TRUE/FALSE

1. Early memory management schemes are still used in today's operating systems.

   ANS: F PTS: 1 REF: 32

2. All computers have only a finite amount of memory and if a program doesn't fit, then either the size of the main memory must be increased or the program must be modified.

   ANS: T PTS: 1 REF: 32

3. To overlay is to transfer segments of a program from main memory into secondary storage for execution, so that two or more segments take turns occupying the same memory locations.

   ANS: F PTS: 1 REF: 32

4. The first step in loading a job in a single-user system is storing the first memory location of program into the base register (for memory protection).

   ANS: T PTS: 1 REF: 33

5. A single-user system supports multiprogramming.

   ANS: F PTS: 1 REF: 33

6. The first attempt to allow for multiprogramming used fixed partitions.

   ANS: T PTS: 1 REF: 34

7. The problem of partition intrusion is present in single-user contiguous allocation schemes.

   ANS: F PTS: 1 REF: 34

8. The algorithm used to store jobs into memory requires a few more steps than the one used for a single-user system because the size of the job must be matched with the size of the partition to make sure it fits completely.

   ANS: T PTS: 1 REF: 34

9. The fixed partition scheme does not require that the entire program be stored contiguously and in memory from the beginning to the end of its execution.

   ANS: F PTS: 1 REF: 35

10. The fixed partition scheme works well if all of the jobs run on the system are of the same size or if the sizes are known ahead of time and don't vary between reconfigurations.

    ANS: T PTS: 1 REF: 35

11. In a fixed partition scheme, large jobs may have a longer turnaround time as they wait for free partitions of sufficient size or may never run.

    ANS: T PTS: 1 REF: 36

12. The best-fit allocation method keeps the free/busy lists organized by memory locations, low-order memory to high-order memory.

    ANS: F PTS: 1 REF: 38

13. A large job can have problems with a first-fit memory allocation list.

    ANS: T PTS: 1 REF: 39

14. The best-fit free list scheme uses memory more efficiently than the first-fit free scheme but it is slower to implement.

    ANS: T PTS: 1 REF: 40

15. The first-fit algorithm assumes that the Memory Manager keeps only one list containing free memory blocks.

    ANS: F PTS: 1 REF: 40

16. One of the problems with the best-fit algorithm is that the entire table must be searched before the allocation can be made because the memory blocks are physically stored in sequence according to their location in memory.

    ANS: T PTS: 1 REF: 42

17. Research continues to focus on finding the optimum allocation scheme.

    ANS: T PTS: 1 REF: 43

18. For a fixed partition system, memory deallocation is quite complex.

    ANS: F PTS: 1 REF: 44

19. A null entry in the busy list occurs when a memory block between two other busy memory blocks is returned to the free list.

    ANS: T PTS: 1 REF: 47

20. In the relocatable dynamic partitions scheme, the Memory Manager relocates programs to gather together all of the empty blocks and compact them to make one block of memory large enough to accommodate some or all of the jobs waiting to get in.

    ANS: T PTS: 1 REF: 48

21. Memory is allocated during garbage collection.

    ANS: F PTS: 1 REF: 48|49

22. During compaction, the operating system must distinguish between addresses and data values, and the distinctions are not obvious once the program has been loaded into memory.

ANS: T PTS: 1 REF: 49

23. After relocation and compaction, both the free list and the busy list are updated.

ANS: T PTS: 1 REF: 51

24. The bounds register is used to store the highest (or lowest, depending on the specific system) location in memory accessible by each program.

ANS: T PTS: 1 REF: 52

25. Compaction should always be performed only when there are jobs waiting to get in.

ANS: F PTS: 1 REF: 53|54

MULTIPLE CHOICE

1. The following,____, describes the first memory allocation scheme.
   a. Each program to be processed was loaded into secondary storage, then swapped into memory in parts
   b. Each program to be processed was partially loaded into memory, then granted more memory as needed
   c. Each program to be processed was allocated a portion of memory and could negotiate with other programs to access more memory
   d. Each program to be processed was loaded in its entirety into memory and allocated as much contiguous space in memory as it needed

   ANS: D PTS: 1 REF: 32

2. In a single-user system, jobs are processed ____.
   a. sequentially
   b. intermittently
   c. randomly
   d. in order of longest job to shortest job

   ANS: A PTS: 1 REF: 32

3. In the algorithm to load a job in a single-user system, the program counter is initially set to ____.
   a. the address of the last memory location
   b. the number of instructions
   c. zero
   d. the address of the first memory location

   ANS: D PTS: 1 REF: 33

4. Fixed partitions are also called ____ partitions.
   a. complete
   b. static
   c. direct
   d. sized

   ANS: B PTS: 1 REF: 34

5. ____ is the first step in the algorithm to load a job in a fixed partition.
   a. Comparing job size to size of largest partition

b. Determining the job's requested memory size
c. Setting counter to one
d. Placing the job in a waiting queue

ANS: B PTS: 1 REF: 34

6. In the partition scheme, the table that the Memory Manager uses to keep track of jobs is composed of the ____.
a. partition size, memory address, and status
b. status, access, and memory address
c. partition size, status, and access
d. partition size, memory address, access, and status

ANS: D PTS: 1 REF: 35

7. The fixed partition scheme works well ____.
a. when jobs have the same size
b. when jobs have different sizes
c. when job sizes are not known in advance
d. when all jobs are under 100K

ANS: A PTS: 1 REF: 35

8. ____ consists of fragments of free memory between blocks of allocated memory.
a. An inefficient fit
b. Indirect partitioning
c. External fragmentation
d. Internal fragmentation

ANS: C PTS: 1 REF: 36

9. The ____ keeps the free/busy lists organized by memory locations, low-order memory to high-order memory.
a. fixed partition allocation
b. first-fit memory allocation
c. dynamic fit memory allocation
d. best-fit memory allocation

ANS: B PTS: 1 REF: 38

10. ____ has the least wasted space and the smallest partition fitting the requirements.
a. Fixed partitioning
b. First-fit memory allocation
c. Dynamic fit memory allocation
d. Best-fit memory allocation

ANS: D PTS: 1 REF: 38

11. Consider the following space requirements for jobs 1-4 and memory blocks. Assuming a first-fit scheme is used, the job,____, is not able to run.
Jobs:
J1 10K
J2 20K
J3 30K
J4 10K

Blocks:
B1 30K
B2 15K
B3 50K
B4 20K
a. J1
c. J3

b. J2 d. J4

ANS: C PTS: 1 REF: 39|40

12. Consider the following space requirements for jobs 1-4 and memory blocks. Assuming a best-fit scheme is used, the job,____, is placed in the last block.
Jobs:
J1 10K
J2 20K
J3 30K
J4 10K

Blocks:
B1 30K
B2 15K
B3 50K
B4 20K

a. J1 c. J3
b. J2 d. J4

ANS: B PTS: 1 REF: 40

13. The following algorithm can be described as ____.

```
1 Set counter to 1
2 Do while counter <= number of blocks in memory
  If job_size > memory_size(counter)
    Then counter = counter + 1
  Else
    load job into memory_size(counter)
    adjust free/busy memory lists
    go to step 4
End do
3 Put job in waiting queue
4 Go fetch next job
```

a. first-fit memory allocation c. least-fit memory allocation
b. best-fit memory allocation d. fixed partition memory allocation

ANS: A PTS: 1 REF: 41

14. The following algorithm can be described as ____.

```
1 Initialize memory_block(0) = 99999
2 Compute initial_memory_waste = memory_block(0) – job_size
3 Initialize subscript = 0
4 Set counter to 1
5 Do while counter <= number of blocks in memory
      If job_size > memory_size(counter)
          Then counter = counter + 1
      Else
          memory_waste = memory_size(counter) – job_size
      If initial_memory_waste > memory_waste
          Then subscript = counter
          initial_memory_waste = memory_waste
          counter = counter + 1
```

```
    End do
6 If subscript = 0
    Then put job in waiting queue
  Else
    Load job into memory_size(subscript)
     adjust free/busy memory lists
7 Go fetch next job
```

a. first-fit memory allocation
b. best-fit memory allocation
c. least-fit memory allocation
d. fixed partition memory allocation

ANS: B PTS: 1 REF: 42

15. Assume the Memory Manager receives a request for a block of 200. When the best-fit algorithm is used, ____ is the beginning address of the block granted by the Memory Manager.

Beginning Address	Memory Block Size
4075	105
5225	5
6785	600
7560	20
7600	205
10250	4050
15125	230
24500	1000

a. 6785
b. 7600
c. 10250
d. 15125

ANS: B PTS: 1 REF: 43

16. ____ is how memory is deallocated in a fixed partition scheme.
a. Memory Manager releases the block and combines it with another free block.
b. Memory Manager immediately gives memory to another program.
c. Memory Manager adds block to free list and removes it from busy list.
d. Memory Manager resets the status of the memory block where the job was stored to "free."

ANS: D PTS: 1 REF: 44

17. In a dynamic partition scheme, ____, is how the Memory Manager deallocates a block that is between two other free blocks?
a. The sizes of the three free partitions must be combined.
b. All three are moved individually from the busy list to the free list.
c. The block is combined with the larger of the two adjacent blocks.
d. The status of the block is set to free.

ANS: A PTS: 1 REF: 46

18. When memory is deallocated, an entry can be removed from the free list by creating a(n) ____.
a. blank line
b. null entry
c. joined entry
d. empty entry

ANS: B PTS: 1 REF: 46

19. A(n) ____ in the busy list occurs when a memory block between two other busy memory blocks is returned to the free list.
a. blank line
c. joined entry

b. null entry
d. empty entry

ANS: B PTS: 1 REF: 47

20. The ____ of memory, sometimes referred to as garbage collection or defragmentation, is performed by the operating system to reclaim fragmented sections of the memory space.
a. deallocation
c. compaction
b. redirection
d. reallocation

ANS: C PTS: 1 REF: 48

21. The operating system can tell the ____ of each group of digits by its location in the line and the operation code.
a. function
c. order
b. value
d. assignment

ANS: A PTS: 1 REF: 49

22. The ____ contains the value that must be added to each address referenced in the program so it will be able to access the correct memory addresses after relocation.
a. busy list
c. relocation register
b. compaction monitor
d. bounds register

ANS: C PTS: 1 REF: 52

23. ____ is the actual memory address for a job that starts at 18K.
a. 1,800
c. 18,432
b. 18,000
d. 180,000

ANS: C PTS: 1 REF: 53

24. By compacting and relocating, the Memory Manager optimizes the use of memory and thus improves throughput, but an unfortunate side effect is more ____.
a. null entries
c. errors
b. segmentation
d. overhead

ANS: D PTS: 1 REF: 53

25. One approach to performing compaction is to do it when a certain ____ of memory becomes busy.
a. byte
c. bit
b. percentage
d. area

ANS: B PTS: 1 REF: 53