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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?

a. If it is single-threaded? (8 points)
b. If it is multi-threaded? (8 points)

Solution:

Total time to read a file from Cache = **T_c = 30$msec$ = 30 × 10^{-3}** $second$
Total time to read a file from Hard Disk= **T_D = 50$msec$ + 30$msec$ = 80 × 10^{-3}** $second$

a. **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)

= (T_c + T_D) / 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^{-3}$seconds$ = 18.18 ≈ **18**

b. **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 (T_c + T_D)
= 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^{-3}$seconds$ = 33.33 ≈ **33**