CC371: Analysis and Design of Algorithms
Bonus Programming Assignment

Name	ID
Youssef Victor	6668
Mohamed Zaytoon	6670
Muhanned Bashar	6656

Part 1 Selection Algorithms
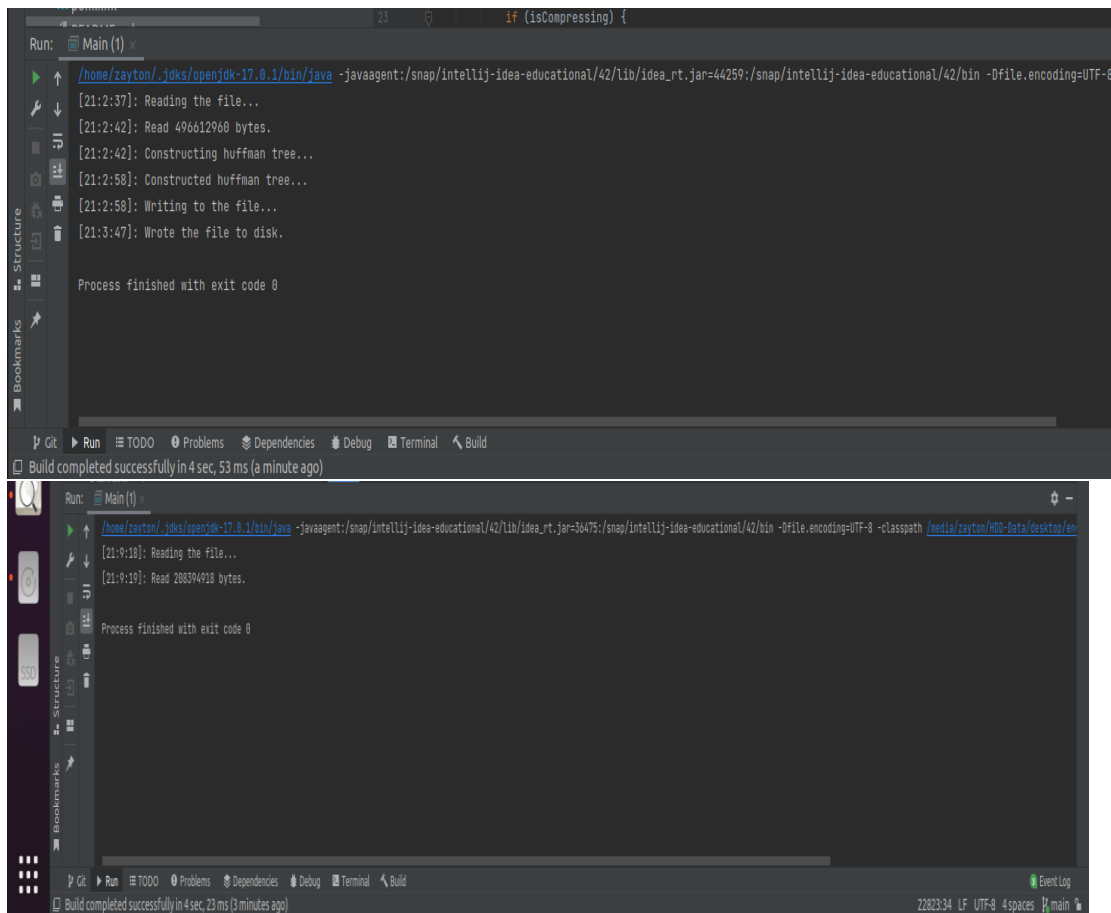
Benchmark	Mode	Cnt	Score	Error	Units
Benchmarks1000.sort1000_medianOfMedians	avgt		24475.460		ns/op
Benchmarks1000.sort1000_naive	avgt		24766.459		ns/op
Benchmarks1000.sort1000_randomized	avgt		8162.536		ns/op
Benchmarks10000.sort10000_medianOfMedians	avgt		258028.728		ns/op
Benchmarks10000.sort10000_naive	avgt		381181.582		ns/op
Benchmarks10000.sort10000_randomized	avgt		83585.125		ns/op
Benchmarks100000.sort100000_medianOfMedians	avgt		2523442.454		ns/op
Benchmarks100000.sort100000_naive	avgt		4219847.385		ns/op
Benchmarks100000.sort100000_randomized	avgt		712522.107		ns/op
Benchmarks1000000.sort1000000_medianOfMedians	avgt		25336915.634		ns/op
Benchmarks1000000.sort1000000_naive	avgt		51022454.945		ns/op
Benchmarks1000000.sort1000000_randomized	avgt		8103038.875		ns/op
Benchmarks10000000.sort10000000_medianOfMedians	avgt		253394782.353		ns/op
Benchmarks10000000.sort10000000_naive	avgt		570676564.706		ns/op
Benchmarks10000000.sort10000000_randomized	avgt		71766659.551		ns/op

Figure 1.1

- Randomized Median algorithm runs faster than the others as shown in figure 1.1

Part 2 Huffman Compression and Decompression

Insert n = 2 byte


```
if (isCompressing) {
Run:  Main (1) x

/home/zayton/.jdks/openjdk-17.0.1/bin/java -javaagent:/snap/intellij-idea-educational/42/lib/idea_rt.jar=44259:/snap/intellij-idea-educational/42/bin -Dfile.encoding=UTF-8
[21:2:37]: Reading the file...
[21:2:42]: Read 496612960 bytes.
[21:2:42]: Constructing huffman tree...
[21:2:58]: Constructed huffman tree...
[21:2:58]: Writing to the file...
[21:3:47]: Wrote the file to disk.


Process finished with exit code 0
```

```
Run:  Main (1) x

/home/zayton/.jdks/openjdk-17.0.1/bin/java -javaagent:/snap/intellij-idea-educational/42/lib/idea_rt.jar=36475:/snap/intellij-idea-educational/42/bin -Dfile.encoding=UTF-8 -classpath /media/zayton/HDD-Data/desktop/en
[21:9:18]: Reading the file...
[21:9:19]: Read 208394918 bytes.

Process finished with exit code 0
```