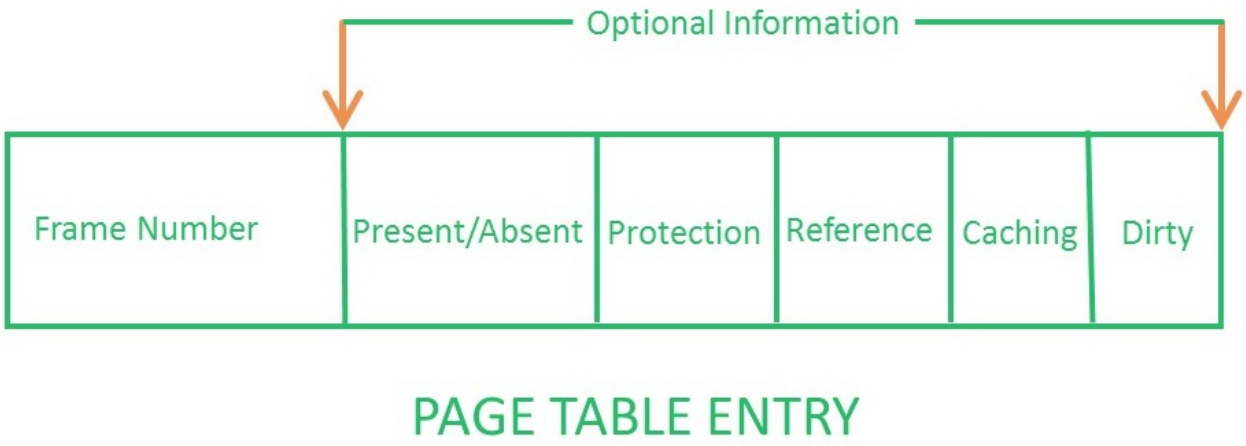
Operating System | Page Table Entries

Prerequisite – Paging

Page table has page table entries where each page table entry stores a frame number and optional status (like protection) bits. Many of status bits used in the virtual memory system. The most **important** thing in PTE is **frame Number**.

Page table entry has the following information –



1. **Frame Number –** It gives the frame number in which the current page you are looking for is present. The number of bits required depends on the number of frames.

   Number of bits for frame = Size of physical memory/frame size

2. **Present/Absent bit –** Present or absent bit says whether a particular page you are looking for is present or absent. In case if it is not present, that is called Page Fault. It is set to 0 if the corresponding page is not in memory. Used to control page fault by the operating system to support virtual memory. Sometimes this bit is also known as **valid/invalid** bits.
3. **Protection bit –** Protection bit says that what kind of protection you want on that page. So, these bit for the protection of the page frame (read, write etc).
4. **Referenced bit –** Referenced bit will say whether this page has been referred in the last clock cycle or not. It is set to 1 by hardware when the page is accessed.
5. **Caching enabled/disabled –** Some times we need the fresh data. Let us say the user is typing some information from the keyboard and your program should run according to the input given by the user. In that case, the information will come into the main memory. Therefore main memory contains the latest information which is typed by the user. Now if you try to put that page in the cache, that cache will show the old information. So whenever freshness is required, we don't want to go for caching or many levels of the memory.The information present in the closest level to the CPU and the information present in the closest level to the user might be different. So we want the information has to be consistency, which means whatever information user has given, CPU should be able to see it as first as possible. That is the reason we want to disable caching. So, this bit **enables or disable** caching of the page.
6. **Modified bit –** Modified bit says whether the page has been modified or not. Modified means sometimes you might try to write something on to the page. If a page is modified, then whenever you should replace that page with some other page, then the modified information should be kept on the hard disk or it has to be written back or it has to be saved back. It is set to 1 by hardware on write-access to page which is used to avoid writing when swapped out. Sometimes this modified bit is also called as the **Dirty bit**.

GATE CS Corner Questions

Practicing the following questions will help you test your knowledge. All questions have been asked in GATE in previous years or in GATE Mock Tests. It is highly recommended that you practice them.

1. GATE CS 2001, Question 46
2. GATE CS 2004, Question 66
3. GATE CS 2015 (Set 1), Question 65

This article is contributed by **Samit Mandal**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

Recommended Posts:

Operating System | Inverted Page Table
Operating System | Page Fault Handling
Operating System | Second Chance (or Clock) Page Replacement Policy
Operating System | Process Table and Process Control Block (PCB)
Page Replacement Algorithms in Operating Systems
Operating System | Starvation and Aging in Operating Systems
Operating System | Buddy System - Memory allocation technique
Operating System | Semaphores in operating system
Operating System | Introduction of Operating System - Set 1
Operating System | Requirements of memory management system
Operating System | Types of Operating Systems
Operating System | Unix File System
Operating System | Introduction of System Call
Operating System | Kernel I/O Subsystem (I/O System)
Operating System | Paging

Article Tags : GATE CS, Operating Systems

Practice Tags : Operating Systems

1

To-do Done

3

Based on **4** vote(s)

Feedback/ Suggest Improvement | Add Notes | Improve Article

Please write to us at contribute@geeksforgeeks.org to report any issue with the above content.

Previous

Mathematics | Properties of Boolean algebra

Next

Operating System | Lock variable synchronization mechanism

Most popular in GATE CS

- Memory based Vs Register based addressing modes
- Theory of Computation | Applications of various Automata
- Operating System | Structures of Directory
- Arden's Theorem and Challenging Applications | Set 2
- Difference between Byte Addressable Memory and Word Addressable Memory

Most visited in Operating Systems

- Deadlock, Starvation, and Livelock
- Logical vs Physical Address in Operating System
- Operating System | Boot Block
- Message based Communication in IPC (inter process communication)
- Get/Set process resource limits in C