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**Course:** Operating Systems

**Section:** AM

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**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)

**Solution:**

Wego was founded in 2005 to help people discover the value of travel. Today, it’s used by millions of people who look for adventures, travel for family and work purposes. In Pakistan, it offers flights to popular destinations such as Lahore, Islamabad, Gwadar, and more cities (<https://www.wego.pk/> ).

For this website we need **1,000 threads** working in different part of the websites.

|  |  |  |
| --- | --- | --- |
| **S.NO** | **Name** | **Quantity** |
| 1 | Registration | 150 |
| 2 | Login | 200 |
| 3 | Search Airline | 100 |
| 4 | Select Date | 50 |
| 4 | Select Airline | 200 |
| 5 | Select Seat | 100 |
| 6 | Checkout | 100 |
| 7 | Verification | 100 |
|  | **Total** | **= 1000** |

**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**

(Thread waiting for data from Hard Disk would be sleeping, other Threads would be keeping the CPU busy, and hence the I/O time would not be counted towards the total time that reading a file from Hard Disk will take)

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