

Sylhet Engineering College, Sylhet
(Shahjalal University of Science & Technology)
Department of Computer Science & Engineering

Final Examination, 2024

Course No: CSE 705

Time: 03 (Three) hours

N.B: (i) Answer any three questions from each PART

(iii) Marks allotted are indicated in the margin

4th Year 1st Semester

Course Title: Peripheral and interfacing

Full Marks: 60

(ii) Use separate answer scripts for each PART

(iv) Special Instruction (if any)-----N/A-----

PART-A

(Answer any three questions)

- | | | | |
|----|-----|---|----|
| 1. | (a) | What is a Peripheral device? | 01 |
| | (b) | How many 8295A are required to have 64 interrupt inputs. | 02 |
| | (c) | Draw and discuss Cascading the 8259A with figure. | 07 |
| 2. | (a) | What is interfacing? | 01 |
| | (b) | Discuss the operation modes of the 8255A microprocessor. | 04 |
| | (c) | Give the bit definition configured from D7 to D0. Construct the control/status word to configure Port A and Upper port C as input, Port B as output for mode 0, and lower port C as output, also in I/O mode 2. | 05 |
| 3. | (a) | What is handshaking in a peripheral device? Draw the handshaking diagram. | 04 |
| | (b) | Explain the input and output operations of handshaking with a diagram. | 06 |
| 4. | (a) | What is the meaning of IBF and OBF? | 02 |
| | (b) | Draw Mode 2 bidirectional configuration and Status Word of the 8255 Programmable Peripheral Interface. | 03 |
| | (c) | Draw the block diagram of the 8259A Priority Interrupt Controller. Explain the pin configuration. | 05 |

PART-B

(Answer any three questions)

- | | | | |
|----|-----|---|----|
| 5. | (a) | Determine the control word for the following configuration of 82C55 :
Port A – Output Mode of port A – Mode 1
Port B – Output Mode of port B – Mode 0
Port C lower (pins PC0 – PC2) – Output | 04 |
| | (b) | Discuss 4 × 2 the encoder with a block diagram, truth table, and circuit diagram. | 06 |
| 6. | (a) | What are the viewing problems of an LCD monitor? | 02 |
| | (b) | Explain the fundamentals of the CRT monitor with a diagram. | 03 |
| | (c) | Draw the CRT Interface Block diagram and discuss the process. | 05 |
| 7. | (a) | Discuss the keyboard switch organization. | 01 |
| | (b) | Explain the Keyboard encoder with a diagram. | 03 |
| | (c) | What are the types of keyboard switches? Discuss and draw the architecture. | 06 |
| 8. | (a) | What do you understand by a strobe signal? | 01 |
| | (b) | Differentiate between SRAM and DRAM. | 02 |
| | (c) | Draw the Internal block diagram of the DMA-8237. Explain the pin configuration. | 07 |

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Final Examination, 2024
Course No: CSE 715
Time: 03 (Three) hours

4th Year 1st Semester
Course Title: Digital Image Processing
Full Marks: 60

- N.B. : (i) Answer any three question from each PART (ii) Use separate answer scripts for each PART
 (iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)-----N/A-----

PART-A

(Answer any three questions)

1. (a) With a neat block diagram, briefly explain about basic steps in digital image processing. 05
- (b) Differentiate among Blurring, Smoothing and Sharpening 03
- (c) Briefly describe about simple image formation model. 02
2. (a) Explain the mechanics of linear spatial filtering. 05
- (b) Perform Histogram equalization for the following image: 05

$f(x, y) =$

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

Fig.1

3. (a) Write short notes on:(**Any two**) 2×2
Image Interpolation, Gamma Correction, Histogram, Contrast Stretching
- (b) You are given an image of $f(x)$ and filter mask $w(x)$. Find both correlation and convolution of the image with the filter mask and show the full correlation and convolution result and cropped correlation and convolution result. 06
 $f(x) = 101011011$, $w(x) = 12314$
4. (a) The following figure shows an image with black dots that has been corrupted by either salt noise or pepper noise. Is it salt noise or pepper noise? Given a choice of (1) arithmetic mean filter; (2) harmonic mean filter; and (3) contraharmonic mean filter, which one is most appropriate for this task. Explain. 03

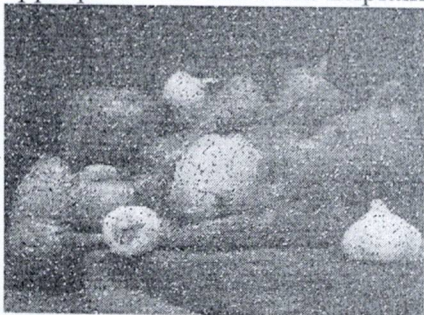


Fig.2

- (b) You have given CMY values (0.2, 0.4, and 0.1) and convert into its equivalent RGB values. 02
- (c) What are image sampling and quantization? 02
- (d) Discuss about different types Wavelet Transforms in image processing. 03

PART-B

(Answer any three questions)

5. (a) Write down different types of color model. Describe the RGB color model in brief. 04
- (b) If the RGB value of an image point is (29, 104, 215); Then convert it to CMY and HSI. 06
6. (a) Write the basic steps of filtering in the frequency domain. 03

- (b) Consider the image below and determine the output of pixel (2,2) if smoothing is performed using the 3x3 neighborhood and all of the filters listed below. 05

A) Average Filter B) Gaussian Filter C) Median Filter D) Min Filter E) Max Filter

1	8	8	0	7
4	7	9	5	7
5	4	6	8	6
4	2	0	1	5
0	1	0	2	0

Fig.3

- (c) Why smoothing filter is used? 02
7. (a) What do you mean by image compression? Why it is used? 04
- (b) Find Walsh transform: $f = \{1, 2, 0, 3\}$ 02
- (c) Find 2D Hadamard transform: 04
- $$f = \begin{bmatrix} 2 & 1 & 2 & 1 \\ 1 & 2 & 3 & 2 \\ 2 & 3 & 4 & 3 \\ 1 & 2 & 3 & 2 \end{bmatrix}$$
8. (a) The following sequence of symbols represents an image data stream: **ABBABABBAABA** 4+2
Initial dictionary: A \rightarrow 0, B \rightarrow 1, next available code = 2
 i) Perform LZW encoding for the given sequence.
 ii) Write the final encoded code stream and final dictionary.
- (b) Briefly discuss about following morphological algorithms (any two): 2x2
Skeletons, Convex Hull, Region Filling

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Final Examination, 2024

Course No: CSE 707

Time: 03 (Three) hours

4th Year 1st Semester

Course Title: Information System Design

Full Marks: 60

N.B.: (i) Answer any three questions from each PART.

(ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin

(iv) Special Instruction (if any)-----N/A-----

PART-A

(Answer any three questions)

1. a) Write two types of Information Systems with examples. 02
b) Define Data, Information & Knowledge. Mention the characteristics of valuable Information? 04
c) A company's managers are making slow decisions. As an IS consultant, should you focus on Efficiency or Effectiveness first? Justify your answer briefly. 04
2. a) Why is disaster recovery important in system design? 02
b) Analyze how ensuring **data integrity** can affect the long-term reliability of an information system, specifically in e-commerce platforms. 05
c) Explain how project scheduling and risk management contribute to the success of large-scale information system projects. 03
3. a) Identify and explain the three major roles in SCRUM and mention one key responsibility of each. 02
b) Discuss the difference between Black Box Testing and White Box Testing. 03
c) Explain with a diagram when the Agile Model is most suitable for software development. Write two disadvantages of this model. 05
4. a) State two objectives of Normalization. 02
b) What is the importance of ensuring accurate data gathering? What are the consequences if we collect improper data? 03
c) Explain the Prototyping Model of system development with a diagram. How does user involvement in this approach help in reducing system rejection? 05

PART-B

(Answer any three questions)

5. a) What are the characteristics of valuable information? 02
b) How can an organization use **valuable information** derived from an information system to gain a competitive advantage? Provide an example. 04
c) Discuss the major security and privacy issues that may arise during the implementation of an information system in a large organization. 04
6. a) Define an Information System. Describe its major components with the help of a diagram. 03
b) Explain four major responsibilities a System Analyst has during the system development life cycle. 03
c) List and briefly explain any four challenges faced by information systems. 04
7. a) A company is looking to implement a new Customer Relationship Management (CRM) system. Conduct a **feasibility analysis** based on technical, operational, and economic criteria. 06
b) What is the SCRUM framework, and how does it differ from traditional models? 04

8. a) Define data modeling and data analysis. 02
- b) Why is it important to define value ranges for variables during data collection? Discuss with examples. 03
- c) Suppose you are tasked with designing Data Flow Diagrams (DFDs) for an 'Online Banking System'. 05
- (i) Draw a Level 0 DFD showing the major processes: Open Account, Transfer Funds, Pay Bills, and Manage Customer Accounts.
- (ii) Create a Level 1 DFD for the Transfer Funds process, including relevant data flows and databases.

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Final Examination, 2024
Course No: CSE 703
Time: 03 (Three) hours

4th Year 1st Semester
Course Title: Artificial Intelligence
Full Marks: 60

N.B. : (i) Answer any three question from each PART
 (iii) Marks allotted are indicated in the margin

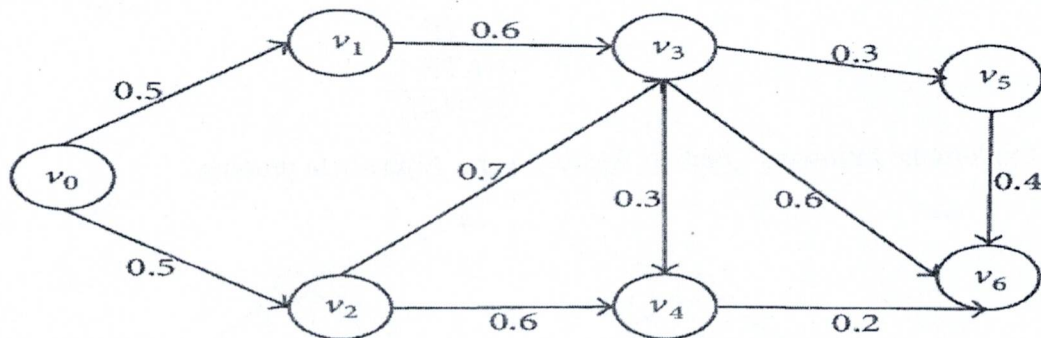
(ii) Use separate answer scripts for each PART
 (iv) Special Instruction (if any)-----N/A-----

PART-A

(Answer any three questions)

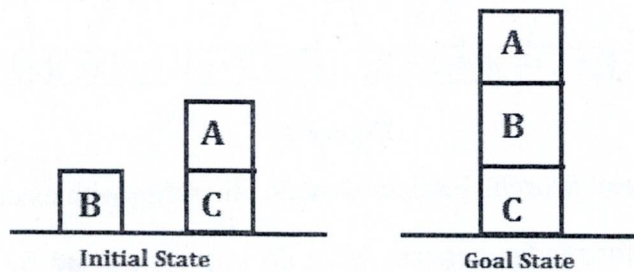
1. (a) Write down the goals of Artificial Intelligence. 02
- (b) Differentiate between strong AI and weak AI. 02
- (c) Give a PEAS description of the following task environment and characterize it in terms of task environment. 06
 - I. Automated taxi driver
 - II. Vacuum cleaner

2. (a) Using UCS find the optimal cost and show the steps from the source node (v_0) to the destination node (v_6). 06

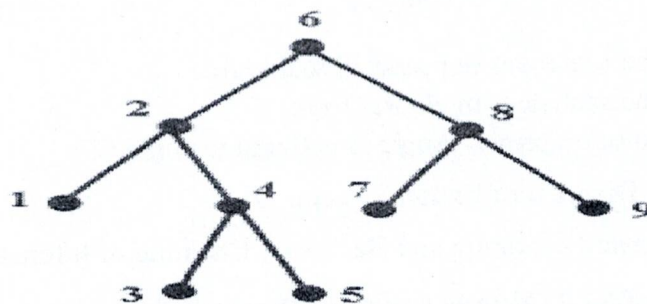


- (b) Solve the following block world problem using goal stack planning. Describe Initial and Goal State. Write actions and their Preconditions. 04

[Hints: Action Given: Move(x, y) , Move To Table(x)]

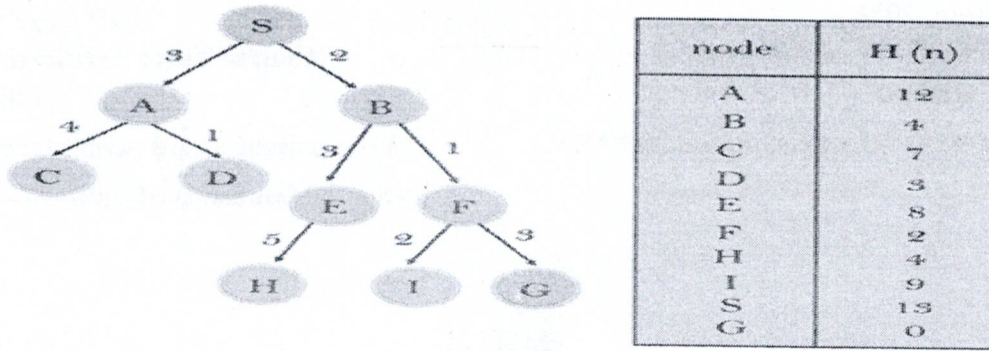


3. (a) Briefly describe about Turing Test. 02
- (b) Show the comparison of Search Techniques aspects of properties. 02
- (c) Show the BFS and DFS Search for the following tree structure. 06



4. (a) Proof that If $h(n)$ is consistent, A* using GRAPH-SEARCH is optimal. 04

- (b) Explore the following graph from the source node (S) the destination node (G) using A* search. 06



PART-B

(Answer any three questions)

5. (a) What is heuristic function? Explain. 02
 (b) What is limitation of Min-max algorithm? Write down the properties of Min-max algorithm. 04
 (c) Solve the following Crypt-arithmetic Problems using constraint satisfaction procedure. 04

$$\begin{array}{r} \text{LOVE} \\ \text{HATE} \\ \hline \text{EQUAL} \end{array}$$

6. (a) Explore the following graph of figure 2 using Alpha-beta pruning. 06

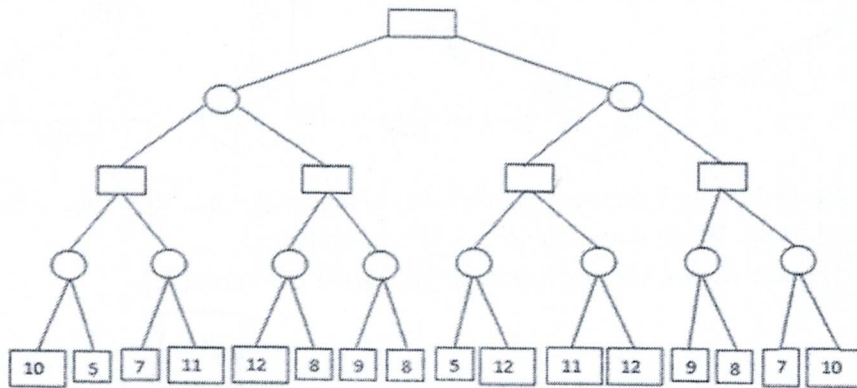


Figure 2

- (b) What is Adversarial Search? Explain Genetic algorithm with example. 04
7. (a) Write the rules for modus ponens. What do you understand by Propositional logic and First Order Logic? 04
 (b) Consider the following sentences- 06
- If a triangle ABC is Equilateral, then it is Isosceles.
 - If a triangle ABC is Isosceles, then two sides AB and AC are Equal.
 - If AB and AC are equal, then angle B and angle C Are Equal.
 - ABC is an Equilateral triangle.
- Now,
- i. Convert the sentences in propositional logic.
 - ii. Convert the sentences in clausal form.
 - iii. Using resolution prove "Angle B is Equal to angle C".
8. (a) Show the block Diagram of Expert System. 03
 (b) Describe the Forward Chaining and Backward Chaining of Inference Engine. 03
 (c) Explain Phases of NLP (Natural Language Processing). 04