

**Department of Computer Science and Engineering
Begum Rokeya University, Rangpur.
3rd Year 2nd Semester Final Examination, 2013(Session: 2010-11)**

Course Title: Distributed System

Course Code: CSE 3201

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

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| 1. | (a) What is distributed system? What are significant advantages and limitations of distributed system? | 4 |
| | (b) What are the challenges for a designer need to be aware to construct a distributed system? | 4 |
| | (c) Explain the difference between intranet and internet. Give some examples of Distributed system | 2 |
| 2. | (a) What are Remote Object and Remote interfaces? Explain with an example. | 2 |
| | (b) What information does an IDL holds? | 1 |
| | (c) Explain in detail about RPC. | 3 |
| | (d) What is the role of PROXY and SKELETON in remote method invocation? Explain with figure | 4 |
| 3. | (a) What is Java RMI? Explain with example. | 3 |
| | (b) Show the inheritance structure of the classes supporting Java RMI servers. | 2 |
| | (c) What do you mean by DFS? Explain the structure of DFS to define service, server and client. | 3 |
| | (d) Describe the importance distributed file system over local file system. | 2 |
| 4. | (a) What is name service? What are the properties of name space service? | 2 |
| | (b) What do you mean by DNS? How can you implement DNS? | 4 |
| | (c) What are the difference between process and thread? | 2 |
| | (d) Write down the algorithm for evaluate possibly Φ and definitely Φ | 2 |
| 5. | (a) What are the necessity of clock synchronization in distributed system? | 2 |
| | (b) Assume three process are running on three different machines (A, B, C). The clock ticks on three different machines are 2, 4 and 8 for the machine A, B and C respectively. Use Cristian's algorithm to synchronize the clocks on three machines. | 3 |
| | (c) What is NTP? What are the chief design aims and features of NTP? | 3 |
| | (d) What do you mean by global state? What are the properties of detecting global state? | 2 |
| 6. | (a) What are the public and private keys? List the key differences and issue in public key cryptography and private key cryptography. | 6/3/0 |
| | (b) What is digital signature? What are its uses in the security of Distributed system? Give a method to create a digital signature. | 6/4 |
| 7. | (a) What is atomicity? Write the aspects of atomicity. | 3 |
| | (b) What is locking in distributed system? Explain briefly read lock and write lock. What are the advantages of locking in distributed system? | 4 |
| | (c) Discuss the concurrency problem with example. | 3 |

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Department of Computer Science and Engineering

Begum Rokeya University, Rangpur.

3rd Year 2nd Semester Final Examination' 2013 (Session:2010-11)

Course Title: Software Engineering

Course Code: CSE 3203

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

1. (a) What do you mean by software engineering? 1
(b) If software does not wear out, why does it deteriorate? 3
(c) Why is it important to understand the customer's problem before creating a software solution? 3
(d) Explain "Software is developed or engineered, it is not manufactured". 3
2. (a) Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process. 2
(b) Explain why incremental development is the most effective approach for developing business software systems. Why is this model less appropriate for real-time systems engineering? 3
(c) Describe the main activities in the software design process and the outputs of these activities. Using a diagram, show possible relationships between the outputs of these activities. 3
(d) Write a set of non-functional requirements for the ticket-issuing system, setting out its expected reliability and response time. 2
3. (a) Explain how the principles underlying agile methods lead to the accelerated development and deployment of software 2
(b) You have a software for which you wrote 1538 lines of codes. You discovered 134 errors before delivery and were reported of 85 defects after delivery. You have another software of 2358 lines of codes. Number of errors and defects this software is 185 and 90 respectively. Which software is better quality in terms of defect removal efficiency? Explain your answer. 3
(c) Compare and contrast the Scrum approach to project management with conventional plan-based approaches, The comparisons should be based on the effectiveness of each approach for planning the allocation of people to projects, estimating the cost of projects, maintaining team cohesion, and managing changes in project team membership. 3
(d) It has been suggested that one of the problems of having a user closely involved with a software development team is that they 'go native'; that is, they adopt the outlook of the development team and lose sight of the needs of their user colleagues. Suggest three ways how you might avoid this problem and discuss the advantages and disadvantages of each approach. 2
4. (a) How might you use a model of a system that already exists? Explain why it is not always necessary for such a system model to be complete and correct. Would the same be true if you were developing a model of a new system? 3
(b) You have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, birthday parties, etc. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that may be used at each stage. 4
(c) You are a software engineering manager and your team proposes that model-driven engineering should be used to develop a new system. What factors should you take into account when deciding whether or not to introduce this new approach to software development? 3

5. (a) Briefly describe the three test strategies of a commercial software. 3
- (b) Considering the common errors in component testing show the guidelines in error minimizing testing. 3
- (c) What are benefits of Test Driven Development (TDD)? What are the fundamental processes in TDD? 3
- (d) What are scope of following testing: 3
- (i) Black box and white box testing
 - (ii) Alpha, beta and acceptance testing
6. (a) Under what circumstances might a company justifiably charge a much higher price for a software system than the software cost estimate plus a reasonable profit margin? 2

Task	Duration (days)	Dependencies
T1	10	
T2	15	T1
T3	10	T1, T2
T4	20	
T5	10	
T6	15	T3, T4
T7	20	T3
T8	35	T7
T9	15	T6
T10	5	T5, T9
T11	10	T9
T12	20	T10
T13	35	T3, T4
T14	10	T8, T9
T15	20	T2, T14
T16	10	T15

Figure-1: Scheduling Example

- (b) (i) Figure-1 sets out a number of tasks, their durations, and their dependencies. Draw a bar chart showing the project schedule. 4
- (ii) Figure-1 shows the task durations for software project activities. Assume that a serious, unanticipated setback occurs and instead of taking 10 days, task T5 takes 35 days. Draw up new bar charts showing how the project might be reorganized. 4
7. (a) Discuss the assessment of software quality according to the quality attributes. 4
- (b) Explain why program inspections are an effective technique for discovering errors in a program. What types of error are unlikely to be discovered through inspections? 3
- (c) Explain why it is essential that every version of a component should be uniquely identified. Comment on the problems of using a version identification scheme that is simply based on version numbers. 3

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Department of Computer Science and Engineering

Begum Rokeya University, Rangpur.

3rd Year 2nd Semester Final Examination' 2013 (Session:2010-11)

Course Title: Computer Networking

Time: 3.00 Hours

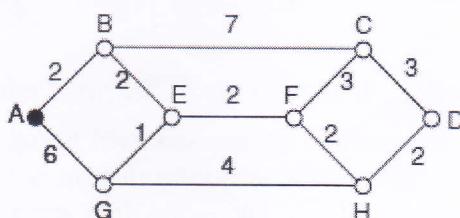
Course Code: CSE 3204

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

1. (a) What do you mean by data communication? What are the five components of data communication? 4
(b) Draw and explain the frame format of Standard Ethernet. What are the physical media that Ethernet can run over? 3+1=4
(c) What are the two types of line configuration? Define each of them. 2
2. (a) Draw the structure of TCP segment. Briefly explain the feature of TCP. 3
(b) Draw and explain the IEEE 802.3 frame format. 5
(c) What are the difference between X.25 and Frame Relay? 2
3. (a) What are the responsibilities of transport layer? 3
(b) What are the functions of interfaces between layers? 3
(c) How many bits are used to represent port address? 1
(d) Define the type of the following destination address: 3
 i) 4A:30:10:21:10:1A
 ii) 57:20:1B:2E:08:EE
 iii) FF:FF:FF:FF:FF:FF
4. (a) What do you mean by hidden station problem? What are the steps that should be taken to solve this problem? 3
(b) How is repeater different from amplifier? 2
(c) How the bandwidth is divided shows with figure? 3
(d) Why wireless LANs cannot implement CSMA/CD? 2
5. (a) Explain how to increase transmission rate from 10 Mbps to 100 Mbps in Fast Ethernet. 4
(b) A bit stream 10011101 is transmitted using standard CRC method. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. 4
(c) What are the differences between feed-back based flow control and rate based flow control? 2
6. (a) Why do we need POP3 or IMAP4 for E-mail? 2
(b) Find the shortest path from node A to node D using shortest path routing algorithm for the following undirected graph (Show every steps). 4



- (c) What are the applications of Flooding routing algorithm? 2
(d) Distinguish between ADSL and SDSL. 2

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7. (a) An address in a block is given as 200.11.8.45. Find the number of addresses in the block, the first address and last address.

- (b) An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows:

ii. The second group has 400 small business; each needs approximately 16 addresses.

iii. The third group has 2000 households; each needs 4 addresses.

~~iii. The third group has 2000 households, each needs 4 addresses.~~

Design the sub-blocks and give the slash notation for each sub-block. Find out how many addresses are still available after these allocation.

- (c) Define UDP and discuss the different fields of the format of a UDP datagram?

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Department of Computer Science and Engineering

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3rd Year 2nd Semester Final Examination' 2013 (Session:2010-11)

Course Title: Theory of Computation and Automata

Time: 3.00 Hours

Course Code: CSE 3206

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

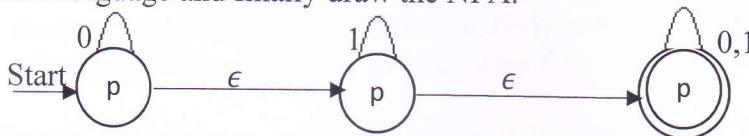
1. (a) What do you mean by pumping lemma for regular languages? 2
 (b) Show that if S is uncountable and T is countable then S-T is uncountable. 2
 (c) If $R = \{(a, b), (b, c), (c, a)\}$ is a relation over $\{a, b, c\}$, find R^+ and R^* . 2
 (d) Design an FSM for a divisibility-by-3 tester for decimal numbers. 4

2. (a) Define finite automata. Why should you study automata? 2
 (b) Design an FA that reads strings made up of the letters in the word 'COMPUTER' and recognizes those strings that contain the word 'CUT' as a substring. 3
 (c) Prove that a language L is accepted by some DFA if and only if L is accepted by some NFA. 3
 (d) What is difference between constituency-based parse tree and dependency-based parse tree? 2

3. (a) Convert the NFA $[\{p, q, r, s\}, \{0, 1\}, \delta, p, \{s\}]$ to its equivalent DFA and finally draw the DFA, where the state transition function δ is as shown in the following table 5

Σ	0	1
Q		
p	p, q	p
q	r	r
r	s	-
s	s	s

- (b) Convert the NFA with ϵ -moves in (Fig a) to its equivalent NFA without ϵ -moves accepting the same language and finally draw the NFA. 5



4. (a) Describe in English the sets denoted by the following regular expressions: 2
 - i) $(a + \epsilon)(b + ba)^*$
 - ii) $(0^* 1^*)^*$

- (b) Show that 3
 - i) $(a + b)^* = (a + b)^* + (a + b)^*$
 - ii) $(a^* bbb)^* a^* = a^* (bbb a^*)^*$

- (c) Draw the NFA with ϵ -moves for the regular expressions (step by step) 5

 $r = [1.(00)^*.1 + 0.1^*.0]^*$

5. (a) Let $\Sigma = \{0, 1\}$. Construct regular expressions for each of the following: 6
 - i) $L1 = \{W = \Sigma^* | W \text{ has at least one pair of consecutive zeros}\}$
 - ii) $L2 = \{W = \Sigma^* | W \text{ has no pair of consecutive zeros}\}$
 - iii) $L3 = \{W = \Sigma^* | W \text{ starts with either '01' or '10'}\}$
 - iv) $L4 = \{W = \Sigma^* | W \text{ consists of even number of 0's followed by odd number of 1's.}\}$

- (b) Describe different types of phrase structure grammar with suitable example. 4

6. (a) How can you simplify a context free grammar? Explain with example.
(b) What is ambiguous grammar? Show that the following grammar is ambiguous:

$$E \rightarrow E^* E | E/E | E+E | E-E | -E | id$$

7. (a) Show that the following grammar is LL(1)

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$$\begin{aligned} E &\rightarrow TE' \\ E' &\rightarrow +TE' \mid \in \\ T &\rightarrow FT' \\ T' &\rightarrow *FT' \mid \in \\ F &\rightarrow (E) | id \end{aligned}$$

4

- (b) What is the difference between quadruples and triples? Suppose an statement A := -B*(C+D),
Can you translate to triple?

**Department of Computer Science and Engineering
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3rd Year 2nd Semester Final Examination' 2013 (Session:2010-11)**

Course Title: Physics

Course Code: PHY 1125

Time: 3.00 Hours

Full Marks: 50

Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

1. a) Define binding energy. Draw the B/A versus A curve and discuss various features of the curve. 4
 b) State the postulates of kinetics theory of gases. 2.5
 c) Established the Einstein's photo-electric equation and show that the maximum velocity of the emitted electrons depends upon the frequency of the incident radiation and not on its intensity. 3.5

2. a) Using radioactive decay law derives the decay equation and hence find an expression for half life. 5.5
 b) Write down the properties of α and β decay. 1
 c) The half life of radium is 1620 years. In how many years will one gram of pure element (i) lose one centigram and (ii) be reduced to one centigram? 3.5

3. a) Explain electric potential and equi-potential surface. 2.5
 b) Define electric quadrupole. Find an expression for the potential at a distance r from the center of the quadrupole. 1+6.5

4. a) State and prove Gauss law of electrostatics. 5
 b) Derive the expression of electric potential and electric field due to an electric field. 2
 c) Discuss briefly the distinguishing features of diamagnetic, paramagnetic and ferromagnetic substances. 3

5. a) Define lattice and crystal structure. 2
 b) What are Miller indices? Draw the (110), (202), (010), (002) planes. 4
 c) Calculate the lattice point for a simple, body centered and face centered unit cell 2
 d) Distinguish between Frenkel and Schottky defects. 2

6. a) Discuss interference of light analytically and obtain the conditions of maximum and minimum intensities. 5.5
 b) A plano-convex lens of radius 300 cm is placed on an optically flat glass plate and is illuminated by monochromatic light. The diameter of the 8-th dark ring in the transmitted system is 0.72 cm. Calculate the wavelength of light used. 2.5
 c) Distinguish between the Fresnel and Fraunhofer classes of diffraction. 2

7. a) What is Carnot cycle? 2
 b) State and explain first law of thermodynamics. 3
 c) Deduce the adiabatic equation in the form $PV^\gamma = \text{constant}$. 5