

**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**

<b>Mid-term Examination, Autumn -2021</b>	Program: B.Sc. Engg. (CSE)			
Course Code: ACC 2401	Course Title: Financial and Managerial Accounting			
Time: <b>3 hours</b> (Writing – <b>2 hours 30 minutes + 30 minutes</b> submission time)	Full Marks: 30 ( <b>Written:21 + Viva/Viva-Quiz: 9</b> )			
[Answer each of the questions from the followings; Figures in the right margin indicate full marks. <b>Answer script must be submitted through online method within 3 hours from starting time.</b> ]				
<b>Q. No.</b>	<b>Question</b>			

<p><b>1.</b> Jonson Corner is a business owned and run by Mr. Jonson . Following events took place in the first month, ledger accounts have not yet been written up and that will become your task here.</p> <p>01-March, The business bank account received £1,700 from the owner . Mr. Jonson also giving a laptop valued £1,900 and portion of land valued £4,000 to the business.</p> <p>03- March, Bought new inventory on credit from N Joshi and received an invoice for £2,800 inclusive of VAT.</p> <p>04 - March, Sold goods to Joan's Phones on credit and sent an invoice for £(Last Four digit of your student ID).</p> <p>06- March, Mr. Jonson puts £2,500 into the business bank account and puts £1,500 into the office safe. This is all new money to his business.</p> <p>06- March, Purchased goods for resale in cash from MTC Wholesale and their cash invoice/receipt was £4,000 goods.</p> <p>07- March, Sold more goods for £2,700 and all customers paid by cheque.</p> <p>08- March, Paid £800 cash to N Joshi for inventory bought on credit on 3rd March.</p> <p>09- March, Mr. Jonson purchased a van solely for use within Jonson Corner cash for £(Last Four digit of your student ID).</p> <p>13- March, A representative of a large company told him of the company's intention to transfer its accounting business to Jonson Corner.</p> <p>19- March, Mr. Jonson place a travel ticket valued £280 which used for business trip.</p>			7
<p><b>1(a).</b> Journalize the above transaction.</p>	<b>CO2</b>	<b>E</b>	
<p><b>1(b).</b> Opening ledger accounts as necessary and following recognized bookkeeping and accounting principles, correctly record each of the transactions stated above.</p>	<b>CO2</b>	<b>E</b>	
<p><b>2(a).</b> We know accounting is the systematic recordation of the financial transactions of a business. How many activities can such recordation be split into ? And what are they ?</p>	<b>CO1</b>	<b>C</b>	7
<p><b>2(b).</b> Accounting information of a company is used for decision making. List the decision makers who use accounting information.</p>	<b>CO1</b>	<b>U</b>	

<b>2(c).</b>	What is the difference between ‘accounts payable (AP)’ and ‘accounts receivable (AR)?	<b>CO1</b>	<b>U</b>	
<b>3.</b>	<p>Andrea Scarlett is a realtor. She organized her business as a corporation, Andrea Scarlett, Realtor, P.C. (Professional Corporation)</p> <p>1. The business owes \$61,000 on a note payable for land that the business acquired for a total price of \$83,000.</p> <p>2. The business spent \$23,000 for a Zinka Banker real estate franchise, which entitles the business to represent itself as a Zinka Banker office. This franchise is a business asset.</p> <p>3. Scarlett owes \$80,000 on a personal mortgage for her personal residence, which she acquired in 2012 for a total price of \$160,000.</p> <p>4. Scarlett has \$5,000 in her personal bank account, and the business has \$9,000 in its bank account.</p> <p>5. Scarlett owes \$(Last Four digit of your student ID)on a personal charge account with Chico's.</p> <p>6. The office acquired business furniture for \$15,000 on September 25. Of this amount, the business owes \$2,000 on account at September 30.</p> <p>7. Office supplies on hand at the real estate office total \$1,300.</p> <p>8. Received partial payment from client on account, \$700</p> <p>9. Received \$1,500 cash for helping a client.</p> <p>10. Scarlett received a birthday gift from his friend valued \$3000.</p>			<b>7</b>
<b>3(a).</b>	Analyze the effects of the above transactions.	<b>CO2</b>	<b>E</b>	
<b>3(b).</b>	Prepare the Financial Transaction.	<b>CO2</b>	<b>E</b>	
<b>4.</b>	<b>Viva/Viva-Quiz:</b> The time of viva/viva-quiz will be declared in Google classroom.	<b>CO3</b>	<b>U</b>	<b>9</b>

**Prepared by:** A.B.M YASIR ARAFAT

Lecturer, CSE

Assisted by: Maruful Islam

**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**

*B. Sc. in CSE Midterm Examination, Autumn 2021*

**Course Code: CSE 2425 Course Title: Theory of Computing**

**Total marks: 21**

**Time: 2.5 hours + 30 minutes for submission**

[Answer all the questions; in some questions, there are options; solve the one which you have been instructed to solve;

For all questions, assume **X** and **Y** are the last two digits of your ID if not mentioned otherwise;

Figures in the right hand margin indicate full marks;

Precisely follow the guideline for preparing and submitting the answer script.]

**1.**

**a)** Construct a DFA for recognizing decimal integers which are divisible by 5 and **1.5** starts with **Y**. Here, **Y** is the last digit of your ID.

**b)** Construct DFA for the following languages: **3.5**

*Solve (a-c) if your ID is ODD*

- a.  $\{w \mid w \text{ begins and ends with different digits}\}$
- b.  $\{w \mid w \text{ has at most two 0's and at least two 1's}\}$
- c.  $\{w \mid w \text{ contains the substring } 1101\}$
- d.  $\{w \mid w \text{ contains neither the substring } 00 \text{ nor } 110\}$

*Solve (d-f) if your ID is EVEN*

- e.  $\{w \mid w \text{ begins and ends with different digits}\}$
- f.  $\{w \mid w \text{ has exactly two 0's and at most three 1's}\}$
- g.  $\{w \mid w \text{ contains the substring } 0101\}$
- h.  $\{w \mid w \text{ contains neither the substring } 001 \text{ nor } 11\}$

**c)** Write regular expressions for the languages described in **1(b)**. **2**

**2.**

**a)** Prove that every nondeterministic finite automaton has an equivalent deterministic finite automaton. **3**

**b)** Prove that the regular language is closed under the concatenation operation. **2.5**

[EVEN ID]

OR

Prove that the regular language is closed under the star operation. [ODD ID]

- c) What are the languages described by the following regular expressions? Write a one sentence description for each language. 1.5

Solve (a-c) if your ID ends with 1, 2, 3, 4, 5

- a.  $a^*(a \cup bb)^*$
- b.  $(aa \cup b)^*(bb)^*$
- c.  $((b(bb)^*aa) \cup (bb)^*a)^*$

Solve (d-f) if your ID ends with 6, 7, 8, 9, 0

- d.  $(ab \cup ba)^*(bb)^*$
- e.  $(a \cup bb)^*(aa)^*$
- f.  $((aa)^*bb) \cup ab)^*$

3.

- a) Convert the following regular expressions to nondeterministic finite automata 1
- $(0^* \cup 1^*)00(0 \cup 1)^*$   
 $(11^* \cup 00^*)1(11 \cup 00)^*$

- b) Give state diagrams of NFAs for the following language. 3
- $\{w \mid w \text{ contains an even number of 0s, or contains exactly two 1s}\}$

Convert the NFA into an equivalent DFA. Give only the portion of the DFA that is reachable from the start state.

- c) Give an NFA recognizing the language  $(11 \cup 10 \cup 110)^*$ . 3
- Convert this NFA to an equivalent DFA. Give only the portion of the DFA that is reachable from the start state.

**International Islamic University Chittagong**  
**Department of Computer Science & Engineering**  
**B.Sc. in CSE *Online Mid Assessment*, Autumn-2021**

**Course Title: Mathematics-IV Course Code: MATH-2407 (New)**  
**Course Title: Mathematics-V Course Code: MATH-3501 (Old)**

Total Marks: 21

Section: 4BM+4CM

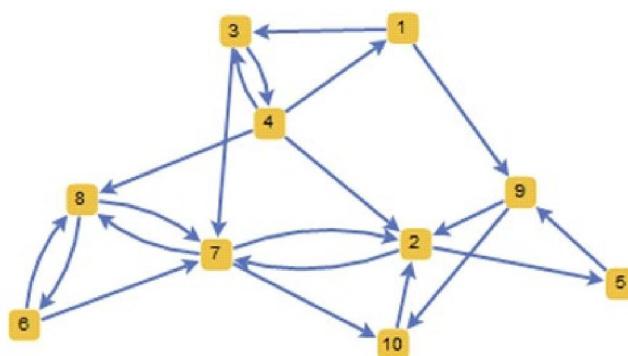
Submission Time: 03 hours

Answer all the questions; Precisely follow the guideline for preparing and submitting the assignment; Figures in the right hand margin indicate full marks

---

1. a)

04



Determine whether the relation is reflexive, symmetric, anti-symmetric and transitive

b) Let the function  $f : \Re^{\#} \rightarrow \Re^{\#}$  be defined by  $f(x) = x^2 + 3x - 4$ . Find  $f^{-1}(3)$

01

c) Evaluate  $\int_C (x + y) dz$  from  $z = 0$  to  $z = 4+3j$  along the curve  $C$ .

02

2.

Determine the image in the  $w$ -plane of the circle  $|z| = 2$  in the  $z$ -plane under the

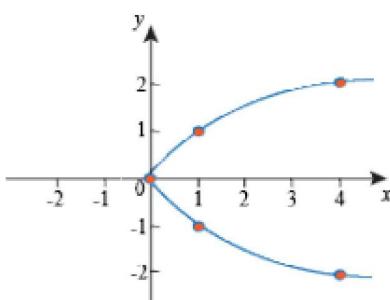
07

transformation  $w = \frac{z+j}{z-j}$  and show the region in the  $w$ -plane onto which the region within the circle is mapped.

3. a)

01

$x$	$y$
0	0
1	1
1	-1
4	2
4	-2



If we plot the points from the table, we find the above graph. Does this image describe a function?

b) Prove that  $f(z) = |z|^2$  is not harmonic functions but  $f(z) = \ln(|z|^2)$  is harmonic.

04

c) Using Demoivre's theorem, find the values of  $(3 + \sqrt{3}i)^{\frac{1}{7}}$

02

Bismillahir Rahmanir Rahim

**International Islamic University Chittagong**  
**Department of Computer Science & Engineering**

*B. Sc. in CSE, Fourth Semester, Mid Term Examination, Autumn 2021*

**Course Code: CSE-2423      Section : 4CM      Course Title: Database Management Systems**

**Total marks: 21**

**Time:** 2 hours 30 minutes for exam + 30 minutes for submission

---

**Answer all the questions**

1.

**A database needs to be developed that supports a supermarket.**

7

*Design an entity-relationship diagram* that captures, as far as possible, the requirements stated below. (Statements in brackets are additional explanations and not part of the requirements proper.) If you make any assumptions in your design, please write them down. Assumptions, however, must not contradict the requirements.

1. The supermarket sells products. Each product is uniquely identified by its product number. Moreover, a product has price. The supermarket also records how many items of each product are currently on stock.
2. A product can be on special offer. A special offer is valid for a period, which has a start date and an end date. A special offer refers to exactly one product. Two special offers for the same product can not have overlapping periods. A special offer for a product specifies that a certain number of items of that product are sold at a certain price (e.g., 2 items for 1,99 EUR).
3. There is a card scheme for which customers can register. A registered customer holds a customer card. Each registered customer has a customer number, which is unique. For each registered customer the supermarket records the name and the address of the customer and the day when the customer joined the card scheme.
4. When a customer buys one or more items and pays for them, a purchase is being completed. A purchase is uniquely identified by the number of the checkout where the customer pays, together with the date and the time when the purchase is made.
5. Some purchases are made by registered customers.
6. A purchase consists of one or more line items. Within a given purchase, each line item is uniquely identified by its line number. Each line item refers to a unique product. (In fact, the line items correspond to the items of the purchase). Some line items have an additional comment, which is a string. (The comment may say that a special price applies to the product item because it is part of a special offer.)

2. UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute.

- a. Please create an **Entity Relationship diagram** that captures this information about the UPS system. Be certain to indicate identifiers and cardinality constraints.
- b. Please convert the ER diagram into a relational database schema. Be certain to indicate primary keys and referential integrity constraints.

3. **Customer Database**

Use the following database:

Customer(**cid: integer**, cname: string, rating: integer, salary: real)  
Item(**iid: integer**, iname: string, type: string)  
Order(**cid: integer, iid: integer, day:date**, qty:real)

*Write the following Queries using Relational Algebra:-*

- a. Find names of customers who've ordered item with id 100
- b. Find names of Customers who've ordered a laptop (i.e., an item of type "laptop")
- c. Find customers who've ordered a laptop and a desktop computer
- d. Find the names of customers who've ordered all item

Bismillahir Rahmanir Rahim  
**International Islamic University Chittagong**  
**Department of Computer Science & Engineering**  
B.Sc. in CSE, Mid-term Assignment, Autumn 2021  
**Course Code: CSE-2421 Course Title: Computer Algorithms**  
Total Marks: 21 Time: 2.5 hours + 30 minutes

---

Answer all three; all questions have the same marks.

For all questions, assume **L2** denotes 1+ second last digit of your ID, **L1** denotes 1+ last digit of your ID and **L#** denotes the 1+ last two digits of your ID;

Example: For C171050, **L2**=6, **L1**=1 and **L#**=51.

---

- 1.a) Define: Algorithm. Briefly describe the Properties of good algorithm. 2
- b) Express the following recurrence in  $\Theta$  notation:  $T(n) = (L1)T\left(\frac{n}{L2}\right) + n5$  2
- c) **Transpose(A, L#)**  

```
for i=1 to L# - 1
    for j=i+1 to L#
        t = A[i,j]
        a[i,j] = A[j,i]
        A[j,i] = t
```

 3

Consider the above pseudocode. Mention how many times each line executes; express in asymptotic notation. Express the running time of **Transpose** in asymptotic notation.

- 2.a) Use Counting sort algorithm to sort the following list: **5, L2, L2, 26, L1, 34, L1, 7, 22.** 2
- b) Perform Heap sort operation on the following list of data: **41, L1, 35, L#, 45, L2, L1, L2.** 2
- c) Use Quick sort algorithm to sort the following list: **L#, L2, L1, 26, L2, L1, 3, L1, 2.** 3
  
- 3.a) What are the differences between Dynamic Programming and Divide and Conquer approach? 1
- b) Determine the LCS of two strings  $S_1 = \{5, L1, 0, L1, 0, 5, L2, 3\}$  and  $S_2 = \{L1, 5, L2, 5, L1, 0, 3, 5, 0\}$ . 3
- c) Find the values of m-table and s-table of a matrix-chain product whose sequence of dimensions is  $\{L1, L2, 5, L#, L2\}$ . 3

**International Islamic University Chittagong**  
Centre for General Education(CGED)  
**Mid Term Assignment Test      Autumn Semester- 2021**  
Course Code: URBL-2401  
Course Title: Functional Bengali Language and Literature  
Full marks : 20                  Time:3.00 Hours

### **ক-বিভাগ**

ভাষা ও নিমিত্তঃ-১০

(যে কোন ২টি প্রশ্নের উত্তর দাও।)

$$5 \times 2 = 10$$

০১. বাংলা ভাষার উৎপত্তি ও বিকাশের গতিপ্রকৃতি আলোচনা কর।
০২. উচ্চারণস্থান ও স্থীতি অনুযায়ী বাংলা ব্যঞ্জনধ্বনির শ্রেণিবিভাজন দেখাও।
০৩. "একুশের চেতনা ও তাওপর্য" শীর্ষক একটি বক্তব্য উপস্থাপন কর।

### **খ-বিভাগ**

সংকৃতি :- ১০

(যে কোনো ২টি প্রশ্নের উত্তর দাও।)

$$5 \times 2 = 10$$

০১. রবীন্দ্রনাথ ঠাকুরের 'পোস্টমাস্টার' গল্পের রূতন ও পোস্টমাস্টার চরিত্র বিশ্লেষণ কর।
০২. বিভূতিভূষণ বন্দোপাধ্যায়ের 'পুইমাচা' গল্পের আলোকে সমাজে নারীর অবস্থান দেখাও।
০৩. সৈয়দ ওয়ালীউল্লাহ রচিত 'নয়নচারা' গল্পের প্রেক্ষাপট ও বিষয় আলোচনা কর।