UV introduction

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What's UV?

Small and fast, all-in-one solution for managing python projects big and small - cargo for python.

Running scripts

```python
import sys
print("Hello from python:", sys.version)
```

```
$ python 01.py
Hello from python: 3.10.14 (main, May  8 2024, 13:05:03) [G
```

To run a script with uv replace python with uv run:

```
$ uv run 01.py
Hello from python: 3.13.1 (main, Dec 19 2024, 14:22:59) [Cl
```

Managing dependencies

```python
import requests
r = requests.get('https://nordvpn.com')
print("requests:", requests.__version__,
    "status:", r.status_code)
```

```
$ uv run 02.py
Traceback (most recent call last):
  File "/Users/tomaszklak/Development/uv-tutorial/02.py", 1
    import requests
ModuleNotFoundError: No module named 'requests'
```

Managing dependencies (--with)

It's easy to use dependencies to with any script using --with:

```
$ uv run --with requests 02.py
requests: 2.32.3 status: 200
```

And to experiment with different versions:

```
$ uv run --with 'requests<2.30' 02.py
Installed 5 packages in 13ms
requests: 2.29.0 status: 200
$ uv run --with 'requests<2.30' 02.py
requests: 2.29.0 status: 200
```

Managing dependencies inline

It's possible to encode dependencies in python scripts directly (see PEP-723):

```python
# /// script
# dependencies = [
#     "requests<2.30",
# ]
# ///
import requests
r = requests.get('https://nordvpn.com')
print("requests:", requests.__version__,
    "status:", r.status_code)
```

```
$ uv run 03.py
Reading inline script metadata from `03.py`
requests: 2.29.0 status: 200
```

Managing dependencies inline

It's still easy to override versions:

```
$ uv run --with 'requests==2.30' 03.py
Reading inline script metadata from `03.py`
requests: 2.30.0 status: 200
```

Managing dependencies - reproducibility

```python
# /// script
# dependencies = [
#     "requests",
# ]
# [tool.uv]
# exclude-newer = "2023-04-27T00:00:00Z"
# ///
import requests
r = requests.get('https://nordvpn.com')
print("requests:", requests.__version__,
    "status:", r.status_code)

$ uv run 04.py
Reading inline script metadata from `04.py`
requests: 2.29.0 status: 200
```

Managing dependencies with lock files

Adding a lockfile is a as simple as `uv lock --script`:

```
$ uv lock --script 05.py
$ head 05.py.lock
version = 1
requires-python = ">=3.13"

[manifest]
requirements = [{ name = "requests" }]

[[package]]
name = "certifi"
version = "2025.1.31"
source = { registry = "https://pypi.org/simple" }
```

Managing python

```
$ uv python list
cpython-3.13.1+freethreaded-macos-aarch64-none    <download
cpython-3.13.1-macos-aarch64-none                 /Users/to
cpython-3.12.8-macos-aarch64-none                 <download
cpython-3.12.6-macos-aarch64-none                 /opt/home
cpython-3.11.11-macos-aarch64-none                <download
cpython-3.11.9-macos-aarch64-none                 /opt/home
cpython-3.10.16-macos-aarch64-none                /Users/to
cpython-3.10.16-macos-aarch64-none                /Users/to
cpython-3.10.14-macos-aarch64-none                /Users/to
cpython-3.10.14-macos-aarch64-none                /Users/to
cpython-3.10.14-macos-aarch64-none                /Users/to
cpython-3.9.21-macos-aarch64-none                 <download
cpython-3.9.6-macos-aarch64-none                  /Applicat
cpython-3.8.20-macos-aarch64-none                 <download
pypy-3.10.14-macos-aarch64-none                   /Users/to
pypy-3.9.19-macos-aarch64-none                    <download
```

Managing python

```
$ uv run --python cpython-3.13 python --version
Python 3.13.1

$ uv run --python cpython-3.13 which python
/Users/tomaszklak/.local/share/uv/python/cpython-3.13.1-mac

$ uv run --python pypy-3.10 python --version
Python 3.10.14 (39dc8d3c85a7, Aug 27 2024, 20:40:24)
[PyPy 7.3.17 with GCC Apple LLVM 15.0.0 (clang-1500.3.9.4)]

$ uv run --python pypy-3.10 which python
/Users/tomaszklak/.local/share/uv/python/pypy-3.10.14-macos
```

```python
# /// script
# requires-python = ">=3.11"
# dependencies = [
#     "requests",
# ]
# ///
import requests
import sys
r = requests.get('https://nordvpn.com')
print("python:", sys.version,
    "version:", requests.__version__,
    "status:", r.status_code)

$ uv run 06.py
python: 3.13.1 (main, Dec 19 2024, 14:22:59)\
    [Clang 18.1.8] version: 2.32.3 status: 200
```

Managing python - --python

```
$ uv run --python cpython-3.12 06.py
python: 3.12.6 (main, Sep  6 2024, 19:03:47)\
    [Clang 15.0.0 (clang-1500.1.0.2.5)] version: 2.32.3\
    status: 200
$ uv run --python pypy-3.10 06.py
python: 3.10.14 (39dc8d3c85a7, Aug 27 2024, 20:40:24)
[PyPy 7.3.17 with GCC Apple LLVM 15.0.0\
    (clang-1500.3.9.4 )] requests: 2.32.3 status: 200
```

UV shebang

```
#!/usr/bin/env -S uv run --script

# /// script
# requires-python = ">=3.10"
# dependencies = [
#     "requests",
# ]
# ///
import requests
import sys
r = requests.get('https://nordvpn.com')
print("python:", sys.version, "requests:", requests.__versi

$ chmod +x 07.py
$ ./07.py
python: 3.13.1 (main, Dec 19 2024, 14:22:59)\
    [Clang 18.1.8 ] requests: 2.32.3 status: 200
```

Projects

```
$ uv init hello
Initialized project `hello` at `/Users/tomaszklak/Developme
$ cat hello/pyproject.toml
[project]
name = "hello"
version = "0.1.0"
description = "Add your description here"
readme = "README.md"
requires-python = ">=3.13"
dependencies = []
$ cat hello/.python-version
3.13
```

Projects

```
$ cat hello.py
import requests
import sys
r = requests.get('https://nordvpn.com')
print("python:", sys.version,
    "requests:", requests.__version__,
    "status:", r.status_code)
$ uv add requests
Using CPython 3.13.1
Creating virtual environment at: .venv
Resolved 6 packages in 0.64ms
Installed 5 packages in 9ms
 + certifi==2025.1.31
 + charset-normalizer==3.4.1
 + idna==3.10
 + requests==2.32.3
 + urllib3==2.3.0
```

Projects

```
$ cat hello/pyproject.toml
[project]
name = "hello"
version = "0.1.0"
description = "Add your description here"
readme = "README.md"
requires-python = ">=3.13"
dependencies = [
    "requests>=2.32.3",
]
$ head hello/uv.lock
version = 1
requires-python = ">=3.13"

[[package]]
name = "certifi"
version = "2025.1.31"
```

Projects

```
$ uv run hello.py
python: 3.13.1 (main, Dec 19 2024, 14:22:59)\
    [Clang 18.1.8 ] requests: 2.32.3 status: 200
```