



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15.
CSPC51 – Computer Architecture
V Semester - Section B / Cycle Test II

Date: 31.10.2022
Max: Marks: 20

Answer ALL Questions

1. Consider the following instructions are executed in five stage pipeline: (3)

lw R1, 0(R2)
add R3, R4, R5
sub R6,R1, R3

Explain the flow of execution in a pipeline using a simple diagram.

2. a. Show how the instructions in the sequence given below will proceed through the pipeline. Assume that (i) branch instruction is not taken and (ii) when it is executed the value of R1 and R2 are same. (4)

beq R1, R2, X
lw R3, 0(R5)
sub R6,R3, R3
X: add R4, R1,R2
lw R1, 0(R4)
sub R1, R1, R1
add R1, R1, R1

- b. For the instruction mix above, on what instruction results does the last add instruction depend on? (1)

3. Indicate the type of hazards and data dependences for the following instructions: (5)

a. lw R1, 40(R6)
add R6, R2, R2
sw R6,50(R1)

b. lw R5, -16(R5)
sw R5, -16(R5)
add R5, R5,R5

4. For the above sequence, add nop instructions to eliminate the hazards. Assume that there is no forwarding in this pipelined processor. (4)

5. Discuss the schemes for dealing with the pipeline stalls caused by branch hazards. (3)

12 Stalls

10 stalls



National Institute of Technology, Tiruchirappalli - 15
Department of Computer Science & Engineering
CSPC52- Database Management Systems
Cycle Test -II

Class / Semester : III yr CSE / V sem.
Venue & Date : ORION-F12 & 31/10/2022

Time : 2.30 to 3.30 P.M
Max. Marks : 20

Answer all questions

1. Consider the following two schedules of actions on the data items A, B, C and D, listed in the order it is submitted to the DBMS (S is a shared lock, X is an exclusive lock):

S1: T4:X(A), T3:S(C), T1:S(B), T2:X(B), T3:X(C), T2:X(A), T1:S(C), T4:S(B)
S2: T1:X(A), T3:S(D), T3:S(A), T4:X(C), T2:S(B), T4:X(A), T2:X(C), T1:X(B),
T4:X(D)

For both the sequences S1 and S2,

- (i) Mention for each request whether the request is granted or blocked by the lock manager.
(ii) Show the waits-for graph and indicate whether there will be a deadlock or not at the end of each sequence. (4)

2. Consider the following schedule on the database objects A, B, and C. The meanings of the operations are as follows: (4)

- R(object): Read the object
- W(object): Write the object

Time	T1	T2	T3
1			
2			R(C)
3			
4			
5			
6	R(A)		
7			
8			
9			
10			W(C)
11		R(A)	
12		W(A)	
13			
14			
15			
16	W(B)		
17			
18			
19			
20	R(D)		
21			
22			
23		Commit	
24			
25			
26			
27	Commit		
28			
29			
30			
31			W(B)
32			
33			Commit

- (i) Is the schedule allowed by 2PL? If the answer is NO, explain the reason briefly. If YES, describe where the lock/unlock requests could have happened.
(ii) Is the schedule allowed by strict 2PL? If the answer is NO, explain the reason briefly. If YES, describe where the lock/unlock requests could have happened.

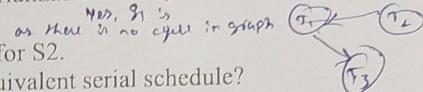
3. Consider the following schedules. The actions are listed in the order they are scheduled, and prefixed with the transaction name. (4)

S1: T2:R(B), T2:W(B), T1:W(A), T1:R(B), T3:R(A), T1:W(B), T2:W(A)

S2: T1: R(B), T3:R(A), T3:W(A), T2:R(B), T2:W(A), T3:W(C), T1:R(A), T2:R(C)

(i) Is the schedule S1 serial? *b*

(ii) Draw the dependency graph for S1. Is S1 conflict serializable? If so, what is the conflict equivalent serial schedule?



(iii) Is the schedule S2 serial? Draw the dependency graph for S2.

(iv) Is S2 conflict serializable? If so, what is the conflict equivalent serial schedule?

4. Assume an immediate database modification scheme. Consider the following log consisting transactions T1, T2, and T3: (4)

1. (Start, T1);
2. (Write, T1, P, 500, 600);
3. (Write, T1, Q, 400, 500);
4. (Commit, T1);
5. (Start, T2);
6. (Write, T2, P, 600, 550);
7. (Write, T2, Q, 500, 450);
8. (Commit, T2);
9. (Start, T3);
10. (Write, T3, P, 550, 600);
11. (Write, T3, Q, 450, 500);
12. (Commit, T3);

What are the recovery operations to be done for the following cases:

(i) If the schedule crashes just after Step 3, what is the recovery operation to be done?

(ii) If the schedule crashes just after Step 11, then after the completion of recovery process, what are the values of P and Q?

(iii) If the schedule crashes just after Step 7, what is the order of recovery operations?

(iv) If the schedule crashes just after Step 6, then before the recovery process is started, what are the values of P & Q?

5. Consider the relation PLAYER with relational schema PLAYER (Player-no, Player-name, Team, Team-color, Coach-no, Coach-name, Player-position, Team-captain) and set of functional dependencies as follows; (4)

$F = \{Player\text{-no} \rightarrow Player\text{-name}, Player\text{-no} \rightarrow Player\text{-position}, Player\text{-no} \rightarrow Team, Coach\text{-no} \rightarrow Coach\text{-name}, Team \rightarrow Team\text{-color}, Team \rightarrow Coach\text{-no}, Team \rightarrow Team\text{-captain}\}$

Answer the question: Is PLAYER in 3NF? If not, convert into 3NF.

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

V SEMESTER B.TECH, CYCLE TEST 2

CSPC53 COMPUTER NETWORKS

DATE: 01/11/2022

Answer All Questions

MAX. MARKS: 20

1. How does the banyan switch route the packets from input port to output port? Discuss with a suitable example. (3)
2. Differentiate the following (1+1)
(i) Network specific VS Host specific method
(ii) DVR VS LSR
3. How does reverse path forwarding technique handle broadcast storm problem? Are there any redundant packets while using this technique? If yes, how to prevent the redundant copies? If no, justify your answer with suitable examples. (3)
4. A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose that 4 organizations A, B, C and D request 4000, 2000, 4000 and 8000 addresses respectively and in that order. For each of these, give first address, last address and mask in w.x.y.z/s notation. (3)
5. What is the first valid host on the subnet that the node 172.26.209.179/20 belongs to? (2)
6. Given the 8-bit actual data 10101110 (1st bit is in rightmost side) which needs to be encoded with the required number of redundant bits for the possible error correction. Using odd parity, the values of redundant bits are determined. Assume that 7th bit is corrupted during the transmission. (i) What is bit pattern received by the receiver? (ii) How does the receiver correct the error? (iii) In addition to 7th bit, assume that the 8th bit is also corrupted. Is it possible to detect these errors? If it is yes, how is it detected. If not, justify your answer. (4)
7. Consider a 50kbps satellite channel with a 500msec round trip propagation delay. 1000-bit frames are transmitted using 1-bit sliding window protocol. At what time, the receiver has received the frame? Also, find the percentage of available bandwidth that is used? (3)



Department of Computer Science and Engineering
CSPE 51 – Augmented and Virtual Reality

Date : 02.11.2022

Cycle Test - 2
Time : 10 – 11 am

Max. Mark : 20

Answer all the questions

1. a) How is translation transformation useful in Virtual Reality? Explain your answer with an example. (2)
b) Perform reflection of unit cube about xy plane and list the coordinate values of the reflected cube. (2)
c) A point $P(x,y,z)$ is rotated about the origin and is moved to the positive z-axis. Check whether the following two methods will result in the same transformation matrix:
$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Method 1: Rotate about the y-axis to place the point in the yz plane. Then rotate about x-axis to place the point on the z-axis.
Method 2: Rotate about the x-axis to place the point in the xy plane. Then rotate about y-axis to place the point on the z-axis.

Discuss with a simple example. (3)
2. a) What is the requirement for the control points of a Bezier curve of order five to produce a smooth closed curve? (2)
b) Perform a perspective projection onto the $z = p$ plane of the unit cube where centre of projection is at $X_c = -10$, $Y_c = -10$ and $Z_c = -10$. (2)
c) How are depth value calculated in Z – buffer method? (1)
d) What will happen if the line of sight is missed in the interactive device? (1)
3. a) Is 3Ball / 3D mouse provide interaction with the virtual world? Justify your answer. (1)
b) What is the need for user-specific calibration in the sensing glove? (1)
c) Explain the different performance metrics used in trackers. (2)
d) What is the haptic device? Explain any one of them with its working principle. (3)



National Institute of Technology Tiruchirappalli

Computer Science and Engineering

V Semester-Section B,
CSPE 56 - Cloud Computing

Cycle Test 2

DATE: 02.11.2022,

DURATION: 60 minutes

Max. Marks: 20

Instructions: Answer all the questions.

1. Perform MapReduce for the following sentences to count the number of occurrences of each word:
Sentence 1: Ali and the Magic Carpet
Sentence 2: George and the Dragon
Sentence 3: The Princess and the Dragon [3M]
2. Mention the issues of static resource provisioning in Intercloud and discuss the dynamic resource provisioning methods that overcome those issues [2M]
3. What are the fundamental components used to construct internetworking architecture? [2M]
4. Discuss any four technologies or components used in the Datacenter.[4M]
5. Explain various REST service design constraints. [4M]
6. Briefly explain the main components of Identity and Access Management. [2M]
7. Consider the scenario where there are several trusted users who can each access the same application on a cloud. Which security mechanism will you use to provide both data integrity and protection, and how? [3M]

*****All The Best*****

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI – 620015
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech (CSE) - Cycle Test 2 – July - December 2022

CSPC54- Introduction to Artificial Intelligence and Machine learning

Max Marks: 15

Time: 1 hour

Semester: V

Curriculum: NITTUGCSE20

Date of Exam: 1st November 2022

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1. Write FOL statements for the following scenario and verify whether the conclusion is true?

- All doctors are college graduates. Some doctors are not golfers. Hence, some golfers are not college graduates.
- Check the validity of the argument. All clear explanations are satisfactory. Some excuses are unsatisfactory. Hence some excuses are not clear explanations. (4)

2. Construct a Decision Tree model that evaluates the following expression: (3)

$$y = \neg x_1 \wedge x_2 | x_3$$

(4)

3. Construct a Naïve Bayes Model for the following data:

Home Owner	Marital status	Job experience	Defaulted
Yes	Single	3	No
No	Married	4	No
No	Single	5	No
Yes	Married	4	No
No	Divorced	2	Yes
No	Married	4	No
Yes	Divorced	2	No
No	Married	3	Yes
No	Married	3	No
Yes	Single	2	Yes

Bob is married, doesn't own a home and has an experience of 2 years. Determine the probability of whether Bob will be defaulted or not.

4. Consider the following statements. Use First order logic and resolution to prove the conclusion. The following are the axioms: (4)

1. All hounds howl at night.
2. Anyone who has any cats will not have any mice.
3. Light sleepers do not have anything which howls at night.
4. John has either a cat or a hound.
5. (Conclusion) If John is a light sleeper, then John does not have any mice.

--- Best Wishes ---