Nama : Bryant Sulthan Nugroho

NPM : 50423286

Kelas : 1IA03

**Thread**

**Code**

```python
import time

#Olah data
class olahData:
    def __init__(self, rentang):
        self.rentang = rentang

    def readData(self):
        print("[1] Read data ke : {}".format(self.rentang))
        time.sleep(2)

    def sortData(self):
        print("[2] Sort data ke : {}".format(self.rentang))
        time.sleep(1)

    def exportData(self):
        print("[3] Export data ke : {}".format(self.rentang))
        time.sleep(1)

    def run(self):
        self.readData()
        self.sortData()
        self.exportData()

if __name__ == '__main__':
    start = time.perf_counter()
    rentangs = [
        '1-100000',
        '100001-200000',
        '200001-300000',
        '300001-400000',
        '400001-500000',
        '500001-600000',
        '600001-700000',
        '700001-800000',
        '800001-900000',
        '900001-1000000'
    ]

    for i in rentangs:
        olahData(i).run()

    finish = time.perf_counter()
    print("Waktu total: ", finish - start)
```

**Output**

```
PS C:\Users\50423286\Documents\Pert1_50423286>  c:; cd 'c:\Users\50423
286\Documents\Pert1_50423286'; & 'C:\Users\50423286\AppData\Local\Micr
osoft\WindowsApps\python3.11.exe' 'c:\Users\50423286\.vscode\extension
s\ms-python.python-2023.14.0\pythonFiles\lib\python\debugpy\adapter/..
/..\debugpy\launcher' '50574' '--' 'C:\Users\50423286\Documents\Pert1_
50423286\thread.py'
[1] Read data ke : 1-100000
[2] Sort data ke : 1-100000
[3] Export data ke : 1-100000
[1] Read data ke : 100001-200000
[2] Sort data ke : 100001-200000
[3] Export data ke : 100001-200000
[1] Read data ke : 200001-300000
[2] Sort data ke : 200001-300000
[3] Export data ke : 200001-300000
[1] Read data ke : 300001-400000
[2] Sort data ke : 300001-400000
[3] Export data ke : 300001-400000
[1] Read data ke : 400001-500000
[2] Sort data ke : 400001-500000
[3] Export data ke : 400001-500000
[1] Read data ke : 500001-600000
[2] Sort data ke : 500001-600000
[3] Export data ke : 500001-600000
[1] Read data ke : 600001-700000
[2] Sort data ke : 600001-700000
[3] Export data ke : 600001-700000
[1] Read data ke : 700001-800000
[2] Sort data ke : 700001-800000
[3] Export data ke : 700001-800000
[1] Read data ke : 800001-900000
[2] Sort data ke : 800001-900000
[3] Export data ke : 800001-900000
[1] Read data ke : 900001-1000000
[2] Sort data ke : 900001-1000000
[3] Export data ke : 900001-1000000
Waktu total:  40.02548670000397
PS C:\Users\50423286\Documents\Pert1_50423286> []
```

**Multithread**

**Code**

```python
multithread.py > ...
1    import time
2    from threading import Thread
3
4    #Olah data
5    class olahData:
6        def __init__(self, rentang):
7            self.rentang = rentang
8
9        def readData(self):
10           print("[1] Read data ke : {}".format(self.rentang))
11           time.sleep(2)
12
13       def sortData(self):
14           print("[2] Sort data ke : {}".format(self.rentang))
15           time.sleep(1)
16
17       def exportData(self):
18           print("[3] Export data ke : {}".format(self.rentang))
19           time.sleep(1)
20
21       def run(self):
22           self.readData()
23           self.sortData()
24           self.exportData()
25
26   if __name__ == '__main__':
27       start = time.perf_counter()
28       rentangs = [
29           '1-100000',
30           '100001-200000',
31           '200001-300000',
32           '300001-400000',
33           '400001-500000',
34           '500001-600000',
35           '600001-700000',
36           '700001-800000',
37           '800001-900000',
38           '900001-1000000'
39       ]
40
41       thread_list = []
42       for rentang in rentangs:
43           t = Thread(target=olahData(rentang).run)
44           t.start()
45           time.sleep(0.1)
46           thread_list.append(t)
47
48       for thread in thread_list:
49           thread.join()
50
51       finish = time.perf_counter()
52       print("Waktu total: ", finish - start)
```

**Output**

```
PS C:\Users\50423286\Documents\Pert1_50423286>  c:; cd 'c:\Users\504
23286\Documents\Pert1_50423286'; & 'C:\Users\50423286\AppData\Local\
Microsoft\WindowsApps\python3.11.exe' 'c:\Users\50423286\.vscode\ext
ensions\ms-python.python-2023.14.0\pythonFiles\lib\python\debugpy\ad
apter/../..\debugpy\launcher' '50574' '--' 'C:\Users\50423286\Docume
nts\Pert1_50423286\thread.py'
[1] Read data ke : 1-100000
[2] Sort data ke : 1-100000
[3] Export data ke : 1-100000
[1] Read data ke : 100001-200000
[2] Sort data ke : 100001-200000
[3] Export data ke : 100001-200000
[1] Read data ke : 200001-300000
[2] Sort data ke : 200001-300000
[3] Export data ke : 200001-300000
[1] Read data ke : 300001-400000
[2] Sort data ke : 300001-400000
[3] Export data ke : 300001-400000
[1] Read data ke : 400001-500000
[2] Sort data ke : 400001-500000
[3] Export data ke : 400001-500000
[1] Read data ke : 500001-600000
[2] Sort data ke : 500001-600000
[3] Export data ke : 500001-600000
[1] Read data ke : 600001-700000
[2] Sort data ke : 600001-700000
[3] Export data ke : 600001-700000
[1] Read data ke : 700001-800000
[2] Sort data ke : 700001-800000
[3] Export data ke : 700001-800000
[1] Read data ke : 800001-900000
[2] Sort data ke : 800001-900000
[3] Export data ke : 800001-900000
[1] Read data ke : 900001-1000000
[2] Sort data ke : 900001-1000000
[3] Export data ke : 900001-1000000
Waktu total:  40.02548670000397
PS C:\Users\50423286\Documents\Pert1_50423286> 
```