



National Institute of Technology Tiruchirappalli

CSPE56-Cloud Computing

July 2023

Department of CSE

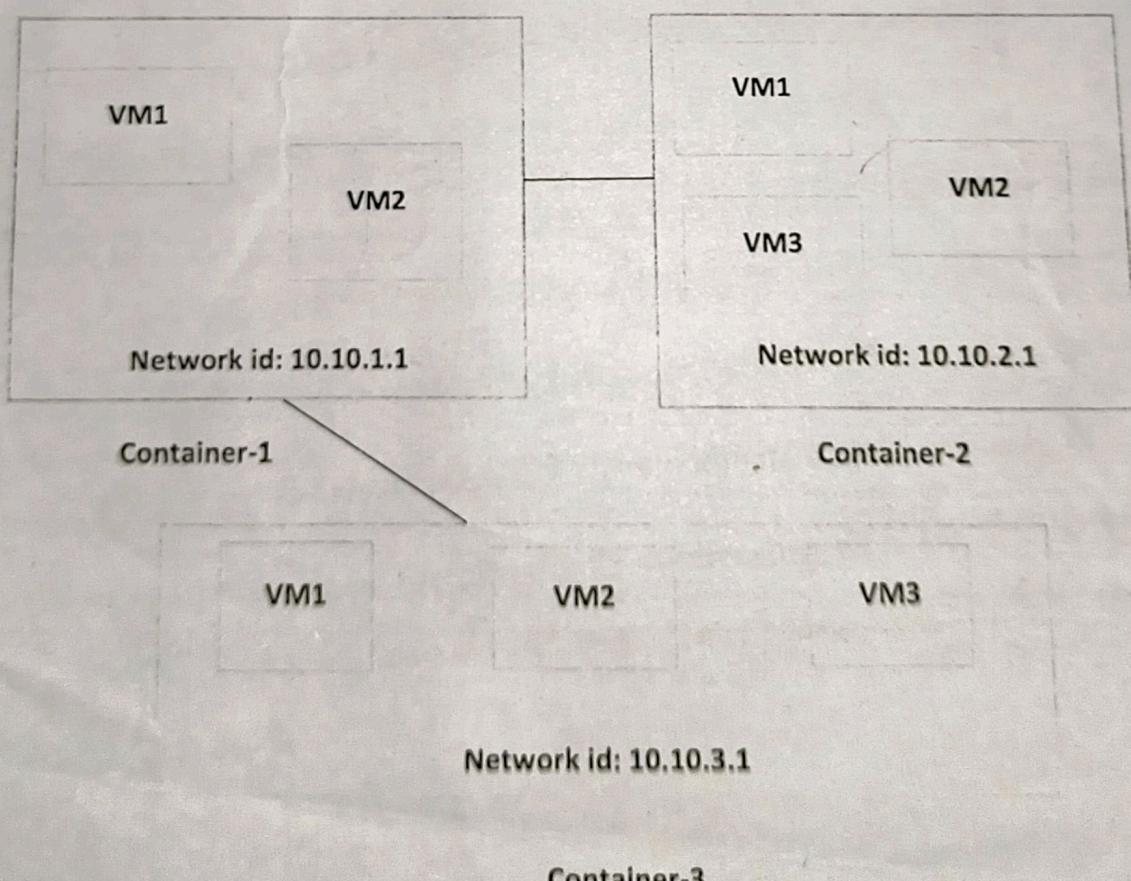
Cycle Test-2

Marks:20

Date: 02-11-2023

Answer all the questions.

1. (a) Differentiate VPN and VLAN with suitable example? [CO3] 2 Marks
 - (b) Differentiate active-active and active-passive failover systems with suitable diagrams? [CO3] 2 Marks
 - (c) How many types of CloudStack networking models exist, explain in brief all the models? [CO4] 2 Marks
 - (d) Draw OpenNebula architecture with its components? [CO4] 2 Marks
 - (e) Differentiate public key and private key with a suitable example? [CO3] 2 Marks
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2. (a) Explain OpenStack architecture with description of all the components? [CO4] 5 Marks
 - (b) Write the CloudFormation Template for the below network? [CO3] 5 Marks





**Department of Computer Science & Engineering
National Institute of Technology**

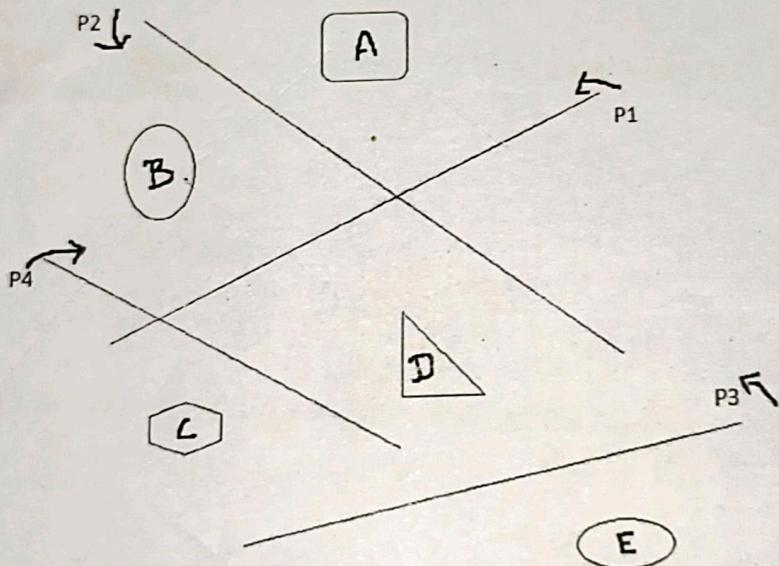
**CSPE51 – Augmented & Virtual Reality
Cycle Test -2**

Date : 03.11.2023

Time : 11 am – 12 pm

Max. mark : 20

1. a) Find the vanishing point for the single point perspective projection of a line AB onto the $z = 0$ plane having the coordinates A [6 4 8 2] and B [6 4 16 2] having a center of projection at $z_c = -2$. (1)
b) How can you determine the depth of a polygon in a painter's algorithm? (1)
c) What is a control point? (1)
d) What is ambient light? (1)
2. a) Is the following statement correct?
"3D rotations about the x-axis followed by an equal angle of rotation about the y-axis is equal to rotation about the y-axis followed by an equal rotation about the x-axis". Justify your answer. (2)
b) Consider the coordinates of a wooden table have been provided. Write down the transformation steps that would result in drawing the top view of the table on the screen. (2)
c) Construct a BSP tree for the following (2)



3. a) What are the reasons by which the tracker signal may be lost? (1)
b) What is the need for user-specific calibration in the sensing glove? (1)
c) How do accuracy and jitter parameters affect the performance of the trackers? Explain it with respect to the different types of trackers. (3)
4. a) What are all the design considerations to be followed for developing good haptic feedback interfaces? (2)
b) What kind of haptic feedback can be obtained in the following devices? Explain how it is obtained.
i) Joystick, ii) Cyberforce, iii) iFeel (3)



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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

Date: 03.11.2023
Max: Marks: 20

Answer ALL Questions

1. The following MIPS program is to be run on a MIPS pipeline processor of form IF-ID-EX-MEM-WB. (3)

a. Please identify all data dependencies beside each instruction, in the form: <type> on <register> from <line-no> to <line-no>, ex: WAW on \$t6 from L_8 to L_10.

L1 lw t2, 60(t1)
L2 lw t1, 40(t2)
L3 slt t1, t1, t2
L4 sw t1, 20(t2)

b. Work out and diagram the *optimal* pipeline schedule using forwarding from EX or MEM stages to any other stage, then compute the pipeline CPI.

L1 lw t2, 60(t1)
L2 lw t1, 40(t2)
L3 slt t1, t1, t2
L4 sw t1, 20(t2)

2. Convert the following C code to MIPS and find the hazards and reorder the instructions to avoid any stalls. (4)

A = B + E;
C = B + F;

3. Consider the code given below. Convert it into DAXPY implementation. Make the following assumptions: (5)

for i := 1 to 100
Y[i] := a*X[i] + Y[i];

- Integer operations issue and complete in one clock cycle.
- There are no memory system delays.
- There is no branch delay.
- FP addition takes 2 cycles, FP multiplication takes 5 cycles, and FP division takes 19 cycles (although you will not need division)

Unwind the loop given above three times. Change the registers used in each of the three versions of the loop body, so that no registers are reused. Eliminate any obviously redundant computations. Notice that you can use the displacement addressing mode instead of repeatedly incrementing R1 and R2.

4. Implement the following code using Tomasulo's Algorithm. Compute the values during clock cycle 6. Use the format given below:

(6)

<u>Instruction status</u>			<u>Execution Write</u>			<u>Busy Address</u>	
Instruction	j	k	Issue	complete	Result	Load1	Address
LD F6	34+	R2				No	
LD F2	45+	R3				No	
MUL F0	F2	F4				No	
SUB/F8	F6	F2					
DIV/F10	F0	F6					
ADD F6	F8	F2					

<u>Reservation Stations</u>			S1	S2	RS for j	RS for k	
Time	Name	Busj	Op	Vj	Vk	Qj	Qk
0	Add1		No				
0	Add2		No				
	Add3		No				
0	Mult1		No				
0	Mult2		No				

<u>Register result status</u>	F0	F2	F4	F6	F8	F10	F12	...	F30
Clock 0	FU								

5. Differentiate Vector, SIMD and GPU architecture with neat diagram.

(2)

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI – 620015

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech (CSE) - Cycle Test 2 - July - December 2023

CSPC54– Introduction to Artificial Intelligence and Machine learning

Semester: V, CSE B

Max Marks: 15

Curriculum: NITTUGCSE21

Time: 1 hour

Date of Exam: 6th November 2023

1. Write FOL statements for the following scenario and verify whether the conclusion is true? (2)
(CO3)

- Some thing that is white is not always milk, whereas the milk is always white.
- Everyone who gets admitted into an IIT gets a job. Therefore, if there are no jobs, then nobody gets admitted into any IIT.

2. Construct a ANN model using a single layer that evaluates the following expression: (3) (CO4)

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

3. Unify (if possible) the following pairs of predicates and give the resulting substitutions. b is a constant. (CO3)

- $P(x, f(x), z)$ and $\neg P(g(y), f(g(b)), y)$ (2)
- $P(x, f(x))$ and $\neg P(f(y), y)$

4. A medical expert is going to build up a case-based reasoning system for diagnosis tasks. Cases correspond to individual persons where the case problem parts are made up of a number of features describing possible symptoms and the solution parts represent the diagnosis (classification of disease). The case base contains the seven cases provided in the table below.

Fever (F)	Vomiting (V)	Diarrhea (D)	Shivering (S)	Classification
No	No	No	No	Healthy (H)
Average	No	No	No	Influenza (I)
High	No	No	Yes	Influenza (I)
High	Yes	Yes	No	Poisoning (P)
Average	No	Yes	No	Poisoning (P)
No	Yes	Yes	No	Inflammation (IT)
Average	Yes	Yes	No	Inflammation (IT)

Moreover, the expert has specified a similarity measure reflecting his expertise, using local similarity measures and feature weights as specified in the figure below.

Training → Q (F)	No	Avg	High
No	1.0	0.7	0.2
Avg	0.5	1.0	0.8
High	0.0	0.3	1.0

Train → Q (V,D,S)	Yes	No
Yes	1.0	0.0
No	0.2	1.0

The weightage of the different symptoms are $W_f = 0.3$, $W_v = 0.2$, $W_d = 0.2$, $W_s = 0.3$. Calculate the similarity between all cases from the case base and the query $q = (\text{high, no, no, no})$ using K-NN. Assume $K=2$ or 3 (CO4) (4)

5. Consider the following statements. Use First order logic and resolution to prove the conclusion. The following are the axioms: (CO3) (4)

- Every investor bought [something that is] stocks or bonds
- If the Dow-Jones Average crashes, then all stocks that are not gold stocks fall.
- If the T-Bill interest rate rises, then all bonds fall.
- Every investor who bought something that falls is not happy.
- (Conclusion) If the Dow-Jones Average crashes and the T-Bill interest rate rises, then any investor who is happy bought some gold stock.

Cycle Test -II

Class / Semester : III yr CSE / V sem.

Time : 11.00 to 12.00 Noon

Venue & Date : ORION-S5&S6 & 06/11/2023

Max. Marks : 20

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			

- (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. What are clustered indices? What are the various types of clustered indices? Explain search, Insertion and deletion operations in different types of clustered indices? (4)
4. Assume an immediate database modification scheme. Consider the following log consisting transactions T1, T2, and T3:
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.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

V SEMESTER B.TECH., CYCLE TEST 2

CSPC53 COMPUTER NETWORKS

DATE: 02/11/2023

Answer All Questions

MAX. MARKS: 20

1. What are the addresses needed for various communication phases in switching networks, including datagram, virtual circuit, and circuit switching? What is the purpose of using these addresses? (3)
2. An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and then, a quarter to Organization B, while retaining the remaining with itself. Find the first and last host addresses in these two organizations. What is the address range that is retained with ISP? (3)
3. Sixteen stations, numbered 1 through 16, are contending for the use of a shared channel. Assume that these numbers are considered as their addresses in 5-bit representation. By using binary countdown protocol, if all the stations whose addresses are prime numbers suddenly become ready at once. In what order the contention is resolved among these stations? (4)
4. A system uses the Selective Repeat protocol with 3-bit sequence number. If each packet carries 1000 bits of data, how long does it take to send 1.5 million bits of data with a 1 Mbps transmission rate if the distance between the sender and receiver is 4000 Km and the propagation speed is 2×10^8 meter/sec. Ignore transmission, waiting, and processing time. Assume that there are no overheads, no damaged data or control frames. (3)
5. Assume that 2-bit sequence number is used by Go-Back N protocol. With a neat time-line diagram, illustrate the working of this protocol with window size as 4. (3)
6. Which of the following CRC divisors guarantee the detection of a single bit error? Justify your answer.
 - a. $x^4 + x$
 - b. 1
 - c. $x^2 + 1$(3+1)

V SEMESTER B.TECH, RETEST

CSPC53 COMPUTER NETWORKS

DATE: 23/11/2023

Answer All Questions

MAX. MARKS: 20

- 1) Explain the working of S-DES algorithm in detail with a suitable diagram. Also, do the encryption and decryption with the plain text of your choice. (4)
- 2) What is the use of the port number in Transport Layer. Mention any 3 commonly used ports along with the protocol. (1)
- 3) Why is checksum in UDP optional? (1)
- 4) Draw the TCP Packet header. Why is Packet length stored in both IP and TCP Packet header? (2+1)
- 5) The following is a dump of a TCP header in hexadecimal format. (3)
053200217 000000001 00000000 500207FF 00000000

Predict the following from this: source port number, destination port number, sequence number, acknowledgment number, header length, type of the segment and window size.

- 6) Why does the reverse path forwarding fail to minimize the redundant packets? (2)
- 7) What are the issues with DSV protocol and how to solve them? (2)
- 8) Draw the table for classful IP addressing with the following information: Class, NetId, HostID, No. of Blocks, Block size, No. of addresses, Address range for 1st, 2nd and last block address range. (2)
- 9) What are the possible multiple access protocols required to resolve the contention among the devices which are interconnected using mesh topology? Explain. (2)