Bangabandhu Sheikh Mujibur Rahman Science and Technology University

Department of Computer Science and Engineering

3rd Year 2nd Semester B.Sc. Engineering Examination-2014

Course No: CSE-370 Course Title: Database Management Systems

Total marks: 70 Time: 4 hours.

N.B.

i. Answer **SIX** questions, taking any **THREE** from each section.
ii. All questions are of equal values
iii. Use separate answer script for each section

SECTION - A

1. (a) What do you mean by Database and Database Management System? What are the goals of a Database Management System? Explain briefly. 2+3⅔

(b) Explain the differences between physical and logical data independence. 2

(c) Describe different types of database-system users, differentiated by the way their interaction with the system. 4

2. (a) With examples define the terms Super Key, Candidate Key and Primary Key. 3

(b) Consider the following relational schema of employee database:

employee (person-name, street, city)
works (person-name, company-name, salary)
manages (person-name, manager-name)

Write down relational algebra for the following queries:

i. Find the names, street address, and cities of residence of all managers who work for City Bank Ltd. and earn more than BDT 100,000 per annum. 2⅔

ii. Modify the database so that the employee Rafiqul Alam now lives in Gopalganj city. 2

iii. Delete all tuples in the *works* relation for the employees of HSBC Bank Ltd. 2

iv. Find the number of employees in each company. 2

3. (a) Define DDL and DML. 2

Consider the following relational schema of employee database:

employee (person-name, street, city)
works (person-name, company-name, salary)
manages (person-name, manager-name)

Write down SQLfor the following queries:

(b) i. Define a table for the relation *works*. 2

ii. Insert the information in the database specifying that a new employee Towhidul Alam, street: 2/3, Motijheel in Dhaka city joined in Agrani Bank Ltd. with the salary BDT 130,000 per annum. 2⅔

iii. Find all the employees' name, street, company and salary in the database who live in the Khulna city. 2

iv. Give all employees of HSBC Bank Ltd. a 10 percent raise if the salary becomes greater than BDT 100,000; otherwise, give only a 5 percent raise. 3

4. (a) What are mapping cardinalities? Define them with example. 2⅔

(b) A university registrar's office maintains data about the following entities (a) Courses: including number, title, credits, syllabus, and prerequisites; (b) course Offerings: including 4

P.T.O

course number, year, semester, section number, instructor(s), timings, and classroom; (c) students: including student-id, name, and program; and (d) instructors: including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.

(c) Perform E-R to Relational Model mapping and construct appropriate tables for the above ~~car-insurance company~~ university database stated in 4(a). 3

(d) Explain the difference between a weak entity set and a strong entity set. 2

SECTION-B

5. (a) Define functional dependency. What are the design goals for relational database design? $2\frac{2}{3}$

(b) Consider the set of functional dependencies: F=(A→BC, B→C, A→B, AB→C) for the relational schema R = (A, B, C). 3+3

i. Find the candidate keys for R

ii. Compute the canonical cover F_c of R.

(c) What are the differences between BCNF and 3NF? 3

6. (a) What is normalization? What are the aims of normalization? 3

(b) A catering company offers different level of service and charges differently for each one. To hold the information of its customers as well as detail the service each one has ordered, the company keeps a database. Initial unnormalized relational schema (R) is as follows: $4\frac{2}{3}$

R=(ClientName, Address, Date, EmpNo, EmpName, Service, AmountDue)

The set of functional dependencies F is:

ClientName → Address
EmpNo → EmpName
Service → AmountDue
ClientName, Date → EmpNo, Service

Apply the normalization technique on the relational schema R in the most effective way possible.

(c) Consider the following authorization on *student* and *instructor* relations. Create appropriate roles and give authorizations to the users for Alice, Bob, Zafar, and Albert. 4

User	**Role**	**Relation/Table**	**Privileges**
Alice	Learner	student	SELECT
Bob			
Zafar	Faculty	student	SELECT, UPDATE
Albert		instructor	ALL PRIVILEGES

7. (a) What is the usefulness of indexing in DBMS? Classify different types of indices. 3

(b) Distinguish between primary and secondary indices. Explain the concept of multilevel indexing. 2+3

(c) What are the causes of bucket overflow in a hash file organization? What can be done to reduce the occurrence of bucket overflows? $3\frac{2}{3}$

8. (a) List the ACID properties of transaction. Explain each of them with example. 4

(b) During its execution, a transaction passes through several states. Draw the state diagram of transaction and define each of them briefly. 4

(c) What is a recoverable schedule? Why is recoverability of schedules desirable? $3\frac{2}{3}$

Bangabandhu Sheikh Mujibur Rahman Science and Technology University, Gopalgonj.

Department of Computer Science and ~~Technology~~ Engineering.

3rd Year 2nd Semester BSc Engineering Examination-2014

CSE350: Microprocessor and Assembly Language

Full Marks: 70 Times: 4 Hours

N.B.

i. Answer **SIX** questions, taking any **THREE** from each section.

ii. All questions are equal values.

iii. Use **separate answer script** for each section

SECTION-A

1.	a)	Write down features of 8086 microprocessor.	3.67
	b)	Draw and Explain the architecture of 8086.	5
	c)	How physical address calculation done in 8086? Give example.	3
2.	a)	What do you mean by segment address and offset address explain?	4
	b)	What is assembly language? What do you mean by opcode and operand?	3.67
	c)	What is an interrupt? How processors handle interrupt?	4
3.	a)	Discuss addressing modes of 8086 microprocessor.	5
	b)	Identify the following addressing mode using in 8086 microprocessor. i) MOV BX,0354H ii) ADD AL,[BX+04] iii) MOV AX,[BX+SI] iv) MOV AX,[BX+SI+04]	4
	c)	What are the purpose of status bits S3 and S4 in 8086 microprocessor?	2.67
4.	a)	Describe **PSW** or **FLAG** register in details in 8086 processor.	5
	b)	Describe each of the following instruction a) PUSH AX b) PUSH ESI c) PUSH [BX] d) PUSHFD e) POP DS f) PUSHD 4	3
	c)	What do you mean by timing diagram of any instruction explain with simple example.	3.66

SECTION-B

5	a)	What are the jump instructions used in Intel 8086 microprocessor? Describe five of them.	6
	b)	Describe rotation instruction of 8086? Give example of five rotation instruction.	5.67
6.	a)	Why stack used in a microprocessor?	3
	b)	Describe calling of a subroutine/procedure.	6
	c)	Write down advantages and disadvantages of assembly language.	2.67
7.	a)	Write the arithmetic operation used in 8086 microprocessor?	6
	b)	What do you mean by a microcontroller?	2
	c)	Differentiate microprocessor and micro controller.	3.67
8	a)	Describe different shift operation used in 8086 microprocessor.	6
	b)	How many pin usually a 8086 microprocessor contains? Describe some of them?	5.67

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
3rd Year 2nd Semester B.Sc. Engineering Examination-2014

Course No: CSE 362 **Course Title:** Operating Systems and System analysis
Full Marks: 70 **Time:** 4 hours

N.B.
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.
iii) Use separate answer script for each section.

SECTION-A

Q.1 (a) What is process? When should an OS create processes and when should an OS terminate processes? 3
(b) Explain System Call with appropriate figure in user program interacts with the Operating System. 4
(c) Define System Call. What is the purpose of system calls? 3
(d) Differentiate between a program and a process. $1\frac{2}{3}$

Q.2 (a) What is thread? Why do we need multiple threads instead of multiple processes? 3
(b) How does operating system manage threads? 3
(c) Describe different types of multithreading models. 4
(d) What are the advantages of thread pool? $1\frac{2}{3}$

Q.3 Five batch jobs A through E, arrive in alphabetical order at a computer center at almost the same time. They have estimated running times of 10, 29, 3, 7, and 12 minutes. Their priorities are 3, 5, 2, 1 and 4 respectively with 5 the highest priority. Consider the FCFS, SJF, a non-preemptive priority queue, and RR (Quantum = 10) scheduling algorithm for the given set of jobs.
(a) What is the turnaround time of each job? 4
(b) What is the waiting time of each job? 4
(c) Which algorithm would give the minimum average waiting time? $3\frac{2}{3}$

Q.4 (a) What is deadlock? When does deadlock occur and how can deadlocks be handled? $4\frac{2}{3}$
(b) Using the Banker's algorithm, determine if the following system is in deadlock. If it is, which process (es) are deadlocked? If not in deadlock, what is the safe sequence? You need to show all intermediate steps to get full marks. P_1– P_5 are processes, and A, B, C, D are resource types. 7

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_1	0	1	0	2	7	5	3	6	3	3	2	4
P_2	2	0	0	1	3	2	2	3				
P_3	3	0	2	1	9	0	2	1				
P_4	2	1	1	2	2	2	2	3				
P_5	0	0	2	1	4	3	3	4				

(i) Determine if a request from process P_2 of (1, 0, 2, 1) instances of resource A, B, C and D respectively will be granted immediately or not. Explain your answer.

(ii) After fulfilling the request of question (a), will the system grant request of P_1 (0, 2, 0, 3)?

SECTION-B

Q.5 (a) How Direct Memory Access works? Explain with an appropriate figure. 5
(b) How interrupts are handled? 4
(c) Draw the layers of the I/O system and the main functions of each layer. $2\frac{2}{3}$

Q.6 (a) Briefly describe the disk arm scheduling algorithms. 4
(b) (i) The disk queue contains the cylinder numbers containing the desire blocks. 5

Queue = 98, 183, 37, 122, 14, 124, 65, 67

Head starts at 53

Find the total head movements at FCFS, SSF, SCAN and Circular SCAN algorithms.

(c). What are the differences between logical and physical addresses? $2\frac{2}{3}$

Q.7 (a) Describe different kinds of file structure with proper figure. 3

(b) Suppose a desk has average seek time 2ms, rotational speed 10,000 rmp. There are 512 bytes per sector and 320 sectors per track. If we need to read file with 2560 sectors (= 1.3MB) then which one is better? Fragmented reading or Contiguous reading? Justify our answer. 5

(c) Why we use Redundant Array of Independent Disks (RAID)? Describe the advantages and disadvantages of RAID 0, RAID 1 and RAID 2 $3\frac{2}{3}$

Q.8 (a) What is critical section problem? Write three requirements that a critical section problem must satisfy? 3

(b) You know that your computer is affected by different kinds of virus. Using appropriate figure describe the procedure how virus works. $3\frac{2}{3}$

(c) What are the advantages of using Inodes? Suppose the block numbers are of 4 bytes length and the block size is 1KB. If the directed block is 12 and used single, double and triple indirect block, what will be the maximum file size? 5

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Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
3rd Year 2nd Semester B.Sc. Engineering Examination-2014
Course No. : CSE350, Title: System Analysis and Design

Full Marks: 70 Times: 4 Hours

N.B.:
i. Answer **SIX** questions, taking any **THREE** from each section.
ii. All questions are of equal values
iii. Use **separate answer script** for each section.

Section- A

1.	a) Define system with example. Mention the three basic implication of system concepts.	4
	b) Discuss the characteristics of a system.	3.67
	c) Distinguish between a physical and abstract system.	4
2.	a) Define system analyst.	1
	b) What is SDLC? Describe its steps in brief.	5
	c) Write down the roles of system analyst.	2.67
	d) Summarize the necessary skils of a system analyst?	3
3.	a) Where does information originate?	1.67
	b) List and explain the steps in interviewing.	5
	c) Describe the major varieties of closed questions.	5
4.	a) What is structured analysis? Write down the attributes of it.	4
	b) What is DFD? What are the symbols used in drawing DFD?	3
	c) What is data dictionary? Why is it used?	2
	d) Briefly explain the concept of decision tree.	2.67

Section - B

5.	a) What is feasibility study? Write down the steps of feasibility study.	4
	b) Illustrate the key considerations that are involved in feasibility study.	3
	c) What cost elements are considered in cost/benefit analysis? Which element do you think is the most difficult to estimate? Why?	3
	d) What is present value of $5000 invested at 20 percent interest for five years.	1.67
6.	a) What is a form? Classify and distinguish each of the form.	5
	b) Discuss briefly the requirements of form design.	3
	c) What design methodology is used in system design? Explain.	3.66
7.	a) Why do we test systems?	2
	b) Write down the steps of system testing.	1.67
	c) Briefly describe the factors that affect the quality of a system.	5
	d) Explain the levels of quality assurance of a system.	3
8.	a) What is implementation? Write down the steps of conversion.	3
	b) What software criteria are considered for selection? Summarize.	4
	c) Why do system fail?	2.67
	d) What is system security? List the potential threats.	2

Bangabandhu Sheikh Mujibur Rahman Science and Technology University

Department of Computer Science and Engineering

3rd Year 2nd Semester B.Sc. Engineering Examination-2014

Course No: CSE-352 Course Title: E-Commerce and Web Engineering

Total marks: 70 Time: 4 hours.

N.B.

i. Answer **SIX** questions, taking any **THREE** from each section.
ii. All questions are of equal values
iii. Use separate answer script for each section

SECTION - A

1. (a) Define E-commerce. Distinguish between traditional commerce and e-commerce. 4

(b) Classify different types of e-commerce business models and explain them briefly. 5

(c) Identify the major limitations of e-commerce. $2\frac{2}{3}$

2. (a) What is m-commerce? What makes m-commerce so appealing? 3

(b) List various e-commerce payment systems. Show the steps of credit card payment process. 4

(c) What are the major security requirements for e-commerce? List and define the popular protocols used over the internet which ensures security of transactions made over the internet. $1\frac{2}{3}$ +3

3. (a) Define Web Engineering. Explain, "Web engineering is multidisciplinary". 4

(b) What do you mean by web application? Categorize web applications with examples of each. 5

(c) Compare between web 2.0 and web 3.0. $2\frac{2}{3}$

4. (a) What is HTTP? Describe HTTP request-response behavior briefly. 4

(b) Explain why DNS is not centralized? Describe how does DNS work? 1+ 3

(c) Write the steps to show how search engine works. $3\frac{2}{3}$

SECTION-B

5. (a) Describe the role of XML namespaces. 3

(b) Why proxy server or web caching is used? Explain what happens when a URL is requested by a browser that is configured to use a proxy. $1\frac{2}{3}$ + 3

(c) Write an XML schema representation for the following two tables in bank database: 4

Table 1: Customer

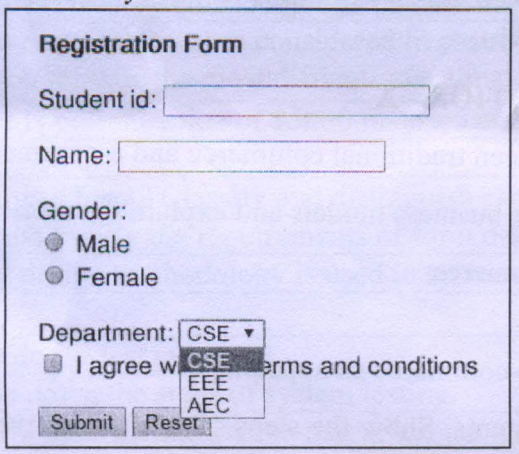
id	name	telephone	city
002001023	Johnson	+88012358623	Khulna
002001023	Hayes	+88012698625	Gopalganj

Table 2: Employee

id	name	position	telephone
201203035	Lindsay	Sr. Officer	+88013358620
201203036	Smith	Manager	+88013358621

6. (a) Define: HTML, HTML tag and HTML element. 3

(b) Write only HTML code for the following registration form of the students: 5



(c) How do you make a picture/image a link? 2

(d) What is the purpose of HTML meta tag? $1\frac{2}{3}$

7. (a) What is CSS? Explain the three main ways to apply CSS styles to a webpage. $3\frac{2}{3}$

(b) What is a Class selector and how does it differ from an ID selector? 3

(c) Explain CSS Box Model. 2

(d) Create the following horizontal menu using proper HTML and CSS. 3

Home	News	Sport	Wheather

8. (a) Why PHP is called a Loosely Typed Language? 2

(b) How to connect a MySQL database with PHP on a HTML page? Write down the required steps with PHP codes. 4

(c) Perform the following steps in PHP: 3

- Design a PHP class: 'person' with different methods 'set_name' and 'get_name'
- Create two objects based on the class.
- Insert data into your objects.
- Retrieve data from your objects.

(d) Distinguish between PHP $_GET and $_POST functions with an example. $2\frac{2}{3}$