

Summary in Graph

Exam Summary (GO Classes CS Test Series 2025 |
Operating Systems | Subject Wise Test 1)

Qs. Attempted:	0 0 + 0	Correct Marks:	0 0 + 0
Correct Attempts:	0 0 + 0	Penalty Marks:	0 0 + 0
Incorrect Attempts:	0 0 + 0	Resultant Marks:	0 0 + 0

Total Questions:	30 15 + 15
Total Marks:	45 15 + 30
Exam Duration:	90 Minutes
Time Taken:	0 Minutes

- EXAM RESPONSE
- EXAM STATS
- FEEDBACK

Technical

Q #1

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Consider the following program.

```
int main() {
    int x = 1;

    fork();
5.   x = x + 1;

    fork();
    printf("%d ", x);

10.  return 0;
}
```

What will be printed by the program above when it is executed?

- A. 2 2 2 2
- B. 1 2 3 4
- C. 1 2
- D. 2 2

Your Answer:

Correct Answer: A

Not Attempted

Time taken: 00min 00sec

Discuss

Q #2

Numerical Type

Award: 1

Penalty: 0

Operating System

Consider a machine with a page size of 1024 bytes. There are 8 KB of physical memory and 8 KB of virtual memory. The TLB is a fully associative cache with space for 4 entries that is currently empty. Assume that the physical page number is always one more than the virtual page number. This is a sequence of memory address accesses for a program we are writing: 0x294, 0xA76, 0x5A4, 0x923, 0xCFF, 0xA12, 0xF9F, 0x392, 0x341.

Here is the current state of the page table:

Valid Bit	Physical Page Number
0	NULL
1	2
0	NULL
0	4
0	5
1	6
1	7
0	NULL

How many TLB hits are there?

- A. 2
- B. 3
- C. 5
- D. 6

Your Answer:

Correct Answer: c

Not Attempted

Time taken: 00min 04sec

Discuss

Q #3

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Assume the address space size is 128 bytes, but the page size is 32 bytes. Here is the page table for a process, where the leftmost bit is the valid bit, and the rightmost 4 bits are the PFN.

$0 \times 8000000c$
 0×00000000
 0×00000000
 0×80000006

Using the page table above translate the virtual address 0×64 .

- A. 0×46
- B. 0×04
- C. $0 \times c4$
- D. 0×64

Your Answer:

Correct Answer: C

Not Attempted

Time taken: 00min 00sec

Discuss

Q #4

Numerical Type

Award: 1

Penalty: 0

Operating System

In a recent NASA discovery, the planet Mars has three-handed philosophers. Consider a table with five three-handed philosophers and a pile of N chopsticks in the middle of the table. Each philosopher needs 3 chopsticks to eat. What is the smallest N such that deadlock is impossible?

Your Answer:

Correct Answer: 11

Not Attempted

Time taken: 00min 00sec

Discuss

Q #5

Multiple Select Type

Award: 1

Penalty: 0

Operating System

Which of the following option(s) is/are true?

- A. In the banker's algorithm, the number of resources available to allocate must be known in advance.
- B. Once a system is in an unsafe state (as the term is used in the banker's algorithm) there is at least one sequence of process requests that will unavoidably lead to deadlock.
- C. Once a deadlock is detected, the problem can be solved by suspending one or more of the deadlocked processes.
- D. None of the above.

Your Answer:

Correct Answer: A;B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #6

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Consider a system with four processes P1, P2, P3, and P4, and two resources, R1, and R2, respectively. Each resource has two instances. Furthermore:

- P1 allocates an instance of R2, and requests an instance of R1
 - P2 allocates an instance of R1 and doesn't need any other resource
 - P3 allocates an instance of R1 and requires an instance of R2
 - P4 allocates an instance of R2 and doesn't need any other resource
- Which of the following options is correct?

- A. There is a cycle in the resource allocation graph (RAG) but no deadlock.
- B. There is a cycle in the RAG and there is a deadlock.
- C. There is no cycle in the RAG and there is a deadlock.
- D. There is no cycle in the RAG and there is no deadlock.

Your Answer:

Correct Answer: A

Not Attempted

Time taken: 00min 00sec

Discuss

Q #7

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Suppose a processor uses a prioritized round robin scheduling policy. New processes are assigned an initial quantum of length q . Whenever a process uses its entire quantum without blocking, its new quantum is set to twice its current quantum. If a process blocks before its quantum expires, its new quantum is reset to q . For the purposes of this question, assume that every process requires a finite total amount of CPU time.

Scenario (a): Suppose the scheduler gives higher priority to processes with larger quanta.

Scenario (b): Suppose the scheduler gives higher priority to processes with smaller quanta.

Which of the following is correct regarding the possibility of starvation in the system?

- A. Starvation is possible in both scenarios.
- B. Starvation is not possible in (a) but possible in (b).
- C. Starvation is possible in (a) but not in (b).
- D. Starvation is not possible in either scenario.

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #8

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Assume you have the following process table (list of active processes):
[Process A base:100 bounds:10]
[Process B base:1000 bounds:20]
Assume process *A* is running on a CPU. After the switch to process *B*, which of the following is a physical address that process B might legally refer to?

A. 0

B. 20

C. 500

D. 1015

Your Answer:

Correct Answer: D

Not Attempted

Time taken: 00min 00sec

Discuss

Q #9

Multiple Select Type

Award: 1

Penalty: 0

Operating System

Consider the following semaphore-based solution to the readers-writers problem:
Common initialization section for both writer and reader:
semaphore wrt = 1, mutex = 1;
int readcount = 0;
The code bodies for writer and reader::

Writer	Reader
<pre>Writer() { P(wrt); //writing is performed V(wrt); }</pre>	<pre>Reader(){ P(mutex) ; readcount ++ ; if (<u> P </u>) <u> Q </u> V(mutex) ; // reading is performed P(mutex) ; readcount - - ; if (<u> R </u>) <u> S </u> V(mutex) ; }</pre>

Fill in the underlined areas in Reader() to make it a complete solution to the readers-writers problem. Your solution should allow multiple concurrent readers, but only one writer, to access the shared database simultaneously.

A. P: readcount == 1

B. Q: P(wrt);

C. R: readcount == 0

D. S: V(wrt);

Your Answer:

Correct Answer: A;B;C;D

Not Attempted

Time taken: 00min 00sec

Discuss

Q #10

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Consider the following different possible pseudo-code taken from two processes, where *A*, *B* are blocks of code, and *S* is a semaphore initialized to 0.

Which of the following sequence ensures that *A* always runs BEFORE *B*?

Process 1: Process 2:
A. A; up(S);
 down(S); B;

Process 1: Process 2:
B. A; down(S);
 up(S); B;

Process 1: Process 2:
C. down(S); down(S);
 A; B;
 up(S); up(S);

Process 1: Process 2:
D. up(S); down(S);
 A; B;

Your Answer: Correct Answer: B Not Attempted Time taken: 00min 00sec Discuss

Q #11 Multiple Choice Type Award: 1 Penalty: 0.33 Operating System

Consider the statements below about scheduling algorithms in operating systems.

- I. If all jobs have identical run lengths, a RR(RoundRobin) scheduler (with a time-slice much shorter than the jobs' run lengths) provides better average turnaround time than FIFO.
- II. We can practically implement a scheduling algorithm that achieves the optimal average waiting time.
- III. Round-robin scheduling ensures no starvation.

Which of the following options is correct?

- A. I and II are TRUE but III is False
- B. I is TRUE but II and III are False
- C. I and II are False but III is True
- D. All statements are true

Your Answer: Correct Answer: C Not Attempted Time taken: 00min 00sec Discuss

Q #12 Multiple Choice Type Award: 1 Penalty: 0.33 Operating System

Consider the following requests to read data from cylinders of a hard drive, where the current position of the head is at cylinder 73 and the head is moving towards cylinder 0. What is the order in which the cylinders in the queue would be serviced using the SCAN disk scheduling algorithm?

84, 17, 25, 102, 92, 1, 72, 56, 89, 143, 91, 50, 95, 32

- A. 72, 56, 50, 32, 25, 17, 1, 84, 89, 91, 92, 95, 102, 143
- B. 72, 56, 50, 32, 25, 17, 1, 143, 102, 95, 92, 91, 89, 84
- C. 84, 89, 91, 92, 95, 102, 143, 72, 56, 50, 32, 25, 17, 1
- D. 84, 89, 91, 92, 95, 102, 143, 1, 17, 25, 32, 50, 56, 72

Your Answer: Correct Answer: A Not Attempted Time taken: 00min 00sec Discuss

Q #13 Multiple Choice Type Award: 1 Penalty: 0.33 Operating System

Which of the following would typically be faster and why?

- i. Printing the numbers from 1 to 1,000,000, one number at a time.
- ii. Creating a string with the numbers from 1 to 1,000,000 and printing that string at once.

A. i is faster because printing numbers individually prevents string manipulation overhead.

B. ii is faster because it reduces the number of system calls to just one.

C. i is faster since it avoids creating a large string.

D. Both are equally efficient because the time complexity for processing 1 million numbers is the same.

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #14

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

In a system with two processes, P_A and P_B , each with one thread, P_A performs a system call. How is P_A 's context saved and restored?

A. The context is stored in the MMU, and the MMU restores it automatically.

B. P_A 's registers are saved in its trap frame (kernel stack), and after the system call, the context is restored from the trap frame.

C. The context is saved in the ready queue and restored when P_A re-enters it.

D. The context is saved in a global system register and restored automatically after the system call.

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #15

Multiple Choice Type

Award: 1

Penalty: 0.33

Operating System

Consider the following allocation of a resource. Assume that there are a total of 10 instances of this resource:

Process	Num Used	Maximum
P_1	1	6
P_2	1	5
P_3	2	4
P_4	4	7

If P_4 requests one more instance of the resource, does this lead to a safe or unsafe state, and why?

A. Safe, because after the allocation, all processes can be allocated enough resources to finish.

B. Unsafe, because after the allocation, there won't be enough free resources to give the maximum required resources to any process.

C. Safe, because P_4 is the largest consumer, and giving one more instance will not affect the system.

D. Unsafe, because P_4 's request exceeds its maximum resource limit.

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #16

Numerical Type

Award: 2

Penalty: 0

Operating System

Consider the Least Completed Next (LCN) Preemptive Scheduling policy that schedules the process that has consumed the least CPU time. Consider the following five processes that run using the LCN policy:

Process	P_1	P_2	P_3	P_4	P_5
Admission Time	0	2	3	4	8
Service Time	3	3	5	2	3

In the event of a tie, it employs the First-Come-First-Served (FCFS) rule to select the process. Let X represent the average turnaround time and Y denotes the average response time. In this case, the sum of X and Y would be:?

Your Answer:

Correct Answer: 8.8

Not Attempted

Time taken: 00min 00sec

Discuss

Q #17

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

Assume there are N processes in a ready queue in decreasing order with respect to their CPU burst length. The length of process k is k time units ($1 \leq k \leq N$). Process N is head and process 1 is tail. What is the average waiting time for the FCFS scheduling algorithm?

- A. $(N^2 - 1) / 3$
- B. $(N^2 + 1) / 3$
- C. $(N - 1) (N^2 + 1) / 3N$
- D. $(N - 1) (N^2 - 1) / 3N$

Your Answer:

Correct Answer: A

Not Attempted

Time taken: 00min 00sec

Discuss

Q #18

Numerical Type

Award: 2

Penalty: 0

Operating System

Suppose that two processes, P_a and P_b , are running in a uniprocessor system. P_a has three threads. P_b has two threads. All threads in both processes are CPU-intensive, i.e., they never block for I/O. The operating system uses simple round-robin scheduling.

(i) Suppose that all of the threads are user-level threads and that user-level threads are implemented using a single kernel thread per process. Let x be the fraction of the processor's time will be spent running P_a 's threads.

(ii) Suppose instead that all of the threads are kernel threads. Let y be the fraction of the processor's time that will be spent running P_a 's threads.

What is the value of $x + y$ (round off to one decimal place)?

Your Answer:

Correct Answer: 1.1

Not Attempted

Time taken: 00min 00sec

Discuss

Q #19

Numerical Type

Award: 2

Penalty: 0

Operating System

Consider a process that uses a user-level threading library to spawn 10 user-level threads. The library maps these 10 threads to 2 kernel threads. The process is executed on an 8 -core system. What is the maximum number of threads of a process that can be executed in parallel?

Your Answer:

Correct Answer: 2

Not Attempted

Time taken: 00min 00sec

Discuss

Q #20

Numerical Type

Award: 2

Penalty: 0

Operating System

Consider a memory architecture using two-level paging for address translation. The format of the virtual address, physical address, and PTE (page table entry) are bellow:

Virtual Address:-

9 bits	9 bits	14 bits
Virtual Page#	Virtual page#	offset

Physical Address:-

10 bits	14 bits
Physical page#	offset

PTE:-

10 bits	6 bits
Physical Page#	perm. bits

What is the total memory (in Bytes) needed for storing all page tables of a process that uses the entire virtual memory?

Your Answer:

Correct Answer: 525312

Not Attempted

Time taken: 00min 00sec

Discuss

Q #21

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

If an instruction takes 1 microsecond and a page fault takes an extra n microseconds, what is the formula for the effective instruction time if page faults occur every k instructions (on average)?

- A. $1 + k/n$
- B. $1 + n/k$
- C. $1/k + n$
- D. $k + 1/n$

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #22

Multiple Select Type

Award: 2

Penalty: 0

Operating System

Given below are descriptions of different entries in the page table of a process, with respect to which bits are set and which are not set. Accessing which of the page table entries below will always result in the MMU generating a trap to the OS during address translation?

- A. Page with both valid and present bits set.
- B. Page with valid bit set but present bit unset.
- C. Page with valid bit unset.
- D. Page with valid, present, and dirty bits set.

Your Answer:

Correct Answer: B;C

Not Attempted

Time taken: 00min 00sec

Discuss

Q #23

Multiple Select Type

Award: 2

Penalty: 0

Operating System

Consider five single-unit resources, A, B, C, D, and E. They all were initially available. Consider also three threads, T1, T2, and T3. Each of them needs some resources as follows:
T1: A at Time 1, C at Time 2, B at Time 3
T2: E at Time 1, D at Time 2, C at Time 3
T3: B at Time 1, A at Time 3
Whenever a thread requests a resource, the request shall be granted if the resource is available. Some threads will eventually be stuck in a deadlock at Time 3. Which of these threads will be in deadlock?

- A. T1
- B. T2

- C. T3
- D. There will be no deadlock

Your Answer:

Correct Answer: A;B;C

Not Attempted

Time taken: 00min 00sec

Discuss

Q #24

Multiple Select Type

Award: 2

Penalty: 0

Operating System

Consider the system's current state, which has been identified as an unsafe condition under the Banker's Algorithm framework.

Process	Allocation	Max
	A B C	A B C
P0	3 2 2	5 6 2
P1	0 1 0	2 1 0
P2	1 1 1	5 6 1
P3	3 2 3	9 9 6
P4	2 1 1	3 2 1

Available
A B C
2 0 0

How could the state be made safe again? Answer all that apply:

- A. Process 2 could finish without using more than its current allocation.
- B. Process 3 could finish without using more than its current allocation.
- C. Process 0 could request (1, 1, 1), be granted this request, and the resulting state would be safe.
- D. Process 3 could request (1, 0, 0), be granted this request, and the resulting state would be safe.

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #25

Numerical Type

Award: 2

Penalty: 0

Operating System

Consider a virtual memory system that uses 2-level paging. The page size in this system is 256 (2⁸) bytes. Each individual page table fits exactly into one memory frame, and the size of each page table entry (PTE) is 8 bytes.

Suppose that there is a process with a virtual address space of the maximum size. How many bytes of memory are occupied by the page tables for this process?

Your Answer:

Correct Answer: 8448

Not Attempted

Time taken: 00min 00sec

Discuss

Q #26

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

Suppose we have a multiprogrammed computer where each job has identical characteristics: Each job runs N computational periods of length T , where half of that time is spent on I/O and half on computation. Jobs are dispatched in a simple round-robin manner and I/O activity can overlap with CPU operations. Compute the average turnaround time (average total time to complete each job) if there are four simultaneous jobs running for time T .

Each period T is distributed as follows:

- CPU — during the first and the third quarter;
- IO — during the other quarters

- A. $(2N + 7/8)T$
- B. $(3N + 2)T$
- C. $(3N - 2)T$
- D. $(2N - 7/8)T$

Your Answer:

Correct Answer: C

Not Attempted

Time taken: 00min 00sec

Discuss

Q #27

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

Two processes, P_1 and P_2 , require C units of execution time each. The system uses a preemptive round-robin scheduler with quantum q , and a context switch overhead of $w(w < q)$. Assume that the execution time C includes the context switch overhead w within itself.

Both processes become runnable at $t = 0$, with P_1 running first. What is the expression for N_1 , the number of times P_1 will be preempted before completing its execution?

- A. $N_1 = \left\lfloor \frac{C}{q} \right\rfloor$
- B. $N_1 = \left\lceil \frac{C}{q} \right\rceil - 1$
- C. $N_1 = \left\lfloor \frac{C+w}{q} \right\rfloor$
- D. $N_1 = \frac{C}{q+w}$

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #28

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

Given a machine with 33-bit virtual addresses and a page size of 32 KB (32768 bytes), the TLB contains the following entries (in octal):

Virtual Page Num	Physical Frame Num	Valid	Dirty
6125	1234567	1	0
61252	123456	0	0
612	3013	1	1
612521	765432	1	1

If the system attempts to load from virtual address 61252127604 (in octal), how will the MMU translate the virtual address to a physical address?

- A. The virtual address will result in a TLB miss because the VPN does not match any entry.
- B. The virtual address will be translated to the physical address 076543227604 using the TLB entry for VPN 612521.
- C. The virtual address will cause a page fault because the TLB entry for 61252 has a valid bit set to 0 .
- D. The virtual address will be translated to the physical address 012345627604 using the TLB entry for VPN 6125 .

Your Answer:

Correct Answer: B

Not Attempted

Time taken: 00min 00sec

Discuss

Q #29

Multiple Select Type

Award: 2

Penalty: 0

Operating System

Which of the following statements about threads is/are CORRECT?

- A. Threads that are part of the same process share the same stack.
- B. Threads that are part of the same process can access the same TLB entries.
- C. With kernel-level threads, multiple threads from the same process can be scheduled on multiple CPUs simultaneously.
- D. A thread can hold only one lock at a time.

Your Answer:

Correct Answer: B;C

Not Attempted

Time taken: 00min 00sec

Discuss

Q #30

Multiple Choice Type

Award: 2

Penalty: 0.67

Operating System

Consider a system running ten I/O-bound tasks and one CPU-bound task. Assume that the I/O bound tasks issue an I/O operation once for every millisecond of CPU computing and that each I/O operation takes 10 milliseconds to complete. Also, assume that the context-switching overhead is 0.1 millisecond and all processes are long-running tasks. What is the approx CPU utilization for a round-robin scheduler when the time quantum is 10 milliseconds?

- A. 94%
- B. 91%
- C. 90%
- D. 96%

Your Answer:

Correct Answer: A

Not Attempted

Time taken: 00min 00sec

Discuss

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