



VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

Matunga, Mumbai-400 019

Autonomous Institute affiliated to University of Mumbai

EXAMINATION	End Semester Examination November 2018	DATE OF EXAM	22/11/2018
SEMESTER & PROGRAM	Sem-VII, BTech Computer Engineering	TIME	9:30 am - 12:30 pm
TIME ALLOWED	3 HRS.	MARKS	100
COURSE NAME - (CODE)	Software Architecture-VII - (CO4001_5)		

Instructions

1. All questions carry equal marks.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.

- Q 1. ☒ a. How does the nature of your organization affect the architectures that it develops? How do the architectures affect the nature of the organization? (10) CO4
- ☒ b. State with reason following statement is true or false: "connectors are mostly application dependent elements. (05) CO1
- ☒ c. "Focus on architecture is a focus on Reuse". is it true or false, Comment. (05) CO4
- Q 2. ☒ a. Elucidate different stake holder for building software architecture with their roles. (10) CO4
- ☒ b. Justify your answer, the system you are currently working on, what are the most important qualities? What are the system-specific scenarios that capture these qualities and what are the general scenarios they make concrete? (10) CO2
- Q3. ☒ a. Discuss service oriented architecture(SOA), and web service. (10) CO3
- ☒ b. Elaborate in detail Availability tactics. Modifiability tactics, Testability tactics. Usability analytics. (10) CO1
- Q 4. ☒ a. Illustrate Event-driven architecture and explain its application. (10) CO3
- ☒ b. What type of application are applicable for following styles and give examples of each: (10) CO1
- (i) Event-based, (ii) Pipe and filter, (iii) Layered, (iv) Mobile Code, (v) Black-board.
- Q 5. ☒ a. A Lunar Lander game is to be developed with following specifications: (15) CO1
- User input - It take input from pilot as increase/decrease speed which is directly mapped to required burn rate.
- Other inputs: Lunar Lander has two sensors:
- (i) current burnt rate (ii) current altitude
- Output: Based on these 3 inputs determine new burn rate and set different parameters like altitude, velocity and display them.
- Draw an architecture using any of the two styles:
- (a) Object oriented style, (b) Rule Based style, (c) Black board style
- ☒ b. Write a short note on Software Architecture and Deployment. (05) CO2



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EXAMINATION	End Semester Examination Nov/Dec 2018	DATE OF EXAM	28/11/ 2018
SEMESTER & PROGRAM	Sem-VII, Final Year BTech Computer Engineering	TIME	10:00 AM to 1:00 PM
TIME ALLOWED	3 HRS.	MARKS	100
COURSE NAME – (CODE)	Information Security– (CO4002_T)		

Instructions

1. All questions carry equal marks.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.

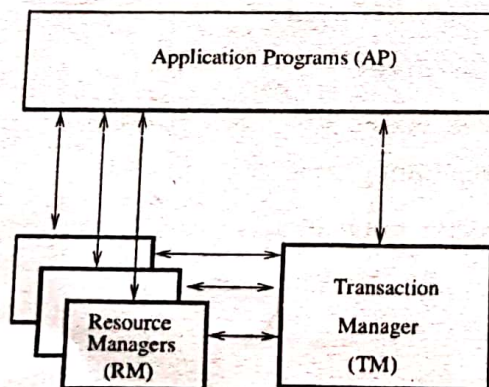
- Q1. a. In a 2004 version of AOL's AIM instant-messaging 10 CO2
software exposed users to buffer overflow vulnerabilities. If
a user posted a URL in their "I'm away" message, any of
his or her friends who clicked on that link might be
vulnerable to attack. AOL's response was to suggest that
users update to a new version that would fix the bug. For
the above mentioned study, What non malicious program
error must have occurred that leads to more serious
security vulnerabilities? How a malicious attacker can
exploit these program flaws?
- b. Cite a situation with real life example in computing 08 CO1
environment in which hardware vulnerabilities, software
vulnerabilities and Data vulnerabilities have occurred?
- c. In banking domain, List some of the hacking techniques 02 CO1
that are commonly used to get your personal information in
an unauthorized way. Furthermore, Depending upon the
activity profile of hackers, How can they be broadly
classified?

(10) CO4
(10) CO2
(10) CO
(10) CO1
Q2. a. Suppose a group of students is preparing for an exam for 10 CO2 which each question has four choices (a,b,c,d); one student in the group, Sophie, understands the material perfectly and she agrees to help the others. She says she will reveal the answers to the questions, in order, by coughing once for answer "a", sighing for answer "b", and so forth. Sophie uses a communication channel that outsiders may not notice; her communications are hidden in an open channel. With respect to above scenario, how a programmer can create covert channels for the programs that leak information? Why are such channels addressed as storage channels?

b. One of the problems with using base/bounds registers for 10 CO2 protection or relocation is their contiguous nature. Discuss in detail about the challenges faced and Briefly specify any alternative approach for it?

Q3. a. Illustrate the ESAPI security mechanism to mitigate the top 10 CO4 threats of OWASP? 10x 10/10 10/10

b. For the following diagram, Elaborate in detail, the security 10 CO2 measures taken into consideration for x/open distributed transaction processing (DTP) Architectures?



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Q4. a. Perform AES encryption .Given the plain-text 10 CO3
{000102030405060708090A0B0C0D0E0F} and the key
{01010101010101010101010101010101}.

i. Show the original contents of State, displayed as a 4 x 4
matrix.

ii. Show the value of State after initial AddRoundKey.

iii. Show the value of State after SubBytes.

iv. Show the value of State after ShiftRows.

b. Implement some of the methods /algorithms used for 10 CO3
detection of router attacks?

Q5. a. In the Educational organization, Evaluate the use of MAC, 10 CO2
DAC, and RBAC methods and recommend the best
method for the organization. Provide a rationale for your
response.

b. How is an Intrusion Prevention System implemented with 10 CO3
Open Source tools, Briefly explain it with respect to the
attack generation, detection and defense algorithms.
Design a layered architecture of IPS in network security?



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EXAMINATION	End Semester Examination (ESE) Nov 2018	DATE OF EXAM	30/11/2018
SEMESTER & PROGRAM	Sem-VII, B Tech (Computer Engineering)	TIME	9.30 am to 12.30pm
TIME ALLOWED	3 HRS.	MARKS	100
COURSE NAME – (CODE)	Data Mining and Data Warehousing (CO4003_T)		

- Instructions
1. All questions carry equal marks.
 2. Figures to the right indicate full marks.
 3. Make assumptions wherever necessary.

- Q.1
- a. Differentiate between Classification and Regression. 05 CO1
 - b. Why are concept hierarchies useful in data mining? Write steps for concept hierarchy generation based on number of distinct values per attribute. 05 CO1
 - c. Mention the two type of tables involved in producing a star schema and the type of data that they hold. Explain with an example. 05 CO1
 - d. Why is tree pruning useful in decision tree induction? What is the drawback of using a separate set of tuples to evaluate pruning? 05 CO1
- Q.2.
- a. Explain the different distance metrics used in clustering data points with nominal and Boolean attributes. Find the cosine similarity of two documents given by the term frequency vector $D1 = (5, 0, 3, 0, 2, 0, 0, 2, 0, 0)$ $D2 = (3, 0, 2, 0, 1, 1, 0, 1, 0, 1)$ 05 CO2

Consider the following table

Instance	A1	A2	A3	Target class
1	T	T	1.0	+
2	T	T	6.0	+
3	F	F	5.0	-
4	F	F	4.0	+
5	F	T	7.0	-
6	F	T	3.0	-
7	F	F	8.0	-
8	T	F	7.0	+
9	F	T	5.0	-

- i) What is the entropy of this collection of training examples with respect to the positive class?
 - ii) What are the information gains of a1 and a2 relative to these training examples?
 - iii) What is the best split (among a1, a2,) according to the information gain?
- c. Use the k-means algorithm and Euclidean distance to cluster the following 8 examples into 3 clusters. Use A1, A4 and A7 as seed. Find the final clusters. Perform till 3 iterations 08 CO2
- $A1 = (2, 10)$, $A2 = (2, 5)$, $A3 = (8, 4)$, $A4 = (5, 8)$, $A5 = (7, 5)$, $A6 = (6, 4)$, $A7 = (1, 2)$, $A8 = (4, 9)$.

- Q.3. ~~a~~ Differentiate between agglomerative and divisive hierarchical clustering. 05 CO3
~~b~~ Consider the data set shown in the Table given below 07 CO3
- Compute the support for itemsets $\{e\}$, $\{b, d\}$, and $\{b, d, e\}$ by treating each transaction ID as a market basket.
 - Compute the confidence for the association rules $\{b, d\} \rightarrow \{e\}$ and $\{e\} \rightarrow \{b, d\}$
 - Repeat part (a) by treating each customer ID as a market basket. Each item should be treated as a binary variable (1 if an item appears in at least one transaction bought by the customer, and 0 otherwise.)
 - Use the results in part (c) to compute the confidence for the association rules $\{b, d\} \rightarrow \{e\}$ and $\{e\} \rightarrow \{b, d\}$.

Customer ID	Transaction ID	Items Bought
1	0001	{a, d, e}
1	0024	{a, b, c, e}
2	0012	{a, b, d, e}
2	0031	{a, c, d, e}
3	0015	{b, c, e}
3	0022	{b, d, e}
4	0029	{c, d}
4	0040	{a, b, c}
5	0033	{a, d, e}
5	0038	{a, b, e}

$$A = b, d$$

$$B = e$$

$$\frac{2}{8} \times 0.8$$

$$0.2$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

$$A = e$$

$$B = b, d$$

$$P(B|A) = \frac{1}{8} \times 0.2$$

$$0.2$$

- c An educational psychologist wants to use association analysis to analyze test results. The test consists of 100 questions with four possible answers each. How would you convert this data into a form suitable for association analysis? In particular, what type of attributes would you have and how many of them are there?

03 CO4

- d Explain Bagging and Boosting.

05 CO3

- Q.4. A ABC company has a website for purchasing books. They want to implement a recommender system using collaborative filtering so that they can recommend books read by similar users. They have a database of registered information which consists of the following attributes Name, Address, Contact No, Email Id, Gender, Income, Qualification, Profession etc.

CO4

10

- List the additional data that needs to be collected from the user. And how it can be collected
- List the attributes that will be used for the data mining task.
- The data mining techniques and the algorithm that will be used.
- Specify the model for the system
- Measures that will be used for model evaluation.

05 CO4

- b Explain Pagerank algorithm.

05 CO4

- c How is web usage mining different from web content mining and web structure mining.

- Q.5 a Give three application examples of spatiotemporal data streams. What 10 CO4

kind of interesting knowledge can be mined from such data streams, with limited time and resources. What are the challenges in spatio temporal mining

- b Suppose that a data warehouse for *Big University* consists of the following four dimensions: *student*, *course*, *semester*, and *instructor*, and two measures *count* and *avg grade*. When at the lowest conceptual level (e.g., for a given student, course, semester, and instructor combination), the *avg grade* measure stores the actual course grade of the student. At higher conceptual levels, *avg grade* stores the average grade for the given combination. 10 CO4
- (a) Draw a snowflake schema diagram for the data warehouse.
 - (b) Starting with the base cuboid [*student*; *course*; *semester*; *instructor*], what specific OLAP operations should one perform in order to list the average grade of CS courses for each *Big University* student.
 - (c) If each dimension has five levels (including all), such as "*student* < *major* < *status* < *university* < all", how many cuboids will this cube contain (including the base and apex cuboids)?
 - (d) Specify how the concept hierarchy for each of the dimensions and how the tuples will be stored in the fact and dimension tables



VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE (VJTI)
[Central Technological Institute, Maharashtra State]
Matunga, Mumbai-400 019

EXAMINATION	ESE - Odd Semester 2018	DATE OF EXAM	03/11/2018.
SEMESTER & PROGRAM	Sem-VII, Final Year B Tech (Computer Engineering) / IT	TIME	9.30 AM to 12.30 PM
TIME ALLOWED	3 Hrs	MARKS	100
COURSE (Course Code)	Digital Image Processing - (CO4102_T) / (IT4102-T)		

Instructions: All questions are Compulsory

- Q.1 a) Determine whether a given system is Linear or Non-Linear system. 2 CO1
 $y(t) = t \cdot x^2(t)$
b) Find out whether given system is Causal or Non-Causal system. 3 CO1
 $y(t) = 2x(t) + 3x(t-3)$ where $t = 1$
c) Calculate time required to transmit a 1024 X 1024 image with 256 grey levels if we use a 56K baud modem where packets consisting of a start bit, a byte (8 bits) of information and stop bit. And what would the time be at 750K baud, a representative medium speed of a phone DSI connection? 5 CO1
d) Check whether the 1D DFT is an example of a Unitary transform. 5 CO2
e) Find the Slant transform of the given signal. 5 CO2

$$x(n) = \begin{bmatrix} 1 \\ 2 \\ 2 \\ 1 \end{bmatrix}$$

- Q.2 a) Consider the image segment shown, 6 CO2
(a) Let $V = \{0, 1\}$ and compute the length of the shortest 4-, 8- and m-path between p and q. If a particular path does not exist between these two points, explain why.
(b) Repeat for $V = \{1, 2\}$

3 1 2 1q
2 2 0 2
1 2 1 1

p 1 0 1 2

- b) Find out the discrete convolution of following signal: 4 CO1

$$x(n) = \begin{matrix} -1 & 0 & 1 & 2 \\ \uparrow & & & \\ 1 & 2 & 3 & 4 \end{matrix} \quad h(n) = \begin{matrix} 0 & 1 & 2 & 3 \\ \uparrow & & & \\ 1 & 2 & 1 & -1 \end{matrix}$$

①

c) $A =$

1	1	1	1
1	0	0	1
1	0	0	1
1	1	1	1

$B =$

1	1
1	1

Compute: i. $A \oplus B$
ii. $A \odot B$

5 CO2

d) Compute the inverse Hadamard transform of the sequence $\{6, -4, 0, 2\}$.

5 CO1

Q3. a) What measures are taken into consideration for evaluating the performance of lossy compression techniques.

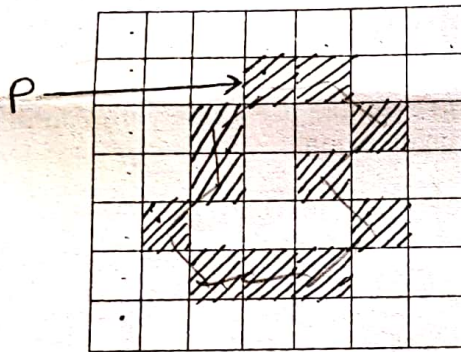
5 CO3

b) Perform histogram equalization for following. Obtain a plot of original as well as equalized histogram.

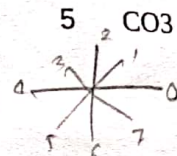
5 CO3

Intensity	0	1	2	3	4	5	6	7
No. Of Pixels	70	100	40	60	0	80	10	40

c) Given an image, Write down the 8-chain code



0 7 5 1 8 4 4
3 1 2 1



d) In Spatial filtering, Briefly mention about Mean filters with respect to Noise.

5 CO4

Q4. a) Given a four symbol source. Perform the Arithmetic coding for the signal $\{a_1, a_2, a_3, a_4\}$.

10 CO3

b) Given $h(x, y)$

10 CO4

-1	-1	-1
-1	8	-1
-1	-1	-1

Find frequency domain filter $H(u, v)$.

2

Q5. a) Given 7 X 7 image, Compute $A \otimes B$

10 CO3

$A =$

0	0	0	0	0	0	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	0	0	0	0	0	0

$B_1 =$

0	0	0
0	1	0
0	1	0

$B_2 =$

0	1	0
0	0	0
0	0	0

b) Discuss a case study on:

10 CO4

1. Vehicle Number Plate Detection and Recognition.
2. Face Recognition.
