# Department of Computer Science & Engineering Begum Rokeya University, Rangpur

#### 4th Year 1st Semester Final Examination – 2017

Course Title: Artificial Intelligence

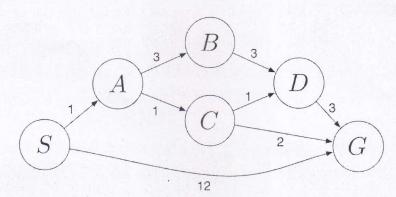
**Course Code: CSE4201** 

**Total Marks: 50** 

**Exam Duration: 3 Hours** 

#### Answer any of the five questions

- a. Differentiate Natural & Artificial Intelligence. Explain types of problems which requires
   AI techniques to be solved.
   b. Describe three main AI techniques that an AI solution need to adapt.
   c. Write an algorithm that can be used for game Tic-Tac-Toe.
   a. Consider, you are given two jugs, a 4-gallon one and a 3-gallon one. Neither has
   measuring marks on it. There is a pump that can be used to fill the jugs with water.
  - Write production rules, and solve the above problem by justifying that an AI problem is a State-Space-Search problem.
  - b. If more than one production rules are found in searching for a solution of a problem, what are the two main things you should consider in choosing a rule, briefly describe.
- 3. a. What is combinatorial explosion in search? How heuristic search deals with a combinatorial explosive search problem?
  - b. Write algorithm for "Steepest-Ascent Hill Climbing" problem? Why "Steepest-Ascent Hill Climbing" algorithm may fail in
    - i. A local maximum
    - ii. A plateau
    - iii. ridge
- 4. a. Differentiate between Breadth-First-Search and Depth-First Search.
  - b. Consider the following map. 2+2



- i. What path would breadth-first graph search return for this search problem?
- ii. What path would depth-first graph search return for this search problem?
- c. Explain A\* algorithm.

2

|    | c. | Distinguish between Syntactic Analysis and Semantic Analysis.                          | 2   |
|----|----|--|-----|
|    | d. | What is parser? Consider a sentence "Bill printed the file", show its parse tree.      | 1+2 |
| 6. | a. | Explain the procedure to develop an Expert System.                                     | 4   |
|    | b. | Write an algorithm for DECISION-TREE-LEARNING. Explain your algorithm with an example. | 6   |
| 7. | a. | What is neural network? Describe how a Feed-Forward neural network works.              | 1+5 |
|    | b. | Why do we use convolution in a CNN-based neural network?                               | 2   |
|    | c. | Differentiate between RNN and LSTM network.  | 2   |

#### Department of Computer Science and Engineering Begum RokeyaUniversity, Rangpur 4<sup>th</sup> Year 2<sup>nd</sup>Semester B.Sc. (Engg.) Examination-2018

Course No. : CSE 4203 Course Title: Web Engineering

Full Marks: 50 Time: 03 hours

|    | 4ns | wer any FIVE questions from the followings. The figures in the right margin indicate full  | marks]      |
|----|-----|--|-------------|
|    |     |  | Marks       |
| 1. | a)  | What do you mean by web engineering? What are the applications of web engineering?   | 3           |
|    | b)  | What does a Web Designer do? What are the main differences/similarities between Web Designer and Web Programmer?   | 2+2=4       |
|    | c)  | Discuss different techniques of collecting visitor data in the web site.   | 3           |
| 2. | a)  | What are the security threats that can affects a company's client-server environment?  | 5           |
|    | b)  | Describe the basic components of Web architectures and relationships among the components.   | 5           |
| 3. | a)  | What are the objectives of presentation modeling? Describe the concept of customization modeling?  | 5           |
|    | b)  | What do you understand by 'business model'? Discuss different E-commerce business model.   | 5           |
| 4. | a)  | What criteria should be considered while choosing ISP?   | 3           |
|    | b)  | Briefly discuss various web security protocols.  | 4           |
|    | c)  | Discuss legal issues that should be considered while choosing domain name.   | 3           |
| 5) | a)  | Why should you seek professional help to create maximum traffic for your website?  | 3           |
|    | b)  | Discuss the proven formula by which you can create maximum traffic for your website.   | 5           |
|    | c)  | List the criteria that can be used in evaluating a website.  | 2           |
| 6. | a)  | What does it mean by ASP.Net life cycle? Briefly discuss application life cycle and page life cycle of ASP.NET. Identify their similarities and differences. | 5           |
|    | b)  | What is ADO.NET? Describe the data binding process of ADO.NET.   | 5           |
| 7. | a)  | What is E-Commerce? How recommender systems help in e-Commerce? Discuss an use-case of recommender system.   | 1+2+3<br>=6 |
|    | b)  | What is transaction processing? Describe the steps of transaction processing briefly.  | 4           |

## Department of Computer Science and Engineering

## Begum Rokeya University, Rangpur

B.Sc. (Engg.) 4<sup>th</sup>year 2<sup>nd</sup>Semester Final Examination-2018

Course Code: CSE 4205

Time: 3.00 hours Total Marks: 50

|        |                | tle: Digital Image Processing  Total Marks: 50   |             |
|--------|----------------|--|-------------|
| - Cour | 50 11          | [N B: Answer any five (5) questions and figures in the right margin indicate full marks]   |             |
| 1.     | a)             | Write down the difference between image enhancement and image restoration.   | 2           |
|        | b)             | Briefly discuss the components of an image processing system.  | 4           |
|        | c)             | Explain the procedure of digital image acquisition process.  | 4           |
| 2.     | a)             | Note down the necessary conditions for <i>m- adjacency</i> of two pixels.  | 2           |
|        | b)             | Find the 8-path and m-path in the following arrangement of pixels. Why ambiguity is arisen in 8-adjacency and how ambiguity can be resolved.   | 4           |
|        |                | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |             |
|        | c)             | Define Intensity transformation. Explain image negatives in brief and explain why it is necessary.   | 4           |
| 3.     | a)<br>b)       | Explain bit-plane slicing in brief. What is histogram? Let a 3-bit image (L=8) of size 64×64 has the intensity distributions given in following table. Draw a histogram from given table then perform histogram equalization and finally draw equalized histogram. | 3 7         |
|        |                | $\begin{array}{c cccc} r_k & n_k \\ \hline r_0 & 790 \\ \hline r_1 & 1024 \\ \hline r_2 & 860 \\ \hline r_3 & 660 \\ \hline r_4 & 325 \\ \hline r_5 & 245 \\ \hline r_6 & 120 \\ \hline r_7 & 72 \\ \end{array}$   |             |
| 4.     | a)<br>b)<br>c) | Define averaging filters. What are the disadvantages of averaging filter?  Describe unsharp masking and high boost filtering with example.  Explain how the gradient is used in image sharpening?  | 2<br>5<br>3 |
| 5.     |                | What is need of image transform? Define DFT.   | 2+2         |
|        | )              |  | =4          |
|        | b)             | Explain the following two properties of 2D-DFT: (i) Convolution; (ii) Correlation.   |             |
| 6.     | a)<br>b)       | - " - 1: 1 · '41 DDE   | 5           |
| 7.     | a)             | Why order statistic filters are called nonlinear filter.   | . 2         |
|        | b)             | Explain median filter and midpoint filter.   | 3           |
|        | ,              |  |             |

c) Define data compression. Describe different types of data redundancies.

#### Department of Computer Science and Engineering

## Begum Rokeya University, Rangpur

B.Sc. (Engg.) 4<sup>th</sup>year 2<sup>nd</sup>Semester Final Examination-2018

Course Code: CSE 4205 Time: 3.00 hours

|    |          | Code: CSE 4205  Fitle: Digital Image Processing  |  | Total Marks: 50    |  |  |  |
|----|----------|--|--|--------------------|--|--|--|
|    |          | [N B: Answer any five (5) questions and  | figures in the right margin indicate ful | l marks]           |  |  |  |
| 1. | a)       | Write down the difference between image  | e enhancement and image restoration      | n. 2               |  |  |  |
|    | b)       | Briefly discuss the components of an ima   | ge processing system.                    | 4                  |  |  |  |
|    | c)       | Explain the procedure of digital image ac  | quisition process.                       | 4                  |  |  |  |
| 2. | a)       | Note down the necessary conditions for n   | n- adjacency of two pixels.              | 2                  |  |  |  |
|    | 20)      | Find the 8-path and m-path in the following in 8-adjacency and how ambiguity can be  | ng arrangement of pixels. Why ambi       | iguity is arisen 4 |  |  |  |
|    |          |  | 1<br>1 0<br>0 1                          |                    |  |  |  |
|    |          |  |  |                    |  |  |  |
|    | c)       | Define Intensity transformation. Explain necessary.  | image negatives in brief and explain     | why it is 4        |  |  |  |
| 3. | a)<br>b) | Explain bit-plane slicing in brief. , What is histogram? Let a 3-bit image (L=8) of size 64×64 has the intensity distributions given in following table. Draw a histogram from given table then perform histogram equalization and finally draw equalized histogram. |  |                    |  |  |  |
|    |          | $r_k$  | $n_k$                                    |                    |  |  |  |
|    |          | $r_0$  | 790                                      |                    |  |  |  |
|    |          | $r_1$  | 1024                                     |                    |  |  |  |
|    |          | r <sub>2</sub>   | 860                                      |                    |  |  |  |
|    | -1       | <u>r3</u>  | 325                                      |                    |  |  |  |
|    |          | 15   | 245                                      |                    |  |  |  |
|    |          | $-\frac{r_6}{r_6}$   | 120                                      |                    |  |  |  |
|    | 2        | $r_7$  | 72                                       |                    |  |  |  |
| 4. | a)<br>b) | Define averaging fixers. What are the disa<br>Describe unsharp masking and high boost  | idvantages of averaging filter?          | 2                  |  |  |  |
|    | c)       | Explain how the gradient is used in image  |  | 5 3                |  |  |  |
| 5. | a)       | What is need of image transform? Define  |  | 2+2                |  |  |  |
|    | b)       | Explain the following two properties of 2I   | D-DFT: (i) Convolution; (ii) Correla     | =4<br>tion 6       |  |  |  |
| 6. | a)<br>b) | Discuss various methods to estimate the di<br>Describe Rayleigh noise, gamma noise and   | egradation function for image restor.    |                    |  |  |  |
| 7. | a)       | Why order statistic filters are called nonlin  |  | 5                  |  |  |  |
|    |          |  | icai mitoi.                              | 2                  |  |  |  |
|    | b)       | Explain median filter and midpoint filter.   |  | 3                  |  |  |  |

Define data compression. Describe different types of data redundancies.

### Begum Rokeya University, Rangpur.

#### Department of Computer Science and Engineering

(B.Sc. Engg.) 4<sup>th</sup> Year 2<sup>2nd</sup> Semester Final Examination, 2017. (Session:2013-14)

Course Title: Machine Learning; Course Code: CSE 4221

Full Marks: 50

Time:3.00 Hours

3

Answer Any Five from the Given Questions

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

| <ul> <li>(b) Describe in detail all the steps involved in designing a learning system.</li> <li>(c) Differentiate among supervised, unsupervised and reinforcement learning.</li> <li>(a) Discuss the necessity of dimensionality reduction in machine learning.</li> <li>(b) Briefly Explain the procedure for the computation of principal components of a given dataset.</li> <li>(c) Distinguish between overfitting and underfitting. How it can affect model generalization?</li> <li>(a) Describe Maximum Likelihood Hypothesis (MLE) for predicting probabilities.</li> <li>(b) Explain linear regression for multivariate data.</li> <li>(c) Explain (i) Hypothesis space (ii) Version space.</li> <li>(a) Explain Confusion Matrix with respect to detection of "Spam e-mails"</li> <li>(b) Define expected value, variance, standard deviation and estimate bias of a random variable.</li> <li>(c) Explain Bootstrapping method for evaluating accuracy of a classifier.</li> <li>(a) What is concept learning?</li> <li>(b) Illustrate Find S Algorithm over EnjoySport concept. Training instances given below:</li> <li>Example Sky Air Temp Humidity Wind Water Forecast EnjoySport</li> <li>1 Sunny Warm Normal Strong Warm Same Yes</li> <li>2 Sunny Warm High Strong Warm Same Yes</li> <li>3 Rainy Cold High Strong Warm Same Yes</li> <li>3 Rainy Cold High Strong Cool Change No</li> <li>4 Sunny Warm High Strong Cool Change Yes</li> <li>(c) How is Candidate Elimination algorithm different from Find-S Algorithm?</li> <li>(d) Explain Bayes theorem. Hence, define: prior probability and posterior probability.</li> <li>(e) Consider a medical diagnosis problem in which there are two alternative hypotheses: 1. That the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or</li></ul>  | (a)   |  |   |   |  |   |   |  |  |
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| <ul> <li>(c) Explain Bootstrapping method for evaluating accuracy of a classifier.</li> <li>(a) What is concept learning?</li> <li>(b) Illustrate Find S Algorithm over EnjoySport concept. Training instances given below:    Example   Sky   Air Temp   Humidity   Wind   Water   Forecast   EnjoySport    </li></ul>  | ` '   |  |   |   |  |   |   |  |  |
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| (b) Illustrate Find S Algorithm over EnjoySport concept. Training instances given below:    Example   Sky  | (2)   | 하는 사람들은 사람들은 사람들이 가지 않는 것이 되었다. 그 나는 사람들은 사람들은 사람들이 되었다면 하는데 보다 되었다.                                     |   |   |  |   |   |  |  |
| Example Sky Air Temp Humidity Wind Water Forecast Enjoy Sport  1 Sunny Warm Normal Strong Warm Same Yes  2 Sunny Warm High Strong Warm Change No  4 Sunny Warm High Strong Cool Change Yes  (c) How is Candidate Elimination algorithm different from Find-S Algorithm?  (a) Explain Bayes theorem. Hence, define: prior probability and posterior probability.  (b) Consider a medical diagnosis problem in which there are two alternative hypotheses: 1. That the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.   |   |  |   |   |  |   |   |  |  |
| 1 Sunny Warm Normal Strong Warm Same Yes 2 Sunny Warm High Strong Warm Same Yes 3 Rainy Cold High Strong Warm Change No 4 Sunny Warm High Strong Cool Change Yes  (c) How is Candidate Elimination algorithm different from Find-S Algorithm?  (a) Explain Bayes theorem. Hence, define: prior probability and posterior probability.  (b) Consider a medical diagnosis problem in which there are two alternative hypotheses: 1. That the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.   | (b) mustate find 8 Algorithm over <i>EnjoySport</i> concept. Training instances given below |  |   |   |  |   |   | ven below:   |  |
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| 4 Sunny Warm High Strong Cool Change Yes  (c) How is Candidate Elimination algorithm different from Find-S Algorithm?  (a) Explain Bayes theorem. Hence, define: prior probability and posterior probability.  (b) Consider a medical diagnosis problem in which there are two alternative hypotheses: 1. That the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.  (a) What is Artificial Neural Network? Explain appropriate problem for Neural Network Learning with its characteristics.   |   |  | <del> </del>  |   |  | Strong  | Warm  | Same   | Yes  |
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| population have this cancer. Determine whether the patient has Cancer or not using MAF hypothesis.  (a) What is Artificial Neural Network? Explain appropriate problem for Neural Network Learning with its characteristics.   | (a)   | Consider a<br>the patient<br>takes a lab   | a medical<br>t has a pa<br>test and   | diagnosis particular form   | roblem in won of cancer (omes back po  | hich there (+) and 2. ositive. The  | are two That the test reti                                  | alternative<br>patient do<br>urns a corr   | hypotheses: 1. That pes not (-). A patient rect positive result in   |
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(c) Explain how to learn Multilayer Networks using Gradient Descent Algorithm.