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**Course:** Operating Systems

**Section:** AM

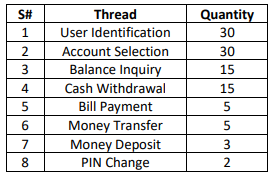
**Teacher:** Osama khan

**CS 3220-AM, BM, CM, DM: Operating Systems**

**Assignment 2**

**Date Assigned: Nov 23rd, 2021**

**Q 1.** In a real-world application of an online Airline Ticketing Reservation System that processes all customers’ requests, provide names and quantities of all possible threads that might be needed in a process, where a process is associated with a single user using the system. (18 points)



**Q 2.** In this problem you are to compare reading a file using a single-threaded server and a multithreaded server. It takes 30 msec to get a request for work, dispatch it, and do the rest of the necessary processing, assuming that the data needed are in the block cache. If a disk operation is needed, as is the case half of the time, an additional 50 msec is required, during which time the thread sleeps. How many requests/sec can the server handle?

1. If it is single-threaded? (8 points)
2. If it is multi-threaded? (8 points)

**Solution:**

Total time to read a file from Cache = **Tc = 30𝑚𝑠𝑒𝑐 = 30 × 10−3 𝑠𝑒𝑐𝑜𝑛𝑑**

Total time to read a file from Hard Disk= **TD = 50𝑚𝑠𝑒𝑐 + 30𝑚𝑠𝑒𝑐 = 80 × 10−3 𝑠𝑒𝑐𝑜𝑛𝑑**

1. **If it is single-threaded? (8 points):**

Average time to read a file (get a request for work, dispatch it, and do the rest of the necessary processing)

**= (Tc +TD) / 2**

**=** (30 + 80) / 2

= 110 / 2

= **55msec**

= **55** **× 10−3 𝑠𝑒𝑐𝑜𝑛𝑑**

Total number of requests per second that the server can handle = 1 / 55×10−3𝑠𝑒𝑐𝑜𝑛𝑑𝑠 = 18.18 ≈ **18**

1. **If it is single-threaded? (8 points):**

Average time to read a file (get a request for work, dispatch it, and do the rest of the necessary processing)

**= min (Tc +TD)**

**= min** (30 + 80)

= **30msec**

= **30** **× 10−3 𝑠𝑒𝑐𝑜𝑛𝑑**

(Average time to read a file would be the time it takes to read a file from Cache only.)

Total number of requests per second that the server can handle = 1 / 30×10−3𝑠𝑒𝑐𝑜𝑛𝑑𝑠 = 33.33 ≈ **33**