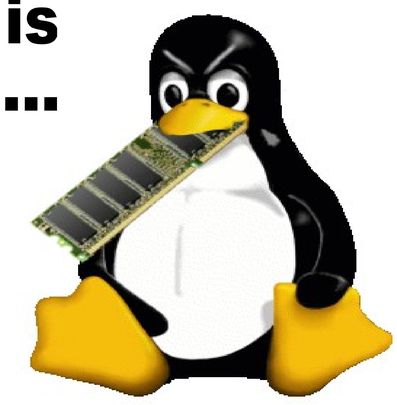
memory_profiler: monitor memory usage of Python code

Fabian Pedregosa
[1]*INRIA Saclay Parietal Team, Paris, France*

Project Goals

- Control the amount of memory used by a Python program
- Quickly spot lines that are consuming the most
- Set breakpoints for memory hotspots.
- Easy to use user interface and multi-platform.

How is memory ...



...being used?

Features

Line-by-line analysis

- Perform a line-by-line analysis of memory consumption for Python code.
- Decorate any function with **@profile** and give the arguments **-m memory_profiler** to the Python interpreter.

```
$ python -m memory_profiler example.py
Filename: example.py

 #  Mem usage  Increment   Line Contents
================================================
 2                         @profile
 3    8.03 MB      0.00 MB   def my_func():
 4   15.66 MB      7.63 MB     a = [1]*(10 ** 6)
 5  168.25 MB    152.59 MB     b = [2]*(2*10**7)
 6   15.66 MB   -152.59 MB     del b
 7   15.66 MB      0.00 MB     return a
```

Memory-based debugging

- Set a limit on the amount of memory with **--pdb-mmem**
- Step into the debugger when the limit is exceeded

```
$ python -m memory_profiler --pdb-mmem=50
example.py
Current memory 168.53 MB exceeded the maximum of
50.00 MB
Stepping into the debugger
>/example.py(5)my_func()
-> b = [2] * (2 * 10 ** 7)
(Pdb)
```

IPython integration

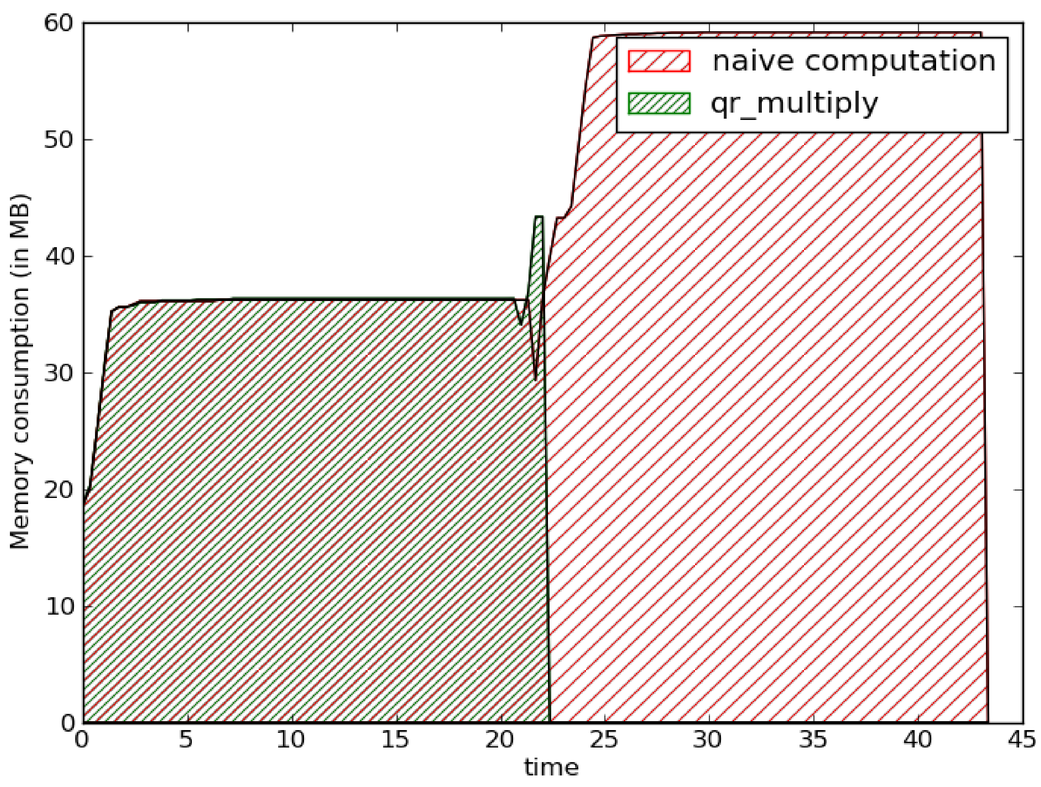
- Magic functions **%mprun** and **%memit** let you perform line-by-line and quick memory report from IPython.

```
In [1]: from example import my_func

In [2]: %mprun -f my_func my_func()

In [3]: %memit my_func()
maximum of 3: 76.402344 MB per loop
```

Memory usage over time

- Fetch memory consumption of a program over time

```
In [1]: from memory_profiler import memory_usage
In [2]: memory_usage((my_func, args, kw))
```



VBench integration

- Developed as part of Vlad Niculae's “Google Summer of Code” program
- Reports memory usage over the project history.
- Currently being used in scikit-learn benchmarks

Development

- Small codebase: full package is only 9KB.
- Low dependencies
- BSD-licensed

github SOCIAL CODING

http://github.com/fabianp/memory_profiler

Conclusion

- Easily monitor the amount of memory used in Python code.
- Perform memory benchmarking with Vbench and IPython integration.

Contact: fabian@fseoane.net