Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc. (Engg.) 3rd year 2nd Semester Final Examination, 2015. (Session: 2012-13)

Course Code: **CSE 3203** Time: **3.00 hours**

Course Title: **Software Engineering** Total Marks: **50**

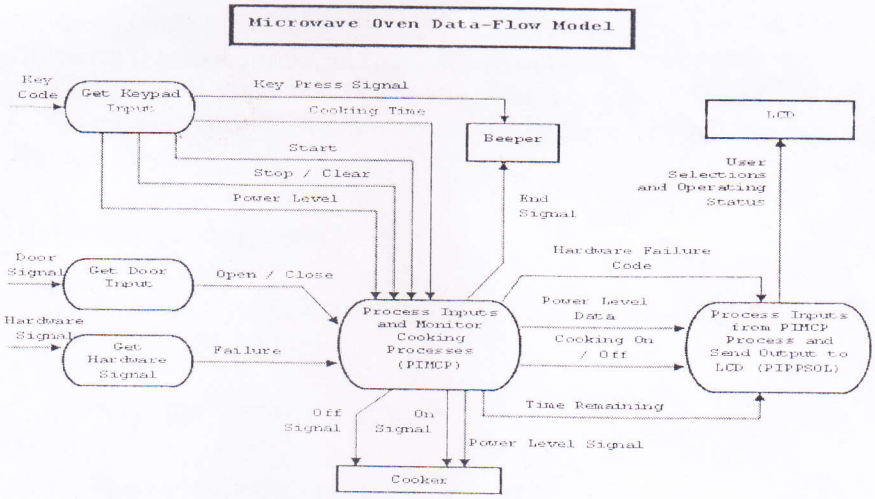
[N B: Answer any five (5) questions and figures in the right margin indicate full marks]

1. a) Define Legacy Software. When legacy software need to be fixed. 2
   b) A novice software engineering has the following beliefs. Do you agree with that engineer? Justify your opinion. 4
   (i) Software requirements continually change, but change can be easily accommodated because software is flexible.
   (ii) If the project is behind schedule, increasing the number of programmers can reduce the time gap.
   c) Briefly discuss prototyping paradigm. In which situation it offer the best approach. 4

2. a) What is project management? As a software leader your main focus to set up a best project team but sometime you settle a less ideal project team. Write down some reasons behind about a less ideal project team. 3.5
   b) What are the differences between milestones and deliverables? Write down milestones in requirement process. 3.5
   c) What are the differences between user requirement and system requirement? 3

3. a) Why non-functional requirements are important for a system? Explain with example. 3
   b) Briefly discuss the requirements engineering process. 3
   c) Write a short note on "Domain requirements". 4

4. a) 4



   Explain above data flow model of a microwave oven.
   b) Explain object behaviour model with example. 4
   c) Write down the differences between verification and validation. 2

5. a) What are the goals of software testing? 2
   b) Write down the differences between block box and white box testing. 3
   c) Describe path testing and partition testing with example. 5

6. a) What is the most important difference between generic software product development and custom software development? What might this mean in practice for users of generic software products? 2

b) Apart from the challenges of heterogeneity, business and social change, and trust and security, identify other problems and challenges that software engineering is likely to face in the 21st century (Hint: think about the environment). 2

c) What are the four important attributes that all professional software should have? Suggest four other attributes that may sometimes be significant. 2

d) Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model? 4

7. a) Discuss the assessment of software quality according to the quality attributes. 4

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. 3

c) Explain why it is essential that every version of a component should be uniquely identified. 3

Comment on the problems of using a version identification scheme that is simply based on version numbers.

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B.Sc. 3rd Year 2nd Semester Examination-2015

Course Title: Computer Networking
Course Code: CSE 3204

Time: 3 Hours

Note: i) Answer any FIVE questions from the following questions
ii) Numbers in the right margin indicate marks for each question.

1. (a) What is hidden station problem? What are the steps that should be taken to solve this problem? 3
   (b) What are the differences between a router, a repeater and a bridge? 2
   (c) How is the bandwidth divided? Shows with figure. 3
   (d) Why wireless LANs cannot implement CSMA/CD? 2

2. (a) Briefly explain the CIDR notation for IP addressing with at least one example. 2
   (b) One of the addresses in a block is 110.23.120.14/20. Find the number of addresses, the first address, and the last address in the block. 3
   (c) An ISP is granted a block of address starting with 190.100.0.0/16 (65,536 address). The ISP needs to distribute these addresses to three group of customers as follows: 5
   - The first group has 64 customers; each needs approximately 256 address.
   - The second group has 128 customers; each needs approximately 127 addresses.
   - The third group has 128 customers; each needs approximately 64 addresses.

   Design the sub-blocks and find out how many addresses are still available after these allocations.

3. (a) What is the difference in the service offered to applications by the TCP and UDP protcols? 4
   (b) For each of the following applications determine whether you would use TCP or UDP protocols 4
      i. File Transfer
      ii. VoIP telephone conversation
   (c) Define the type of the following destination address: 2
      i. 4A:30:10:21:10:1A
      ii. 57:20:1B:2E:08:EE

4. (a) What are **traceroute** and **ping**? 2
   (b) Briefly discuss different types on attacks on computer networks. 3
   (c) In RSA, given n = 12091,e = 13, and d = 3653 encrypt the message "THIS IS TOUGH" using he 00 to 26 encoding scheme. Decrypt the cipher-text to find the original message. Use 4-digit plaintext or cipher-text blocks. 5 (1+4)

5. (a) Briefly explain the working principle of a VLAN. 2
   (b) What is ARP, how does it work? 3
   (c) Write short notes on: i) Network Address Translation (NAT) ii) Loopback and Private addresses 5 (2+3)

6. (a) What is a switch? What are the functions of a switch. 2
   (b) Briefly discuss the IPv6. 3
   (c) Describe DHCP operations and configurations 5

7. (a) What is Virtual Private Network (VPN)? 2
   (b) Write short notes on: Telnet and FTP 3
   (c) Why is the purpose of DNS? Explain your answer. Compare and contrast the DNS structure with the UNIX directory structure. 5

Department of Computer Science & Engineering

Begum Rokeya University, Rangpur

3rd Year 2nd Semester Final Examination – 2015

Course Title: Algorithm Design & Analysis	Course Code: 3206
Total Marks: 50	Exam Duration: 3 Hours
Answer any of the five questions	

1 a. What is an Algorithm? What is Efficiency of algorithm and how it is measured, describe? 1+2

b. Step-by-step, calculate complexity for the following code snippet 4

```
void kind_of_sort(int arr[], int n)
{
  Step 1: int i, j;
  Step 2: for (i = 0; i < n-1; i++)
  Step 3:   for (j = 0; j < n-i-1; j++)
  Step 4:     if (arr[j] > arr[j+1])
  Step 5:       swap(&arr[j], &arr[j+1]);
}
```

c. Define "Order of Growth", how is it is used in three different Asymptotic notations, discuss? 3

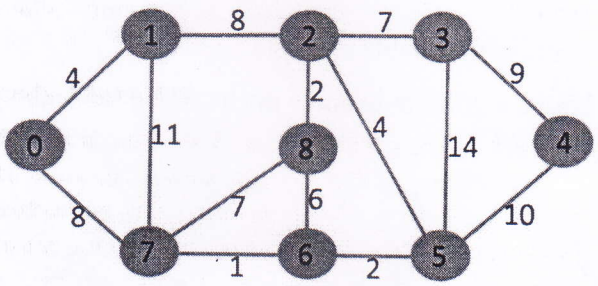
2 a. Define properties Greedy Algorithm. 1

b. Consider an integer K, and n integers $1<s_i<=K$, find subset of $S = \{ s_i\}$ such that the sum over these s_i is exactly K (or determine that no such set exists).

i. Write an algorithm using to solve the above problem. 4

ii. Using asymptotic notation, compute the worst-case running time for function of n 2

c. In step-by-step, show development of a minimum spanning tree for the following graph 3



3 a. Define paradigm of Dynamic Algorithm. With appropriate examples, describe four basic steps that every dynamic programming requires to follow. 1+3

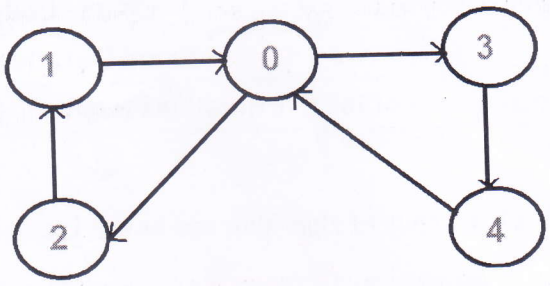
b. Consider you have given a set of numbers $\{1, 2, 3\}$,

i. Write a dynamic programming algorithm that can calculate the total number of ways to sum up them to value 6. 4

ii. Calculate complexity of your algorithm. 2

4 a. Differentiate between Graph and Tree. How a graph can be represented using different data structure. 1+2

b. Consider the following graph 2



Mentioning a root from any of the nodes, show traversal path for DFS and BFS.

c. What is Strongly Connected Graph? Write an algorithm that can check whether a graph is strongly connected or not 1+4

5. a) Consider the following algorithm 2

```
S=0
for i=1 to n do
S = S + i
return i
```

What does this algorithm compute? How many times is the basic operation executed?

b) Write an algorithm for Fibonacci numbers generation and compute the following 6

i. How many times is the basic operation executed

ii. What is the efficiency class of this algorithm

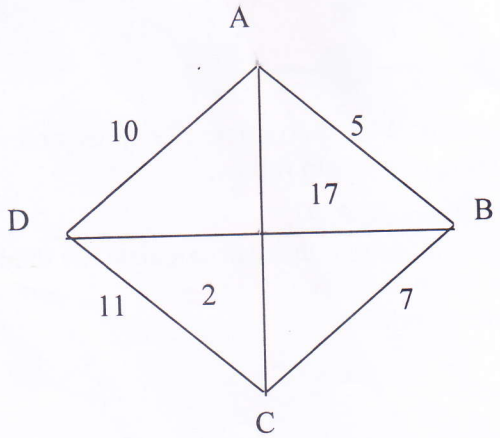
c) Define non-recursive algorithm? 2

6. a) Write an algorithm for quick sort. Explain with an example and show the analysis for the algorithm. 5

b) Write the algorithm for maximum matching in Bipartite Graphs and prove the theorem with example 5

7. a) Explain P and NP problems with suitable example. 5

b) Apply the branch and bound algorithm to solve the traveling salesman problem for the following graph 5



Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B. Sc. Engineering Final Examination- 2015
Third Year Second Semester
Course: GEN 3221 (Bangladesh Studies)

Time: 3 hours | Full Marks: 50

N.B.
a) There are **SEVEN** questions in this course. Answer any **FIVE** questions.
b) The figures in the margin indicate full marks.

1.	Critically discuss the nature of village communities and oriental despotism in ancient Bengal	10
2.	Explain the impact of British role on Bengal with especial reference to the emergence of middle class.	10
3.	Discuss the determinant and nature of social class in Bangladesh in contemporary era.	10
4.	Briefly discuss the Socio-economic condition of pre-liberation Bangladesh. How much is that condition affected by colonialism? Explain.	10
5.	Describe the governmental initiatives to reduce poverty from Bangladesh. What are your recommendations to accelerate the process of poverty alleviation from Bangladesh?	10
6.	Briefly discuss the environmental impact highlighting Bangladesh.	10
7.	Critically discuss the process of digitalization of Bangladesh.	10

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B. Sc. Engineering Final Examination- 2015
Third Year Second Semester
Course: CSE 3208 (Theory of Computation and Automata)

Time: 3 hours | Full Marks: 50

N.B.
a) There are **SEVEN** questions in this course. Answer any **FIVE** questions.
b) The figures in the margin indicate full marks.

1. a) What is a Turing Machine? Discuss Turing Machines as Acceptors. 4
   b) If R = {(1, 2), (2, 3), (3, 1)} is a relation over {1, 2, 3}, find R^+ and R^*. 2
   c) Design an FSM for a divisibility-by-5 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 {0, 1} and accepts only those strings which end in either '00' or '01'. 3
   c) Prove that every FA can be represented using a transition graph (TG), but not every TG satisfies the definition of an FA. 3
   d) 'Every DFA is also an NFA', explain it. 2

3. a) When NFA and DFA are equivalent? 2
   b) Determine a deterministic Finite State Automaton from the given NFA M= [{p, q}, {a, b}, δ, p, {q}] where the state transition function δ is as shown in the following table 4

δ	a	b
p	{p, q}	{q}
q	∅	{p, q}

   c) Define regular expression and regular language. 4

4. a) Using a regular expression, describe the language consisting of all string over $\sum = \{0,1\}$ with at least two consecutive 0's. 2
   b) Show that $(a + b)^* = a(a + b)^* + b(a + b)^* + \in$ 3
   c) Construct a transition graph that recognizes the set: 5
   $r = [1.(00)^*.1 + 0.1^*.0]^*$

5. a) With the help of a suitable example, prove that 'regular sets are closed under union, concatenation and kleene closure'. 5
   b) Explain in brief the applications of finite automata. 5

6. a) What is Chomsky Normal Form? Discuss the procedure to find equivalent grammar in CNF. 4
   b) Define Greibach Normal Form. Obtain a grammar in CNF equivalent to the grammar G with productions P given by 6
   $S \rightarrow ABa$
   $A \rightarrow aab$
   $B \rightarrow AC$

7. a) Show that the following grammar is LL ambiguous 3
   $S \rightarrow aSbS$
   $S \rightarrow bSaS$
   $S \rightarrow \in$
   b) What are the necessary conditions to be carried out before construction of predictive parsing? 2
   c) Construct the predictive parser for the following grammar 5

Department of Compute Science and Engineering
Begum Rokeya University, Rangpur
3rd Year 2nd Semester Final Examination, 2015 (Session: 20012-2013)

Course Title: Distributed System
Course Code: CSE3201

Full Marks: 50
Time: 3 Hours

Answer Any FIVE From the Given Questions

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

1. (a) What is *distributed system*? Give some examples of distributed systems. 2
   (b) Explain *failure handling* in distributed system. 4
   (c) What is *transparency* in distributed system design? What are the most important transparency challenges in a distributed system? Briefly explain each of them. 4

2. (a) What are the entities that communicate in a distributed system? 2
   (b) Discuss the different communication paradigms in distributed system. 4
   (c) What do you know about client-server and peer-to-peer architechture? Write the answer in your own words. 4

3. (a) What is the task of an Ethernet switch? What tables does it maintain? 2
   (b) Briefly disscuss the following: (any two) i) Ethernet ii) Firewalls iii) RIP routng algorithm iv) TCP and UDP 4
   (c) How does a web proxy server work in a Distributed System Environment? Describe it in details. 4

4. (a) Define *processes* and *threads*. 2
   (b) Briefly disscuss the implementation of Remote Method Invocation (RMI) and also give overview of Java RMI. 4
   (c) Explain the role of Operating System Layer in distributed system. 4

5. (a) What is a *web service*? Why web servies are increasingly important in distributed system? 2
   (b) What is SOAP? How does communication happen via SOAP? Explain. 4
   (c) How does shared-memory multiprocessor work in Distribued system? 4

6. (a) What are the security threats in distribued system. 2
   (b) Write short notes on the following (any two) : i) Cryptography ii) peer-to-peer middlewear iii) Domain Name system. 4
   (c) What are the ACID properties? Describe them for distribued system. 4

7. (a) How is concurrency maintained in distributed system? 2
   (b) What is VoIP? Define different BitTorrent terminologies. 4
   (c) The key requirements for the Google infrastructure are scalability, reliability, performance and openness. Provide three example of where these requirements might be in conflict and discuss how Google deals with these potential conflicts 4