

CBCS Scheme

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15CS52

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Compare client server and Peer-to-Peer architecture. (05 Marks)
b. Describe HTTP with persistent and non-persistent connections. (08 Marks)
c. What are the services provided by DNS? (03 Marks)

OR

- 2 a. Demonstrate socket implementation using TCP. (08 Marks)
b. Write a note on web caching. (04 Marks)
c. Illustrate the basic operation of SMTP with an example. (04 Marks)

Module-2

- 3 a. Elaborate the three way handshaking in TCP. (05 Marks)
b. Discuss Go-Back N protocol. (06 Marks)
c. Explain the connection-oriented multiplexing and de-multiplexing. (05 Marks)

OR

- 4 a. State congestion and discuss the cause of congestion. (04 Marks)
b. With a neat diagram, explain the TCP segment structure. (08 Marks)
c. Suppose that two measured sample RTT values are 106 ms and 120 ms. Compute:
i) Estimated RTT after each of these sample RTT value is obtained. Assume $\alpha = 0.125$ and estimated RTT is 100 msec just before first of the samples obtained.
ii) Compute DevRTT.
Assume $\beta = 0.25$ and DevRTT was 5 msec before first of these samples are obtained. (04 Marks)

Module-3

- 5 a. Write the link-state routing algorithm. Solve the following graph using link-state algorithm with source node 'u'.

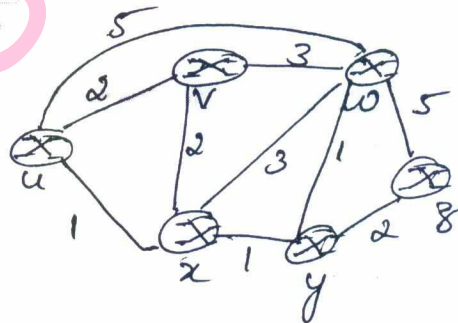


Fig.Q5(a)

- b. What is routing? Explain the structure of a router.

(08 Marks)

(08 Marks)

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OR

- 6 a. Discuss the IPV6 packet format. (05 Marks)
b. Elaborate the path attributes in BGP and steps to select the BGP routes. (05 Marks)
c. List the broadcast routing algorithms. Explain any one of them. (06 Marks)

Module-4

- 7 a. Show the components of GSM 2G cellular network architecture with a diagram. (07 Marks)
b. Illustrate the steps involved in mobile IP registration with home agent. (05 Marks)
c. Write a note on mobile IP. (04 Marks)

OR

- 8 a. Define Handoff. Explain the steps accomplishing a handoff. (07 Marks)
b. Bring out the mechanism of direct routing to mobile node in mobility management. (06 Marks)
c. Compare the 4G LTE standard to 3G systems. (03 Marks)

Module-5

- 9 a. Elaborate the features of streaming stored video. (03 Marks)
b. With a neat diagram, explain the CDN operation. (08 Marks)
c. Summarize the limitations of Best-effort IP service. (05 Marks)

OR

- 10 a. Explain the diffserv internet architecture. (05 Marks)
b. Describe the leaky bucket policing mechanism. (06 Marks)
c. Discuss the round-robin and waited fair queuing scheduling mechanism. (05 Marks)

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15CS53

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Database Management Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain the main characteristics of the database approach versus the file processing approach. (08 Marks)
- b. Explain the three – schema architecture with neat diagram. Why do we need mappings among schema levels? How do different schema definition languages support this architecture? (08 Marks)

OR

- 2 a. Discuss with examples, different types of attributes. (07 Marks)
- b. Draw an ER diagram for a BANK database schema with atleast five entity types. Also specify primary key and structural constraints. (09 Marks)

Module-2

- 3 a. Describe the characteristics of relations with suitable example for each. (08 Marks)
- b. What are the basic operations that can change the states of relations in the database? Explain how the basic operations deal with constraint violations. (08 Marks)

OR

- 4 a. Describe the steps of an algorithm for ER – to – relational mapping. (10 Marks)
- b. In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example. (06 Marks)

Module-3

- 5 Consider the COMPANY DATABASE
EMPLOYEE (Fname, Minit, Lname, Ssn, Bdate, Address, Sex, Salary, super-ssn, Dno)
DEPARTMENT (Dname, Dnumber, Mgr_ssn, Mgr_st_date)
DEPART_LOCATIONS(Dnumber, Dlocation)
PROJECT (Pname, Pnumber, Plocation, Dnum)
WORKS_ON (Essn, Pno, Hours)
DEPENDENT (Essn, Dependent_name, Sex, Bdate, Relationship).
Specify the following queries in SQL on the database schema given above :
 - a. For every project located in Stafford, list the project number the controlling department number and the department manager's last name, address and birth date. (04 Marks)
 - b. List the names of all employees who have a dependent with the same first name as themselves. (02 Marks)
 - c. For each project, list the project name and the total hours per week (by all employees) spent on that project. (04 Marks)
 - d. Retrieve the name of each employee who works on all the projects controlled by 'Research' department. (06 Marks)

OR

- 6 a. Define Stored Procedure. Explain the creating and calling of stored procedure with suitable example. (08 Marks)
 b. Explain the Single – tier and Client – server architecture, with neat diagram. (08 Marks)

Module-4

- 7 a. Explain the informal design guidelines used as measures to determine the quality of relation schema design. (08 Marks)
 b. Define Normal form. Explain 1NF, 2NF and 3NF with suitable examples for each. (08 Marks)

OR

- 8 a. Define Minimal cover. Write an algorithm for finding a minimal cover F for a set of functional dependencies E. Find the minimal cover for the given set of FDs be (08 Marks)
 $E : \{B \rightarrow A, D \rightarrow A, AB \rightarrow D\}$.
 b. Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies (08 Marks)
 $F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$.
 Determine whether each decomposition has the lossless join property with respect to F.
 $D_1 = \{R_1, R_2, R_3\}$; $R_1 = \{A, B, C, D, E\}$; $R_2 = \{B, F, G, H\}$; $R_3 = \{D, I, J\}$.

Module-5

- 9 a. Why Concurrency control is needed demonstrate with example? (12 Marks)
 b. Discuss the desirable properties of transactions. (04 Marks)

OR

- 10 a. When deadlock and starvation problems occurs? Explain how these problems can be resolved. (09 Marks)
 b. Explain how shadow paging helps to recover from transaction failure. (07 Marks)

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15CS/IS54

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Automata Theory & Compatibility

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Define the following terms with examples: (i) Alphabet (ii) Power of an alphabet
 (iii) Concatenation (iv) Languages (04 Marks)
- b. Draw a DFA to accept strings of a's and b's ending with 'bab'. (03 Marks)
- c. Convert the following NDFSM Fig. Q1 (c) to its equivalent DFSM. (09 Marks)

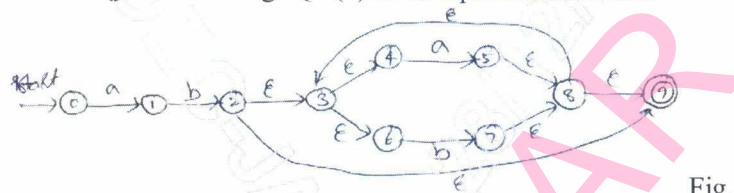


Fig. Q1 (c)

OR

- 2 a. Draw a DFSM to accept the language,
 $L = \{\omega \in \{a, b\}^* : \forall x, y \in \{a, b\}^* ((\omega = x abbaay) \vee (\omega = x babay))\}$ (03 Marks)
- b. Define distinguishable and indistinguishable states. Minimize the following DFSM,

S	0	1
A	B	A
B	A	C
C	D	B
*D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

- (i) Draw the table of distinguishable and indistinguishable state for the automata.
 (ii) Construct minimum state equivalent of automata. (09 Marks)
- c. Write differences between DFA, NFA and ϵ -NFA. (04 Marks)

Module-2

- 3 a. Consider the DFA shown below:

States	0	1
$\rightarrow q_1$	q_2	q_1
q_2	q_3	q_1
* q_3	q_3	q_2

Obtain the regular expressions $R_{ij}^{(0)}$, $R_{ij}^{(1)}$ and simplify the regular expressions as much as possible. (09 Marks)

- b. Give Regular expressions for the following languages on $\Sigma = \{a, b, c\}$
- (i) all strings containing exactly one a
 (ii) all strings containing no more than 3 a's.
 (iii) all strings that contain at least one occurrence of each symbol in Σ . (03 Marks)

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- 3 c. Let L be the language accepted by the following finite state machine. (04 Marks)

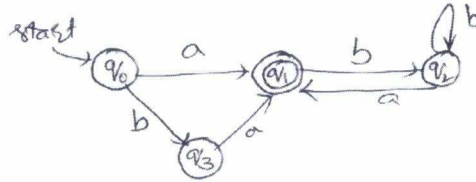


Fig. Q3 (c)

Indicate for each of the following regular expressions, whether it correctly describes L:

- $(a \cup ba)bb^*a$
- $(\epsilon \cup b)a(bb^*a)^*$
- $ba \cup ab^*a$
- $(a \cup ba)(bb^*a)^*$

OR

- 4 a. Prove that the following language is not regular : $L = \{0^n1^n \mid n > 0\}$. (05 Marks)
- b. If L_1 and L_2 are regular languages then prove that $L_1 \cup L_2$, $L_1.L_2$ and L_1^* are regular languages. (05 Marks)
- c. Is the following grammar ambiguous? (06 Marks)
- $S \rightarrow iC + S \mid iC + SeS \mid a$
- $C \rightarrow b$

Module-3

- 5 a. Define Grammar, Derivation, Sentential forms and give one example for each. (03 Marks)
- b. What is CNF? Obtain the following grammar in CNF
 $S \rightarrow ASB \mid \epsilon$
 $A \rightarrow aAS \mid a$
 $B \rightarrow SbS \mid A \mid bb$ (09 Marks)
- c. Let G be the grammar,
 $S \rightarrow aB \mid bA$
 $A \rightarrow a \mid aS \mid bAA$
 $B \rightarrow b \mid bS \mid aBB$
- For the string $aaabbabbba$ find a
- Left most derivation.
 - Right most derivation.
 - Parse tree. (04 Marks)

OR

- 6 a. Explain the following terms: (03 Marks)
- Pushdown automata (PDA).
 - Languages of a PDA.
 - Instantaneous description of a PDA.
- b. Construct a PDA to accept the language $L = \{\omega\omega^R \mid \omega \in \{a, b\}^*\}$. Draw the graphical representation of this PDA. Show the moves made by this PDA for the string $aabbba$. (10 Marks)
- c. Convert the following CFG to PDA
 $S \rightarrow aABB \mid aAA$
 $A \rightarrow aBB \mid a$
 $B \rightarrow bBB \mid A$
 $C \rightarrow a$ (03 Marks)

Module-4

- 7 a. If L_1 and L_2 are context free languages then prove that $L_1 \cup L_2$, $L_1 \cdot L_2$ and L_1^* are context free languages. (04 Marks)
- b. Give a decision procedure to answer each of the following questions:
- Given a regular expression α and a PDA M , the language accepted by M a subset of the language generated by α ?
 - Given a context-free Grammar G and two strings S_1 and S_2 , does G generate $S_1 S_2$?
 - Given a context free Grammar G , does G generate any even length strings.
 - Given a Regular Grammar G , is $L(G)$ context-free? (12 Marks)

OR

- 8 a. Explain with neat diagram, the working of a Turing Machine model. (05 Marks)
- b. Design a Turing machine to accept the language $L = \{a^n b^n c^n \mid n \geq 1\}$. Draw the transition diagram. Show the moves made by this turing machine for the string aabbcc. (11 Marks)

Module-5

- 9 Write short notes on:
- Multi-tape turing machine.
 - Non-deterministic turing machine.
 - Linear Bounded automata. (16 Marks)

OR

- 10 Write short notes on:
- Undecidable languages.
 - Halting problem of turing machine.
 - The post correspondence problem. (16 Marks)

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15CS551

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Object Oriented Modeling and Design

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is object-oriented model? Explain the important characteristics of object oriented approach. (08 Marks)
b. What are links and associations? Write and explain UML notation for links and association with an example. (08 Marks)

OR

- 2 a. Define reification. Explain it with a diagram. (08 Marks)
b. What is aggregation and composition? Give their respective UML notations with an example. (08 Marks)

Module-2

- 3 a. Explain briefly detailed object-oriented requirements definitions. (08 Marks)
b. Explain the notation used in use case diagram. with example. (08 Marks)

OR

- 4 a. Illustrate the system sequence with diagrams. (08 Marks)
b. List the propose of system diagrams with SSD notations. (08 Marks)

Module-3

- 5 a. Explain the different stages of software development process. (08 Marks)
b. Explain briefly the system conception for an automated tiller machine. (08 Marks)

OR

- 6 a. Explain the various steps to construct a domain class model. (08 Marks)
b. Briefly explain the different concepts for iterating the analysis. (08 Marks)

Module-4

- 7 a. Briefly explain the steps involved in design the class design. (08 Marks)
b. Illustrate the concept of bridging the gap to design. (08 Marks)

OR

- 8 a. Describe the detailed steps of design by use case realization. (08 Marks)
b. List the primary responsibilities of view layer, domain layer and data access layer. (08 Marks)

Module-5

- 9 a. What is design pattern? Explain in brief the four essential elements of pattern. (08 Marks)
b. Describe in brief in design patter using a consistent format. (08 Marks)

OR

- 10 a. Explain the benefits and liabilities of abstract factory pattern. (08 Marks)
b. Explain with diagram the object adapter class. (08 Marks)

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15CS552

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Introduction to Software Testing

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain Testing and Debugging cycle with a diagram. (08 Marks)
b. What are errors? Explain Software quality in detail. (08 Marks)

OR

- 2 a. Explain Levels of testing with a neat diagram. (08 Marks)
b. Explain Functional Testing and structural Testing. (08 Marks)

Module-2

- 3 a. Write a Pseudo code for structured programming version of triangle programme. (08 Marks)
b. List and explain equivalence class Testing with diagram. (08 Marks)

OR

- 4 a. Explain Boundary value analysis and Robustness Testing. (08 Marks)
b. What are Decision Tables? Draw the Decision Table for Triangle problem. (08 Marks)

Module-3

- 5 a. Explain Fault Based Adequacy Criteria. (08 Marks)
b. Explain mutation Analysis Terminologies. (08 Marks)

OR

- 6 a. Explain in brief :
i) Statement Testing ii) Branch Testing. (08 Marks)
b. Explain McCabe's Basis path method. (08 Marks)

Module-4

- 7 a. Define scaffolding. Explain Generic versus specific scaffolding. (08 Marks)
b. Define: i) Sensitivity ii) Restriction iii) Partition iv) Visibility. (08 Marks)

OR

- 8 a. Explain the following :
i) Risk Planning ii) Monitoring the process. (08 Marks)
b. Explain the following:
i) Quality Goals ii) Dependability properties. (08 Marks)

Module-5

- 9 a. Explain the following :
i) Usability ii) Regression testing (08 Marks)
b. Explain the upper level SATM Finite state machine. (08 Marks)

OR

- 10 a. Explain the path based integration testing. (08 Marks)
b. Explain call graph based integration. (08 Marks)

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15CS563

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Embedded Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. What is an embedded system? With the aid of a neat functional schematic diagram, explain the components of an embedded system. (08 Marks)
- b. With the help of a neat diagram, explain the process of converting a C program into the file for the ROM image. (08 Marks)

OR

- 2 a. What are the different competing design metrics? What are the challenges faced in designing an embedded system? (08 Marks)
- b. Explain the three classes of embedded systems, Further discuss the skills required for an embedded system designer. (08 Marks)

Module-2

- 3 a. With neat sketch, explain synchronous serial input and synchronous serial output operations. (08 Marks)
- b. Explain :
i) I²C Bus
ii) WatchDog Timer
iii) SDIO. (08 Marks)

OR

- 4 a. With the aid of a functional diagram, describe how an internet enabled embedded system is communicating to other systems on the internet. (08 Marks)
- b. Explain the following wireless and mobile system protocols.
i) Bluetooth
ii) ZigBee (08 Marks)

Module-3

- 5 a. Explain the working of busy and wait transfer mode for the I/O devices. (08 Marks)
- b. What do you mean by throwing an exception? How is the exception condition during execution of a function (routine) handled? (08 Marks)

OR

- 6 a. Explain context switching, interrupt latency and interrupt service deadline. (08 Marks)
- b. Describe DMA transfer in an embedded system, with the help of a neat diagram. (08 Marks)

Module-4

- 7 a. Define process and tasks. Distinguish among the ISRs, tasks and functions. (08 Marks)
- b. What is a semaphore? Explain use of a semaphore as resource key and its critical section. (08 Marks)

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OR

- 8 a. Explain the pipe functions. (08 Marks)
b. What is shared data problem and solution for shared data problem? (08 Marks)

Module-5

- 9 a. What is RTOS? Explain the design principles when using an RTOS to design an embedded system. (08 Marks)
b. Discuss the 3 approaches used for interrupt routines in RTOS environment and handling of interrupt source calls. (08 Marks)

OR

- 10 a. Mention the various scheduling models. Explain the cyclic and round robin with time slicing and co-operative scheduling model. (08 Marks)
b. What is a target system? With the help of a block diagram, illustrate the different components of a target system. How does target system differ from the final embedded system? (08 Marks)

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15CS564

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Dot Net Framework for Application Development

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain general structure of C# program with suitable example. (06 Marks)
b. Define exception. List any four built in classes to handle exception. (04 Marks)
c. Write a C# program to generate Fibonacci series upto 'n'. Read 'n' from console device. (06 Marks)

OR

- 2 a. List the different types of operators in C#. Explain any one type of operation in brief. (05 Marks)
b. Define method. List and explain different method parameters. (05 Marks)
c. Write a C# program to read two arguments as parameter and return four output values as addition, subtraction, product and division as output parameter from a method. (06 Marks)

Module-2

- 3 a. Define constructor? Write a C# program to demonstrate construction overloading. (08 Marks)
b. With an example, explain 'is' and 'as' operator. (04 Marks)
c. Give difference between structure and class. (04 Marks)

OR

- 4 a. Define Jagged array? Explain with example how jagged arrays are declared. (06 Marks)
b. Write a program in C# to initialize an array with 10 integer elements. Write a method that accepts the array and returns the sum of array elements. (06 Marks)
c. Explain boxing and unboxing concept with example. (04 Marks)

Module-3

- 5 a. Define method overriding. Explain different forms of override a method with example. (08 Marks)
b. Write a C# program that has class "TwoDshape" with fields dim1 and dim2 and a method area(). Inherit two classes "Triangle" and "Rectangle" for "TwoDshape" and override method area() to calculate area of triangle and rectangle respectively. Instantiate objects of all classes. (08 Marks)

OR

- 6 a. Define and explain a abstract and sealed class with example. (07 Marks)
b. Explain the steps taken by the garbage collector to destroy objects. (05 Marks)
c. Mention the difference between interface and class. (04 Marks)

Module-4

- 7 a. Define property. List and explain with example different types of properties. (06 Marks)
b. Compare Indexers and arrays with example. (06 Marks)
c. Write an algorithm to insert an item into an ordered binary tree. (04 Marks)

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OR

- 8 a. Explain the stack <J> collection class with example. (08 Marks)
b. List and explain different operators used to access and manipulate individual bits in 'int' type. (08 Marks)

Module-5

- 9 a. Explain how to implement enumerator using iterator. (06 Marks)
b. Write a note on delegates. (04 Marks)
c. Writes Language – Integrator Query to selecting and filtering data. (06 Marks)

OR

- 10 a. Define event. Explain how event is subscribed and unsubscribed with example. (08 Marks)
b. Write a C# program to overload increment and decrement operator. (08 Marks)

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