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Begum Rokeya University, Rangpur.
Department of Computer Science and Engineering
 B.Sc. (Engg.) 4th Year 2nd Semester Final Examination-2015 (Session: 2011-12)
 Course Title: **Digital Image Processing**; Course Code: **CSE 4204**

Total Marks: 50

Time: 3.00 hours

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

1. a) As a bi-informatics expert when you process any medical image, which basic steps you have to go through in digital image processing? Illustrate each steps. 4
 b) Explain the image formation in the Eye. 4
 c) Briefly describe sampling and quantization. 2

 2. a) When you study digital image processing, you will introduce numerous spatial operations, now you briefly explain three operations among them. 3
 b) Consider the two image subsets, A and B, shown in the following figure. For $V = \{1\}$, determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent, or (c) m-adjacent. 4.5
- | | A | | | | | B | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
- c) Given the condition(s) under which the D4 distance between two points p and q is equal to the shortest 4-path between these points. 2.5

 3. a) Categorize image enhancement techniques, and explain them including three approaches (enhancement models) in each category. 3
 b) Briefly describe negative transformation approach. 3
 c) In which context 1) contrast stretching, 2) Gray level Slicing, 3) Dynamic range transformation, iv) power-law transformation is better than others. 4

 4. a) Define histogram. Suppose that a digital image is subjected to histogram equalization. Show that a second pass of histogram equalization (on the histogram-equalized image) will produce exactly the same result as the first pass. 1+2
 b) Explain histogram equalization and histogram specification. Mention the limitations of histogram equalization, and also present the solutions to overcome these limitations. 3
 c) Define Mask processing techniques. Explain a nonlinear mask processing technique. 1+3

 5. a) What is image segmentation? Discuss an Edge detection techniques with necessary mathematical details. 4
 b) What is pattern recognition? Discuss the structural method of pattern recognition. 3
 c) Formulate a point detection mask. 3

 6. a) Explain any three major properties of 2-D discrete Fourier transform. 3
 b) In frequency domain, digital image processing widely uses Butterworth and Gaussian filters in different context. Now you explain them in two contexts: a) In image smoothing and b) In image Sharpening. 6
 c) Just depict a model of image degradation/restoration process. 1

 7. a) Define Euclidian, city-block and chessboard distance matric for pixels p and q with coordinates (x, y) and (s, t). 3
 b) Write short notes on dilation and erosion. 3
 c) Briefly discuss the boundary extraction algorithm. 4

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Department of Computer Science & Engineering

Begum Rokeya University, Rangpur

Semester Final Examination-2016

4th year 2nd Semester

Year Session: 2011-2012

Course Title: VLSI Design

Course Code: CSE 4208

Time: 3.0Hours

Full Marks: 50

[N.B. *Answer any Five (5) Questions, Number of each question is indicated to the right*]

1. (a) Describe in brief the evolution of logical complexity in IC. 2
- (b) State Moore's law. Write down the benefit of monolithic integrated circuit. 1+2=3
- (c) What do you mean by universal logic gate? Explain the POS and SOP. 2+3=5
2. (a) Define custom and semi-custom design styles. How can choose a particular design style for a VLSI product? 2+1=3
- (b) Explain design hierarchy. Define regularity, modularity and locality. 2+3=5
- (c) Describe the criteria of full-custom design style. 2
3. (a) Explain the VLSI layout design rule. 5
- (b) With neat sketches explain nMOS fabrication process. 5
4. (a) What do you mean by scaling model and scaling factor? 4
- (b) Discuss in detail the scaling factors for device parameters and show the effects of scaling for constant voltage model. 6
5. (a) Explain how channel formed in MOSFET? 3
- (b) Discuss the various regions of operation of an n-MOS transistor. 7
6. (a) Define threshold voltage of MOSFET. 1
- (b) Deduce an expression for threshold voltage of MOSFET. 6
- (c) What do you mean by MOS capacitor and explain its effect on the operation of MOS transistor. 3
7. (a) Deduce an expression for depletion layer charge density of MOS transistor under external bias. 5
- (b) Explain in brief the current voltage characteristics of MOS transistor. 5



[N.B. Answer any Five (5) Questions, Number of each question is indicated to the right]

1. (a) What are the steps in a Simulation study? 4
 - (b) Distinguish between i) System and environment ii). Continuous and discrete systems iii). Stochastic and deterministic activities iv). Random numbers and random variates. 4
 - (c) Name several entities, attributes, activities, events and state variables for following systems: (i) A taxicab company with 10 taxis; (ii) A hospital emergency room 2
 2. (a) What are the major concepts in Discrete- Event simulation? 3
 - (b) Construct the event logic diagrams for the Single-Channel Queue problem. 4
 - (c) Write a program that will generate four-digit random numbers using the multiplicative congruential method. Allow the user to input values of X_0 , a , c and m . 3
 3. (a) Develop the poker test for Five-digit numbers. 5
 - (b) A sequence of 1000 four-digit numbers has been generated and an analysis indicates the following combinations and frequencies
- | Combination i | Observed frequency O_i |
|-----------------------|--------------------------|
| Four different digits | 565 |
| One pair | 392 |
| Two pairs | 17 |
| Three like digits | 24 |
| Four like digits | 2 |
- Based on the poker test whether these numbers are independent. Use $\alpha=0.05$ and $D_{0.05}=0.710$.
4. (a) Write down some differences between system verification and system validation. Explain the purpose and process of verification of system models. 7
 - (b) What are Bicubic patches? Give an example. 3
 5. (a) Explain the approach of forward pass while finding the critical path of an activity network. 6
 - (b) Why random numbers are required? What are the important characteristics of random number routines? Explain briefly. 4
 6. (a) Describe geometric continuity conditions. 3
 - (b) Determine the Hermite Interpolation blending function for control points. Plot each function and label the maximum and minimum values. 5
 - (c) Define the following terms with example 2
 - (i) Interpolation spline
 - (ii) Convex hull
 7. (a) What are characteristics of a fractal object? 2
 - (b) Define fractal dimension. Find out the fractal dimension of a self-similar fractal. 4
 - (c) Illustrate geometric construction of statistically self-similar fractals with example. 4

Department of Computer Science and Engineering

Begum Rokeya University, Rangpur.

B.Sc. (Engg.) 4th Year 2nd Semester Final Examination'2015 (Session: 2011-12)

Course Title: **Web Engineering**; Course Code: **CSE4202**

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) Categorize web application based on their development history and degree of complexity. Hence, describe briefly each one with proper example. 4
(b) How is web engineering different from traditional software engineering. 3
(c) Write down the main properties of Web 1.0, Web 2.0 and Web 3.0 technologies. 3
2. (a) What are the challenges that make Requirement Engineering special in Web Engineering? Mention the sources of information from where requirements can be gathered. 2+1=3
(b) Among Requirement Engineering specifics in Web Engineering discuss (i) Multidisciplinary (ii) Unpredictable Operational Environment (iii) Volatility of Requirements and Constraints. 3
(c) What do you mean by Non-linearity of web application? How can you reduce cognitive overload? 2
(d) What is a Content Management System (CMS)? Explain with suitable Example. 2
3. (a) What are the objectives of Content Modeling? Draw a state machine diagram for the states of a paper in a paper reviewing system. 2+3=5
(b) What do you mean by static adaptation and dynamic adaptation in customization modeling? 3
(c) Describe the functionality of hypertext links used in WebML method. 2
4. (a) Explain 2-Tier and 3-Tier Architecture for web application. Define the role of design pattern and frameworks in web application. 1+2=3
(b) What is **MVC**? Write and discuss the components of **MVC**? Why should we follow (or not follow) it? 3
(c) Describe the Components of generic web application architecture. 4
5. (a) What is cross-browser compatibility? How does jQuery help in cross-browser compatibility? 3
(b) What is inline styling, internal styling and external styling in CSS? Explain with code segment. 3
(c) What is **XML** and **DTD**? Explain with simple example. 2
(d) Cookies are one of the most important techniques commonly used to maintain "state" in a Web-based system. Explain how do cookies work and clearly identify how they are exchanged between the Web browser and Web server. 2
6. (a) How to publish a web site? Explain the process of web publishing. 3
(b) How **RTP** and **RTSP** are useful for multimedia data transmission. 3
(c) How does a **DNS Server** and **Web Server** play role in surfing web application/services? 2
(d) Differentiate between **search engine** and **web directory**. 2
7. (a) Internet of things (IoT) is defined as "the infrastructure of the information society." Briefly explain with appropriate examples. 3
(b) What key issues will need to be addressed for IoT to be fully accepted? 2
(c) Briefly explain virtualization, citing suitable examples 3
(d) Write short notes on web personalization and ontology. 2