THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME: LEVEL 04/05
NO BOOK TEST 1 - 2017/2018
CSU4300 / CSU5315 – OPERATING SYSTEMS
DURATION: One hour

Date: 22/06/2018	Time: 4.15 pm – 5.15 pm

Answer All Questions

QUESTION 1

1.1) Draw a diagram to highlight abstractions of computer system components from a User to Hardware.

1.2) What is Process Control Block (PCB)? List four (4) fields in PCB.

1.3) Draw the five-state process transition diagram and **briefly explain** keywords used for describing transitions.

1.4) In answering section 1.4, consider the following set of processes, arrival times and CPU burst times. State your assumptions and show all the calculations.

Process	Arrival time	Burst time (ms)
P1	0	.12
P2	2	8
P3	4	5
P4	7	3
P5	9	1

(i) Assuming shortest job first (SJF) scheduling algorithm with pre-emption is used, draw a Gantt chart of process execution. Calculate average turnaround time, average waiting time, and average response time.

(ii) Assuming a time quanta of 3ms is used in the Round Robin algorithm, draw the Gantt chart of process execution and calculate average waiting time.

1.5) List two system calls used in Windows and Unix for creating a process.

QUESTION 2

2.1) List four (4) reasons for executing processes cooperatively.

2.2) Explain the difference between User Level thread and Kernel level thread.

2.3) Write an Algorithm for Producer Consumer Problem using Bounded Buffer.

2.4) Draw a clear resource allocation graph based on the information below. The sets are named as P – Processes, R – Resources and E – Edges.

P = { P1, P2, P3, P4 }

R = {R1, R2, R3, R4, R5}

E = { (P1, R1), (P1, R4), (R2, P1), (P2, R4), (R1, P2), (P3,R1), (R4,P3), (P3, R2),
(R3, P3), (R5, P3), (R3, P4), (P4, R5), (R2, P4), (P5, R2), (R3, P5) }

The number of resource instances are

R1 – 1 instance
R2 – 2 instances
R3 – 3 instances
R4 – 1 instance
R5 – 1 instance

2.5   Using the resource graph you have drawn for the question 2.4, identify deadlock
        sequences (if any). Justify your answer.

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