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Name : Mubin



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test-1 – May 2023

Programme	: B.Tech (CSE and its Specialization)	Semester	: Fall Inter 2022-23
Course	: Operating System	Code	: BCSE303L
Faculty	: Dr.ABDUL QUADIR MD Dr.BHANU CHANDER BALUSA Dr.RISHIKESHAN C A Dr.SANDEEP KUMAR SATAPATHY Dr.PRADEEP K Dr.VALARMATHI Dr.INDRA PRIYADHARSHINI Dr.MONICA K M Dr.SANGEETHA N Dr.ANANDAN P Dr.YOGESH C Dr.LEKI CHOM THUNGON Dr.TAPABRATA ROY	Slot(s) Class Nbr(s)	: E2+TE2 CH2022232500759 CH2022232500982 CH2022232500983 CH2022232500993 CH2022232500992 CH2022232500988 CH2022232500755 CH2022232500756 CH2022232500757 CH2022232500758 CH2022232500760 CH2022232501076 CH2022232501075
Time	: 1½ Hours	Max. Marks	: 50

Answer ALL Questions

1.	Mr. Anuj is attending an interview for a developer role at XYZ Pvt. Ltd. During the interview his manager asked him to list out the components and functionalities of the Operating system. Your task is to help Mr. Anuj to achieve the above scenario while taking into consideration the goal of a good operating system?	[10]
2. a.	Consider the following C program to be executed on CPU. With neat diagram explain how the following code is prepared for execution in terms of text, data, stack and heap segments when stored in memory. [5 Marks] #include<stdio.h> int c; int main() { int a=10; int b=20; print(a,b); return 0; } void print(int x, int y) { c=x+y; printf(“%d”,c);}	[10]
b.	In general, the processor does not acknowledge the interrupts generated, till the completion of current instruction. Assume that the processor acknowledges the generated interrupt by preventing the execution of current on-going instruction. Write the various difficulties encountered by the operating system if the above step is implemented by the processor. [5 Marks]	

3. a. Consider the following C program and explain in detail the creation of child processes and [10]
how many times the "Hello" statement will be printed and which process will be responsible
for printing each of them. [5 Marks]

```
#include<stdio.h>
#include<unistd.h>
int main()
{
    if (fork() && fork())
    {
        fork();
    }
    printf("Hello\n");
    return 0;
}
```

- b. Find the output for the two programs given below. Compare in brief why there is a similarity
or difference in the outputs. [5 Marks]

```
#include <stdio.h>
#include<unistd.h>
int main()
{
    int i, a = 10;
    for(i = 0; i < 2; i++)
    {
        a += 5;
        printf("%d\n", a);
    }
    return 0;
}

#include <stdio.h>
#include<unistd.h>
int main()
{
    int a = 10;
    fork();
    a += 5;
    printf("%d\n", a);
    return 0;
}
```

4. Assume four students [S1, S2, S3, S4] would like to refer operating system book in the VIT [10]
library. Unfortunately, only one copy is available for reference. Assuming S1 will read the
book for 10m, S2 for 12m, S3 for 6m, and S4 for 9m. Also consider that all four students
arrive at the library at the same time. Analyze the following scenarios with appropriate CPU
scheduling algorithm and determine the average Turn Around Time (TAT) and average
Waiting Time(WT) of the students in library if,
- The students are allowed to read the book based on their time requirement. The
book will be allotted (until completion) to a student only if the demanded reading
time of the student is lesser than the others.
 - The students are allowed to read the book one after the other for 5m in each of
their turn.
5. a. Consider the following snapshot of a system in which five resources R1, R2, R3, R4 and R5 [10]
are available. Using the below snapshot convert the matrix representation to a resource

allocation graph and find whether the system contains a deadlock or not. [5 Marks]

	Allocation					Request					Available				
	R_1	R_2	R_3	R_4	R_5	R_1	R_2	R_3	R_4	R_5	R_1	R_2	R_3	R_4	R_5
P_1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
P_2	1	0	0	0	0	0	1	1	0	1					
P_3	0	0	1	0	0	0	0	0	0	1					
P_4	0	1	0	0	0	0	0	0	0	0					
P_5	0	0	0	0	1	0	0	0	1	0					

- b. Consider the following snapshot of a system in which five resources A, B, C, D and E are available. Using the below snapshot convert the matrix representation to a resource allocation graph and find whether the system contains a deadlock or not [5 Marks]

	Allocation					Request					Available				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
P_0	1	0	1	1	0	0	1	0	0	1	2	1	1	2	1
P_1	1	1	0	0	0	0	0	1	0	1					
P_2	0	0	0	1	0	0	0	0	0	1					
P_3	0	0	0	0	0	1	0	1	0	1					

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Continuous Assessment Test 1(CAT 1) –January 2023

Programme	: B.Tech (CSE)	Semester	: Winter Semester 2022-23
Course Code	: BCSE303L	Class Nbr(s)	: CH2022235000811, CH2022235000812, CH2022235000816, CH2022235000815, CH2022235000819, CH2022235000813
Course Title	: Operating Systems		
Faculty(s)	: R.K.Singh, Shyamal.L, , Thomas Abraham, Pradeep.K , IndraPriyadarshini, M.Sivagami	Slot	: F1+TF1
Time	: 90 Minutes	Max. Marks	: 50

Answer all the Questions

Note: Assume that the necessary header files are included wherever required.

Q. No.	Question Text	Marks
1.	<p>Considering the below C code execution, explain in detail how protection is achieved through abstraction in a microkernel operating system. Justify your answer with a neat diagram.</p> <pre>int main() { int i,n; scanf("%d\n",&n); for (i=0; i<n; i++) printf("%d\n", i); return 0; }</pre>	10
2.	<p>Develop a C program which creates two child processes from the parent process. Child1 should display the perfect square numbers from 1 to 10000 and child2 should display the perfect square numbers from 10000 to 20000. Discuss the nature of the output generated by your program for this scenario with proper justification. (8 marks)</p> <p>Note:</p> <p>Perfect Square Number: A perfect square is a positive integer that is obtained by multiplying an integer by itself. In simple words, perfect squares are numbers that are the products of integers by themselves. Generally, we can express a perfect square as x^2, where x is an integer and the value of x^2 is a perfect square.</p> <p>Ex: List of perfect square numbers from 1 to 25 are 1,4,9,16,25.</p>	10

	<p>Discuss the execution status of the below program with justification. (2 marks)</p> <pre> int main() { while(1) // 1 represents the condition is true and 0 represents the condition is false in C {fork();} return 0; } </pre>																			
3.	<p>Declare an integer array that has 1000 elements and calculate the sum of all 1000 elements. To complete this task, write a C program with two threads such that each thread find the sum of half of the array elements and return the result to the main(). main() should display the sum of total values returned by these two threads.</p>	10																		
4.	<p>You are part of Operating Systems Development team in a company who develop android OS and ios for mobile phones. Identify kernel structures used in these operating systems, elaborate the structure in detail. Differentiate user experience and functionalities of these two operating systems</p>	10																		
5.	<p>Consider a clinic with a set of patients for getting the treatment from an Eye specialist. Patients along with the arrival time and expected consultation time are mentioned in the following table.</p> <table border="1"> <thead> <tr> <th>Patient_id</th><th>Arrival time</th><th>Consultation time</th></tr> </thead> <tbody> <tr> <td>p1</td><td>5</td><td>6 5</td></tr> <tr> <td>P2</td><td>6</td><td>8</td></tr> <tr> <td>P3</td><td>7</td><td>7</td></tr> <tr> <td>P4</td><td>0</td><td>3 2</td></tr> <tr> <td>P5</td><td>4 3</td><td>2 10</td></tr> </tbody> </table> <p> i) Give a pictorial representation of the sequence of patients being consulted by the Doctor for the below both strategies. a) Arrival time to the clinic. b) Shortest consultation time (considering with arrival time). Compare the performance of both strategies in terms of Waiting Time and Turnaround Time. (ii) Identify the best strategy used in (a) and (b) and justify. (iii) Calculate the CPU utilization for both scheduling </p>	Patient_id	Arrival time	Consultation time	p1	5	6 5	P2	6	8	P3	7	7	P4	0	3 2	P5	4 3	2 10	10
Patient_id	Arrival time	Consultation time																		
p1	5	6 5																		
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