

Jatiya Kabi Kazi Nazrul Islam University
Department of Computer Science and Engineering
2nd Year 2nd Semester Final Examination, 2022
Session: 2020-2021
Course: CSE- 229 (Engineering Ethics and Cyber Law)

Full Marks: 60

Time: 3 hours

Answer any five of the following questions:

1. a) Label the general categories of cybercrime. 3
b) What is code of ethics? Write a note on Ethics in Business. 4
c) What are the ethics that computer professional should follow? List and explain. 5
2. a) What are the pillars of work ethic? 3
b) Differentiate between morals and ethics. 3
c) What are the different psychological issues in Meta-ethics? 2
d) What are the various crimes happening using computers? 4
3. a) What do you mean by ethical issues? Write the main ethical issues in research. 3
b) Write the different types of cyber-attacks. 3
c) What is the present status of cyber law in Bangladesh? 3
d) What is the role of the digital forensic Lab in investigating cybercrimes in BD? 3
4. a) Write a note on cyber law and describes its advantages and disadvantages 4
b) What are the essential components of cyber security? Describe criminalization through online speech on social media. 4
c) What are the key components of digital security act of Bangladesh Government? Explain. 4
5. a) Define cyberspace. Explain jurisdiction in cyberspace. 4
b) Write about Software development and licensing agreements. 3
c) What are Intellectual Property Rights (IPR) in Cyberspace? 2
d) Mention different types of intellectual property rights. 3
6. a) What is the difference between IP and IPR? patents 3
b) Write the differences between copyrights and patents. 3
c) What is piracy? Mention the types of piracy. How can it be prevented? 3
d) What do you mean by Software Piracy and trademarks? 3
7. a) What do you mean by Cyber tribunal? Write the effectiveness of the Cyber Tribunal in BD. 4
b) Write the advantages of e-commerce. What are B2B, B2C, C2B, and C2C in E-commerce Business? 2
c) What are cultural differences and similarities? 2
8. a) What is computer and information ethics? 1
b) How do yoga and meditation help in professional excellence and stress management? 2
c) Choose the correct answer to the following questions: 9
i). One of the most important issues faced by the world is that _____.
(a) Computer ethics
(b) Confidentiality

- (c) Environmental deterioration
 - (d) Conflict of interest
- ii). Which one does fall under computer ethics?
- a) Computers can be used for robbery, crime, and blackmailing others.
 - b) Hacking is used to access private information
 - c) A leak of such information of individual leads to harassment in terms of repeated phone calls.
 - d) Above all
- iii) The aim of _____ is to do whatever possible to avoid any kind of harm or accident.
- a) Minimalist
 - b) Reasonable care
 - c) Beyond one's duty
 - d) None
- iv) The prime responsibility of any professional is _____.
- a) Confidentiality
 - b) Conflict of interest
 - c) Environmental ethics
 - d) Computer ethics
- v) Which of the following is not done by cybercriminals?
- a) Unauthorized account access
 - b) Mass attack using Trojans as botnets
 - c) Email spoofing and spamming
 - d) Report vulnerability in any system
- vi) Which of the following is not an example of a computer as a weapon in cyber-crime?
- a) Credit card fraudulent
 - b) Spying on someone using a keylogger
 - c) IPR Violation
 - d) Pornography
- vii) Which of the following is not a type of cyber-crime?
- a) Data Theft
 - b) Forgery
 - c) Damage to data and systems
 - d) Installing antivirus for protection
- viii) The factor that affects ethical and unethical behavior. . . .
- a) Ethical dilemma
 - b) Diversity
 - c) Teamwork
 - d) Open communication
 - e) none of these
- ix) Installing antivirus for protection
One who believes in making decisions for the good of many people is known as _____
- a) utilitarianism
 - b) teleology
 - c) deontology
 - d) egoism
 - e) None of these

B.Sc (Engg.) 2nd Year 2nd Semester Final Exam
Dept. Of Computer Science and Engineering
Jatiya Kabi Kazi Nazrul Islam University
Course: CSE 225(Computer Architecture and Organization)

Marks: 60

Time: 3hours

✓1

Answer any five question from the following

- a. What is computer architecture? What are the limitations of computer? 4
b. What are the differences between second generation computer and third generation computer? 3
c. Discuss about the organization of first-generation computer. 5

✓2

- a. What is the benefit of using a multiple-bus architecture compared to a single-bus architecture? 3
b. What is the general relationship among access time, memory cost and capacity? 4
c. Briefly explain about technologies for building processors and memory. 5

✓3

- a. What are the differences between fixed point numbers and floating point numbers? 3
b. What is the function of status register, stack pointer and program counter? 3
c. What is instruction set? What are the requirements to be satisfied by an instruction set? 4
d. Discuss about representations of data. 2

4

- a. Differentiate between SIMD and MIMD. 3
b. Describe the techniques for handling data and instruction hazards in pipelining. 4
c. Briefly explain about Binary Addition and Subtraction MIPS architecture. 5

5

- a. Discuss about basic structure of a microprogrammed control unit. 6
b. How do you differ horizontal microinstruction from vertical microinstruction? 3
c. Draw the floating-point number format. Define exponent and mantissa. 3

✓6

- a. Draw and discuss the control signals that implement an addition instruction of the form ADD A,B. 5
b. What is interrupt? Discuss about different types of interrupt. 4
c. How do you increase performance of your personal computer? 3

7

- a. Describe the role of cache memory in pipelined system. 3
b. What are the main differences between CISC and RISC? 4
c. Briefly explain about hardware multithreading and multicore processors. 5

✓8

- a. What are the reasons for using virtual memory? 3
b. Discuss about typical CPU with the general register organization. 5
c. What is parallel processing? How processor level parallelism executes? 4

Department of Computer Science and Engineering

2nd year 2nd semester Final Examination-2022

Course: MATH-275 (Complex variable, Laplace transformation and Fourier analysis)

Time: 3 hours

Full Marks: 60

There are 8 Sets of questions out of which 5 should be answered.

- ✓ 1. a) Define complex number and conjugate of a complex number. Prove that the sum and product of a complex number and its conjugate are real numbers. 4
- b) Define modulus and argument of a complex number. For any complex numbers z_1 and z_2 , prove that
 (i) $|z_1 z_2| = |z_1| + |z_2|$ (ii) $\operatorname{Arg}(z_1 z_2) = \operatorname{Arg}(z_1) + \operatorname{Arg}(z_2)$ 4
- c) Find the equation of circle of radius 4 and center at $(-2, 1)$. 4
- ✓ 2. a) Define Limit. Prove that $\lim_{z \rightarrow z_0} z^2 = (z_0)^2$ 1+3=4
- b) Prove that $\lim_{z \rightarrow z_0} (f(z), g(z)) = \lim_{z \rightarrow z_0} f(z), \lim_{z \rightarrow z_0} g(z)$ 4
- c) Prove that $f(z) = z^2$ is uniformly continuous on $|z| < 1$. 4
3. a) Evaluate $\int_{(0,3)}^{(2,4)} (2y + x^2)dx + (3x - y)dy$ along:
 (i) the parabola $x = 2t, y = t^2 + 3$;
 (ii) straight lines from $(0,3)$ to $(2, 3)$ and then from $(2, 3)$ to $(2, 4)$;
 (iii) a straight line from $(0, 3)$ to $(2, 4)$. 7
- b) State Cauchy theorem. Evaluate $\oint_C \frac{dz}{z-a}$ where C is any simple closed curve and $z = a$ is (i) outside C , (ii) inside C . 5
4. a) Define complex line integration. If $f(z)$ is analytic in a simply-connected region R . Prove that $\int_a^b f(z)dz$ is independent of the path in R joining any two points a and b in R . 2+4=6
- b) If $f(z)$ is analytic inside and on a simple closed curve C and a is any point inside C , Then prove that $f'(a) = \frac{1}{2\pi i} \oint_C \frac{f(z)}{(z-a)^2} dz$. 6
5. a) State and prove Taylor's theorem 1+5=6
- b) Evaluate $\oint_C \frac{\cos \pi z}{z^2-1} dz$ where C is
 (i) The circle $|z| = 2$ (ii) The rectangle with vertices $-i, 2-i, 2+i, i$ 3+3=6
- ✓ 6. a) Prove that $L[f^n(t)] = s^n L[f(t)] - s^{n-1}f(0) - s^{n-2}f'(0) - s^{n-3}f''(0) - \dots - f^{n-1}(0)$ 5
- b) Find the Laplace transform of (any two)
 (i) $1 + \cos 2t$ (ii) $t^2 e^t \sin 4t$ (iii) $\frac{\sin 2t}{t}$ 7
- ✓ 7. a) Using Laplace transform prove that $\int_0^\infty \frac{e^{-at} - e^{-bt}}{t} dt = \log \frac{b}{a}$. 6
- b) Find the inverse Laplace transform of $\frac{2s^2 - 6s + 5}{s^3 - 6s^2 + 11s - 6}$. 6
- ✓ 8. a) Define Fourier's series and find the Fourier's coefficients. 6
- b) Find the Fourier series expansion of the periodic function $f(x)$ of period 2π where $f(x) = x^2$ for $-\pi < x < \pi$, Hence find the sum of the series $1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$. 6

Jatiya Kabi Kazi Nazrul Islam University
 Dept. Of computer Science and Engineering
 2nd year 2nd semester Final Examination-2023
 Course Title: Database Management System
 Course Code: CSE-223

Total Marks: 60

Time: 3 hours

Answer any Five from the following questions

1. a) What is a Database Management System (DBMS), and why is it important in modern computing? 4
- b) List and explain some significant differences between file-processing system and DBMS. 4
- c) There are different types of database-system users, differentiated by the way they expect to interact with the system. Explain each of them. 4
2. a) List two reasons why null values might be introduced into the database. 2
- b) Discuss the relative merits of procedural and nonprocedural languages. 2
- c) Consider the SQL query
 select distinct p.a1
 from p,r1,r2
 where p.a1=r1.a1 or p.a1=r2.a1
 Under what conditions does the preceding query select values of p.a1 that are either in r1 or in r2? Examine carefully the cases where one of r1 or r2 may be empty. 5
- d) Show that, in SQL, \bowtie all is identical to not in. 3
3. a) List some common data types supported by SQL. 3
- b) Consider the following Bank Database 6
- branch(branch name, branch city, assets)*
customer (customer name, customer street, customer city)
loan (loan number, branch name, amount)
borrower (customer name, loan number)
account (account number, branch name, balance)
depositor (customer name, account number)
- i. Write an SQL query to find the name of all customers whose balance is over 900000 and whose branch name is Trishal. 3
- ii. Write an SQL query to find all customer who have a loan but not an account at the bank 3
- c) In what ways data mining and data warehousing are closely connected to DBMS? 3
4. a) What are the different types of attributes in the ER model? Provide examples for each type. 4
- b) Draw an ER diagram for a simple library database that includes entities for books, authors, and borrowers. Include relationships and cardinalities. 5
- c) Explain what a weak entity is and how it differs from a strong entity. 3
5. a) What are the significances of triggers in DBMS? Write an example of trigger with proper syntax. 4
- b) Define the concept of roles in the context of database privileges. Give an example of it. 4
- c) Explain how the concept of privileges contributes to the overall security of a database. 4
6. a) Consider the following University Database 6
- department(dept name, building, budget)*
course(course id, title, dept_name, credits)
instructor(ID, name, dept_name, salary)
section(course id, sec id, semester, year, building,
room_number, time_slot_id)
teaches(ID, course id, sec id, semester, year)

Write the SQL queries for each of the following condition.

- 5 → I. Find those branches where the average account balance is more than Tk. 3000. Find the names of all instructors who have a higher salary than some instructor in 'Comp. Sci'.
II. Find the name of all instructors in the university who have taught some course, find their names and course_id.
b) Explain how integrity constraints guard against accidental damage to the database. 3
c) How SQL aggregation handles queries on relation containing null values? 3

7. a) Design a database for an automobile company to provide to its dealers to assist them in maintaining customer records and dealer inventory and to assist sales staff ordering cars. Each vehicle identified by a vehicle identification number (VIN). Each individual vehicle is a particular model of a particular brand offered by the company (e.g., the XF is a model of the car brand Jaguar f Tata Motors). Each model can be offered with a variety of options, but an individual car may have only some (or none) of the available options, as well as information about individual dealers, customers, and cars.
Your design should include and E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.
b) Use Armstrong's axioms to prove the soundness of the decomposition rules. 3

8. a) Suppose that we decompose the schema $r(A,B,C,D,E)$ into 5

$$r1(A,B,C)$$

$$r2(A,D,E)$$

Show that this decomposition is a lossless decomposition if the following set F of functional dependencies holds:

$$A \rightarrow BC$$

$$CD \rightarrow E$$

$$B \rightarrow D$$

$$E \rightarrow A$$

- b) Consider the following two transactions: 7

T_{13} : read(A);

Read(B);

If $A=0$ then $B:=B+1$

Write(B).

T_{14} : read(B);

Read(A);

If $B=0$ then $A:=A+1$

Write(A).

Let the consistency requirement be $A=0 \vee B=0$, with $A=B=0$ the initial values.

i) Show that every serial execution involving these two transactions preserve the consistency of the database.

ii) Show a concurrent execution of T_{13} and T_{14} that produces a non-serializable schedule.

Time: 3 Hours

Full Marks: $5 \times 12 = 60$

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

1. (a) Define algorithm? Why is it important in solving computational problems? 3
 (b) What do you know about algorithmic complexity? Write the differences between "Big Theta" and "Big Omega" notation? 1+2
 (c) Discuss the repeat-until statement used in the algorithm with a proper example. 3
 (d) If $f(n) = a_m n^m + a_{m-1} n^{m-1} + \dots + a_1 n + a_0$, then prove that $f(n) = O(n^m)$. 3

2. (a) What do you know about divide-and-conquer strategy for algorithms? Solve the following recurrence relation for $a = 28, b = 3$ and $f(n) = cn^3$. 1+3

$$T(n) = \begin{cases} T(1) & n = 1 \\ aT(n/b) + f(n) & n > 1 \end{cases}$$

- (b) Write the quicksort algorithm to sort n elements using the divide and conquer strategy. 5
 (c) Show how the min-max algorithm is used to get the maximum and minimum from the dataset: 3
 51, 115, 8, 31, 41, 35, 122, 110, 5.
3. (a) Construct the string matching automation for the pattern **P=ababac** and illustrate its operation on the text string **T=ababababacba**. 4
 (b) Write down the advantages of preprocessing of text and pattern in string matching. 2
 (c) Write down the number of hits does the following string matching algorithms encounter in the text **T=acbcbccbc** when looking for the pattern **P=bccb** and also write down their procedure.
 (i) Naïve string matching
 (ii) KMP 6

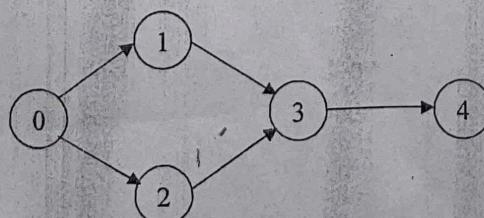
4. (a) Write the recursive backtracking algorithm to solve n -Queen problem. 4
 (b) Consider a sum of subset problem: $n = 4, (w_1, w_2, w_3, w_4) = (11, 13, 24, 7)$ and $m = 31$. 5
 Find all subset of w_i whose sums are m . Also, draw the possible solution space tree using fixed and variable tuple size formulation of this problem and indicate answer node. Indicate the nodes numbered in depth-first search manner of the one tree.
 (c) Draw a state space tree for mColoring when $n = 4$ and $m = 3$ where n represents number of nodes in a graph and m represents the number of colors. 3

5. (a) Define dynamic programming. Given two sequences of characters. Find out the length along with procedure of the longest common subsequence of both sequences. 4

- (i) a1b2c3d4e
 (ii) z1yy2xx3w4

- (b) Write down the minimum number of insert, remove or delete operations required to convert "cseb" to "cfcbk" with procedure. 4

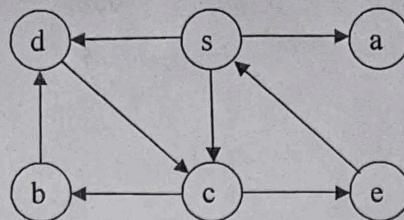
- (c) A topological sort or topological ordering of a directed graph is a linear ordering of its vertices such that for every directed edge u and v from vertex u to vertex v , u comes before v in the ordering. 4



Find out the topological ordering of the graph using Kahn's algorithm.

6. (a) Consider the following directed graph with unit weight.

6



- (i) Give the visited node order for breadth first search and depth first search, starting with 's'.
- (ii) Find the shortest path from source 's' to destination 'd'.
- (c) Consider the following adjacent list for directed graph.
 - $\text{adj}(y) = [x]$,
 - $\text{adj}(x) = [z]$,
 - $\text{adj}(z) = [y, w]$,
 - $\text{adj}(w) = [x]$,
 - $\text{adj}(s) = [z, w]$,
 - $\text{adj}(v) = [s, w]$,
 - $\text{adj}(t) = [u, v]$,
 - $\text{adj}(u) = [v]$.
 - (i) Construct a graph from the above information.
 - (ii) Identify the tree edge, back edge, cross edge and forward edge for the graph.

7. (a) What is the branch and bound method? Write the disadvantages of FIFOBB and LIFOBB. 4
How can you speed up the search procedure in FIFOBB and LIFOBB?
- (b) State Least Cost search technique. Write the algorithm of LC search technique. 4
- (c) Draw the portion of state space tree generated by the FIFO Branch-and-Bound technique for the job sequencing with deadlines instances $n = 4$,
 $(p_1, p_2, \dots, p_4) = (5, 10, 6, 3)$, $(t_1, t_2, \dots, t_4) = (1, 2, 1, 1)$, and $(d_1, d_2, \dots, d_4) = (1, 3, 2, 1)$.
Use fixed tuple size formulation to solve this problem. 4

- ✓ 8. (a) Define P, NP, NP-Hard and NP-complete problems with example. 4
3
- (b) Consider the following recurrence relation. +2

$$T(n) = \begin{cases} 2T(n/2) & n > 2 \\ 1 & n = 2 \\ 0 & n = 1 \end{cases}$$

When $n = 2^k$ for some positive integer k . Now prove that $T(n) = 3n/2 - 2$.

- (c) Explain - All NP-complete problems are NP-hard, but some NP-hard problems are not known to be NP-complete. 3
- (d) What do you know about decision problems and optimization problems? Give examples. 2

***** End *****