size n of relation S	avg execution time to scan S (in ms)	avg execution time to sort S (in ms)
10^1	0.014 ms	0.392 ms
10^2	0.029 ms	0.094 ms
10^3	0.176 ms	0.492 ms
10^4	1.643 ms	4.889 ms
10^5	16.339 ms	73.582 ms
10^6	167.428 ms	856.306 ms
10^7	1770.416 ms	12048.246 ms
10^8	18281.931 ms	82083.887 ms

3 A) Observations about query plan
Initially the creation of index and sorting of table all are done in main memory, therefore the execution time of both
are nearly the same. As the size of N increases, the execution time of indexing as well as sorting increases as now the
main memory itself is not sufficient to hold the entire data. It utilizes the external memory (disk/ hard-drive) and
performs 1/O operations on the data.

3 B) 1+ log(N/B)

3 C) Yes

3 D) (64 kB)

size n of relation S	avg execution time to scan S (in ms)	avg execution time to sort S (in ms)
10^1	0.016 ms	0.588 ms
10^2	0.031 ms	0.099 ms
10^3	0.179 ms	1.463 ms
10^4	1.635 ms	8.895 ms
10^5	16.458 ms	121.903 ms
10^6	163.005 ms	799.047 ms
10^7	1744.355 ms	9148.042 ms
10^8	18313.465 ms	128497.407 ms

(1 GB)

size n of relation S	avg execution time to scan S (in ms)	avg execution time to sort S (in ms)
10^1	0.016 ms	0.053 ms
10^2	0.029 ms	0.099 ms
10^3	0.187 ms	0.525 ms
10^4	1.656 ms	4.912 ms
10^5	16.309 ms	54.484 ms
10^6	162.798 ms	576.719 ms

size n of relation S	avg execution time to scan S (in ms)	avg execution time to sort S (in ms)
10^7	1868.105 ms	6776.755 ms
10^8	18564.314 ms	95082.045 ms