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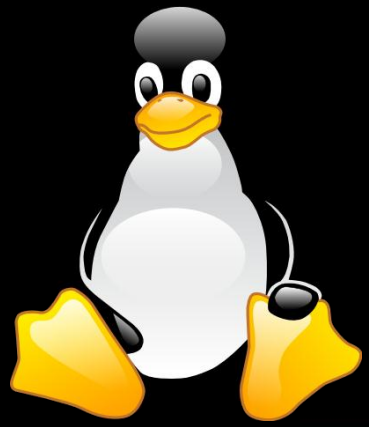
OPERATING SYSTEM

Part 20: Paging and Segmentation



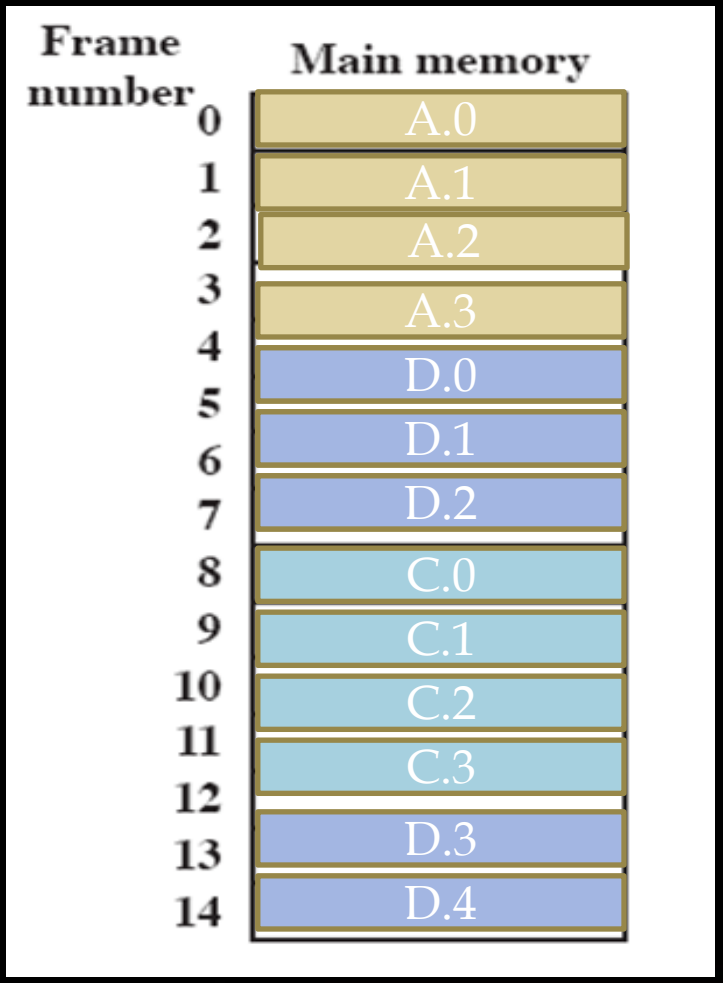
Paging

- Partition memory into small equal fixed-size chunks and divide each process into the same size chunks
- The chunks of a process are called pages
- The chunks of memory are called frames

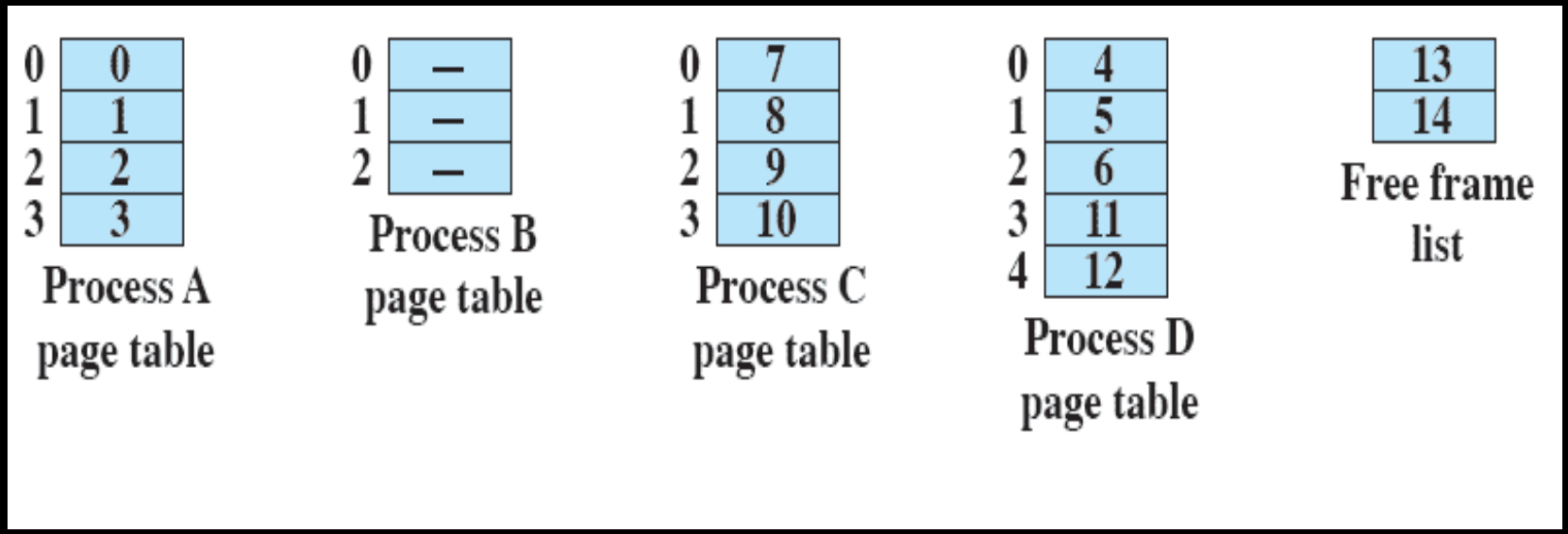
Paging

- Operating system maintains a page table for each process
- Contains the frame location for each page in the process
- Memory address consist of a page number and offset within the page

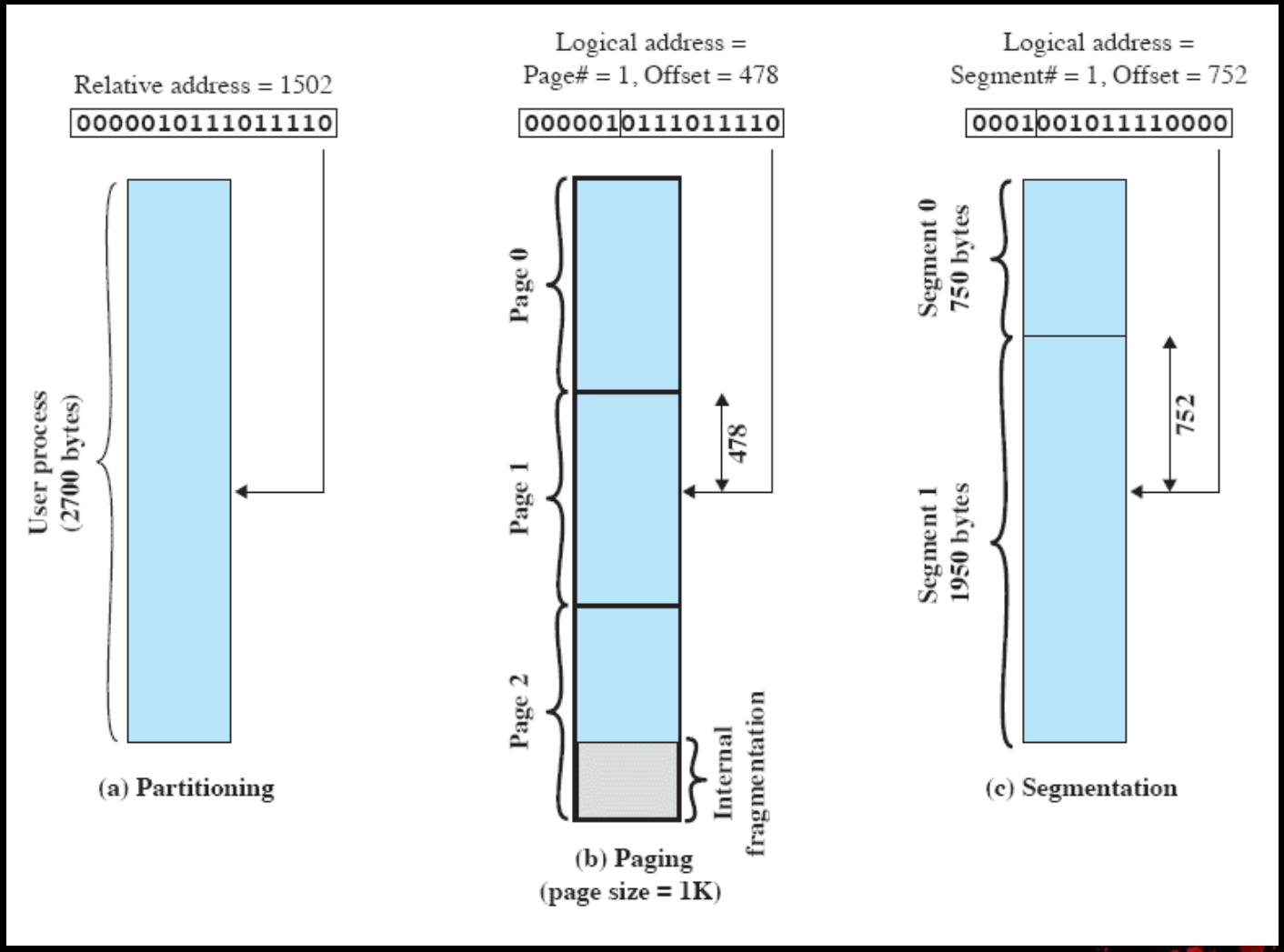
Paging


Frame number
Main memory
0
A.0
1
A.1
2
A.2
3
A.3
4
D.0
5
D.1
6
D.2
7
8
C.0
9
C.1
10
C.2
11
C.3
12
13
D.3
14
D.4

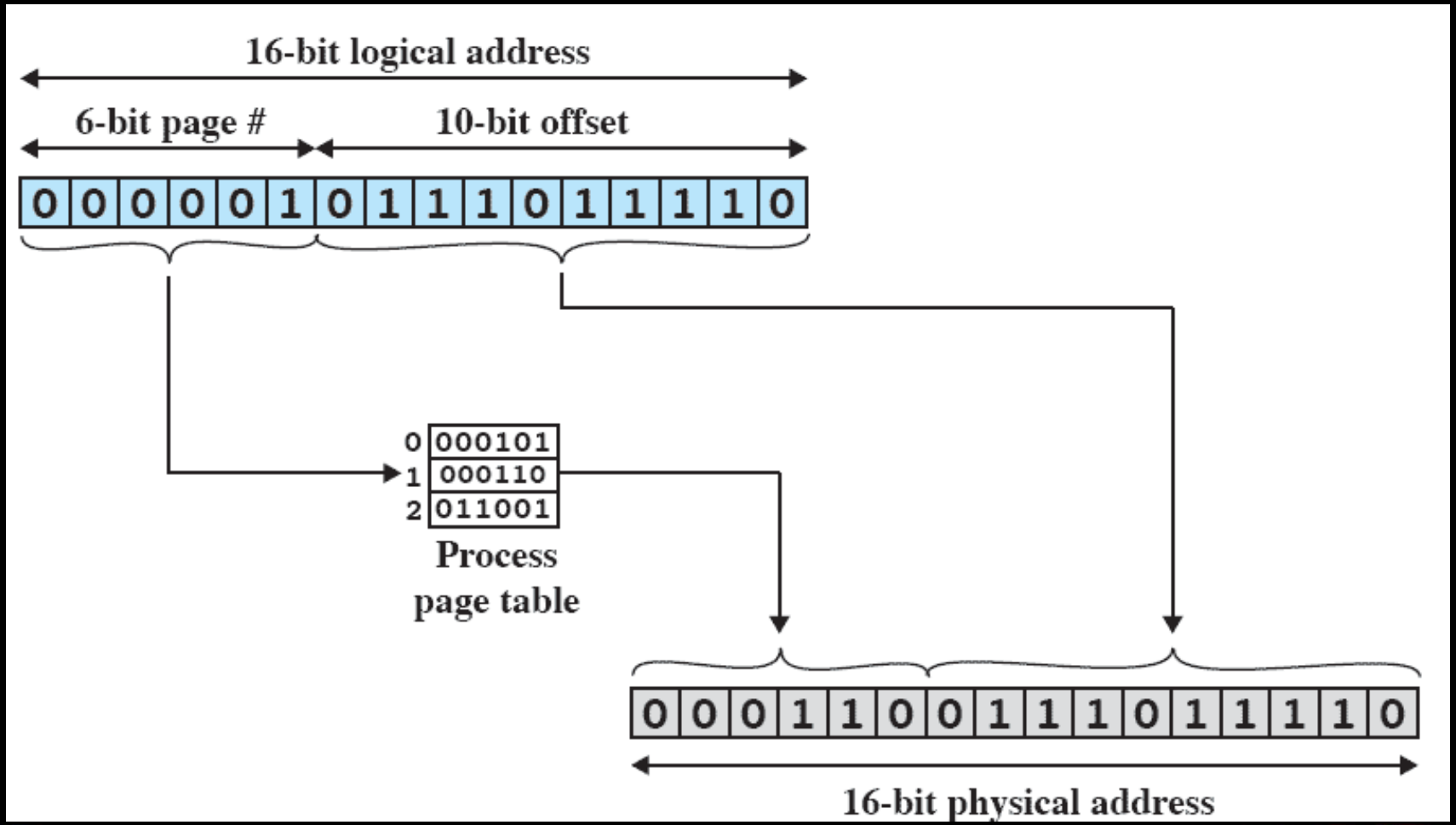
Page Table


0 0
1 1
2 2
3 3
Process A page table
0 —
1 —
2 —
Process B page table
0 7
1 8
2 9
3 10
Process C page table
0 4
1 5
2 6
3 11
4 12
Process D page table
13
14
Free frame list

Logical Addresses



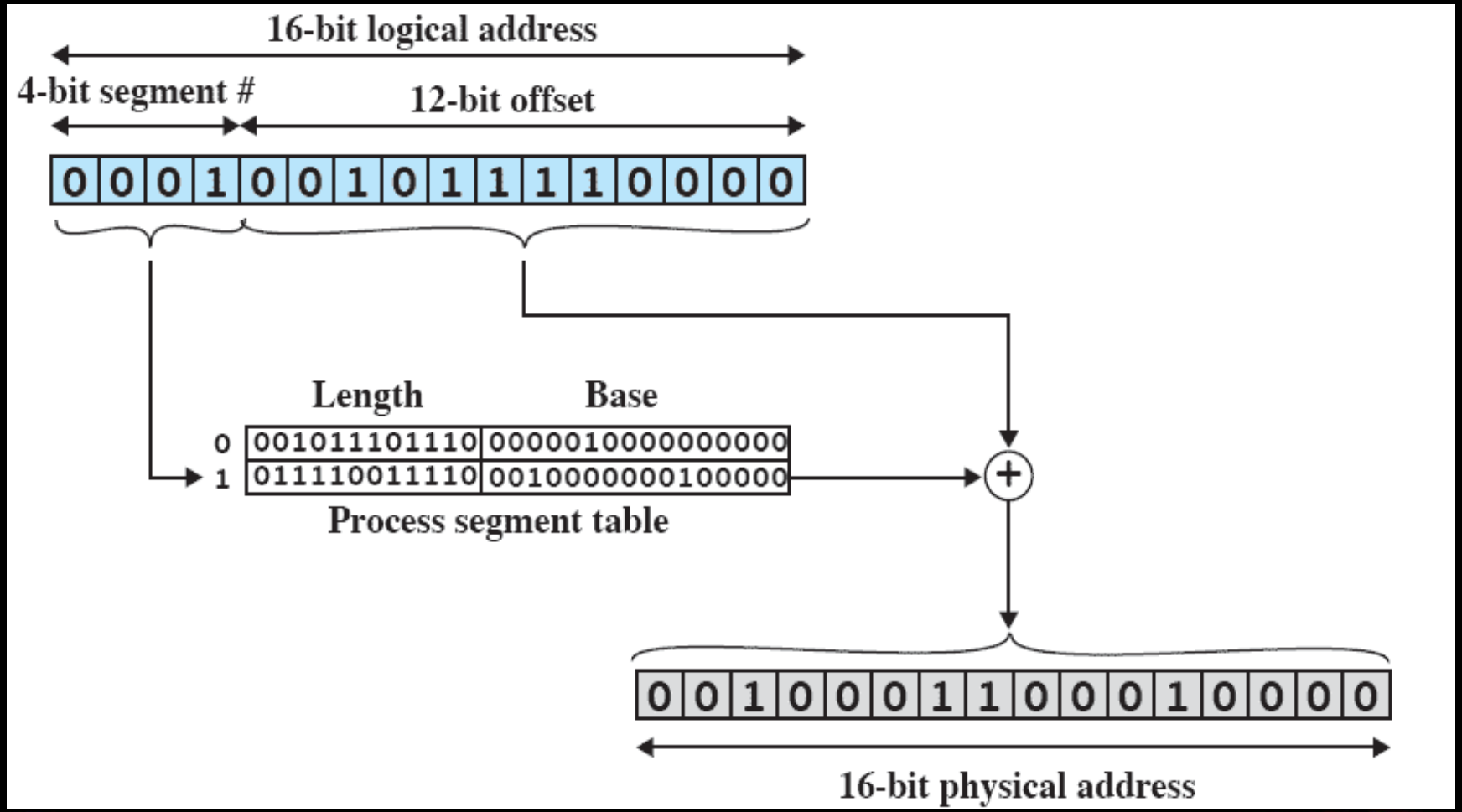
Paging


16-bit logical address
6-bit page #
10-bit offset
0 0 0 0 0 1 0 1 1 1 0 1 1 1 1 0
0 000101
1 000110
2 011001
Process page table
0 0 0 1 1 0 0 1 1 1 0 1 1 1 1 0
16-bit physical address

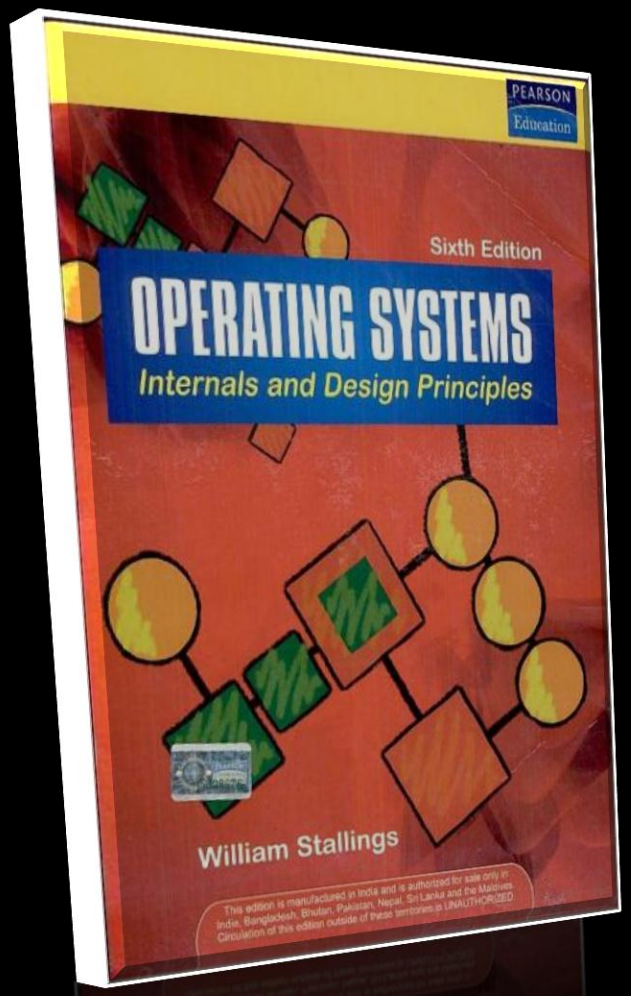
Segmentation

- A program can be subdivided into segments
- Segments may vary in length
- There is a maximum segment length
- Addressing consist of two parts
- a segment number and
- an offset
- Segmentation is similar to dynamic partitioning

Segmentation



Reference Books



- "Operating System: Internals and Design Principles" by *William Stallings*, Pearson Education.