

**Subject:**

TC4002 - Analysis, Design and Construction of Software Systems

**Professor:**

Gerardo Padilla Zarate

**L5.1 - Development Exercises****Student:**

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For this assignment, we were requested to implement a couple of sorting algorithms and as bonus task to print their stats. Number of records, the time consumed in order to sort the list, start time, end time and the name of the used algorithm. A couple of learned lessons here, at least for me, are, in order to ease the test process, functions should focus in perform only one thing and only one thing. Input data should be passed as arguments rather generated inside them. Is a great practice to think how you will test your program before start coding.

Upon the results that I obtained, I conclude that the best algorithm is **quick sort** followed by **merge**, **heap** and **bubble sort**, in that order.

Test Results	28 s 814 ms
test_lab5	28 s 814 ms
TestLab5	28 s 814 ms
test_able_to_write	14 s 166 ms
test_bubble_sort_correctness	7 s 838 ms
test_file_not_found	0 ms
test_heap_sort_correctness	48 ms
test_merge_sort_correctness	43 ms
test_opened_file	2 ms
test_performance	6 s 644 ms
test_quick_sort_correctness	65 ms
test_try_to_break	8 ms

```

Process finished with exit code 0
=====bubble Sort=====
Num of records: 5036
Consumed time: 0:00:06.532504
Start time: 19/Mar/2020 15:15:28
End time: 19/Mar/2020 15:15:34

=====merge Sort=====
Num of records: 5036
Consumed time: 0:00:00.035898
Start time: 19/Mar/2020 15:15:34
End time: 19/Mar/2020 15:15:34

=====heap Sort=====
Num of records: 5036
Consumed time: 0:00:00.053855
Start time: 19/Mar/2020 15:15:34
End time: 19/Mar/2020 15:15:34

=====quick Sort=====
Num of records: 5036
Consumed time: 0:00:00.012958
Start time: 19/Mar/2020 15:15:34
End time: 19/Mar/2020 15:15:34

```

Figure 1 – Performed tests and output

```

C:\Users\jucorral\Documents\personal\Master\TC4002_analisisDiseñoYConstruccionDel
Software\Development Exercises\lab5>coverage run --source=. -m unittest discover
.....=====bubble Sort=====
Num of records: 5036
Consumed time: 0:00:58.292188
Start time: 19/Mar/2020 01:41:51
End time: 19/Mar/2020 01:42:49

=====merge Sort=====
Num of records: 5036
Consumed time: 0:00:00.423897
Start time: 19/Mar/2020 01:42:49
End time: 19/Mar/2020 01:42:50

=====heap Sort=====
Num of records: 5036
Consumed time: 0:00:00.845282
Start time: 19/Mar/2020 01:42:50
End time: 19/Mar/2020 01:42:51

=====quick Sort=====
Num of records: 5036
Consumed time: 0:00:00.214426
Start time: 19/Mar/2020 01:42:51
End time: 19/Mar/2020 01:42:51

...
-----
Ran 9 tests in 182.747s

OK

C:\Users\jucorral\Documents\personal\Master\TC4002_analisisDiseñoYConstruccionDel
Software\Development Exercises\lab5>coverage report
Name          Stmts   Miss  Cover
-----
lab5.py        109     0    100%
test_lab5.py    62     0    100%
-----
TOTAL          171     0    100%

C:\Users\jucorral\Documents\personal\Master\TC4002_analisisDiseñoYConstruccionDel
Software\Development Exercises\lab5>coverage html

C:\Users\jucorral\Documents\personal\Master\TC4002_analisisDiseñoYConstruccionDel
Software\Development Exercises\lab5>

```

Figure 2 – Coverage run