K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)
Semester: July 2017- November 2017

Max. Marks: 30 **Duration: 1hr.15 min.**

Class: T.Y.B.Tech **Semester: V**

Branch: COMP **Course Code: UCEC501**

Test 2 **Name of the Course: Operating System**

Question No.		Max. Marks	*CO Mapped
1.	What is the distinction between competing processes & cooperating processes? **OR** What operations can be performed on semaphores? Explain with the help of an example.	05	CO4

2.	A software approach to mutual exclusion is Lamport's bakery algorithm, so called because it is based on the practice in bakeries & other shops in which every customer receives a numbered ticket on arrival, allowing each to be served in turn.
	The algorithm is as follows:
	boolean choosing [n];
	int number [n];
	while (true) {
	choosing [i] = true;
	number [i] = 1 + getmax(number[ ], n);
	choosing [i] = false;
	for (int j = 0; j < n; j++) {
	while (choosing [j] { };
	while ((number[j] !=0) && (number [j], j) < number [i], i) { };
	}
	/* critical section */;
	number [i] = 0;
	/* remainder */;
	}
	The arrays choosing & number are initialized to false & 0,
		10	CO4

<table>
<tr><td></td><td>respectively. The ith element of each array may be read & written by process i but only read by other processes. The notation (a,b) < (c,d) is defined as:
(a < c) or (a = c and b < d).
a) Show that this algorithm avoids deadlock.
b) Show that it enforces mutual exclusion.</td><td></td><td></td></tr>
<tr><td>3.</td><td>Suppose that there are two types of philosophers. One type always pick up his left fork (a “lefty”), and the other type always picks up his right fork first (a “righty”). The behavior of a lefty & righty is defined below.
<table>
<tr><td>Lefty
begin
repeat
think;
wait (fork [i]);
wait (fork [(i+1) mod 5]);
eat;
signal (fork [(i+1) mod 5]);
signal (fork [i]);
forever
end;</td><td>Righty
begin
repeat
think;
wait (fork [(i+1) mod 5]);
wait (fork [i]);
eat;
signal (fork [i]);
signal (fork [(i+1) mod 5]);
forever
end;</td></tr>
</table>
Prove the following:
a) Any seating arrangement of the lefties & righties with at least one of each avoids deadlock.
b) Any seating arrangement of lefties & righties with at least one of each prevents starvation.</td><td>05</td><td>CO4</td></tr>
<tr><td>4.</td><td>What is File Management System? List & briefly define five file organizations. What criteria are important in choosing a file organization?</td><td>10</td><td>CO5</td></tr>
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