TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

A counting semaphore S is initialized to 2 then following sequence of operation are performed over S. [NAT] (PW)

V V V P | V P P P | V P P | V P V V P

What will be the value of S after ### operations?

$$S = 2$$
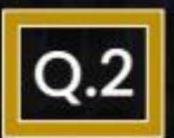
$$\boxed{2}$$

$$(3V)$$
$$2+3 = 5$$
$$5-1 = 4+1 = 5$$
$$5-3 = 2+1 = 3$$
$$3-2 = 1+1 = 2-1 = 1$$
$$1+2 = 3-1 = 2$$

Q.2

Recall the readers-writers problem. Consider the following solution to this problem.

Writer

Wait (wrt);

....

CS: writing is performed

....

Signal (wrt);

Reader

    wait (mutex);

    readcount = readcount + 1;

    if readcount = 1 then wait (wrt);

    signal (mutex);

    ....

    CS: Reading is performed
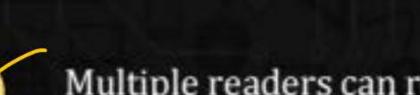
    ....

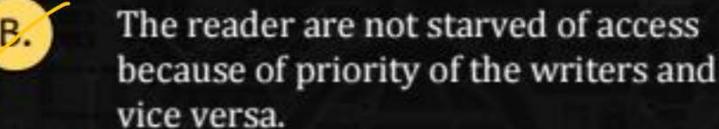   wait (mutex);

    readcount = readcount − 1;

    if readcount = 0 then signal (wrt);

    signal (mutex);

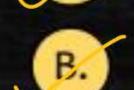Which of the following is/are correct reading above solution?

[MSQ]

A. Multiple readers can read together

B. The reader are not starved of access because of priority of the writers and vice versa.

C. A writer gets exclusive access, i.e., while a writer is writing. No one can write or read.

D. Deadlock is possible.

Q.3 At a particular time of computation, the value of a counting semaphore is 9. Then 20 P operation and xV operations were completed on this semaphore. If the final value of the semaphore is 5, x will be?
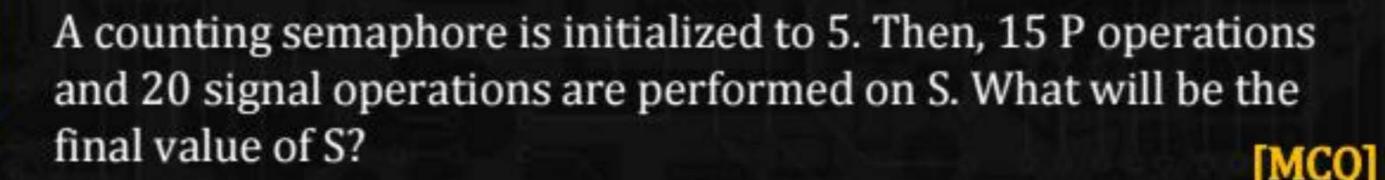
[MCQ]

A. 19

B. 18

C. **16**

D. 20

$S = 9$

$9 - 20 + x(1) \Rightarrow 5$

16

$-11 + x = 5$

$x = 5 + 11$

$x = 16$

Q.4 A counting semaphore is initialized to 5. Then, 15 P operations and 20 signal operations are performed on S. What will be the final value of S?

[MCQ]

A. 0

B. 20

C. 5

D. 10
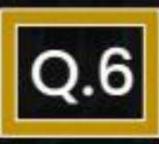
$S = 5$

$S - 15 + 20$

$S + 5$

$5 + 5 = 10$

Q.5 Which of the following condition must be satisfied in the classical reader-writer problem?

[MSQ]

A. Only one writer may write a file at a time.

B. Only one reader may read a file at a time.

C. If a reader is reading a file, no writer may write to it.

D. Any number of the reader can read at a time.

A, C, D

Q.6 A thread that is blocked on a semaphore is awakened when another thread:

[MCQ]

A. Tries to block the same semaphore.

B. Tries to decrement a semaphores value ≤ 0.

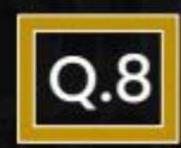C. Tries to increment the semaphore value ≥ 0.

D. None of these.

$$S = -8$$
$$S = 0 \text{ (Binary)}$$
$$0 > \text{(counting)}$$

If semaphore value is $-ve$.

$$\boxed{P_1 \mid P_2 \mid P_3 \mid \sim \ldots P_8}$$

(A.)   Does not guarantee bounded waiting ✗

(B.)   Does not guarantee progress.

(C.)   Does not guarantee Mutual exclusion ✗

(D.)   All of these

B.

Q.8 The bounded buffer problem is also known as [MCQ]

(A.) Readers – writing problem

(B.) Producer – consumer problem / *Bounded buffer problem.*

(C.) Dining – Philospher problem

(D.) None of these