

Optimal Page Replacement Algorithm



Optimal Page Replacement

The Optimal Page Replacement Algorithm replaces the page which will not be referred for so long in future. Practically it can't be implemented but it can be used as benchmark.

It is optimal as compared to other algorithms.

In Operating System, when the new page is referred and if it is not present in memory, then page fault occurs due to which the Operating System replaces one of the existing pages with newly added page.

The Operating System replaces the page that will not be used for the longest period of time in future.

Optimal page replacement algorithm is not practical as we cannot predict future. However it is used as a reference for other page replacement algorithms.



Steps to Perform Algorithm

If referred page is already present, increment hit count.

If not present, find if a page that is never referenced in future. If such a page exists, replace this page with new page.

If no such page exists, find a page that is referenced farthest in future. Replace this page with new page.



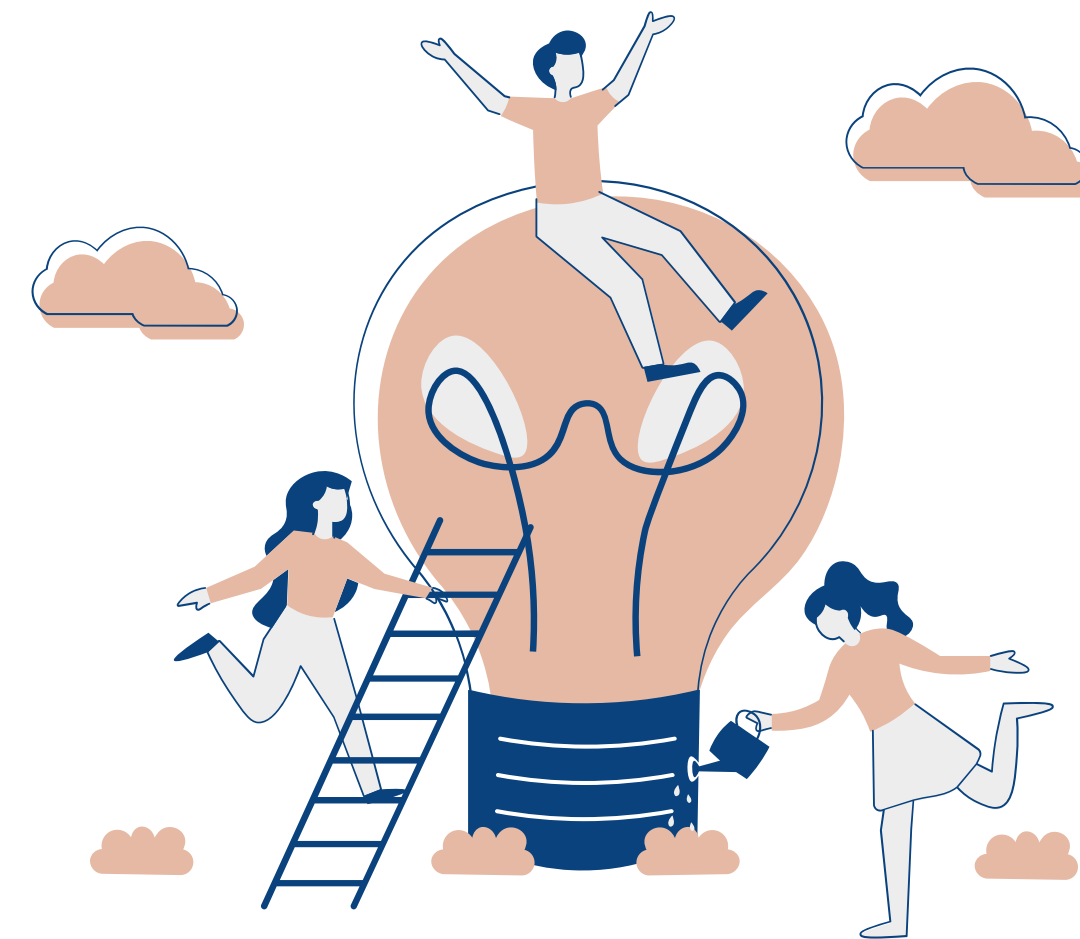
Example

Suppose,
Reference String of pages are
[7,0,1,2,0,3,0,4,2,3,0,3,2]
Frames = 4

			2	2	2	2	2	2	2	2	2	2
		1	1	1	1	1	4	4	4	4	4	4
	0	0	0	0	0	0	0	0	0	0	0	0
7	7	7	7	7	3	3	3	3	3	3	3	3



★ Represents Page Faults
Red color indicates Page Hits



Explanation of Example

- First Four pages are not available on frames so they are considered as page faults .
- Next page is 0 which is available in frame so it is page hit.
- Next page is 3 which is not available in frame so it is page fault. 7 got removes as there is no demand for 7 in future pages.
- Next page is 0 which is available in frame so it is page hit.
- Next page is 4 which is not available in frame so it is page fault. 1 got removes as there is no demand for 1 in future pages
- Next page is 2 which is available in frame so it is page hit.
- Next page is 3 which is available in frame so it is page hit.
- Next page is 0 which is available in frame so it is page hit.
- Next page is 3 which is available in frame so it is page hit.
- Next page is 2 which is available in frame so it is page hit.



Conclusion

Total No of Hits - 7 out of 13

Total No of Faults - 6 out of 13

Hit Ratio - $(7/13)*100 = 53.84\%$

Fault Ratio - $(6/13)*100 = 46.16\%$

