

Most Recently Used Page Replacement Algorithm



What do you mean by page replacement?

Page replacement happens when a requested page is not in memory (page fault) and a free page cannot be used to satisfy the allocation, either because there are none, or because the number of free pages is lower than some threshold. What do you mean by page replacement?

Why page replacement algorithm is used?

In an operating system that uses paging for memory management, a page replacement algorithm is needed to decide which page needs to be replaced when new page comes in. The target for all algorithms is to reduce the number of page faults.



What is MRU in page replacement algorithm?

Optimal page replacement algorithm replaces the most recently used page to minimize the page faults. Thus, Optimal page replacement algorithm acts as MRU page replacement algorithm

What is MRU in operating system?

It is a computer algorithm used to manage the cache area which stores data in the memory. When a cache becomes full and you need space for new data. Hence you will discard the least recently used items first, things you haven't used for a while but are in the cache consuming space. MRU stands for 'most recently used'.



Working of MRU Algorithm

Page References: 4 5 6 7 8 9 4 5 6 7 8 9 4 5 6 7 8 and no of frame is 4

Empty frame	4	5	6	7	8	9	4	5	6	7	8	9	4	5	6	7	8	9
	4	4		4	4	4	4	4	4	4	4	4	4	4	4	6	6	6
	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	7	7
	6	6		6	6	6	6	7	7	8	8	8	8	8	8	8	8	8
	7	7	8	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9

■ - Means page fault

■ - Means no page fault; page already present at frame

Here the number of rings are 4



Internal working process:-

1. The first 4 query pages will be directly added into the frame as the frame is empty initially. So, here page no. 4, 5, 6, 7 will be added into the page frame in the same order as it has been queried.
2. Then in the 5th query we get page no. 8. Now, if the page frame doesn't contain the queried page no. then the "most recently used" page will get popped and the queried page has been pushed into the frame. So here page no.7 is removed and page no.8 has been added in the frame. This circumstance is known as "page fault".
3. In 6th iteration the queried page is 9. Now again we encountered the page fault that as we discussed in the 2nd point. So here the page no.8 is popped and page no.9 will be pushed into the current frame.
4. Now in 7th query we've got page no.4. So here the page 4 already exists in our current frame, so the current frame remains unchanged. This situation is known as "page hit".
5. In 8th query we have got 2 different pages 5 and 6. So here also we encountered "page hit" for both the pages. Hence the page frame remains unchanged but 5 and 6 will be our "most recently used".



Internal working process:-

.6) 7th query is about page 7. So as page 7 is not there into the current page frame its obviously a page fault and hence 6 will be removed as it's the M.R.U page and 7 has been added to the frame.

7. In 8th query we are asked about page no.8. It will arise the situation of page fault. So page 7 will be popped and page 8 will be pushed into the current page frame.

8. At the time of 9th iteration our MRU page is 7. But we have a query of page 9 which is already present in the frame so its page hit and page 9 will become MRU page for our current frame.

9. 10th iteration asks about page 4 which is already present so as it's the page hit page 4 will become our most recently used page.

10. In 11th query we get 5 which is a page hit only making page 5 as MRU for out page frame.

11. Now in 12th iteration we get page 6 creating the page fault so page 5 is being removed and page 6 will be added as MRU page.

12. In 13th query we have pg 7 creating the page fault which results into the removal of the page 5 and addition of pg 7 into the page frame.

13. 14th and 15 query is about page 8 and page 9. Both are present in page frame and it creates a page fault.

