

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

(B.Sc. Engg.) 4th Year 1st Semester Final Examination, 2015.(Session:2011-12)

Course Title: Computer Graphics and Multimedia; Course Code: CSE 4107

Full Marks: 50

Time:3.00 Hours

Answer Any Five from the Given Questions

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

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1. (a) Define Computer Graphics. Write the differences between image processing and computer graphics. 3
(b) What is raster scan system random scan system? 2
(c) What do you mean by scan conversion and rendering? 2
(d) With figure describe the graphics pipeline. 3
 2. (a) Use the midpoint method to derive the decision parameter that can be used to generate straight line segments with any slope. 3
(b) Using the midpoint circle generating algorithm, find the coordinates of pixels that lie to the boundary of circle with radius 10 and center at (5,5). 5
(c) Why computer generated lines which are not parallel to x-axis or y-axis and which are not inclined at $\pm 45^\circ$ to x or y-axis appears to be zigzagged? 2
 3. (a) What is "geometric transformation" in terms of computer graphics? 1
(b) How shearing is different from scaling? 2
(c) Magnify the triangle with vertices $A(0, 0)$, $B(1, 1)$ and $C(5, 2)$ to twice its size while keeping $C(5, 2)$ fixed. 7
 4. (a) What is Projection? Explain in brief the role of perspective projection in 3-D visualization. 4
(b) Differentiate orthogonal and oblique projection. 3
(c) Explain homogeneous coordinate system. Why do we need it in modeling transformation? 3
 5. (a) You are given a polygon with vertices in order (10,10), (10,16), (16,20), (28,10), (28,16) and (22,10) and. Using Scan line polygon filling algorithm show the active edge table after scanning 2nd line. 6
(b) How can you decide whether a point is inside a polygon or outside a polygon? 2
(c) What is the difference between Boundary-fill and Flood-fill algorithm? 2
 6. (a) Differentiate clipping and windowing. 3
(b) Give a comparative analysis of various clipping algorithm with their shortcomings. 4
(c) What is the difference between Gouraud and phong shading? Which one is better? 3
 7. (a) Name different types of Bezier curves and their applications. Discuss How the Bezier curves are constructed? 6
(b) What do you understand by spline representation? What is interpolation? 4

Department of Compute Science and Engineering
Begum Rokeya University, Rangpur
4th Year 1st Semester Final Examination, 2015 (Session: 2011-2012)

Course Title: Artificial Intelligence
 Course Code: CSE 4101

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) Is AI a Science, or is it engineering? Or neither or both? Explain. 3
 (b) To what extent are the following computer system instances of artificial intelligence: 4
 (i) Supermarket bar-code scanners.
 (ii) Web search engines.
 (c) Define in your own word: (i) intelligence (ii) artificial intelligence (iii) agent (iv) rationality. 3
2. (a) What is the probability of the occurrence of a number that is odd or less than 5 when a fair die is rolled. 2
 (b) Formulate a solution for the 8-queen problem. Also mention the number of possible sequences to investigate in your solution. 4
 (c) Briefly explain the structure of Agents. 4
3. (a) In a class, 40% of the students study math and science. 60% of the students study math. What is the probability of a student studying science given he/she is already studying math? 2
 (b) The 8-puzzle, an instance of which is shown in the following Figure consists of a 3 x 3 board with 4

| | | |
|---|---|---|
| 7 | | 4 |
| 5 | | 6 |
| 8 | 3 | 1 |

Start State

| | | |
|---|---|---|
| | 1 | 2 |
| 3 | 4 | 5 |
| 6 | 7 | 8 |

Goal State

eight numbered tiles and a blank space. A tile adjacent to the blank space can slide into the space. The object is to reach a specified goal state, such as the one shown on the right of the figure. Write a standard formulation of the problem.

- (c) Having formulated the problem in the previous question 3b, describe a solution strategy to solve the problem using minimum number of slide moves. Illustrate your answer when necessary. 4
4. (a) What are the motivations behind the development of Artificial Neural Networks (ANNs)? 2
 (b) Explain 'the artificial computational model' of biological neuron. 4
 (c) What is learning rule? Write the differences between unsupervised and supervised learning. 4
5. (a) Define Markov Process with examples. 2
 (b) Explain the *backtracking searching* technique with proper examples. 4
 (c) What is Reinforcement Learning (RL)? Briefly explain the major components of a RL agent. 4
6. (a) How clustering algorithms can be used in digital image processing? 2
 (b) Name and explain a variant of depth-first search that requires $O(m)$ memory, where m denotes maximum depth. 4
 (c) What is clustering? Briefly explain two different clustering algorithms. 4

7. (a) Construct by hand a neural network that computes the XOR function of two inputs. Make sure to specify what sort of units you are using. 4
- (b) Suppose you had a neural network with linear activation functions. That is, for each unit the output is some constant c times the weighted sum of the inputs. 6

(i). Assume that the network has one hidden layer. For a given assignment to the weights \mathbf{w} , write down equations for the value of the units in the output layer as a function of \mathbf{w} and the input layer \mathbf{x} , without any explicit mention of the output of the hidden layer. Show that there is a network with no hidden units that computes the same function.

(ii). Repeat the calculation in part (i), but this time do it for a network with any number of hidden layers.

(iii). Suppose a network with one hidden layer and linear activation functions has n input and output nodes and h hidden nodes. What effect does the transformation in part (i) to a network with no hidden layers have on the total number of weights? Discuss in particular the case $h * n$.

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
4th Year 1st Semester B.Sc. (Engg.) Examination-2015
Course No. : CSE 4104 Course Title: Compiler Design



Full Marks: 50

Time: 03 hours

N.B.: Instruction for Candidates:

- i) The figures in the right margin indicate full marks.
 - ii) Answer any **FIVE** questions from the followings.
 - iii) All questions must be answered sequentially.
1. a) What is Compiler? Discuss at least two applications where the compiler design are necessary. 2
b) Discuss types of compiler. 2
c) Discuss different phases of a compiler in compiler design. 6
 2. a) Draw syntax tree for the expression $a = b * -c + b * -c$ 4
b) What do you mean by L-values and R-values? 3
c) What are the roles of lexical analyzer? 3
 3. a) What are the necessary conditions to be carried out before construction of predictive parsing? 2
b) Show that the following grammar is LL(1) grammar. 6
 $S \rightarrow iEtS/iEtSeS/a$
 $B \rightarrow b$
c) What is an ambiguous grammar? Give an example. 2
 4. a) Consider the context free grammar:
 $S \rightarrow SS^+ | SS^* | a$ 8
 and the string aa^+a^*
 i) Give a leftmost derivation for the string.
 ii) Give a rightmost derivation for the string.
 iii) Give a parse tree for the string.
 iv) Describe the language generated by this grammar.
b) What is the main idea of left factoring? Give an example. 2
 5. a) Write a regular expression that defines a fixed-decimal number with no leading or trailing zeros. That is, 0.0, 123.01 and 1230005.0 are legal but 00.0, 001.000 and 0002345.1000 are illegal. 2
b) Build a Deterministic Finite Automaton (DFA) that recognizes this regular expression. 5
c) Using DFA, discuss why the lexical analysis phase of a compiler is implemented separately. 3
 6. a) Define symbol table. How can you implement a symbol table? 4
b) Discuss in detail about the syntax directed definitions. 3
c) How would you solve the issue in the design of code generators? 3
 7. a) Write down the name of the techniques in loop optimization. 2
b) How to solve the loop unrolling for the given program 4

```
Int x;  
For(x=0; x< 100; x++)  
{ Delete (x);}
```


c) Write three address code for the expression $r = 5 * 9 + 7/2$. 4

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Department of Computer Science and Engineering
Begum Rokeya University, Rangpur.
4th Year 1st Semester Final Examination-2015 (Session: 2011-2012)
Course Code: GEN 3221; Course Title: Bangladesh Studies

Time: 3.00 Hours

Full Marks: 50

[Answer any five(5) of the following Questions]

1. Briefly discuss the socio-economic, political and cultural traditions of colonial Bangladesh. 10
2. Critically discuss the role of six points movement in bringing the independence of Bangladesh. 10
3. What do you mean by Digital Bangladesh? Please put your opinions on the concept. 10
4. Define constitution. Critically discuss its principles and problems. 10
5. What is rural development? Is globalization fostering rural development? Discuss in favour of your opinion. 10
6. Discuss the socio-economic status of woman in Bangladesh. 10
7. Critically discuss the impact of foreign aid on the economic development of Bangladesh. 10

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B.Sc. (Engg.) Final Examination-2015
4th year 1st Semester; Session: 2011-12
Course Code: CSE 4106; Course Title: Project Management

Time: 3 hours

Marks: 50

(Answer any five of the following questions)

The figures in the right margin indicate full marks for the respective question.

All part of each question must be answered sequentially

1. a) As a computer Science Graduate when you design a project, how do you manage its different posses? What project planning problems you have to diagnosis to develop any big software project? 3+3
- b) Suppose you design a software project to develop hospital management in Rangpur district. In this context identify some significant stakeholders and illustrate why they are significant. 2
- c) For developing the above project how do you define its SOW (Statement of Work). 2
2. a) How lack of communication with stakeholder create problem in a software project. Explain. 4
- b) Briefly describe vision and scope documents with example 4
- c) What are the aims of work breakdown structure? 2
3. a) Briefly describes wideband Delphi estimation. 5
- b) What is core of project planning and why? 3
- c) Which part is called core of project planning and why? 2
4. a) Demonstrate task, different type dependency among tasks, milestone, and summary task using Gantt chart. 5
- b) What are the difference between Effort and Duration? 2
- c) Define buffer scheduling. Write down some advantages and disadvantages of buffer scheduling. 3
5. a) Broadly describe subversion basic work cycle. 6
- b) Do you think vision control system and subversions are similar? Support your position with real-world instances. 4
6. a) Write a short note on postmortem report. 4
- b) To success a project, explain the importance of taking responsibility to a project manager. 3
- c) Explain how accepting criticism is importance for project manager. 3
7. a) "Project fails because of inefficient leadership", explain it in your own view. 4
- b) Define test Execution and regression test. 2
- c) Write down a short note on "Defect age". 4

Department of Computer Science and Engineering

Begum Rokeya University, Rangpur.

B.Sc.(Engg.) 4th Year 1st Semester Final Examination-2015 (Session: 2011-2012)

Course Code: CSE 4109; Course Title: Digital Signal Processing



Full Marks: 50

Time: 3:00 Hours

[Answer any five(5) of the following Questions]

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|--------|--|-------|
| 1. (a) | Define signal. Write down the differences between analog signal and digital signal. | 1+2=3 |
| (b) | Imagine you have an analog signal, how do you convert analog signal to digital signal? Explain. | 4 |
| (c) | Briefly discuss application of digital signal processing. | 3 |
| 2. (a) | What is multidimensional and multichannel signal? | 3 |
| (b) | Explain Nyquist theorem. Determine the minimum sampling rate required to avoid aliasing of the signal $x(a) = 3\cos 400\pi t$ and why? | 4 |
| (c) | Describe unit sample and unit ramp signal with graphical representation. | 3 |
| 3. (a) | What is symmetric signal and anti-symmetric signal? Determine the even and odd components of the signal $x(n) = e^{j(\omega_0 n + \pi)}$. | 5 |
| (b) | Discuss basic operation on discrete signals. | 5 |
| 4. (a) | What is Region of convergence? State the properties of Regional of convergence. | 4 |
| (b) | Explain the convolution property of z-transformation. | 3 |
| (c) | Determine the z-transformation and ROC of signal $x(n) = a^n u(n)$ | 3 |
| 5. (a) | What are the differences between time domain and frequency domain signal processing? | 2 |
| (b) | Discuss Fourier series for continuous time periodic signals. | 3 |
| (c) | What are the problems of Fourier transformation? Derive Parseval's relation for power signal. | 5 |
| 6. (a) | Define correlation of discrete time signal. Find out cross-correlation and auto correlation sequences of two real signals. | 5 |
| (b) | Find the DFT of a sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using DIF algorithm | 5 |
| 7. (a) | Write down the general purpose of using digital filters. | 3 |
| (b) | Briefly explain recursive implementation of the moving average filter. | 4 |
| (c) | Write down the characteristics of the Blackman and Hamming windows. | 3 |