

Jaypee University of Engineering & Technology, Guna

T-1 (Odd Semester 2023)

18B11HS312 - TECHNIQUES FOR DECISION MAKING

Maximum duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has 04 questions.
2. Write relevant answers only.
3. Do not write anything on question paper.
4. Use of calculators is permitted.

Q1. Describe the stages of decision making process using an appropriate diagram. Justify your answer with the help of an example. Marks [04] CO No. CO1

Q2. If the median of the following distribution is 41, then compute the values of x and y. [04] CO2

Group	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	6	x	14	10	y	68

Q3. A company uses the tracking signal to judge the accuracy level of the forecasting method. The company's actual sales and forecast sales are mentioned in the table below: [04] CO3

Week	1	2	3	4	5	6
Actual Sales	56	78	87	92	97	94
Forecast Sales	56	79	87.71	91.75	96.63	98.97

Compute RSFE, MAD and tracking signal for each week and determine the accuracy of the forecasting technique.

Q4. Find the standard deviation of the following data set: [03] CO3

30, 14, 9, 5, 22

Jaypee University of Engineering & Technology, Guna**T-1 (Odd Semester 2023)**

18B19GE399 Environmental Science

Maximum duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has 03 questions.
2. Write relevant answers only.
3. Do not write anything on question paper.
4. Draw diagrams to support your answers.

Q1.	(a) What are various components of Environment? Show by a neat diagram.	[03]	CO1
	(b) Describe all "layers of atmosphere."	[02]	CO1
Q2.	(a) Discuss all characteristics required to understand an "Ecosystem"	[03]	CO2
	(b) Give your views about "Marine food chain."	[02]	CO2
Q3.	(a) Elaborate "Pyramid of Biomass" of "Terrestrial Ecosystem" by a diagram.	[03]	CO2
	(b) Establish the importance of "Forest Ecosystem by its component".	[02]	CO3

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T-1(Odd Semester 2023)

18B11EC311 – Digital Systems and Microprocessors

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has three questions.
2. Write relevant answers only in proper order.
3. Calculators are not allowed.
4. Do not write anything on question paper (Except your Er. No.).

Q1.	Solve the following:	Marks [05]	CO No. CO2
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- (a) Determine the base of the number in $54/4 = 13$ for correct operation.
- (b) Convert Binary number 11.0111 to decimal number.
- (c) Convert $(4429.625)_{10}$ to its equivalent octal number.
- (d) Subtract 11001 from 11011 using 2's complement arithmetic.
- (e) Convert gray code 11010101011010 to its equivalent binary number.

Q2. (a)	Write the truth table for AND, OR, NAND, NOR gates with their logic representation.	[01]	CO3
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- (b) Minimize the expression $F(P,Q,R) = P + P'QR' + (Q+R)'$ using Boolean expression and implement the resultant with the simple logic gates.
- (c) Reduce the following Boolean expression and implement the resultant using NAND gates only,

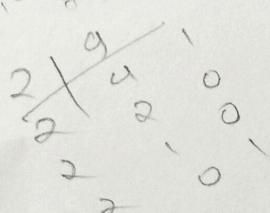
$$F(A,B,C) = \overline{(A+B)} \cdot \overline{(A+C)}$$

SOP $A' \rightarrow 0$
 $A \rightarrow 1$

Q3. (a)	Determine the sum of minterms and function $f(A, B, C, D)$ in canonical sum of products form for the function $f(A, B, C, D) = AC$.	[02]	CO4
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- (b) Find out the minimal expression/expressions for the switching function given below by using Karnaugh Map.

$$F(A, B, C, D) = \sum m(0, 1, 4, 5, 6, 7, 12, 14)$$



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T-1(Odd Semester 2023)

18B11CI311 – Data Structures

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has 03 questions.
2. Write relevant answers only.
3. Solve the questions in a serial order.
4. Do not write anything on question paper (Except your Er. No.).

Q1. Analyze the time complexity of the following code snippets with suitable explanations for each:

Marks [06] CO No. CO4

(i) `int a = 0, b = 0;
for (i = 0; i < n; i++) {
 a = a + rand();
}
for (j = 0; j < n; j++) {
 b = b + rand();
}
//Assume rand() function takes O(1) time.`

(ii) `int i, j, k = 0;
for (i = n / 2; i <= n; i++) {
 for (j = 2; j <= n; j = j * 2) {
 k = k + n / 2;
 }
}`

(iii) `int i=1, s=1;
while (s <=n) {
 s=s+i;
 i++;
}`

Q2. Write the insertion sort algorithm, and then analyze its time [04] CO3 complexity and auxiliary space requirements in both the best and worst cases.

Q3. Given a sorted array of distinct positive integers, with one integer [05] CO5 missing, design a time-efficient recursive algorithm to find the missing integer.

Test Case 1:

arr1 = {1, 2, 3, 4, 6, 7, 8} (Missing number: 5)

Test Case 2:

arr2 = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11} (Missing number: 12)

Test Case 3:

arr3 = {2, 3, 4, 5, 6, 7} (Missing number: 1)

Derive the recurrence relation from your algorithm and solve it using backward-substitution method to find the time complexity.

Q:

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T-1(Odd Semester 2023)

18B11CI312 – Database Systems

Q. Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has 3 questions.
2. Answer the questions in serial order.
3. Write relevant answers only.
4. Do not write anything on question paper (Except your Er. No.).
5. Calculators are allowed according to university norms.

Q1.

Consider a disk with the following characteristics (these are not parameters of any particular disk unit): block size $B=512$ bytes, interblock gap size $G=128$ bytes, number of blocks per track=20, number of tracks per surface=400. A disk pack consists of 15 double-sided disks.

Marks [05] CO No. CO1

- (a) What is the total capacity of a track and what is its useful capacity (excluding interblock gaps)? How many cylinders are there?
- (b) What is the total capacity and the useful capacity of a cylinder? What is the total capacity and the useful capacity of a disk pack?
- (c) Suppose the disk drive rotates the disk pack at a speed of 2400 rpm (revolutions per minute); what is the transfer rate in bytes/msec and the block transfer time btt in msec? What is the average rotational delay rd in msec? What is the bulk transfer rate?
- (d) Suppose the average seek time is 30 msec. How much time does it take (on the average) in msec to locate and transfer a single block given its block address?
- (e) Calculate the average time it would take to transfer 20 random blocks and compare it with the time it would take to transfer 20 consecutive blocks using double buffering to save seek time and rotational delay.

Q2.

We wish to create a database for a company that runs training courses. For this, we must store data about the trainees and the instructors. For each course participant (about 5,000), identified by a code, we want to store her social security number, surname, age, sex, place of birth, employer's name, address and telephone number, previous employers (and periods employed), the courses attended (there are about 200 courses) and the final assessment for each course. We need also to represent the seminars that each participant is attending at present and, for each day, the places and times the classes are held. Each course has a code and a title and any course can be given any number of times. Each time a particular course is given, we will call it an 'edition' of the course. For each edition, we represent the start date, the end

Marks [05] CO2

date, and the number of participants. If a trainee is self-employed, we need to know her area of expertise, and, if appropriate, her title. For somebody who works for a company, we store the level and position held. For each instructor (about 300), we will show the surname, age, place of birth, the edition of the course taught, those taught in the past and the courses that the tutor is qualified to teach. All the instructors' telephone numbers are also stored. An instructor can be permanently employed by the training company or freelance. Represent the above database in the form or an ER diagram.

Q3. Consider three tables exist without any primary key and foreign key constraints under COMPANY database as given below. Write following MySQL queries on existing tables/records: [05] CO3

- Update John's Salary from 30000 to 40000.
- Create foreign key on Dno of EMPLOYEE table.
- Change data type of Lname to VARCHAR(20)
- Identify primary key of DEPT_LOCATIONS table and write a query to add primary key constraint.
- Display detail of all female employees.

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	6
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston