Jahangirnagar University

Department of Computer Science and Engineering

3rd Year 1st Semester B.Sc. (Hons.) Final Examination -2020

Answer Script
Total Page# 16 7

Course Information						
Course Title:	Operating Systems					
Course Code:	CSE-301		**Marks:**	10	**Time:**	45 Minutes

Student Information	
Examination Roll No.:	180649
Registration No.:	46124
Academic Session:	2017-2018
Date:	04/07/2021

Instructions

1. Examinee must write his/her exam roll no. and page no. at the top of every page of the script.
2. Do not write your name or any identification mark anywhere of the script.
3. Total time for exam is 45 minutes. You will get 15 additional minutes for submission.
4. Delay in submission is not acceptable.
5. You have to submit your exam script in PDF format.
6. The examinee must submit the examination script **through online (Google classroom/email/google form etc.)** as prescribed by the examiner.
7. You must use **your EXAM ID** only for naming your submitted file.
8. After completing the exam, you must write the total number of pages used for the exam in the top sheet.

Answer to the question number 1(b):

The system is in a safe state if there is a safe sequence of process. Like if there is a set of process $<P_1, \ldots P_n>$ such that for every P_i, the requested resource of the p_i can be satisfied by the resources available by the system.

Unsafe state: If there is a cycle among the processes then the system is in unsafe state.

Deadlock state: If a processes in set holding a resource and requesting to get additional resource that is held by another process of the set then there is deadlock.

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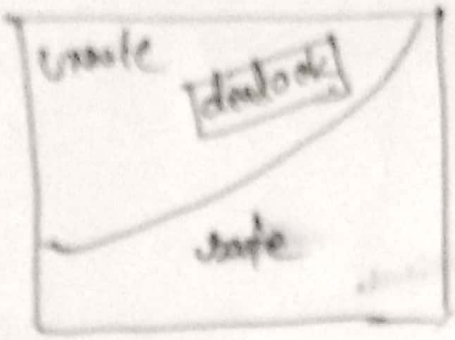
Answer to the question number 1(h):



Necessary condition to enter a deadlock —

(i) Mutul exclusion.

(ii) Hold and wait.

(iii) No preemption.

(iv) Circular wait.

Answer to the question number 1(c):

Steps of handling page fault with block diagram :

If the reference is not found in the page table then this is called page fault. There are few steps to handle this fault.

(i) Operating system has to determine if the reference is valid or not.

(ii) If legal then bring the requested page in the disk.

(iii) Find out a free frame to bring out that page. If no free frame apply page replacement algorithm to replace a place with the requested page.

(iv) Change the page and frame table.

(v) Execute the instruction that was suspended.

Answer to the question number 1(c):

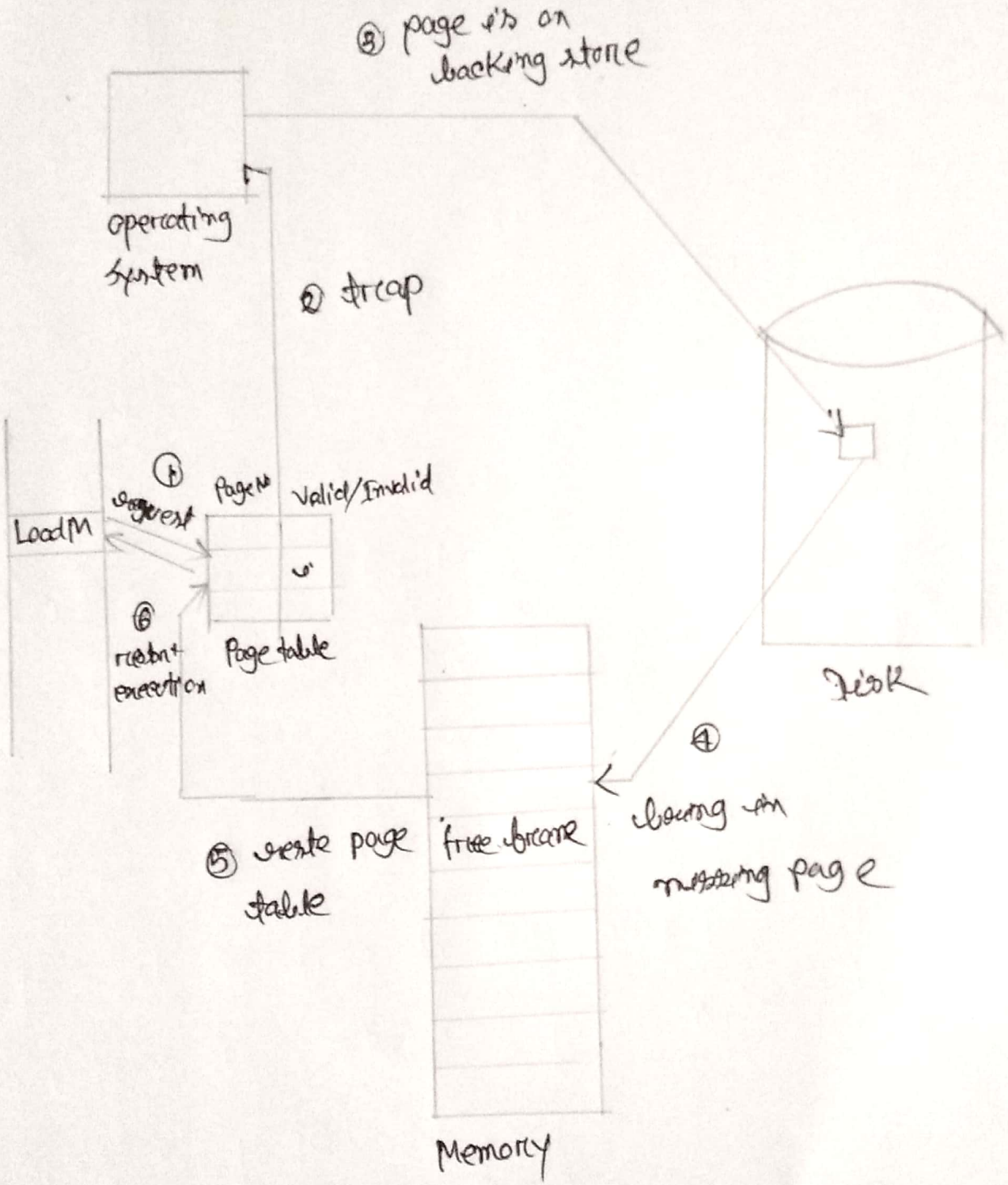


Fig: Block diagram of page Handling

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Answer to the question number 2(b):

(i) Using Optimal page replacement algorithm:

Given string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

	1	2	3	4	2	1	5	6	2	1	2	3	7	6	3
f_3			3	4	4	4	5	6	6	6	6	6	6	6	6
f_2		2	2	2	2	2	2	2	2	2	2	2	7	7	7
f_1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3
	*	*	*	*	Hit	Hit	*	*	Hit	Hit	Hit	*	*	Hit	Hit

	2	1	2	3	6
f_3	6	1	1	1	1
f_2	2	2	2	2	2
f_1	3	3	3	3	6
	*	*	Hit	Hit	*

Page fault = 11

page hit = 9

fault ratio = $\frac{11}{20} \times 100$

= 55%

Hit ratio = $\frac{9}{20} \times 100$

= 45%

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Answer to the question number 2(a): b

(ii) Using LRU algorithm:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

			4	2	1	5	6	2	1	2	3	7	6	3
f_3			3	3	3	1	1	1	2	2	2	2	2	6	6
f_2		2	2	2	2	2	2	6	6	6	6	3	3	3	3
f_1	1	1	1	4	4	4	5	5	5	1	1	1	7	7	7
	*	*	*	*	Hit	*	*	*	*	*	Hit	*	*	*	Hit

	2	6
f_3	6	6
f_2	3	3
f_1	2	2
	*	Hit

$$\text{Hit ratio} = \frac{4}{20} \times 100$$

$$\text{Miss ratio} = \frac{16}{20} \times 100$$

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Answer to the question number 2(b): (5)

Optimal page replacement algorithm is not practical cause —

(i) In this algorithm we need the priori information about the reference.

(ii) we have to find out which reference will not in the future for long amount of time and it is difficult to assume.

And If we can't determine the future info about the page than we can't apply this algorithm. So, this is not practical.