Operating Systems (2CS403)

Innovative Assignment

Demonstration of Paging Technique

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Introduction :

In this innovative assignment, I have made a simulation for visualizing the paging mechanism in operating systems. For that, I have assumed a 16-KB main memory, along with a 32-KB virtual address space. Both are divided into blocks of 4-KB, which is the corresponding page frame size and page size respectively.

Hence, the main memory will be divided into four page frames, while the virtual memory will be capable of containing eight pages. The page order will initially be asked from the user and it will be loaded as is into the virtual memory.

The address conversion from virtual to physical address will be done by maintaining the offset (first 12 bits of the virtual address) and appending the page frame referred in the main memory to the left of this offset. This will give us the corresponding physical address for the given virtual address.

If the virtual address does not refer to a physical address, then a page fault occurs and a page-replacement algorithm is set into action. The page-replacement algorithm in this case is the First-In-First-Out

(FIFO) algorithm. The corresponding changes will be made to the page frame status and the same will be implemented.

Output :

Demonstration of Paging Technique

Enter comma-separated values for page frame order (in order of earliest arrival) : Enter initial requests

Page No.	Referring Page Frame	Memory Space
7	-	28k-32k
6	-	24k-28k
5	-	20k-24k
4	-	16k-20k
3	-	12k-16k
2	-	8k-12k
1	-	4k-8k
0	-	0-4k

Page Frame No.	Memory Space
3	12k-16k
2	8k-12k
1	4k-8k
0	0-4k

Enter virtual memory address : Enter

Resultant Physical Address :

Demonstration of Paging Technique

Enter comma-separated values for page frame order (in order of earliest arrival) : 2,3,1,0 Enter initial requests

Page No.	Referring Page Frame	Memory Space
7	x	28k-32k
6	x	24k-28k
5	x	20k-24k
4	x	16k-20k
3	0	12k-16k
2	1	8k-12k
1	3	4k-8k
0	2	0-4k

Page Frame No.	Memory Space
3	12k-16k
2	8k-12k
1	4k-8k
0	0-4k

Enter virtual memory address : 1232 Enter

Page frame status : FOUND! Page frame refers to page no : 2

Binary Array of the selected virtual address :

0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0

Conversion of virtual address to physical address

Physical Address (found by keeping the offset as it is and changing the first 4-bit page no. to a 3-bit corresponding page frame no) :

0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0

Resultant Physical Address :

9424

Demonstration of Paging Technique

Enter comma-separated values for page frame order (in order of earliest arrival) : 2,3,1,0 Enter initial requests

Page No.	Referring Page Frame	Memory Space
7	x	28k-32k
6	x	24k-28k
5	2	20k-24k
4	x	16k-20k
3	0	12k-16k
2	1	8k-12k
1	3	4k-8k
0	x	0-4k

Page Frame No.	Memory Space
3	12k-16k
2	8k-12k
1	4k-8k
0	0-4k

Enter virtual memory address : 24444 Enter

Page frame status : FOUND! Page frame refers to page no : 2

Binary Array of the selected virtual address :

0	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0

Demonstration of Paging Technique

127.0.0.1:5500 says

PAGE FAULT! Accessing FIFO Page replacement algorithm...

OK

Enter comma-separated values for page frame order (in order of earliest arri

Page No.	Referring Page Frame	Memory Space
7	x	28k-32k
6	x	24k-28k
5	x	20k-24k
4	x	16k-20k
3	0	12k-16k
2	1	8k-12k
1	3	4k-8k
0	2	0-4k

Page Frame No.	Memory Space
3	12k-16k
2	8k-12k
1	4k-8k
0	0-4k

Enter virtual memory address : 24444 Enter

Demonstration of Paging Technique

Enter comma-separated values for page frame order (in order of earliest arrival) : 2,3,1,0 Enter initial requests

Page No.	Referring Page Frame	Memory Space
7	x	28k-32k
6	x	24k-28k
5	2	20k-24k
4	x	16k-20k
3	0	12k-16k
2	1	8k-12k
1	3	4k-8k
0	x	0-4k

Page Frame No.	Memory Space
3	12k-16k
2	8k-12k
1	4k-8k
0	0-4k

Enter virtual memory address : 24444 Enter

Page frame status : FOUND! Page frame refers to page no : 2

Binary Array of the selected virtual address :

0	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0

Conversion of virtual address to physical address

Physical Address (found by keeping the offset as it is and changing the first 4-bit page no. to a 3-bit corresponding page frame no) :

0	1	0	1	1	1	1	0	1	1	1	1	1	0	0

Resultant Physical Address :

12156