IVS Profiling

Korytnačky

20. Dubna 2021

1 Shrnutí výstupu profileru

Naše matematická knihovna byla navržena pro přímou práci s grafickým uživatelským rozhraním kalkulačky. Proto obshauje vícero knihoven, které nejsou pro program profiling.py potřebné.

Největší část výpočetního času zabralo právě načtení zmíňených knihoven.

Rozdelení naší knihovny mathlib.py na 2 části, jednu zaměřenou na spolupráci s grafickým rozhraním a drhou pouze pro výpočty, by mnohonásobně urychlilo běh programu profiling.py.

Funkce 'compact_spaces' byla nejpomalejší část algoritmu. Tato funkce odstraňuje vícenásobný výskyt mezer na vstupu za sebou. Optimalizace této funkce by mněla významný vplyv na efektivitu programu profiling.py. Případně by bylo možné funkcí nepoužít vůbec, a spoléhat se na správný formát vstupních dat.

2 Výstup profileru

Výstup profileru po spuštění profiling.py s 2000 čísly.

```
ncalls  tottime  percall  cumtime  percall filename:lineno(function)
    7135 function calls (7086 primitive calls) in 0.019 seconds
    1    0.002    0.002    0.019    0.019 profiling.py:5(<module>)
  6/1    0.000    0.000    0.019    0.019 {built-in method builtins.exec}
    1    0.000    0.000    0.012    0.012 mathlib.py:6(<module>)
  5/1    0.000    0.000    0.012    0.012 <frozen importlib._bootstrap_external>:777(exec_module)
  7/1    0.000    0.000    0.012    0.012 <frozen importlib._bootstrap>:986(_find_and_load)
  7/1    0.000    0.000    0.012    0.012 <frozen importlib._bootstrap>:956(_find_and_load_unlocked)
  7/1    0.000    0.000    0.012    0.012 <frozen importlib._bootstrap>:650(_load_unlocked)
  9/1    0.000    0.000    0.012    0.012 <frozen importlib._bootstrap>:211(_call_with_frames_removed)
    1    0.000    0.000    0.007    0.007 UI.py:6(<module>)
    1    0.000    0.000    0.005    0.005 __init__.py:1(<module>)
    1    0.000    0.000    0.004    0.004 signal.py:1(<module>)
    3    0.000    0.000    0.004    0.001 enum.py:439(_convert_)
    3    0.000    0.000    0.004    0.001 enum.py:386(_create_)
    7    0.000    0.000    0.004    0.001 enum.py:283(__call__)
   99    0.004    0.000    0.004    0.000 profiling.py:11(compact_spaces)
   90    0.003    0.000    0.003    0.000 enum.py:65(__setitem__)
   42    0.001    0.000    0.003    0.000 {built-in method builtins.__build_class__}
    1    0.000    0.000    0.002    0.002 <frozen importlib._bootstrap_external>:1099(create_module)
    1    0.002    0.002    0.002    0.002 {built-in method _imp.create_dynamic}
    5    0.000    0.000    0.002    0.000 <frozen importlib._bootstrap_external>:849(get_code)
    7    0.000    0.000    0.002    0.000 <frozen importlib._bootstrap>:549(module_from_spec)
    4    0.001    0.000    0.002    0.000 enum.py:134(__new__)
    5    0.000    0.000    0.001    0.000 <frozen importlib._bootstrap_external>:578(_compile_bytecode)
   13    0.000    0.000    0.001    0.000 <frozen importlib._bootstrap_external>:1431(find_spec)
    6    0.000    0.000    0.001    0.000 <frozen importlib._bootstrap_external>:1334(find_spec)
    6    0.000    0.000    0.001    0.000 <frozen importlib._bootstrap_external>:1302(_get_spec)
    7    0.000    0.000    0.001    0.000 <frozen importlib._bootstrap>:890(_find_spec)
    5    0.001    0.000    0.001    0.000 {built-in method marshal.loads}
    1    0.000    0.000    0.000    0.000 UI.py:12(UI)
    1    0.000    0.000    0.000    0.000 types.py:171(__get__)
    2    0.000    0.000    0.000    0.000 sre_parse.py:96(closegroup)
    2    0.000    0.000    0.000    0.000 sre_parse.py:937(parse)
    2    0.000    0.000    0.000    0.000 sre_parse.py:921(fix_flags)
    2    0.000    0.000    0.000    0.000 sre_parse.py:84(opengroup)
    8    0.000    0.000    0.000    0.000 sre_parse.py:81(groups)
    2    0.000    0.000    0.000    0.000 sre_parse.py:76(__init__)
  4/2    0.000    0.000    0.000    0.000 sre_parse.py:493(_parse)
  4/2    0.000    0.000    0.000    0.000 sre_parse.py:435(_parse_sub)
    2    0.000    0.000    0.000    0.000 sre_parse.py:432(_uniq)
    2    0.000    0.000    0.000    0.000 sre_parse.py:295(_class_escape)
    8    0.000    0.000    0.000    0.000 sre_parse.py:286(tell)
   10    0.000    0.000    0.000    0.000 sre_parse.py:254(get)
   14    0.000    0.000    0.000    0.000 sre_parse.py:249(match)
   14    0.000    0.000    0.000    0.000 sre_parse.py:233(__next)
    2    0.000    0.000    0.000    0.000 sre_parse.py:224(__init__)
  6/4    0.000    0.000    0.000    0.000 sre_parse.py:174(getwidth)
    4    0.000    0.000    0.000    0.000 sre_parse.py:172(append)
    8    0.000    0.000    0.000    0.000 sre_parse.py:164(__getitem__)
    4    0.000    0.000    0.000    0.000 sre_parse.py:160(__len__)
    4    0.000    0.000    0.000    0.000 sre_parse.py:111(__init__)
    2    0.000    0.000    0.000    0.000 sre_compile.py:759(compile)
  4/2    0.000    0.000    0.000    0.000 sre_compile.py:71(_compile)
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     6    0.000    0.000    0.000    0.000 sre_compile.py:65(_combine_flags)
     2    0.000    0.000    0.000    0.000 sre_compile.py:598(_code)
     4    0.000    0.000    0.000    0.000 sre_compile.py:595(isstring)
     2    0.000    0.000    0.000    0.000 sre_compile.py:536(_compile_info)
     2    0.000    0.000    0.000    0.000 sre_compile.py:492(_get_charset_prefix)
   4/2    0.000    0.000    0.000    0.000 sre_compile.py:461(_get_literal_prefix)
     6    0.000    0.000    0.000    0.000 sre_compile.py:453(_get_iscased)
     2    0.000    0.000    0.000    0.000 sre_compile.py:413(<listcomp>)
     2    0.000    0.000    0.000    0.000 sre_compile.py:411(_mk_bitmap)
     4    0.000    0.000    0.000    0.000 sre_compile.py:276(_optimize_charset)
     4    0.000    0.000    0.000    0.000 sre_compile.py:249(_compile_charset)
    78    0.000    0.000    0.000    0.000 signal.py:22(<lambda>)
    77    0.000    0.000    0.000    0.000 signal.py:17(<lambda>)
    76    0.000    0.000    0.000    0.000 signal.py:10(<lambda>)
     2    0.000    0.000    0.000    0.000 re.py:289(_compile)
     2    0.000    0.000    0.000    0.000 re.py:250(compile)
     9    0.000    0.000    0.000    0.000 {method 'update' of 'dict' objects}
     2    0.000    0.000    0.000    0.000 {method 'translate' of 'bytearray' objects}
    99    0.000    0.000    0.000    0.000 {method 'strip' of 'str' objects}
   129    0.000    0.000    0.000    0.000 {method 'startswith' of 'str' objects}
    99    0.000    0.000    0.000    0.000 {method 'split' of 'str' objects}
     3    0.000    0.000    0.000    0.000 {method 'sort' of 'list' objects}
     4    0.000    0.000    0.000    0.000 {method 'setdefault' of 'dict' objects}
   144    0.000    0.000    0.000    0.000 {method 'rstrip' of 'str' objects}
    47    0.000    0.000    0.000    0.000 {method 'rpartition' of 'str' objects}
    99    0.000    0.000    0.000    0.000 {method 'replace' of 'str' objects}
     5    0.000    0.000    0.000    0.000 {method 'read' of '_io.BufferedReader' objects}
    15    0.000    0.000    0.000    0.000 {method 'pop' of 'dict' objects}
     4    0.000    0.000    0.000    0.000 {method 'mro' of 'type' objects}
    78    0.000    0.000    0.000    0.000 {method 'join' of 'str' objects}
    19    0.000    0.000    0.000    0.000 {method 'items' of 'mappingproxy' objects}
    84    0.000    0.000    0.000    0.000 {method 'items' of 'dict' objects}
    76    0.000    0.000    0.000    0.000 {method 'isupper' of 'str' objects}
   107    0.000    0.000    0.000    0.000 {method 'get' of 'mappingproxy' objects}
    21    0.000    0.000    0.000    0.000 {method 'get' of 'dict' objects}
    12    0.000    0.000    0.000    0.000 {method 'find' of 'bytearray' objects}
    10    0.000    0.000    0.000    0.000 {method 'extend' of 'list' objects}
     7    0.000    0.000    0.000    0.000 {method 'endswith' of 'str' objects}
     1    0.000    0.000    0.000    0.000 {method 'disable' of '_lsprof.Profiler' objects}
  2292    0.000    0.000    0.000    0.000 {method 'append' of 'list' objects}
     1    0.000    0.000    0.000    0.000 mathlib.py:141(sum_squares)
     1    0.000    0.000    0.000    0.000 mathlib.py:136(avg)
     1    0.000    0.000    0.000    0.000 __init__.py:611(Misc)
     1    0.000    0.000    0.000    0.000 __init__.py:561(BooleanVar)
     1    0.000    0.000    0.000    0.000 __init__.py:540(DoubleVar)
     1    0.000    0.000    0.000    0.000 __init__.py:515(IntVar)
     1    0.000    0.000    0.000    0.000 __init__.py:491(StringVar)
     1    0.000    0.000    0.000    0.000 __init__.py:4357(PanedWindow)
     1    0.000    0.000    0.000    0.000 __init__.py:4333(LabelFrame)
     1    0.000    0.000    0.000    0.000 __init__.py:4155(Spinbox)
     1    0.000    0.000    0.000    0.000 __init__.py:4137(BitmapImage)
     1    0.000    0.000    0.000    0.000 __init__.py:4053(PhotoImage)
     1    0.000    0.000    0.000    0.000 __init__.py:3985(Image)
     1    0.000    0.000    0.000    0.000 __init__.py:3946(OptionMenu)
     1    0.000    0.000    0.000    0.000 __init__.py:3932(_setit)
     1    0.000    0.000    0.000    0.000 __init__.py:3528(Text)
     1    0.000    0.000    0.000    0.000 __init__.py:3478(Scrollbar)
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    1    0.000    0.000    0.000    0.000 __init__.py:3439(Scale)
    1    0.000    0.000    0.000    0.000 __init__.py:3406(Radiobutton)
    1    0.000    0.000    0.000    0.000 __init__.py:3399(Message)
    1    0.000    0.000    0.000    0.000 __init__.py:3392(Menubutton)
    1    0.000    0.000    0.000    0.000 __init__.py:3262(Menu)
    1    0.000    0.000    0.000    0.000 __init__.py:3146(Listbox)
    1    0.000    0.000    0.000    0.000 __init__.py:3122(Label)
    1    0.000    0.000    0.000    0.000 __init__.py:3102(Frame)
    1    0.000    0.000    0.000    0.000 __init__.py:308(Variable)
    1    0.000    0.000    0.000    0.000 __init__.py:3016(Entry)
    1    0.000    0.000    0.000    0.000 __init__.py:2980(Checkbutton)
    1    0.000    0.000    0.000    0.000 __init__.py:2670(Canvas)
    1    0.000    0.000    0.000    0.000 __init__.py:2623(Button)
    1    0.000    0.000    0.000    0.000 __init__.py:2593(Toplevel)
    1    0.000    0.000    0.000    0.000 __init__.py:2585(Widget)
    1    0.000    0.000    0.000    0.000 __init__.py:2518(BaseWidget)
    1    0.000    0.000    0.000    0.000 __init__.py:2463(Grid)
    1    0.000    0.000    0.000    0.000 __init__.py:2412(Place)
    1    0.000    0.000    0.000    0.000 __init__.py:2366(Pack)
    1    0.000    0.000    0.000    0.000 __init__.py:2236(Tk)
    1    0.000    0.000    0.000    0.000 __init__.py:1932(Wm)
    1    0.000    0.000    0.000    0.000 __init__.py:192(Event)
    1    0.000    0.000    0.000    0.000 __init__.py:1911(YView)
    1    0.000    0.000    0.000    0.000 __init__.py:1890(XView)
    1    0.000    0.000    0.000    0.000 __init__.py:1868(CallWrapper)
    1    0.000    0.000    0.000    0.000 __init__.py:147(EventType)
    6    0.000    0.000    0.000    0.000 functools.py:64(wraps)
    6    0.000    0.000    0.000    0.000 functools.py:34(update_wrapper)
    2    0.000    0.000    0.000    0.000 <frozen zipimport>:63(__init__)
    9    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:99(_path_isfile)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:969(get_data)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:964(get_filename)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:939(__init__)
   11    0.000    0.00     0.000    0.000 <frozen importlib._bootstrap_external>:90(_path_is_mode_type)
   31    0.000    0.00     0.000    0.000 <frozen importlib._bootstrap_external>:80(_path_stat)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:774(create_module)
   10    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:68(_path_split)
   67    0.000    0.00     0.000    0.000 <frozen importlib._bootstrap_external>:64(<listcomp>)
   67    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:62(_path_join)
    6    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:629(spec_from_file_location)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:526(_validate_timestamp_pyc)
   15    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:51(_unpack_uint32)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:493(_classify_pyc)
    5    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:456(_check_name_wrapper)
    6    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:424(_get_cached)
   13    0.000    0.00     0.000    0.000 <frozen importlib._bootstrap_external>:40(_relax_case)
   10    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:294(cache_from_source)
    2    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1520(path_for_FileFinder)
    2    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1479(_fill_cache)
    6    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1426(_get_spec)
   16    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1400(<genexpr>)
    2    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1394(__init__)
   16    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1265(_path_importer_cache)
    2    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1252(_path_hooks)
    1    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1107(exec_module)
    1    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:1088(__init__)
    2    0.000    0.000    0.000    0.000 <frozen importlib._bootstrap_external>:104(_path_isdir)
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    5    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap_external>:1010(path_stats)
   19    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:867(__exit__)
   19    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:863(__enter__)
    6    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:800(find_spec)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:78(acquire)
    1    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:771(is_package)
    1    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:754(exec_module)
    1    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:746(create_module)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:725(find_spec)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:58(__init__)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:477(_init_module_attrs)
    1    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:406(spec_from_loader)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:397(has_location)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:389(parent)
   11    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:376(cached)
    5    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:35(_new_module)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:342(__init__)
    1    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:232(_requires_builtin_wrapper)
   71    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:222(_verbose_message)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:176(cb)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:157(_get_module_lock)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:151(__exit__)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:147(__enter__)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:143(__init__)
    7    0.000   0.000   0.000   0.000 <frozen importlib._bootstrap>:103(release)
    2    0.000   0.000   0.000   0.000 enum.py:833(__and__)
    1    0.000   0.000   0.000   0.000 enum.py:664(value)
    4    0.000   0.000   0.000   0.000 enum.py:58(__init__)
    4    0.000   0.000   0.000   0.000 enum.py:562(__new__)
    4    0.000   0.000   0.000   0.000 enum.py:510(_find_new_)
   11    0.000   0.000   0.000   0.000 enum.py:489(_find_data_type)
   11    0.000   0.000   0.000   0.000 enum.py:478(_get_mixins_)
   40    0.000   0.000   0.000   0.000 enum.py:462(<lambda>)
    3    0.000   0.000   0.000   0.000 enum.py:456(<listcomp>)
  107    0.000   0.000   0.000   0.000 enum.py:373(__setattr__)
    3    0.000   0.000   0.000   0.000 enum.py:357(__members__)
    4    0.000   0.000   0.000   0.000 enum.py:332(__getattr__)
   90    0.000   0.000   0.000   0.000 enum.py:28(_is_sunder)
   90    0.000   0.000   0.000   0.000 enum.py:20(_is_dunder)
   12    0.000   0.000   0.000   0.000 enum.py:197(<genexpr>)
    4    0.000   0.000   0.000   0.000 enum.py:176(<setcomp>)
    4    0.000   0.000   0.000   0.000 enum.py:151(<dictcomp>)
   79    0.000   0.000   0.000   0.000 enum.py:12(_is_descriptor)
    4    0.000   0.000   0.000   0.000 enum.py:124(__prepare__)
    1    0.000   0.000   0.000   0.000 constants.py:4(<module>)
    4    0.000   0.000   0.000   0.000 codecs.py:319(decode)
   14    0.000   0.000   0.000   0.000 {built-in method _thread.get_ident}
   14    0.000   0.000   0.000   0.000 {built-in method _thread.allocate_lock}
    2    0.000   0.000   0.000   0.000 {built-in method _sre.compile}
   31    0.000   0.000   0.000   0.000 {built-in method posix.stat}
    2    0.000   0.000   0.000   0.000 {built-in method posix.listdir}
   16    0.000   0.000   0.000   0.000 {built-in method posix.fspath}
   83    0.000   0.000   0.000   0.000 {built-in method __new__ of type object at 0x907780}
    5    0.000   0.000   0.000   0.000 {built-in method io.open_code}
   33    0.000   0.000   0.000   0.000 {built-in method _imp.release_lock}
    6    0.000   0.000   0.000   0.000 {built-in method _imp.is_frozen}
    6    0.000   0.000   0.000   0.000 {built-in method _imp.is_builtin}
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    5    0.000    0.000    0.000    0.000 {built-in method _imp._fix_co_filename}
    1    0.000    0.000    0.000    0.000 {built-in method _imp.exec_dynamic}
    1    0.000    0.000    0.000    0.000 {built-in method _imp.exec_builtin}
    1    0.000    0.000    0.000    0.000 {built-in method _imp.create_builtin}
   33    0.000    0.000    0.000    0.000 {built-in method _imp.acquire_lock}
    2    0.000    0.000    0.000    0.000 {built-in method fromkeys}
   15    0.000    0.000    0.000    0.000 {built-in method from_bytes}
    4    0.000    0.000    0.000    0.000 {built-in method _codecs.utf_8_decode}
    3    0.000    0.000    0.000    0.000 {built-in method builtins.vars}
    1    0.000    0.000    0.000    0.000 {built-in method builtins.sum}
  110    0.000    0.000    0.000    0.000 {built-in method builtins.setattr}
    1    0.000    0.000    0.000    0.000 {built-in method builtins.print}
    2    0.000    0.000    0.000    0.000 {built-in method builtins.ord}
   10    0.000    0.000    0.000    0.000 {built-in method builtins.min}
268/264    0.000    0.000    0.000    0.000 {built-in method builtins.len}
   31    0.000    0.000    0.000    0.000 {built-in method builtins.issubclass}
  737    0.000    0.000    0.000    0.000 {built-in method builtins.isinstance}
  345    0.000    0.000    0.000    0.000 {built-in method builtins.hasattr}
    1    0.000    0.000    0.000    0.000 {built-in method builtins.globals}
  146    0.000    0.000    0.000    0.000 {built-in method builtins.getattr}
    4    0.000    0.000    0.000    0.000 {built-in method builtins.any}
```