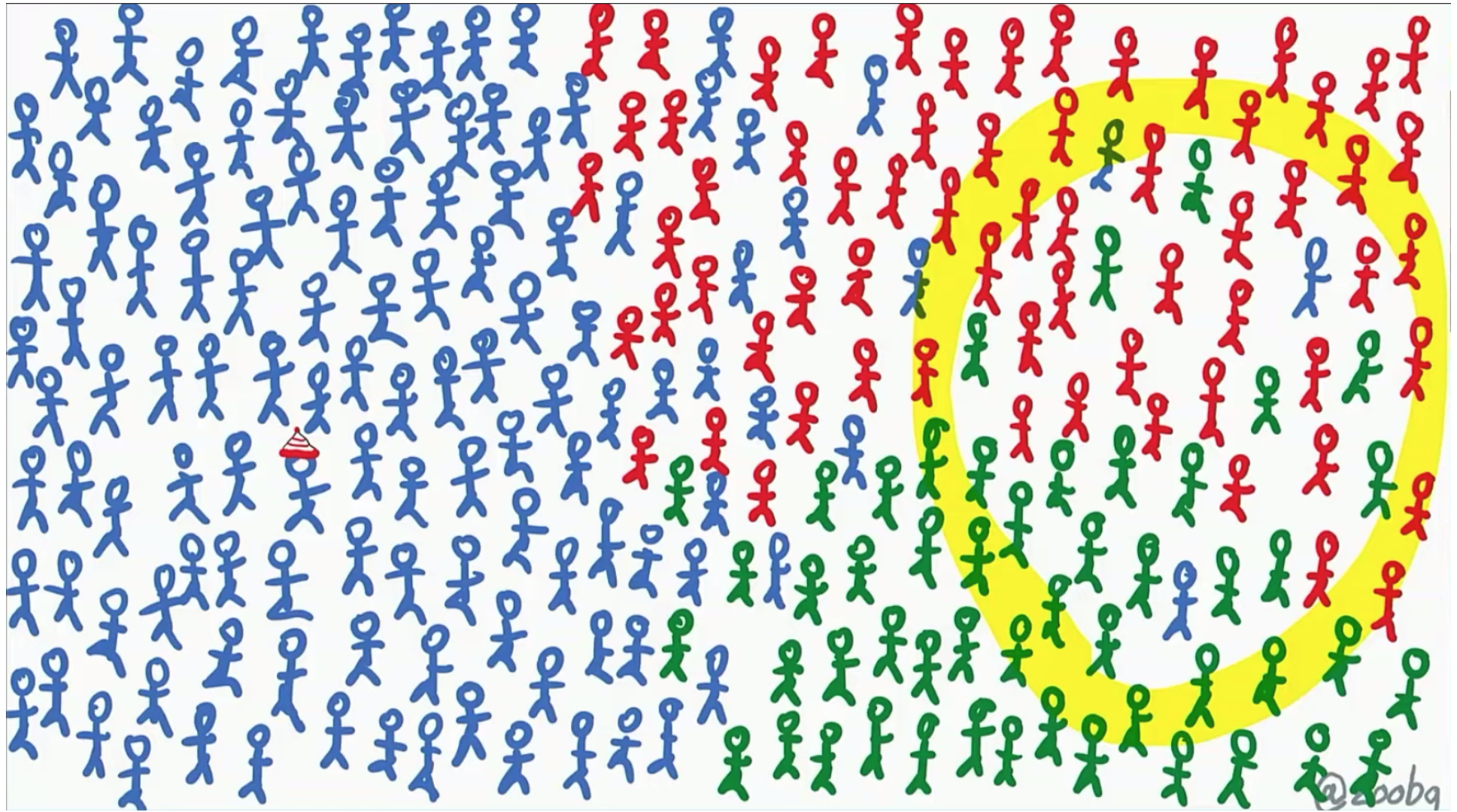
SOURCE: Selected file in 29M downloads March 2019

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# Python userbase



# Our perception



# Make sure your libs "just work" on Windows

- Make sure `-m` works on your project
- Use `pathlib.path` to handle paths
- Adopt `appdirs` to store user and configuration data
- Use `str` to let Python handle encoding at OS boundaries. Do your own IO stream conversions.
- Get CI, collaborate, or...

more info at <https://youtu.be/uol57uMdDD4>

# PYTHON DEVELOPMENT ON WINDOWS

- Python tooling has been rapidly evolving
- One-click install from the Microsoft Store
- Visual Studio has great Python support
- VSCode+Python extension works on Windows too
- A brand new Windows Terminal
- Windows Subsystem for Linux 2

# ONE-CLICK INSTALL FROM THE STORE

The image shows a Windows desktop environment. On the left, a Command Prompt window is open with the text `C:\Users\scott>python` and `C:\Users\scott>`. A red arrow points from the `python` command to the Microsoft Store application icon in the taskbar. The Microsoft Store window is open, displaying the page for Python 3.7. The page includes the Python logo, the title "Python 3.7", the publisher "Python Software Foundation", and a "Get" button. The price is listed as "Free". Below the "Get" button is an "Add to cart" button and a "Wish list" link. The page also shows a 5-star rating with 34 reviews and an ESRB rating of "EVERYONE". At the bottom of the page, there are tabs for "Overview", "System Requirements", "Reviews", and "Related".

Command Prompt:  
`C:\Users\scott>python`  
`C:\Users\scott>`

Microsoft Store: Python 3.7  
Python Software Foundation  
Developer tools > Development kits  
★★★★★ 34 Share  
Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's  
More  
EVERYONE  
Get  
Add to cart  
Wish list  
Overview System Requirements Reviews Related  
Available on

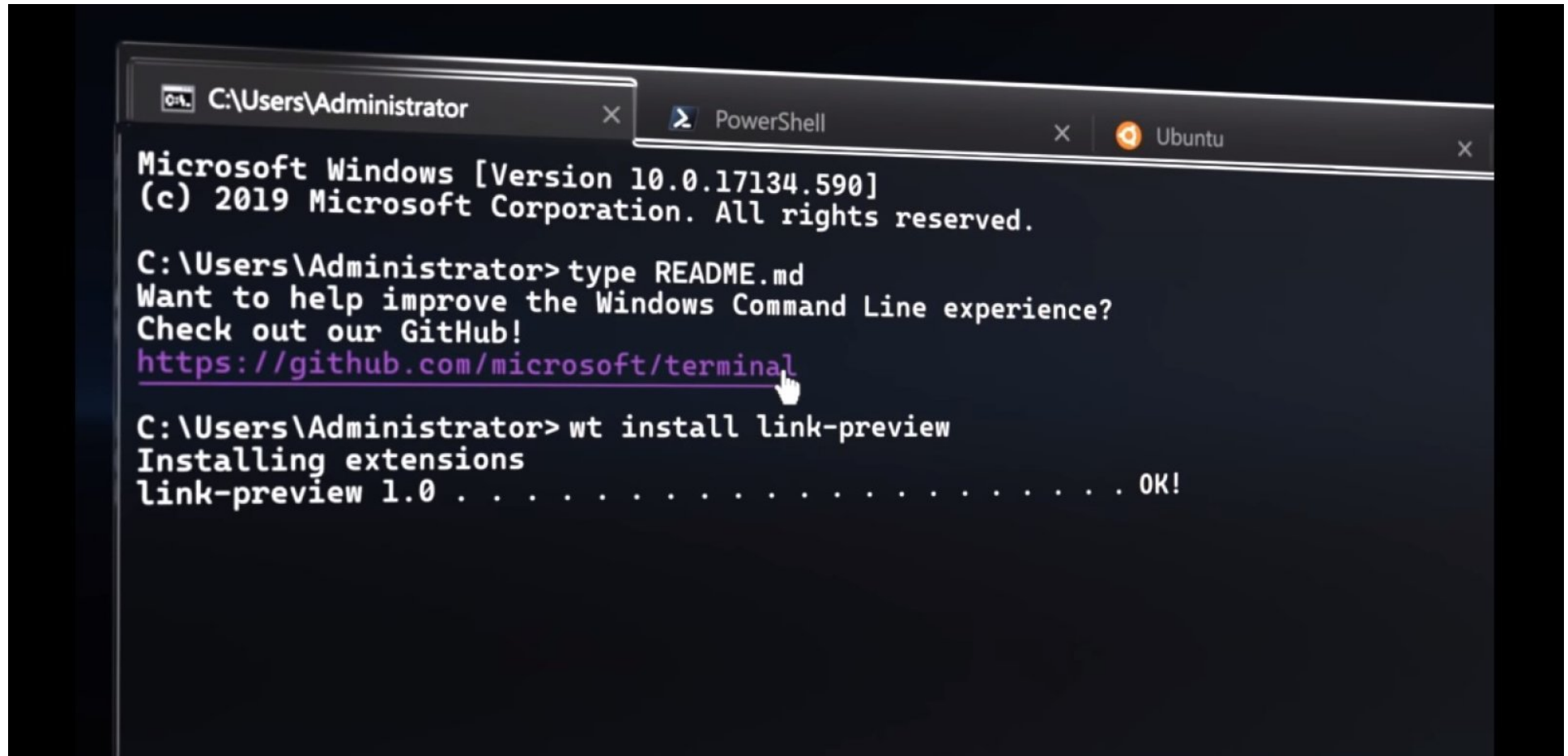
# VISUAL STUDIO

- Python install from VS Installer
- Package Management
- Virtual Environments
- IntelliSense and code analysis
- Interactive debugging (remote too)
- Unit Tests
- Templates (Django, Flask, PyGame, etc.)
- Code Imports
- Jupyter support
- REPL
- Community edition is free

PyCharm also works great on Windows.



# WINDOWS TERMINAL (PREVIEW)



The image shows a Windows Terminal window with three tabs: 'C:\Users\Administrator', 'PowerShell', and 'Ubuntu'. The PowerShell tab is active and displays the following text:

```
Microsoft Windows [Version 10.0.17134.590]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Administrator> type README.md
Want to help improve the Windows Command Line experience?
Check out our GitHub!
https://github.com/microsoft/terminal
C:\Users\Administrator> wt install link-preview
Installing extensions
link-preview 1.0 . . . . . OK!
```

# WINDOWS TERMINAL (PREVIEW)

- Multiple Tabs
- Command Prompt, PowerShell, Linux
- GPU accelerated text rendering
- glyphs, emojis, ideograms, symbols, icons, ligatures
- Fully configurable and customizable via json
- Multiple profiles
- Cascadia Code font, with ligatures (Preview)
- Open Source ([link](#))

cool video at <https://aka.ms/terminal-video>

# Windows Subsystem for Linux 2

Alarms & Clock

🕒 🌐 ⌚ 🕒

00:00:01.02

🚩 ⏸ ↗

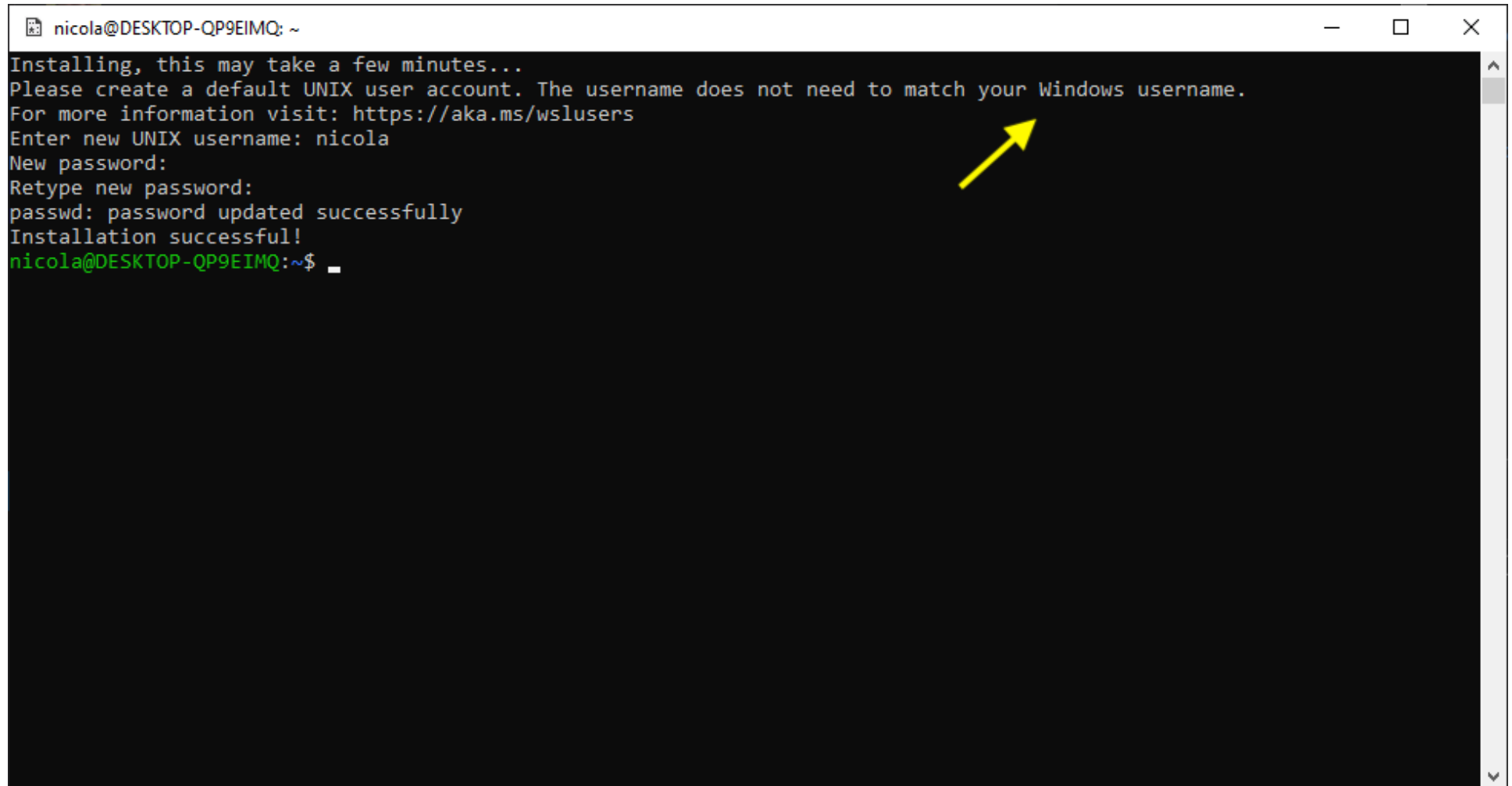
🪟 🔍 Type here to search

🌐 📁 📧 📧



# WSL2 QUICK FACTS

Windows ships with a Linux kernel



```
nicola@DESKTOP-QP9EIMQ: ~  
Installing, this may take a few minutes...  
Please create a default UNIX user account. The username does not need to match your Windows username.  
For more information visit: https://aka.ms/wslusers  
Enter new UNIX username: nicola  
New password:  
Retype new password:  
passwd: password updated successfully  
Installation successful!  
nicola@DESKTOP-QP9EIMQ:~$
```

A yellow arrow points to the URL <https://aka.ms/wslusers> in the terminal output.

# WSL2 QUICK FACTS

- WSL2 runs on a **lightweight** utility virtual machine
- Super **fast boot**, small footprint, **zero configuration**
- Both WSL2 and Linux kernel are Open Source ([link](#))

# ONE-CLICK INSTALL OF LINUX DISTRIBUTIONS

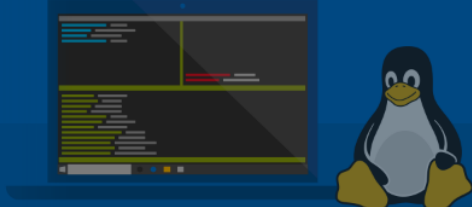







Microsoft Store

Home Apps Games Devices Movies & TV Books Edge Departments Search

# Run Linux on Windows

Install and run Linux distributions side-by-side on the Windows Subsystem for Linux (WSL).














				
<b>Ubuntu</b> ★★★★★	<b>openSUSE Leap 42</b> ★★★★★	<b>SUSE Linux Enterprise Server 12</b> ★★★★★	<b>Debian GNU/Linux</b> ★★★★★	<b>Kali Linux</b> ★★★★★
Installed	Installed	Owned	Installed	Owned

DEMO #1

LINUX ON WINDOWS, WITH TERMINAL

WSL2 IS IN PREVIEW

JOIN THE INSIDER PROGRAM (FAST RING)

 Home**Update & Security** Windows Update Delivery Optimization Windows Security Backup Troubleshoot Recovery Activation Find my device For developers Windows Insider Program

# Windows Insider Program

## Pick your Insider settings

Choose which kind of preview builds you want and how often your device gets one.

**Fast**

Be the first to give Microsoft feedback on the newest preview builds of Windows. You will get an OS update once or twice a week, which will require a reboot.

## Windows Insider account



nicola@nicolaiarocci.com  
Microsoft account

## Stop getting preview builds

Opt this device out of flighting when the next major release of Windows 10 is installed



Off

[Learn how to start fresh with a clean installation of Windows](#)

## Help from the web

[Become a Windows Insider](#)[Get help](#)[Give feedback](#)

# YOU ALSO NEED TO KNOW

## SPARE YOURSELF SOME PAIN

- BIOS virtualization must be active
- Virtual Machine Platform feature must be active
- WSL feature must be active
- distros will be on WSL1 once installed
- status: `wsl --list --verbose` \*
- switch to v2: `wsl --set-version Ubuntu 2` \*
- set v2 as default: `wsl --set-default-version 2` \*

(\*) in PowerShell, as admin

# HOWEVER...

## ONE SMALL PROBLEM

- WSL has no GUI
- You can't install a visual tool like VSCode
- We do have interop between Windows and Linux
- Microsoft recommends that you do not alter files in the WSL side with Windows programs...

# REMOTE EXTENSION TO THE RESCUE

The image shows a screenshot of the Visual Studio Code editor interface. The main editor window displays a Python script named `guess.py`. The script is a simple number-guessing game. The code is as follows:

```
1  # -*- coding: utf-8 -*-
2  """
3      Guess the Number
4      get get get get get get get get get
5      Coded by Giulia at age 9
6
7      :copyright: (c) 2013 by Nicola Iarocci.
8      :license: BSD, see LICENSE for more details.
9  """
10 import random
11
12 guesses_taken = 0
13
14 print('hello! what is your name?')
15 my_name = input()
16
17 number = random.randint(1, 20)
18 print('well, ' + my_name + ', I am thinking of a number between 1 and 20!')
19
20 while guesses_taken < 6:
21     print('take a guess.')
22     guess = input()
23     guess = int(guess)
24
25     guesses_taken = guesses_taken + 1
26
```

The Explorer sidebar on the left shows the file structure of the project, including `guess.py`, `__pycache__`, `.vscode`, `LICENSE`, `README.md`, and `screenshot.png`. The Terminal window at the bottom shows the execution of the script, displaying the output of the `ls -la` command:

```
(guess) guess [master] ls -la
total 188
drwxr-xr-x 5 nicola nicola 4096 Oct 16 10:33 .
drwxr-xr-x 4 nicola nicola 4096 Oct 16 10:30 ..
drwxr-xr-x 8 nicola nicola 4096 Oct 16 10:37 .git
drwxr-xr-x 2 nicola nicola 4096 Oct 16 10:32 .vscode
-rw-r--r-- 1 nicola nicola 1629 Oct 16 10:30 LICENSE
-rw-r--r-- 1 nicola nicola 55 Oct 16 10:30 README.md
drwxr-xr-x 2 nicola nicola 4096 Oct 16 10:33 __pycache__
-rw-r--r-- 1 nicola nicola 1051 Oct 16 10:30 guess.py
-rw-r--r-- 1 nicola nicola 157466 Oct 16 10:30 screenshot.png
```

The status bar at the bottom indicates the current environment: WSL: Ubuntu, master\*, Python 3.6.8 64-bit (guess: virtualenv), and the file is located at Ln 24, Col 1. The system tray shows the date and time as 10:37 AM on 10/16/2019.

# CODE + REMOTE + WSL2

WINDOWS-SIDE CODE, CONNECTED TO LINUX

The image shows a Visual Studio Code window with a Python script named 'guess.py' open. The script is a simple number-guessing game. The code is as follows:

```
1 # -*- coding: utf-8 -*-
2 """
3     Guess the Number
4     guess the number
5     Coded by Giulia at age 9
6
7     :copyright: (c) 2013 by Nicola Iarocci.
8     :license: BSD, see LICENSE for more details.
9 """
10 import random
11
12 guesses_taken = 0
13
14 print('hello! what is your name?')
15 my_name = input()
16
17 number = random.randint(1, 20)
18 print('well, ' + my_name + ', I am thinking of a number between 1 and 20!')
19
20 while guesses_taken < 6:
21     print('take a guess.')
22     guess = input()
23     guess = int(guess)
24
25     guesses_taken = guesses_taken + 1
26
```

The Explorer view on the left shows the file structure of the project, with 'guess.py' highlighted. The terminal at the bottom shows the output of the 'ls -la' command in the Linux environment:

```
(guess) guess [master] ls -la
total 188
drwxr-xr-x 5 nicola nicola 4096 Oct 16 10:33 .
drwxr-xr-x 4 nicola nicola 4096 Oct 16 10:30 ..
drwxr-xr-x 8 nicola nicola 4096 Oct 16 10:37 .git
drwxr-xr-x 2 nicola nicola 4096 Oct 16 10:32 .vscode
-rw-r--r-- 1 nicola nicola 1629 Oct 16 10:30 LICENSE
-rw-r--r-- 1 nicola nicola 55 Oct 16 10:30 README.md
drwxr-xr-x 2 nicola nicola 4096 Oct 16 10:33 __pycache__
-rw-r--r-- 1 nicola nicola 1051 Oct 16 10:30 guess.py
-rw-r--r-- 1 nicola nicola 157466 Oct 16 10:30 screenshot.png
(guess)
```

A yellow arrow points from the 'guess.py' file in the Explorer view to the 'guess.py' file in the terminal output, indicating the connection between the code and the environment. The status bar at the bottom shows the current environment is 'WSL: Ubuntu' with 'Python 3.6.8 64-bit (guess: virtualenv)'.



# CODE + REMOTE + WSL2 COURTESY OF REMOTE EXTENSION

The screenshot displays the Visual Studio Code interface with a remote connection to a WSL2 Ubuntu environment. The Explorer sidebar on the left shows the file structure of the remote workspace, including `guess.py`. The main editor window shows the code for `guess.py`, which is a simple number-guessing game. The code includes a docstring with metadata, imports the `random` module, and uses a `while` loop to prompt the user for a guess.

```
1 # -*- coding: utf-8 -*-
2 """
3     Guess the Number
4     guess the number
5     Coded by Giulia at age 9
6
7     :copyright: (c) 2013 by Nicola Iarocci.
8     :license: BSD, see LICENSE for more details.
9 """
10 import random
11
12 guesses_taken = 0
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14 print('hello! what is your name?')
15 my_name = input()
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17 number = random.randint(1, 20)
18 print('well, ' + my_name + ', I am thinking of a number between 1 and 20!')
19
20 while guesses_taken < 6:
21     print('take a guess.')
22     guess = input()
23     guess = int(guess)
24
25     guesses_taken = guesses_taken + 1
26
```

The Terminal at the bottom shows the execution of the `ls -la` command, listing the files in the current directory. An orange arrow points to the 'WSL: Ubuntu' tab in the bottom status bar, with the text 'Magic happens here' next to it.

WSL: Ubuntu | master\* | Python 3.6.8 64-bit ('guess': virtualenv) | Ln 24, Col 1 | Spaces: 8 | UTF-8 | LF | Python | 10:37 AM | 10/16/2019

# CODE + REMOTE + WSL2 EXTENSIONS WORK ACROSS BOUNDARIES

The screenshot displays the Visual Studio Code interface with the following components:

- EXTENSIONS MARKETPLACE:** The left sidebar shows the 'EXTENSIONS' view. The 'LOCAL - INSTALLED' section is highlighted with a cyan box, listing 'Remote - WSL' (0.39.9) and 'Vim' (1.11.2). The 'WSL: UBUNTU - INSTALLED' section is highlighted with a yellow box, listing 'C#' (1.21.5), 'lonide-fsharp' (4.2.0), and 'Python' (2019.10.41019).
- EDITOR:** The main editor window shows a Python file named 'guess.py'. The code includes a docstring, a random number generator, and a loop for guessing a number between 1 and 20.
- TERMINAL:** The bottom terminal window shows the output of the 'ls -la' command in the 'guess' directory, listing files like '.git', '.vscode', 'LICENSE', 'README.md', '\_\_pycache\_\_', 'guess.py', and 'screenshot.png'.
- STATUS BAR:** The bottom status bar indicates the current environment is 'WSL: Ubuntu' with a 'Python 3.6.8 64-bit (guess: virtualenv)' interpreter.

DEMO #2

CODE + REMOTE + WSL

# BTW REMOTE EXTENSION CONNECTS TO

- Windows Subsystem or Linux
- Remote hosts via SSH
- Docker containers
  - [Docker Desktop WSL 2 Tech Preview](#)  
(docker running inside linux, inside windows!)

# PYTHON IN THE WSL

## KEY POINTS

- Run Windows and Linux side-by-side
- Multiple linux distros, one-click away
- No heavyweight VMs
- Leverage your existing bash/linux skills
- Powerful desktop applications
- Rich eco-system (omg games!)
- Innovation happens right here

# QUESTIONS?

- WSL2 uses Hyper-V
  - VirtualBox 6+ -OK!
  - Hypervisor Platform API for third-party virtualization providers
- WSL2 can run in a VM
  - Needs nested virtualization enabled
- Networking apps?
  - Yes! Will have different IP than host \*
- GPU is currently a no go \*

\* high on the backlog

# SUGGESTED READING



## ABOUT THE AUTHOR


Burke Holland is a front-end developer living in Nashville, TN; the greatest city in the world. He enjoys JavaScript a lot because it's the only way he ... [More about Burke Holland](#)

...

SEPTEMBER 11, 2019 · [24 comments](#)

## Moving Your ~~JavaScript~~ **Python** Development To Bash On Windows

**QUICK SUMMARY** ↪ *Love your Bash terminal but also love your PC? Maybe you've had your eye on some of that new Surface hardware, but can't make the switch without your terminal. Now you can have Windows and Bash. In this article, we'll take an in-depth look at how to set up a Windows/Linux development box for JavaScript development.*

 24 min read

 [JavaScript](#)

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