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SURAT TUGAS

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3. Sehubungan dengan hal tersebut diatas, maka Dekan Fakultas Ilmu Komputer Universitas Bhayangkara Jakarta Raya menugaskan:

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Analysis of Random Page Replacement Algorithm in Operating System

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Abstract: Page replacement algorithms choose pages to swap out from memory, namely when a new page needs allocation memory. Several page replacement algorithms proposed by experts. Four well known page replacement algorithms are Least Recently Used (LRU), Optimal Page Replacement (OPR), First In First Out (FIFO), Random page replacement algorithms. Each one has the objective to minimize the page fault. If the minimum page fault achieved, the performance of the process increased. The algorithm discussed is random page replacement algorithm. In this paper three case studies of random page replacement algorithm are discussed thoroughly.

Keywords: Random page replacement algorithm, page fault, page replacement algorithm, FIFO, LRU, OPR

I. INTRODUCTION

Memory management is the most important part of operating system in which all activities related to the memory are perform [1]. The replacement of page is the main concept. Pages is required to be in the main memory [2]. Computer system objective is to execute program of different sizes. The program should be in main memory when program is executed. But main memory has limited size to accommodate programs which is large. Execution of program that may not be entirely in main memory is called virtual memory [3]. Virtual memory paved the way to execute program that is larger than main memory. The process in which we provisionally moves process from primary memory to the hard disk or secondary memory, so that the memory available for other processes, which is known as swapping [4]

On operating systems which use paging for memory management, it is needed a page replacement algorithm to decide which pages to replace when a new page is entered. Good replacement can reduce the cost of page fault that result in higher performance of the system [5].

Page Fault occurs when a process references to a page that is not present in the main memory and needs to be through from secondary memory [6]. When a program currently executing, accessing a memory page that is mapped to the virtual address space, but is not loaded into physical memory. Because actual physical memory is much smaller than virtual memory, a page fault occurs. In this case, the operating system may have to replace one of the existing pages with the new page it needs. There are several page replacement algorithms for this replacement. One of them is the random page replacement algorithm [7].

II. LITERATURE SURVEYS

There are several algorithms of page replacement proposed by experts, namely :

1. First in First out (FiFO): This is the simplest page changing algorithm. In this algorithm, the operating system keeps track of all the pages in memory that are in the queue, namely page that has been in front of the queue the longest. When a page has to be replaced the page at the front of the queue is chosen to be deleted. An average of hit ratio of 50 percent is reported by FIFO algorithm. The advantages and disadvantages of FIFO algorithm: Easy to understand, very easy to be implemented, Performance not always good [8].
2. Optimal Page Replacement: In this algorithm, pages are replaced which will not be used for the next longest duration of time. Optimal page replacement is a good algorithm, but it is impossible to implement practically, because the operating system will not know the next request. The use of this algorithm is to create benchmarks so that other replacement algorithms can be analyzed against this algorithm. On this algorithm, system select victim whole reference is furthest. This algorithm has the best page fault behavior reported [9].
3. Least Recently Used: In this algorithm, the page will be replaced the least used (least recently used). An average of 60 % hit ratio is reported by LRU algorithm. This algorithm selects the victim page as that which is not been demanded for access for along time [9].