Part-1 Multithreading with Worker Pattern  
1. Main thread run time (in ms)=7

Thread running background processes runtime(in ms)= 495795

2. a)

Main thread run time 0

Time taken to run all tasks in background thread: Thread-0 is = 250413

Time taken to run all tasks in background thread: Thread-1 is = 255387

Final runtime for the entire code: 255388

b)

Main thread run time 0

Time taken to run all tasks in background thread: Thread-0 is = 161970

Time taken to run all tasks in background thread: Thread-2 is = 165250

Time taken to run all tasks in background thread: Thread-1 is = 168573

Final runtime for the entire code: 168573

c)

Main thread run time 0

Time taken to run all tasks in background thread: Thread-0 is = 122713

Time taken to run all tasks in background thread: Thread-1 is = 125225

Time taken to run all tasks in background thread: Thread-2 is = 127737

Time taken to run all tasks in background thread: Thread-3 is = 130226

Final runtime for the entire code: 130226

d)

Main thread run time 0

Time taken to run all tasks in background thread: Thread-0 is = 97212

Time taken to run all tasks in background thread: Thread-2 is = 99198

Time taken to run all tasks in background thread: Thread-4 is = 101133

Time taken to run all tasks in background thread: Thread-3 is = 103189

Time taken to run all tasks in background thread: Thread-1 is = 105150

Final runtime for the entire code: 105154

e)

Main thread run time 5

Time taken to run all tasks in background thread: Thread-4 is = 80129

Time taken to run all tasks in background thread: Thread-5 is = 81728

Time taken to run all tasks in background thread: Thread-1 is = 83469

Time taken to run all tasks in background thread: Thread-0 is = 85134

Time taken to run all tasks in background thread: Thread-2 is = 86865

Time taken to run all tasks in background thread: Thread-3 is = 88558

Final runtime for the entire code: 88564

f)

Main thread run time 0

Time taken to run all tasks in background thread: Thread-2 is = 68055

Time taken to run all tasks in background thread: Thread-4 is = 69410

Time taken to run all tasks in background thread: Thread-1 is = 70827

Time taken to run all tasks in background thread: Thread-5 is = 72214

Time taken to run all tasks in background thread: Thread-6 is = 73623

Time taken to run all tasks in background thread: Thread-0 is = 75150

Time taken to run all tasks in background thread: Thread-3 is = 76611

Final runtime for the entire code: 76615

Difference between consecutive runs seems to decrease, and is insignificant henceforth.

3. Adding priority

Total time for priority 100 tasks: 1314976 ms

Total time for priority 0 tasks: 3908957 ms

Total runtime of the program: 104138 ms  
Difference between priority100 and priority0 tasks = 2593981ms

4. Blocking Queue

Time taken to run all tasks in background thread: Thread-2 is = 165321

Time taken to run all tasks in background thread: Thread-1 is = 168607

Time taken to run all tasks in background thread: Thread-3 is = 171987

Total running time: 172003

5. Sum of logarithms is: 824.2563941543722

Part-2 DAG and Master Worker pattern  
I wasn’t able to solve this since I am not aware of DAG and Master/Worker design pattern. I have tried my best, but I could not figure it out.