Faculty of Engineering and Technology			
Ramaiah University of Applied Sciences			
Department	Computer Science and Engineering	Programme	B. Tech. in CSE
Semester/Batch	5th / 2017		
Course Code	CSC302A	Course Title	Operating Systems
Course Leader(s)	Ms. Jishmi Jos Choondal/Ms. Naveeta		

Assignment					
Register No.		Name of Student			
Sections		**Marking Scheme**	**Max Marks**	**First Examiner Marks**	**Moderator Marks**
Question 1	Q1.1	Development of application using sequential approach	03		
	Q1.2	Development of application using multithreaded approach	05		
	Q1.3	Comparison of execution time and Analysis	02		
		Question 1 Max Marks	**10**		
Question 2	Q2.1	Number of page faults that occur when FIFO, LRU, and Optimal page replacement algorithms are used respectively	06		
	Q2.2	Diagram of the probability density function of distance strings based on LRU	03		
	Q2.3	Recommendation of an optimal number of physical page frames appropriate for the given string of accesses	01		
		Question 2 Max Marks	**10**		
		Total Assignment Marks	**20**		

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Course Marks Tabulation				
Component- 1(B) Assignment	**First Examiner**	**Remarks**	**Moderator**	**Remarks**
Q1				
Q2				
Marks (out of 20)				
Signature of First Examiner				Signature of Second Examiner

Instructions to students:

1. Maximum marks is **20**
2. The assignment has to be neatly word processed as per the prescribed format.
3. The maximum number of pages should be restricted to **8**
4. The printed assignment must be submitted to the course leader.
5. **Submission Date: 21/10/2019**

Assignment

Question 1 **(10 Marks)**

The program to be implemented reads a character from a file. The program is required to count the frequency of the input character in three text files. In order to perform the above, two versions of the program need to be implemented, one a sequential version and the other a concurrent version. The sequential version implements a function to determine the frequency of occurrence of the input character in a text file. The main function consolidates frequency of the input character in the three text files. The concurrent version of the program spawns three threads, each one to determine the frequency of occurrence of the input character in one of the three files. The main thread computes the consolidated frequency of the input character based on the individual thread's output.

Perform the following using file management system calls:

1. Design and implement the application using sequential approach with functions
2. Design and implement the application using multithreaded approach

3. Compare the execution time of the above two versions of the program and analyse their performance

Question 2 **(10 Marks)**

Consider a computer machine with a memory system containing three physical page frames and eight virtual pages. Suppose the reference string of physical page accesses is 0 1 2 3 2 3 0 4 5 2 3 1 4 3 2 6 3 2 1 2.

1. Determine the number of page faults that occur among the following page replacement algorithms
   - FIFO
   - LRU
   - Optimal
2. Draw the diagram of the probability density function of distance strings based on LRU algorithm.
3. Recommend an optimal number of physical page frames appropriate for the given string of accesses.