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“Page Replacement Algorithms”

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Page Replacement Algorithms

Introduction:

Page replacement algorithms are a critical component of operating systems, responsible for managing the allocation of physical memory to processes. When a process requires memory, the operating system must decide which pages to load into memory and which to evict to make room. The choice of page replacement algorithm can significantly impact the performance of the system.

Algorithms:

First In First Out (FIFO)

Idea: The oldest page in memory is replaced first.

Coding Functionalities:

- Maintain a queue of pages in memory.
- When a page is needed, remove the oldest page from the queue.

Least Recently Used (LRU)

Idea: The page that has not been used for the longest time is replaced first.

Coding Functionalities:

- Maintain a list of pages in memory, ordered by their last usage time.
- When a page is needed, remove the page from the end of the list.

Second Chance Algorithm (SCA)

Idea: A modified version of FIFO that gives pages a "second chance" before being replaced.

Coding Functionalities:

- Maintain a queue of pages in memory, with a "referenced" bit for each page.
- When a page is needed, check the referenced bit of the oldest page.
- If the bit is set, clear it and move the page to the end of the queue.
- If the bit is not set, replace the page.