Multiple Choice

1. An address generated by a CPU is referred to as a ____.
A) physical address
B) logical address
C) post relocation register address
D) Memory-Management Unit (MMU) generated address

2. Suppose a program is operating with execution-time binding and the physical address generated is 300. The relocation register is set to 100. What is the corresponding logical address?
A) 199
B) 201
C) 200
D) 300

3. The mapping of a logical address to a physical address is done in hardware by the _____.
A) memory-management-unit (MMU)
B) memory address register
C) relocation register
D) dynamic loading register

4. _____ is the dynamic storage-allocation algorithm which results in the smallest leftover hole in memory.
A) First fit
B) Best fit
C) Worst fit
D) None of the above

5. _____ is the dynamic storage-allocation algorithm which results in the largest leftover hole in memory.
A) First fit
B) Best fit
C) Worst fit
D) None of the above

6. Consider a logical address with a page size of 8 KB. How many bits must be used to represent the page offset in the logical address?
A) 10
B) 8
C) 13
D) 12

7. Consider a logical address with 18 bits used to represent an entry in a conventional page table. How many entries are in the conventional page table?
A) 262144

B) 1024
C) 1048576
D) 18

EAT.

8. Assume a system has a TLB hit ratio of 90%. It requires 15 nanoseconds to access the TLB, and 85 nanoseconds to access main memory. What is the effective memory access time in nanoseconds for this system?

effective access time
= (1 − ratio) × (tlbs + 2 * ma) + P × (tlbs + ma)
= (0.1) × (15 + 2 × 85) + 0.9 (15 + 85)
= 18.5 + 90 = 108.5

A) 108.5
B) 100
C) 22
D) 176.5

Paging

9. Given the logical address 0xAEF9 (in hexadecimal) with a page size of 256 bytes, what is the page number?

0xAEF9 = 44703

A) 0xAE
B) 0xF9
C) 0xA
D) 0x00F9

10. Given the logical address 0xAEF9 (in hexadecimal) with a page size of 256 bytes, what is the page offset?

A) 0xAE
B) 0xF9
C) 0xA
D) 0xF900

11. Consider a 32-bit address for a two-level paging system with an 8 KB page size. The outer page table has 1024 entries. How many bits are used to represent the second-level page table?

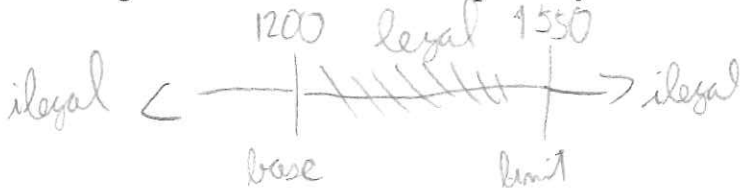
A) 10
B) 8
C) 12
D) 9

Segmentation

12. With segmentation, a logical address consists of _____.

A) segment number and offset
B) segment name and offset
C) segment number and page number
D) segment table and segment number

13. Assume the value of the base and limit registers are 1200 and 350 respectively. Which of the following addresses is legal?



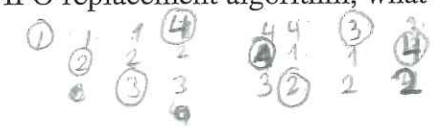
A) 355
B) 1200
C) 1551
D) all of the above

14. Distinguish between internal and external fragmentation.

Ans: Fragmentation occurs when memory is allocated and returned to the system. As this occurs, free memory is broken up into small chunks, often too small to be useful. External fragmentation occurs when there is sufficient total free memory to satisfy a memory request, yet the memory is not contiguous, so it cannot be assigned. Some contiguous allocation schemes may assign a process more memory than it actually requested (i.e. they may assign memory in fixed-block sizes). Internal fragmentation occurs when a process is assigned more memory than it has requested and the wasted memory fragment is internal to a process.

15. In systems that support virtual memory, ____.
A) virtual memory is separated from logical memory.
B) virtual memory is separated from physical memory.
C) physical memory is separated from secondary storage.
D) physical memory is separated from logical memory.

16. Suppose we have the following page accesses: 1 2 3 4 2 3 4 1 2 1 1 3 1 4 and that there are three frames within our system. Using the FIFO replacement algorithm, what is the number of page faults for the given reference string?



A) 14
B) 8
C) 13
D) 10

17. Suppose we have the following page accesses: 1 2 3 4 2 3 4 1 2 1 1 3 1 4 and that there are three frames within our system. Using the FIFO replacement algorithm, what will be the final configuration of the three frames following the execution of the given reference string?
A) 4, 1, 3
B) 3, 1, 4
C) 4, 2, 3
D) 3, 4, 2

18. Suppose we have the following page accesses: 1 2 3 4 2 3 4 1 2 1 1 3 1 4 and that there are three frames within our system. Using the LRU replacement algorithm, what is the number of page faults for the given reference string?

A) 14
B) 13
C) 8
D) 10

19. Given the reference string of page accesses: 1 2 3 4 2 3 4 1 2 1 1 3 1 4 and a system with three page frames, what is the final configuration of the three frames after the LRU algorithm is applied?

A) 1, 3, 4
B) 3, 1, 4
C) 4, 1, 2
D) 1, 2, 3

20. Optimal page replacement ____.
A) is the page-replacement algorithm most often implemented
B) is used mostly for comparison with other page-replacement schemes
C) can suffer from Belady's anomaly → most common in FIFO
D) requires that the system keep track of previously used pages

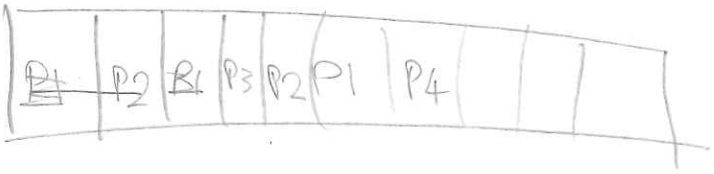
21. In the enhanced second chance algorithm, which of the following ordered pairs represents a page that would be the best choice for replacement?
A) (0,0)
B) (0,1)
C) (1,0)
D) (1,1)

22. _____ is the algorithm implemented on most systems.
A) FIFO
B) Least frequently used
C) Most frequently used
D) LRU

Question	Answer
1	B
2	C
3	A
4	B
5	C
6	C
7	A
8	A
9	A
10	B
11	D
12	A
13	B
14	-
15	D
16	B
17	D
18	C
19	B
20	B
21	A
22	D

RR - 1

1 New



1 old x

1 old - new

P1 - P1 - P1 - P2 - P1 -

P1 - P1 - P1 - P1 - P1 - P2 - P2 -

P1 - P2 - P4

P3 -

P1 - P5 H

P2 - P4 M

P3 Low