

**BILKENT UNIVERSITY**  
**ENGINEERING FACULTY**  
**DEPARTMENT OF COMPUTER ENGINEERING**



**CS 342**  
**Operating Systems**  
**Section 1**  
**Project 1 Raport**

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## Part 0 - Graph Drawing Method:

As a file, Game Of Thrones movie series script is used (appr. 240000 lines) to draw the graphs more accurately with big data (There is 21262 unique token in the file). Also following bash script is used to collect the data:

```
#!/bin/bash

make

for ((a=1000; a>=0; a=a-100))
do
    for ((b=10; b>=0; b--))
    do
        echo "k = $a, n = $b" >> graphA.txt
        { time ./main $a out.txt $b $(yes tests/group5/corpus.txt | head -n $b | tr '\n' ' '); } 2>>
graphA.txt
    done
    if [[ $a -eq 100 ]]; then
        a=110
    elif [[ $a -eq 10 ]]; then
        a=100
    fi
done

a=100
b=1

echo "k = $a, n = $b" >> graph2a.txt
{ time ./main $a out.txt $b $(yes tests/group5/corpus.txt | head -n $b | tr '\n' ' '); } 2>>
graph2a.txt

b=2

echo "k = $a, n = $b" >> graph2a.txt
{ time ./main $a out.txt $b $(yes tests/group6/corpus.txt | head -n $b | tr '\n' ' '); } 2>>
graph2a.txt

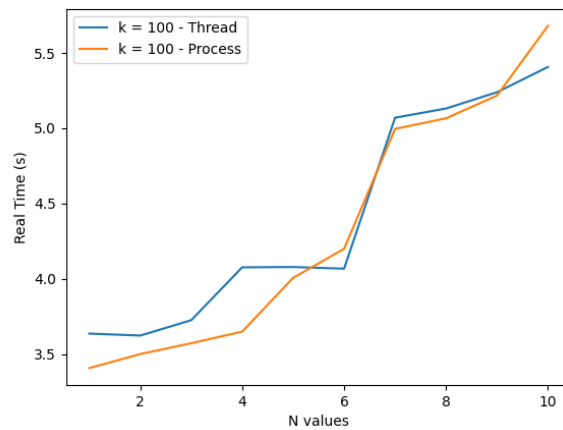
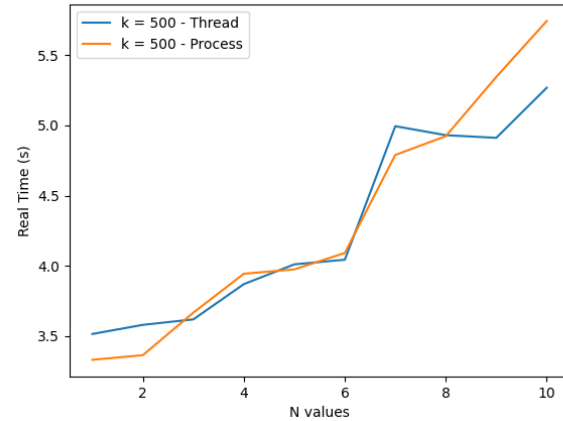
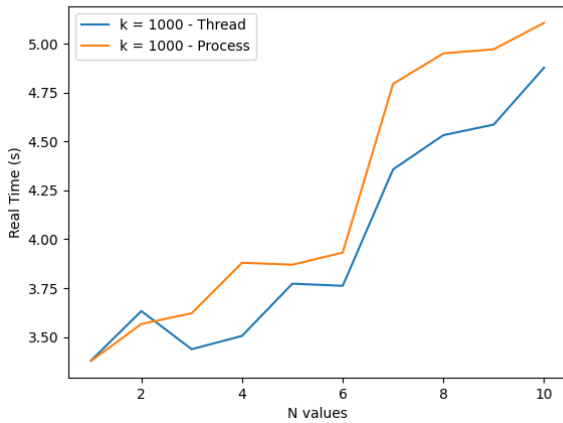
b=5

echo "k = $a, n = $b" >> graph2a.txt
{ time ./main $a out.txt $b $(yes tests/group7/corpus.txt | head -n $b | tr '\n' ' '); } 2>>
graph2a.txt

b=10
```

```
echo "k = $a, n = $b" >> graph2a.txt
{ time ./list $a out.txt $b $(yes tests/group8/corpus.txt | head -n $b | tr '\n' ' '); } 2>> graph2a.txt
```

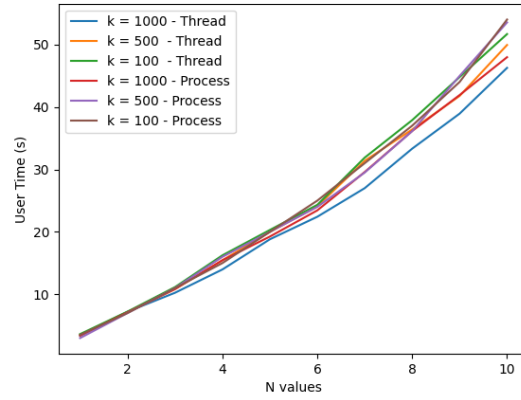
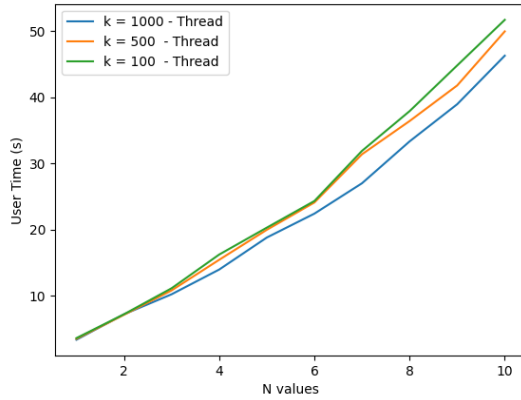
## Graph Group 1:



### Explanation:

- While k is constant and n is increasing, both the real time of the process and thread programs execution times are increasing as they need to analyze more file.
- For big k values, process needs more time to execute the program. However, as k is decreasing both execution times become closer.

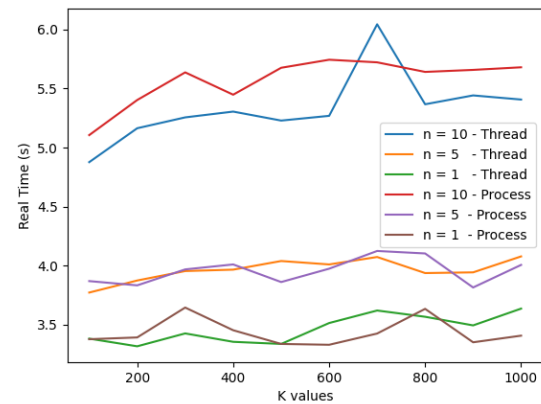
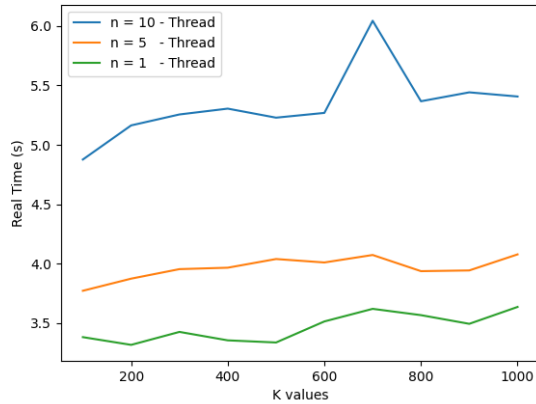
## Graph Group 2:



### Explanation:

- While N values are increasing, user time is linearly increasing for both programs and the k values do not create much difference.

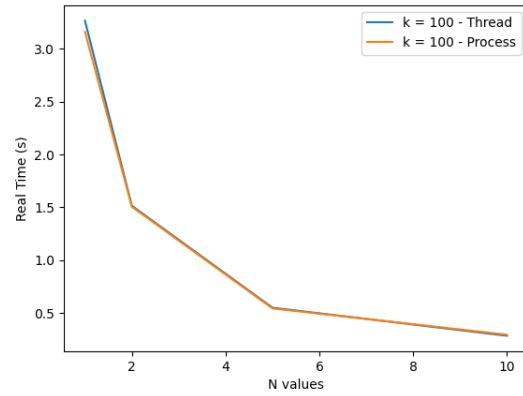
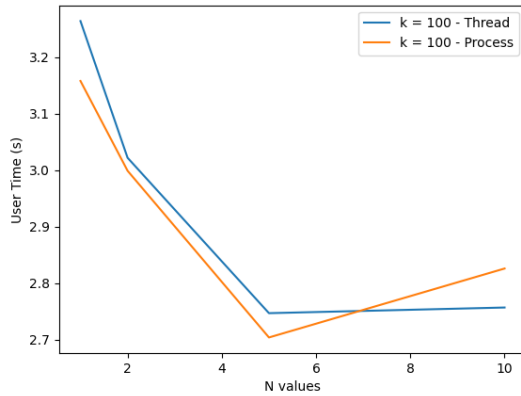
## Graph Group 3:



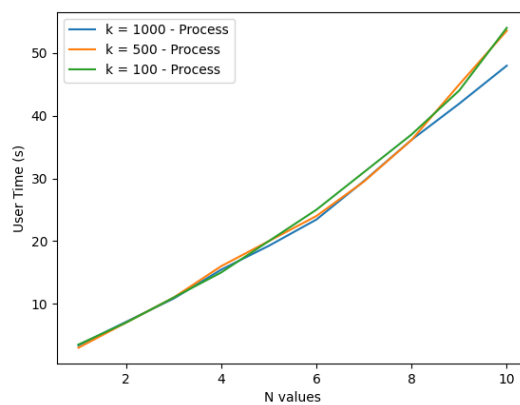
### Explanation:

- When n is constant and k values increasing, program execution times are increasing and when k is constant and n values increasing the programs execution times are also increasing as expected.

## Graph Group 4:



(There is a typo, this graph shows real time)



### Explanation:

- When the input file is partitioned into 1, 2, 5, 10 different files (i.e for 1 file, it has 240000 line; for 2 file, both has 120000 line), both programs executes linearly while changes in k does not affect the performance as opposed to n changes (for real time). For user time, increase in n values increase user time in process possibly because of switching context overhead and duplication of parent process data.