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Nitte Meenakshi Institute of Technology
(AN AUTONOMOUS INSTITUTION AFFILIATED TO VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM)
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Department of Computer Science and Engineering

MID-SEM EXAMINATION-1
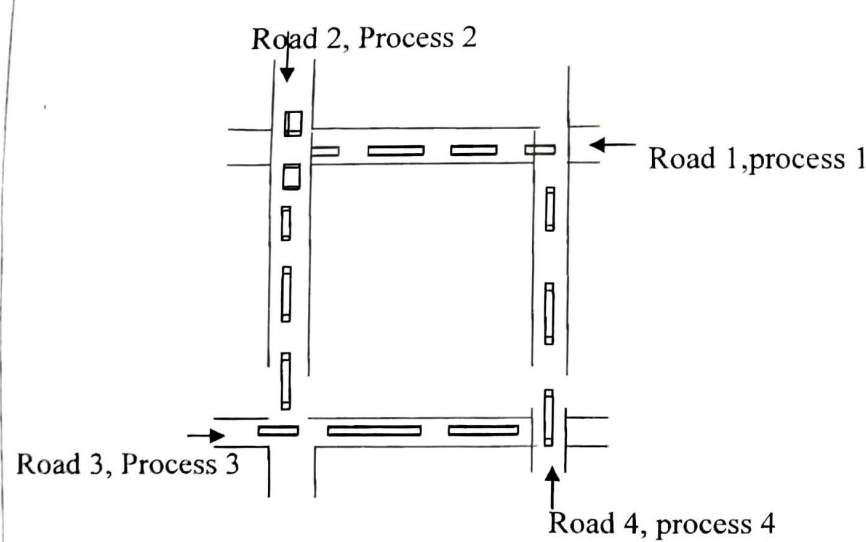
Semester/ Section: IV/A,B,C | Date:30/03/2019
Subject and Code: Operating System (17CS44) | Duration: 1.0 Hr
Faculty Name: Ramyashree BR / Poornima M S/Chaitra H V | Max Marks: 30

Q. No		Questions	Marks	CO/PO/Bloom levels mapping
1	a	Consider a system with 4 processes p_0 through p_4, three resources E,F,G. At time t_0 the status of the system is shown in **Table 1(a)**.		2/3,4

process	Allocation E F G	Max E F G	Available E F G
P0	1 0 1	4 3 1	3 3 0
P1	1 1 2	2 1 4	
P2	1 0 3	1 3 3	
P3	2 0 0	5 4 1	

Table 1(a): State of the system

Marks for this part: 06

Using bankers algorithm
a) Find the need matrix
b) Find whether the system is safe or not and justify

| | b | Consider the traffic deadlock depicted in **the Figure 1(b)** | | 2/3,3 |

Figure 1(b): Representing traffic deadlock

Marks for this part: 05

i.Show that four necessary conditions for deadlocks indeed hold in Figure 1(b)

ii. State a simple rule for avoiding deadlocks in this system.

| | | Explain resource allocation graph in detail | 04 | 2/3,1 |

2	a	Explain any two different ways of structuring the page table	06	3/3,1

	b	Consider the scenario as shown in Table 2(b) and the memory is fixed size partitioning. Use First fit algorithm only. Memory is 4k, 8k ,20k, 2k in order.	05	3/3,4

Process no	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8
Require size	2k	14k	3k	6k	6k	10k	7k	20k
Usage in time(secs)	4	10	2	8	4	1	8	6

Table 2(b): Memory allocation request by processes

i. calculate at what time p_4 entered?

ii. calculate at what time p_4 will be completed?

	c	Consider a System where number of pages is 8K and page size is 16KB. Memory is byte addressable and physical memory address is 22bits. Then Calculate logical address and number of frames.	04	3/3,4

3	a	Explain the following i. Monitors and its usage ii. Demand paging iii. Compare and Contrast between paging and segmentation	06	2/3,2

	b	Consider a binary Semaphore 'Mutex' which is initialized to 1, there are 2 sets of co-operating processes consider SetA and SetB. SetA consists of processes from P_1 through p_9 and set B has one process p_{10}. Table 3(a) depicts the code snippet for process execution.	05	2/3/4,

P_1 through p_9 executes following code	P_{10} executes following code
{(repeat) P(Mutex) Critical section; V(Mutex) }(forever)	{(repeat) V(Mutex) Critical section; V(Mutex) }(forever)

Table 3(a): Code snippet for process execution

What is the maximum number of process that may present in critical section at any point of time?

	c	Assume for a certain processor a read request takes 50 nanoseconds on a TLB miss and 5 nanoseconds on a TLB hit. Suppose while running a program it was observed that 80% of the processor's read request results in TLB hit. Find the average read access time in nanoseconds?	04	2/3,3

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MID-SEM EXAMINATION-1

Semester/ Section: IV/A,B,C

Subject and Code: Operating System (17CS44)

Faculty Name: Chaitra H V/ Poornima M S/Ramyashree

Date: 12/2/2018

Duration: 1.0 Hr

Max Marks: 30

Note: Answer any 2 full questions, each Question 15 marks

Q. No		Questions	Marks	CO/PO/Bloom levels mapping
1	a	Enumerate the task control block along with the process states of transition with a neat diagram.	4	2/3,4/2
	b	Consider the below table of 4 processes under multilevel feedback scheduling. Number of queues is 3, their priority is given as Q1>Q2>Q3. Q1=RR of 18ms ; Q2 = RR of 26ms ; Q3 = FCFS. Draw Gantt-Chart and Calculate the Avg TAT and Avg WT of the Process.	6	2/3,4/4
	c	Illustrate the importance of process-mix in long term scheduling. Compare long-term, short-term and medium-term schedulers.	5	2/3,4/4
2	a	Explain cooperating process and its importance. Annotate the primitives associated with it.	4	2/3,4/2
	b	Discuss the advantages of a multiprocessor system.	3	1/2,4/2
	c	Consider the following data about the process	8	2/3,4/4

Question 1b table:

Process	1	2	3	4
Admission Time	0	0	0	0
Service time	53	17	68	24

Question 2c table:

Process	1	2	3	4	5
Admission Time	0	1	2	3	4
Service time	7	2	3	4	3

i) Draw Gantt-Chart that illustrates the execution of these processes using the following scheduling algorithms, taking the respective arrival times also into consideration:-

FCFS, SJF and Round Robin (quantum=1)

ii) Compute waiting time for each process and average waiting time.

iii) Compute turnaround time for each process and average turnaround

time

				2/3,4/4
3	a	Interpret the characteristics used for comparison of different scheduling algorithms	4	
	b	Explain the need of Direct Memory access for I/O devices. Discuss the role of LWP in Many to Many multithreaded modeling	8	1/2,4/2
	c	Analyze the following scenarios and suggest the best scheduling algorithm		2/3,4/2

a) Situation 1:

The incoming processes are short and there is no need for the processes to execute in a specific order

b) Situation 2:

The processes are a mix of long and short processes and the task will only be completed if all the processes are executed successfully in a given time

c) Situation 3:

The processes are a mix of user based and kernel based processes.

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MID-SEM EXAMINATION-1

Semester/ Section: IV/A,B,C   **Date:** 12/02/19

Subject and Code: *Database Management Systems, 17CS43*   **Duration:** 1.0 Hr

Faculty Name: Dr.Nagaraja S R / Mrs. Ramya S / Mr. MuthuRaj   **Max Marks:** 30

Note: Answer any 2 full questions, each Question 15 marks

Q. No		Questions	Marks	CO/PO/Bloom levels mapping
1	a	With neat diagram Illustrate the role of a high-level data model in the database design process.	05	CO1/2,3/L2
	b	Discuss the DIVISION operation. How it represented and what are the requirements of the numerator and denominator relations? Explain with an example.	05	CO3/2,3/L2
	c	Discuss the various update operations on relations and the types of integrity constraints that must be checked for each update operation.	05	CO3/2,3/L2
2	a	With a neat diagram, describe the component modules of a DBMS and their interactions.	05	CO1/2,3/L2
	b	Consider the following relations for a book club: Members(Member_id, Name, Designation, Age) Books(Bid, Btitle, BAuthor, BPublisher, BPrice) Reserves(Member_id, Bid, Date) where Bid is the book identification, Btitle is Book title, BPublisher is book publisher, BPrice is Book price. Specify the following queries in relational algebra i) List the titles of books reserved by professors ii) Find IDs of members who have not reserved books that cost more than Rs 500. iii) Find the names of members who are professors older than 45 years.	06	CO3/2,4/L3
	c	Explicate concept of a weak entity used in data modeling? Define the terms *owner entity type, weak entity type, identifying relationship type,* and *partial key.*	04	CO2,3/3,4/L2
3	a	Discuss the advantages of the database approach? What are the different types of database end users? Discuss the main activities of each.	06	CO1/1,2/L1
	b	Draw an E-R diagram for Banking System. Assume your own entities (Minimum of 5 entities), attributes and relations, Mention cardinality ratio, Explain.	05	CO2/2,3/L3
	c	Compare the OUTER JOIN operations and the INNER JOIN operations? How is the OUTER UNION operation different from UNION?	04	CO3/2,3/L2

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MID-SEM EXAMINATION-I

Semester/ Section: 4th Sem/A/B/C
Subject and Code: Application Development Using Java
Faculty Name: Dr.Vijaya Shetty S/ Sowmya M R /Asha H V

Date: 13/1/2019
Duration: 1.0 Hr
Max Marks: 30

Note: Answer any 2 full questions, each Question 15 marks

Q. No		Questions	Marks	CO/PO/Bloom levels mapping

1	a	**Analyze** the following statements and explain your **interpretation** of the code
		i) Public static void main(){
		         System.out.println()}
		ii) class Box{
		         int i; int j; int k;}
		         ....
		         Box b1;
		         b1 = new Box();
		         Box b2 = b1;
		         ------ 	
		         b1=null;
			4	1/1,2/4

	b	Discuss **Garbage collection** mechanism of Java and the role of **finalize()** method with an **example**.	5	1/1,2/1,3
	c	There are two book shelves one containing **CS** books and another containing **EC** books. Put the **CS** and **EC** books to a shelf containing **ME** books and find the total number of books in **ME** shelf. Use default interface methods.	6	2/2,3/3

2	a	**Analyze** the following code and write the **output/correct version** of the
		class Aa {
		private int i;
		}
		class B extends Aa {
		int i; B(int a, int b) {
		super.i = a;
		i = b;
		}
		void show() {
		System.*out*.println("i in superclass: " + **super**.i);
		System.*out*.println("i in subclass: " + i);
		}
		}
			4	1/2,3/4,3

		``class UseSuper {
public static void main(String args[]) {
B subOb = new B(1, 2);
subOb.show();
}
}```		
	b	Discuss the **three main uses** of final keyword in Java. Give **an example** for each case.	6	1/1/1,2
	c	Write a Java program to catch ArithmeticException and ArrayIndexOutOfBoundsException types	5	2/1,2/3
3	a	Design and implement an abstract **Student** class with an abstract method **degreeProvided()**. Define two other classes **Undergraduate** and **Graduate** to extend Student class. Display degree provided for Undergraduate and Graduate objects on console through run-time polymorphism(dynamic degreeProvided() method dispatch)	5	1/1,2,3/2
	b	Find length of an int array and a String array by overloading int Length() method of an **Array** class. **Array** class object needs to maintain length as its state.	5	2/1,2,3/3
	c	Discuss exception handling statements of Java with an example code.	5	2/1,2/1,2

MID-SEM EXAMINATION-I

Semester:4th **Sem CSE**   Date: 11 / 02 /2019   Time: 2:00-3:00 pm

Subject and Code: **Design and Analysis of Algorithms (17CS42)**   Max Marks: **30**

Name of faculty : Mrs.Ramya.Srikanteswara , Mrs.Kavya.B.S , Mrs.Meenakshi
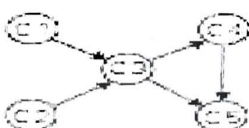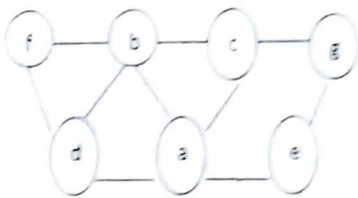
Answer any Two Full Questions

Q.No	Question	Marks	CO:PO	Bloom's Level
1.a)	Suggest a general plan for analyzing non recursive algorithms. Write an algorithm to find the largest element in a list of n numbers. Analyze it mathematically based on the plan suggested above.	6	CO4 / 1,4,9	L4
b)	Design an algorithm to sort an array of n elements using insertion sort technique. Show that the worst case efficiency is in $\theta (n^2)$.	5	CO2,4 / 1,4,9	L4
c)	Explain the concept of searching a number using the interpolation search method.	4	CO2,4 / 1,4,9	L2
2.a)	Describe the various stages of algorithm design and analysis process with the help of a diagram.	6	CO1 / 1,4	L2
b)	Design an algorithm to sort elements of an array using bubble sort technique. Show that the worst case efficiency is quadratic.	5	CO2,4 / 1,4,9	L4
c)	Apply source removal method to Topologically sort the graph given in Figure 2(c).	4	CO3 / 1,4,9	L3

Figure 2 (c) : Graph for topological sort

3 a)	Design an algorithm to sort elements using quick sort. Analyze its efficiency for the worst case. Trace algorithm for the data set 5,3,1,9,8,2,4,7.	7	CO2,3 4 1,4,9
b)	Consider the graph given in Figure-3(b)	4	CO3 1,4,9

Figure- 3(b) : Graph for DFS traversal

i) Write adjacency matrix and adjacency linked list for the above graph

ii) Starting at vertex 'a' and resolving ties by vertex alphabetical order, traverse the graph by depth first search method and construct the corresponding DFS tree for the above graph.

c)	Solve the following knapsack problem using Brute force method. Capacity of the knapsack W= 40	4	CO3 1,4,3

Number of objects n=3

Weights (w1,w2w3)={20,25,10}

Profits (p1,p2,p3)={30,40,35}