DS(RCS301)

Date: 1st January 2020

Unit: Linear DS 1 (CO1)

ASSIGNMENT NO 1

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| Course Outcomes | |
| C216.1 | Understand the structure and functions of OS |
| C216.2 | Learn about Processes, Threads and Scheduling algorithms |
| C216.3 | Understand the principles of concurrency and Deadlocks |
| C216.4 | Learn various memory management scheme |
| C216.5 | Study I/O management and File systems. |

Q No 1

Fill in the boxes below, to get the solution for Readers-Writers

Problem, using a single Binary Semaphore “mutex” (Initialized to 1):-

int R = 0, W = 0;

Reader ( )

{ L 1 :

wait (&mutex);

if (W = = 0)

{

R++ ;

}

else

{

goto L 1 ;

}

<Perform Read Operation>

wait (&mutex)

R - - ;

signal (&mutex);

}

Writer ( )

{ L 2 :

wait (&mutex);

if (

{

)

signal (&mutex);

goto L 2 ;

}

W = 1;

Signal (&mutex);<Perform Write Operation>

wait (&mutex);

W= 0;

signal (&mutex);

}

Q No 2

Show how SEMPHORES can be used to achieve the precedence of the

following graph?

Answer the following questions:-

(a)

At least how many Semaphores will be required? Give

Justification for your answer.

(b)

What will be the initial Count of each semaphore?

(c)

What will be the advantage of using “Counting Semaphores”

rather than “Binary Semaphores”?

(d)

Can “Condition” variables be used to provide the same solution?

P 0

P 1

P 3

Q No 3

P 2

P 4

P 5

Write a solution for “Sleeping Barber” Problem, using Monitor.

Q No 4

Is it possible to have a solution for Dijkstra’s “Dining Philosophers” Problem,

that ensures, under all possible conditions:-

(a)

(b)

That no philosopher ever faces condition of “Starvation”

AND

The solution meets the requirement of “Progress”

Q No 5

Show how Lamport’s “Bakery Algorithm” meets all the three requirements of

a satisfactory Critical Section Solution