Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: CS472

Course Name: PRINCIPLES OF INFORMATION SECURITY

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

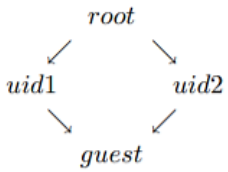
1		Explain the need of information security.	(4)
2		Distinguish between vulnerability and threat. Give example.	(4)
3		Explain Clark-Wilson Model with a neat diagram.	(4)
4		Illustrate SQL injection with an example.	(4)
5		Briefly explain the life cycle of a computer virus.	(4)
6		Explain XSS or Cross Site Scripting.	(4)
7		What is a poll control frame? How does an attacker exploit a poll control frame?	(4)
8		List out any 4 lacunae/pitfalls in GSM Security. Give a brief explanation.	(4)
9		Discuss the strength and weakness of Secure Electronic Transactions.	(4)
10		Explain the entities involved in a web service.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Consider a computer system with three users: Alice, Bob, and Cyndy. Alice owns the file alicerc, and Bob and Cyndy can read it. Cyndy can read and write the file bobrc, which Bob owns, but Alice can only read it.Only Cyndy can read and write the file cyndyrc, which she owns. Assume that the owner of each of these files can execute it. Create the corresponding access control matrix.	(6)
	b)	What is a CIA Triad? Explain.	(3)
12	a)	State the *-property for the Chinese Wall model	(4)
	b)	Explain Biba Model.	(5)
13	a)	Differentiate between Discretionary and Mandatory Access Control	(4)
	b)	You are given a security policy stating that a subject has access to an object if and only if the security level of the subject dominates the security level of the	(5)

object. What is the effect of using the following lattice with this policy?



PART C

Answer any two full questions, each carries 9 marks.

14 a) How does buffer overflow vulnerability occur? How does a canary variable detect buffer overflow attack? (5)

b) What is software vulnerability? What are the common types of software flaws that lead to vulnerability? (4)

15 a) Explain various Internet propagation models for worms. (6)

b) Explain about code red worms. (3)

16 a) What are topological worms? Explain any 2 Topological worms. (5)

b) Differentiate between stored and reflected XSS. (4)

PART D

Answer any two full questions, each carries 12 marks.

17 a) How is security enhanced in UMTS when compared to GSM? (8)

b) How is encryption of messages between cell phone and base station achieved in GSM? (4)

18 a) Explain various security threats associated with RFID systems. (6)

b) What are the various elements in XML Encryption? Explain. (6)

19 a) How is data protection achieved in WEP? What are its drawbacks. (6)

b) Explain dual signature with respect to SET. (3)

c) With an example, explain SAML assertion. (3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CS402

Course Name: DATA MINING AND WAREHOUSING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		How is data mining related to business intelligence?	(4)
2		Differentiate between OLTP and OLAP.	(4)
3		Why do we need data transformation? What are the different ways of data transformation?	(4)
4		An airport security screening station wants to determine if passengers are criminals or not. To do this, the faces of passengers are scanned and kept in a database. Is this a classification or prediction task? Justify	(4)
5		Where do we use Linear regression? Explain linear regression.	(4)
6		What is the significance of tree pruning in decision tree algorithms?	(4)
7		What are the two measures used for rule interestingness?	(4)
8		Given two objects represented by the tuples (22,1,42,10) and (20,0,36,8) Compute the Manhattan distance between the two objects.	(4)
9		How density based clustering varies from other methods?	(4)
10		Differentiate web content mining and web structure mining.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Explain various stages in knowledge discovery process with neat diagram	(5)
	b)	Use the two methods below to normalize the following group of data: 1000,2000,3000,5000,9000 i)min-max normalization by setting min=0 and max=1 ii) z-score normalization	(4)
12		Suppose that a data warehouse for University consists of four dimensions date, spectator, location and game and two measures count and charge, where charge is the fare that a spectator pays when watching a game on the given date. Spectator may be students , adults or seniors ,with each category having its own charge rate	

a) Draw a star scheme for the data warehouse. (6)

b) Starting with the basic cuboid [date,spectator,location,game] ,what specific OLAP operation should be performed in order to list the total charge paid by student spectators at GM_PLACE in 2010. (3)

13 Summarize the various pre-processing activities involved in data mining (9)

PART C

Answer any two full questions, each carries 9 marks.

14 Based on the following data determine the gender of a person having height 6 ft., weight 130 lbs. and foot size 8 in. (use Naive Bayes algorithm). (9)

person	height (feet)	weight (lbs)	foot size (inches)
male	6.00	180	10
male	6.00	180	10
male	5.50	170	8
male	6.00	170	10
female	5.00	130	8
female	5.50	150	6
female	5.00	130	6
female	6.00	150	8

15 (9)

The "Restaurant A" sells burger with optional flavours: Pepper, Ginger and Chilly. Every day this week you have tried a burger (A to E) and kept a record of which you liked. Using Hamming distance, show how the 3NN classifier with majority voting would classify
{pepper = false, ginger =true, chilly = true}

	Pepper	Ginger	Chilly	liked
A	true	true	true	false
B	true	false	flase	true
C	false	true	true	false
D	false	true	false	true
E	true	false	false	true

16 a) How C4.5 differs from ID3 algorithm? (3)

b) How does backpropagation algorithm works? (6)

PART D

Answer any two full questions, each carries 12 marks.

17 Consider the transaction database given below. Set minimum support count as 2 and minimum confidence threshold as 70%

Transaction ID	List of Item_Ids
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5
T900	I1,I2,I3

a) Find the frequent itemset using FP Growth Algorithm. (8)

b) Generate strong association rules. (4)

18 a) Explain BIRCH Clustering Method. (8)

b) What are the advantages of BIRCH compared to other clustering method. (4)

19 a) Explain k-means partition algorithm. What is the drawback of K-means? (6)

b) Term frequency matrix given in the table shows the frequency of terms per document. Calculate the TF-IDF value for the term T4 in document 3. (6)

Document/term	T1	T2	T3	T4	T5	T6
D1	5	9	4	0	5	6
D2	0	8	5	3	10	8
D3	3	5	6	6	5	0
D4	4	6	7	8	4	4

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: CS402

Course Name: DATA MINING AND WAREHOUSING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1	How is data warehouse different from a database? How are they similar?	(4)
2	Compare star and snowflake schema dimension table.	(4)
3	Use the two methods below to normalize the following group of data: 100,200,300,500,900 i) min-max normalization by setting min=0 and max=1 ii) z-score normalization	(4)
4	Explain the attribute selection method in decision trees .	(4)
5	Distinguish between hold out method and cross validation method.	(4)
6	Explain prepruning and postpruning approaches in decision tree algorithm.	(4)
7	Differentiate between support and confidence.	(4)
8	How to compute the dissimilarity between objects described by binary variables?	(4)
9	Differentiate between Agglomerative and Divisive hierarchical clustering method.	(4)
10	Explain web content mining?	(4)

PART B

Answer any two full questions, each carries 9 marks.

11		The following data is given in increasing order for the attribute age: 13,15,16,16,19,20,20,21,22,22,25,25,25,25,30,33,33,35,35,35,36,40,45,46,52,70.	
	a)	Use smoothing by bin boundaries to smooth these data, using bin depth of 3.	(3)
	b)	How might you determine outliers in the data?	(3)
	c)	What other methods are there for data smoothing?	(3)
12)		Explain the following procedures for attribute subset selection	
	a)	Stepwise forward selection	(3)
	b)	Stepwise backward elimination	(3)
	c)	A combination of forward selection and backward elimination	(3)

13 a) Suppose a datawarehouse consists of three measures customer, account and branch and two measures count (number of customers in the branch) and balance. Draw the schema diagram using snowflake schema. (4)

b) Real-world data tend to be incomplete, noisy, and inconsistent. What are the various approaches adopted to clean the data? (5)

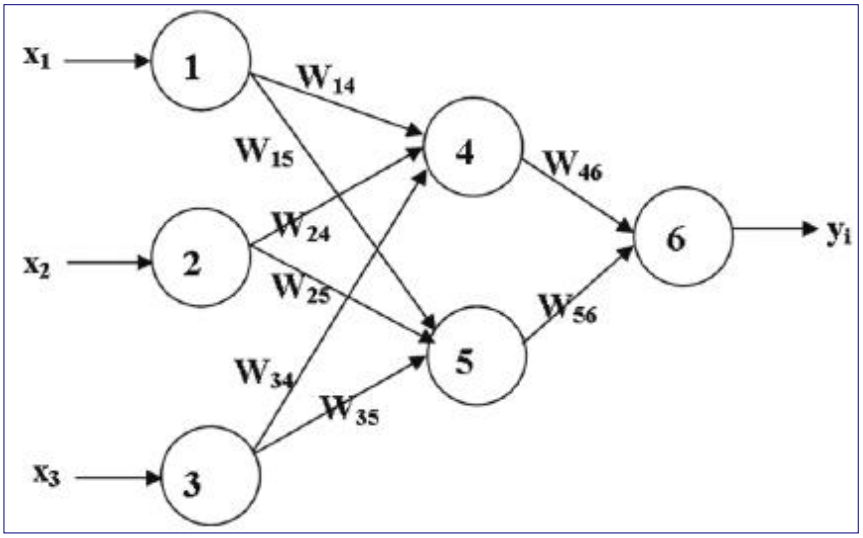
PART C

Answer any two full questions, each carries 9 marks.

14 Given the following data on a certain set of patients seen by a doctor, can the doctor conclude that a person having chills, fever, mild headache and without running nose has the flu?(Use Naive Bayes algorithm for prediction) (9)

chills	running nose	headache	fever	has flu
Y	N	mild	Y	N
Y	Y	no	N	Y
Y	N	strong	Y	Y
N	Y	mild	Y	Y
N	N	no	N	N
N	Y	strong	Y	Y
N	Y	strong	N	N
Y	Y	mild	Y	Y

15 The following figure shows a multilayer feed-forward neural network. Let the learning rate be 0.9. The initial weight and bias values of the network is given in the table below.The activation function used is the sigmoid function. (9)



x_1	x_2	x_3	w_{14}	w_{15}	w_{24}	w_{25}	w_{34}	w_{35}	w_{46}	w_{56}	θ_4	θ_5	θ_6
1	0	1	0.2	-0.3	0.4	0.1	-0.5	0.2	-0.3	-0.2	-0.4	0.2	0.1

Show weight and bias updation with the first training sample (1,0,1) with class label 1, using backpropagation algorithm

16 a) Explain classification by C4.5 algorithm. (6)

b) What is meant by Maximum Marginal Hyperplane (MMH)? (3)

PART D

Answer any two full questions, each carries 12 marks.

17 Consider the transaction database given below. Set minimum support count as 2 and minimum confidence threshold as 70%

Transaction ID	List of Item_Ids
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5
T900	I1,I2,I3

a) Find the frequent itemset using Apriori Algorithm. (8)

b) Generate strong association rules . (4)

18 a) Explain DBSCAN algorithm . (8)

b) State the pros and cons of DBSCAN method. (4)

19 a) Explain clustering by k-medoid algorithm. (6)

b) Explain Apriori based frequent subgraph mining. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth semester B.Tech degree examinations, September 2020

Course Code: CS402

Course Name: DATA MINING AND WAREHOUSING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		List out the four major features of data warehouse as defined by William H. Inmon, the father of data warehousing.	(4)
2		What is the purpose of data discretization in data mining? List out any four data discretization strategies.	(4)
3	a)	Draw a suitable figure that shows data mining as a process of knowledge discovery.	(2)
	b)	List out any four methods to handle missing attribute values in a dataset.	(2)
4	a)	How is entropy of a dataset calculated?	(2)
	b)	What are the advantages of DBSCAN over k-Means clustering algorithm?	(2)
5		What is confusion matrix?	(4)
6		Describe the purpose of kernel function in nonlinear SVM with a suitable example.	(4)
7		What is the significance of CF (Clustering Feature) in BIRCH Algorithm?	(4)
8		The transaction details are given in the following table, what is the confidence and support of the association rule {Diapers} ⇒ {Coffee, Nuts}?	(4)

T_id	Items bought
10	Beer, Nuts, Diapers
20	Beer, Coffee, Diapers, Nuts
30	Beer, Diapers, Eggs
40	Beer, Nuts, Eggs, Milk
50	Nuts, Coffee, Diapers, Eggs, Milk

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9		How can we compute the dissimilarity between two binary objects?	(4)
10		Describe the following activities involved in the web usage mining. i)Pre-processing activity ii) Pattern analysis activity	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Suppose a group of 15 sales price records has been given as follows: 5, 10, 11, 13, 15, 5,8,12,11,13,18,20,18,19,19 Draw a three bucket equi-width histogram.	(3)
	b)	Draw a three-bucket equi-depth histogram.	(3)
	c)	How numerosity reduction is done by MaxDiff histogram.	(3)
12	a)	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. Draw a snowflake schema diagram for the data warehouse. Starting with the base cuboid [student, course, semester, instructor], what specific OLAP operations (e.g., roll-up from semester to year) should one perform in order to list the average grade of CS courses for each Big University student.	(5)
	b)	A set of data is given: A= {115,233,484,543}. Normalize the data by Min-max normalization (range: [0.0,1.0]).	(4)
13	a)	Explain different OLAP operations on multi-dimensional data with suitable examples.	(6)
	b)	A data warehouse can be modeled by either a star schema or a snowflake schema. Describe the similarities and the differences of the two models.	(3)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	Why linear SVM is known as maximal margin classifier? Explain with suitable figure.	(4.5)

ICE-TCE-TCE

b) Consider the collection of training samples (S) in the table given below. Loan_risk is the target attribute which describes the risk associated with loan for each customer. Find the value of the following. (4.5)

i) Gain(S, Sex) ii) Gain (S,Credit_rating)

Cust_ID	Age	Sex	Income	Credit_rating	Loan_risk
1000	Young	F	High	Normal	Safe
1001	Young	F	High	High	Safe
1002	Middle Age	F	High	Normal	Risky
1003	Senior	F	Normal	Normal	Risky
1004	Senior	M	Low	Normal	Risky
1005	Senior	M	Low	High	Safe
1006	Middle Age	M	Low	High	Risky
1007	Young	F	Normal	Normal	Safe
1008	Young	M	Low	Normal	Risky
1009	Senior	M	Normal	Normal	Risky
1010	Young	M	Normal	High	Risky
1011	Middle Age	F	Normal	HIgh	Risky
1012	Middle Age	M	High	Normal	Risky
1013	Senior	F	Normal	High	Safe

15 Suppose we have data on few individuals randomly surveyed. The data gives the responses towards interests to promotional offers made in the areas of Finanace, Travel, Reading, and Health. Sex is the output attribute to be predicted. Apply Naïve Bayesian classification algorithm to classify the new instance (Finance = No,Travel = Yes, Reading = Yes, Health = No). (9)

Finance	Travel	Reading	Health	Sex
Yes	No	Yes	No	Male
Yes	Yes	No	No	Male
No	Yes	Yes	Yes	Female
No	Yes	No	Yes	Male
Yes	Yes	Yes	Yes	Female
No	No	Yes	No	Female
Yes	No	No	No	Male
Yes	Yes	No	No	Male
No	No	No	Yes	Female
Yes	No	No	No	Male

ICE-TCE-TOE

16 a) The following table shows the midterm and final exam grades obtained for students in a database course.

x(Mid-term Exam)	Y(Final Exam)
72	84
50	63
81	77
74	78
94	90
86	75
59	49
83	79
65	77
33	52
88	74
81	90

(6)

Use the method of least squares to find an equation for the prediction of a student's final exam grade based on the student's midterm grade in the course.

b) Predict the final exam grade of a student who received 86 marks on the midterm exam with the above model. (3)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Given two objects represented by the tuples (22, 1, 42, 10) and (20, 0, 36, 8):

(i) Compute the Euclidean distance between the two objects. (6)

(ii) Compute the Manhattan distance between the two objects.

(iii) Compute the Minkowski distance between the two objects, using p = 3.

b) Explain frequent subgraph mining using Apriori method. (6)

18 A database has five transactions.Let min sup=60% and min confidence=50%. (12)
Find all frequent patterns using FP-growth algorithm.

Tid	Items_bought
T1000	{M,O,N,K,E,Y}
T2000	{D,O,N,K,E,Y}
T3000	{M,A,K,E}

ICE-TCE-TCE

T4000	{M,U,C,K,Y}
T5000	{C,O,O,K,I,E}

Find all strong association rules for the above table.

19 a) Explain BIRCH algorithm (9)

b) Explain the application of Naive Bayes Classifier in web content mining. (3)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CS404

Course Name: Embedded Systems

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What is an embedded computing system? Write two functionalities of an embedded system.	(4)
2		Explain the problems of hardware software co-design in an embedded system.	(4)
3		Draw a concurrent program model for Seat Belt Warning System of an automobile.	(4)
4		Explain the library file in assembly language context. What is the benefit of 'library file'.	(4)
5		Briefly describe out of circuit programming in Embedded System.	(4)
6		Differentiate generic IDEs with IDEs used in embedded firmware development with suitable examples.	(4)
7		Explain hard real-time considerations and soft real-time considerations	(4)
8		Differentiate monolithic kernel with microkernel	(4)
9		Explain System on Chip technique (SOC)	(4)
10		Write any 4 bottlenecks available in the embedded industry.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	With a suitable example, explain the specification phase of an embedded system.	(5)
	b)	Show the UML representation of an object and a class with a suitable example.	(4)
12	a)	Design a coin operated public telephone unit based on FSM model for the following requirements.	(9)

1. The calling process is initiated by lifting the receiver (off-hook) of the telephone unit.
2. After lifting the phone the user needs to insert a 1 rupee coin to make the call.

3. If the line is busy, the coin is returned on placing the receiver back on the hook (on-hook).
4. If the line is through, the user is allowed to talk till 60 seconds and at the end of 45th second, prompt for inserting another one rupee coin for continuing the call is initiated.
5. If the user doesn't insert another 1 rupee coin, the call is terminated on completing the 60 seconds time slot.
6. The system is ready to accept new call request when the receiver is placed back on the hook (on-hook).
7. The system goes to the "Out of Order" state when there is a line fault.

(No need to take care of the scenarios like user doesn't insert a coin within the specified time after lifting the receiver, user inserts coins other than a one rupee etc.)

13 a) List and explain the non functional requirements in an embedded system. (4)

b) Draw a class diagram for a basic microwave oven, cooking time should be adjusted from 1 min to 60 min. Include classes for door, front panel and heating elements. (5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) With a neat diagram explain the steps in converting assembly language to machine language (9)

15 a) Explain the Debuggers used in Embedded System Development Environment (5)

b) Briefly describe (i) decompiler (4)

(ii) disassemblers

16 a) Is it possible to embed the firmware into the target processor/controller memory at the time of chip fabrication? Justify your answer. (3)

b) Explain the merits and demerits of assembly language based embedded firmware development . (6)

PART D

Answer any two full questions, each carries 12 marks.

17 Explain the different types of Inter Task Communication mechanisms supported by MicroC/OS-II kernel. (12)

18 (a) Explain the various steps involved in the development of an embedded system (5)

using Waterfall model.

(b) Explain the need for product Re-engineering in embedded product development. (4)

(c) What are the factors that lead to the disposal of an embedded product. (3)

19 a) Consider a mobile phone device and look at the main menu. Explain how the events of touching the screen at different points on the screen are handled by an RTOS using two-level ISR handling. (6)

(b) Explain various types of testing performed in Embedded product development. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: CS404

Course Name: EMBEDDED SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

		Marks
1	Mention the challenges in embedded computing system design	(4)
2	What is the use of specification phase in an embedded system design? Mention the components of GPS system specification.	(4)
3	Explain Control Data Flow Graph with an example	(4)
4	Explain the firmware execution flow of super loop based approach.	(4)
5	Describe mixing high level language with Assembly code with an example	(4)
6	Write short notes on (i) Simulator (ii) Emulator	(4)
7	Differentiate General purpose Operating System (GPOS) with Real time Operating system(RTOS)	(4)
8	Explain the memory model of a thread in an operating system	(4)
9	Depict four reasons to build network-based embedded systems.	(4)
10	Discuss the merits and demerits of Waterfall model for embedded system development.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11		With a neat diagram explain major levels in the embedded system design process	(9)
12	a)	Imagine yourself as an Embedded System developer. A client approached your team to make an automated Coffee Vending machine. Develop requirements description of the machine.	(4)
	b)	Draw the Finite State Machine diagram for an automated Coffee Vending Machine.	(5)
13	a)	Describe the sequence diagram for a mouse click scenario.	(4)
	b)	Draw the Use case diagram for Seat Belt Warning System with explanation	(5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Describe the firmware design approaches used in an embedded product. (9)

15 a) Explain the different techniques for embedding the firmware into the target board of an embedded system? (9)

16 a) What is 'Inline Assembly' ? Explain with an example. (3)

b) Explain different types of files generated after cross – compilation (6)

PART D

Answer any two full questions, each carries 12 marks.

17 Explain the three methods of ISRs handling in the RTOSs with examples (12)

18 State the different phases of Embedded Product Development Life Cycle. Explain briefly the function of each phase. (12)

19 a) Three processes with process IDs P1, P2, P3 with estimated completion time 6, 8, 2 milliseconds respectively, enters the ready queue together in the order. Process P4 with estimated execution completion time 4 milliseconds enters the ready queue after 1 millisecond. (Assuming there is no I/O waiting for the processes) in non- preemptive SJF scheduling algorithm. (6)

Calculate the waiting time for each process and average waiting time?

(b) Describe I^2C bus structure and its transaction process. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech. Degree Examinations, September 2020

Course Code: CS404
Course Name: Embedded Systems

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What are the building blocks of UML?	(4)
2		List the pros and cons of assembly language based embedded firmware development	(4)
3		Which are the different levels of abstraction that have to be analysed to understand the real-time behaviour of an embedded computing system?	(4)
4		List out the major drawbacks of 'super loop' based embedded system design with suitable examples.	(4)
5		Differentiate between In System Programming (ISP) and In Application Programming (IAP).	(4)
6		What is the purpose of 'Reverse engineering' in Embedded Product development? Also explain the tools used for reverse engineering.	(4)
7		Draw a sequential program model for Seat Belt Warning System of an automobile	(4)
8		Describe the Interrupt Handling mechanism of MicroC/OSII kernel.	(4)
9		What are the recent trends in embedded operating systems?	(4)
10		What are the limitations of standard Java in embedded application development?	(4)

PART B

Answer any two full questions, each carries 9 marks.

11		Draw a system architecture diagram for a GPS hand held map and refine it to hardware and software architectural block diagrams with explanation.	(9)
12	a)	Draw a Finite State Machine diagram for modeling the operation of a timer, indicating and explaining all the states, events, transitions and actions.	(5)
	b)	Compare embedded systems and general purpose computers.	(4)
13	a)	Explain Data Flow Graph/Diagram (DFGs) with an example.	(3)

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	b)	Which type of embedded applications is best modeled using DFGs?	(1)
	c)	Illustrate multiple inheritance in UML with a neat diagram.	(5)

PART C

Answer any two full questions, each carries 9 marks.

14		Illustrate a typical embedded system development environment with a neat figure and explain each of its components.	(9)
15		Describe embedded firmware design approaches.	(9)
16	a)	List the advantages of High Level Language Based Development of embedded firmware.	(4)
	b)	List and explain the advantages and limitations of Simulator Based Debugging.	(5)

PART D

Answer any two full questions, each carries 12 marks.

17	a)	Three processes with process IDs PI, P2, P3 with estimated completion time 10, 5, 7 milliseconds and priorities 0, 3,2 (0—highest priority, 3—lowest priority) respectively enters the ready queue together. Calculate the waiting time and Turn Around Time (TAT) for each process and the Average waiting time and Turn Around Time (Assuming there is no I/O waiting for the processes) in priority based scheduling algorithm.	(6)
	b)	What are the important functional and non-functional requirements that need to be analysed in the selection of an RTOS for an embedded design?	(6)
18		Describe the modelling techniques for modelling the stages involved in the embedded product development life cycle.	(12)
19	a)	State and explain the three primary objectives of Embedded Product Development Life Cycle (EDLC)	(6)
	b)	Explain the various activities performed during the Deployment phase of an embedded product.	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CS464

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		Discuss the history of Artificial Intelligence.	(4)
2		Define the component of 8 puzzle problem with suitable example.	(4)
3		Illustrate the problem of under estimation and over estimation in A*	(4)
4		List the categories for actions in conceptual dependency.	(4)
5		What is a near miss situation in case of Concept Learning?	(4)
6		What is the importance of two bounds in Alpha-Beta cut-offs.	(4)
7		Draw the architecture of a backpropagation network and give its activation function.	(4)
8		What are the three stages of genetic algorithm?	(4)
9		Discuss the significance of context free grammar in natural language analysis.	(4)
10		Define the term text summarization.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Explain the control strategies used to prepare production system.	(4)
	b)	Define the component of 8 puzzle problem with suitable example.	(5)
12	a)	Solve the following crypt arithmetic problem stating all the constraints. EAT +THAT = APPLE	(5)
	b)	Explain heuristic search technique with example.	(4)
13	a)	Determine whether goal driven or data driven search would be preferable for solving error in a computer. State the reason also.	(4.5)
	b)	Differentiate between A* algorithm and Best First Search algorithm.	(4.5)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	Translate each of the following sentences into conceptual dependencies “Jane gave Tom an ice cream ”	(4)

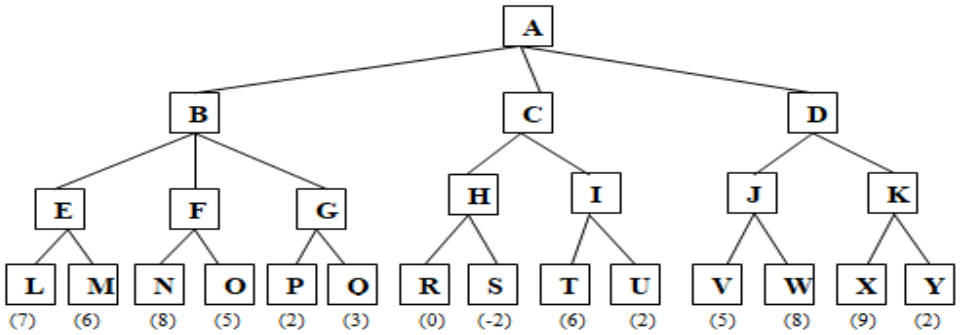
"Basketball players are tall"

"Panel cut down the tree with an axe"

"Place all the ingredients in a bowl and mix thoroughly"

b) Explain the framework for Symbol-Based Learning (5)

15 a) Consider the following game tree in which static evaluation score are all from the players point of view: static evaluation score range is (+10 to -10) (9)



Suppose the first player is the maximizing player. What move should be chosen?

16 a) How and when heuristic is used in Minimax search technique? Illustrate the usage of heuristic in Minimax procedure. (4.5)

b) Design a script for ordering food in a restaurant. (4.5)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Define mutation. Show the difference of bit flip mutation and random resetting with the help of an example. (6)

b) Illustrate swap mutation, scramble mutation and inversion mutation with the help of examples. (6)

18 a) What is the expected output when the sentence "He went to school" is given as input to a POS tagger ? (6)

b) Write short note on probabilistic context free grammar with example. (6)

19 a) Elaborate on specific to general search algorithm. (6)

b) Define the term stemming. What is the expected output when the string "She went for dancing with her sisters" is stemmed? (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: CS464

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

		Marks
1	Distinguish between data driven search and goal driven search strategies	(4)
2	What is Turing Test? Explain.	(4)
3	How can we overcome the limitations of Generate and Test Method?	(4)
4	Design a Semantic Network for the following predicate statements. Is a(baseball player,pitcher) Is a(baseball player,fielder) Instance(three finger brown,pitcher) Instance(pee-wee Reese,fielder) Team(pee-wee Reese, Brooklyn Dodgers)	(4)
5	What are the various components of a script?	(4)
6	Describe the procedure of Alpha-beta pruning.	(4)
7	Define Version Space Search? Give 3 generalization operations used in machine learning with example.	(4)
8	Give an example for concept space with suitable diagram mentioning its properties and values.	(4)
9	List the applications of natural language processing.	(4)
10	Define noun phrase and verb phrase with example.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	You are given a 4-litre jug and a 3-litre jug. Neither has a measuring mark on it. You have to measure exactly 2 litres of water in the 4 litre jug. Define the production rules for solving the problem.	(4)
	b)	Define uninformed search. Which kind of problems can use uninformed search? Why it can't be used in all AI problems?	(5)
12	a)	What is A* algorithm? Is it optimal under all conditions?	(4)
	b)	How is AO* different from A* algorithm?	(5)

13 a) Using Constraint Satisfaction algorithm solve the following Crypt Arithmetic problem (4.5)

```
    SEND
+   MORE
---------
   MONEY
```

b) Why knowledge representation is necessary in AI systems? Give AI systems in which knowledge is important? (4.5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Write the advantages and disadvantages of semantic networks (4)

b) Draw a Semantic Network for the following scenario. (5)

Tom is a cat. Tom caught a bird. Tom is owned by John. Tom is ginger in colour. Cats like cream. The cat sat on the mat. A cat is a mammal. A bird is an animal. All mammals are animals. Mammals have fur.

15 a) Describe in detail about Min-Max procedure (4)

b) What is meant by n-ply look ahead? Discuss it advantages. (5)

16 a) Write notes on primitive action categories in conceptual dependency. (4.5)

b) How Minimax procedure is implemented in exhaustively searchable state spaces? Explain using any two person game. (4.5)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Elaborate on general to specific search algorithm. (6)

b) Write the algorithm for Candidate Elimination Algorithm. (6)

18 a) Draw the parse for the input ‘He brought the book’ using given grammar (6)

S→NP VP

NP →Pronoun| Det NOMINAL

NOMINAL →Noun

VP→Verb |Verb NP

b) Differentiate the Expert System from knowledge-based system (6)

19 a) Depict the network topology of NETtalk. (6)

b) Differentiate the syntax and semantic analysis phases in natural language analysis. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth semester B.Tech degree examinations, September 2020

Course Code: CS464

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		List any four applications of AI.	(4)
2		What are the advantages of Breadth First Search?	(4)
3		Discuss any heuristic search method.	(4)
4		What are frames? How do they differ from semantic nets?	(4)
5		What is alpha beta cutoff? How does it reduces search process in game playing?	(4)
6		Represent the statement "John pushed the cart" using Conceptual Dependency Rules.	(4)
7		Describe the basic structure of rule based expert systems.	(4)
8		Write the general form of the genetic algorithm	(4)
9		Discuss the major issues involved in understanding natural language.	(4)
10		Discuss the major components of the classifier system.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	List the criteria to measure the performance of search strategies.	(4)
	b)	Explain the State Space with the use of Water Jug Problem.	(5)
12	a)	What are crypt arithmetic problems?	(5)
		Solve O D D + O D D = E V E N	
	b)	Differentiate between Data driven and Goal driven searches using suitable examples.	(4)
13	a)	Discuss A* Algorithm. Is the algorithm optimal under all conditions?	(4)
	b)	Write notes on the history and applications of AI	(5)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	Represent the following using Conceptual dependency	(5)

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i) Bucket is filled with milk.

ii) While I was going to college, I saw a snake

iii) Ravi shot Rahul

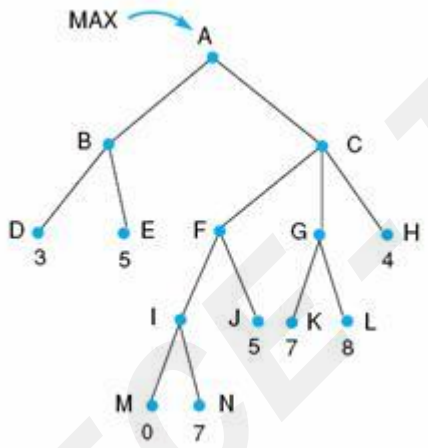
iv) John fertilized the field

v) The plants grew.

b) Represent the following sentences in semantic net. (4)

(i) Sita gave the book to Mary. (ii) The dog named puppy is white in colour.

15 Consider the following figure. (9)



i. Perform minimax on the above tree.
ii. Perform a left-to-right alpha-beta prune on the above tree.
iii. Perform a right-to-left prune on the same tree.

16 a) List the components of a script. (4)

b) Discuss the significance of heuristics in game playing. (5)

PART D

Answer any two full questions, each carries 12 marks.

17 a) What do you mean by back propagation learning? Explain the activation, function and weight adjustment in back propagation learning (6)

b) Discuss the candidate elimination algorithm in version space search (6)

18 a) Generate two different parse tree for the sentence "Print the file on the printer". (6)

b) Write short note on natural language applications (any three). (6)

19 a) Describe the different levels of analysis for natural language. (6)

b) Discuss the constraints on using genetic programming techniques to solve problems. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CS472

Course Name: PRINCIPLES OF INFORMATION SECURITY

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What is brute force attack?	(4)
2		Discuss different types of attacks that can occur in an organization.	(4)
3		Describe discretionary policies for Biba model.	(4)
4		What is phishing? Give an example.	(4)
5		Differentiate between polymorphic and metamorphic worm.	(4)
6		How do you reduce the impact of XSS vulnerabilities?	(4)
7		Describe frame spoofing with a neat diagram.	(4)
8		Describe the security enhancements present in UMTS.	(4)
9		What is SOAP binding? Explain with the help of a HTTP message.	(4)
10		List the security threats in RFID based identification and tracking systems.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	What is role based access control. Illustrate with suitable example the concept of role inheritance.	(4)
	b)	Differentiate between Discretionary and Role based access control.	(2)
	c)	Briefly discuss Mandatory access control implemented in a typical secure operating system.	(3)
12	a)	Demonstrate Chinese wall security model with neat diagram.	(5)
	b)	Classify each of the following as a violation of confidentiality, integrity, availability or some combination thereof. Also justify your answer. i. John copies Mary's homework. ii. Paul crashes Linda's system iii. Carol changes the amount of Angelo's check from 100 to 1000 iv. Gina forges Roger's signature on a deed.	(4)

13	a)	Interpret about the star property in Bell -LaPadula model.	(4)
	b)	Write Windows access control algorithm.	(5)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	How Buffer OverFlow (BOF) vulnerability makes software insecure. Explain different ways in which BOF exploitations occur.	(5)
	b)	Explain XSS vulnerabilities.	(4)
15	a)	Describe Kermack-McKendrick Model of worm propagation.	(5)
	b)	Explain any two categories of topological worms.	(4)
16	a)	Explain how can you detect and prevent SQL Injection vulnerabilities.	(5)
	b)	Name any worm that exploited buffer overflow vulnerability. Explain its characteristics.	(4)

PART D

Answer any two full questions, each carries 12 marks.

17	a)	Explain link level security provided by Bluetooth.	(6)
	b)	Describe entity authentication and key agreement in GSM Networks.	(6)
18	a)	How security is implemented in online credit card payment systems?	(8)
	b)	What are the main concerns involved in online credit card payment systems?	(4)
19	a)	Explain MAC generation and encryption in CCMP.	(6)
	b)	Explain any two technologies for web services.	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth semester B.Tech degree examinations, September 2020

Course Code: CS472

Course Name: PRINCIPLES OF INFORMATION SECURITY

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

1		What access control mechanism provides enhanced security in SELinux? How is the security provided?	(4)
2		Illustrate with an example how access is granted by an access control matrix.	(4)
3		Describe Biba integrity model.	(4)
4		How can buffer overflow vulnerability be prevented?	(4)
5		What is timing attack?	(4)
6		How did Code Red propagate?	(4)
7		With the help of a diagram explain the key hierarchy in 802.11i.	(4)
8		What is the need for Link Level Authentication in Bluetooth?	(4)
9		Describe the strength and weakness of secure electronic transaction	(4)
10		Describe SAML assertion with an example.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)		Distinguish between discretionary and mandatory access control	(3)
	b)		Let L and C be the set of sensitivity/clearance levels and set of categories respectively. L= {UNCLASSIFIED, CONFIDENTIAL,TOP SECRET} and C={Sales, NewProducts, BusinessPartners}. Here TOP SECRET is at the highest clearance level and UNCLASSIFIED the lowest.	
		(i)	How can two documents with security labels <TOP SECRET,{Sales}> and <UNCLASSIFIED,{Sales,NewProducts}> be compared?	(3)
		(ii)	What is the minimum clearance that a subject should have to access the two documents?	(3)
12	a)		Explain waterfall model for providing security.	(5)
	b)		Explain Star property of Bell- LaPadula Model.	(4)

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13 a) Rima, shankar and david are three users of a computer system. They own the files A, B and C respectively (4)

Rima is able to write the files B and C

shankar can read and write files A & C

David can read file A and write file B.

The owner of each of these files can execute it.

Create the corresponding access control matrix

b) Demonstrate Chinese wall Security model with a neat diagram. (5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) What are topological worms? Illustarte email and P2P worms. (5)

b) Explain Kermack-McKendrick Model of worm propagation. (4)

15 a) Describe SQL injection vulnerability. (5)

b) How can a shell code be used for exploiting stack overflow? (4)

16 a) Discuss cross site scripting vulnerabilities. (4)

b) Explain different worm characteristics. (5)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Explain Integrity protection and encryption in UMTS. (6)

b) Illustrate the need for frame spoofing. (6)

18 a) What are the various elements in XML signatures? (6)

b) Describe Secure Electronic Transaction. (6)

19 a) Explain Authentication and Key Agreement in 802.11i. (6)

b) Explain any one mechanism used in RFID for ensuring the security. Mention any one attack that can occur in RFID system. (6)

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