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Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
3rd Year 1st Semester B.Sc. Engineering Examination-2016
Course No: CSE 302 Course Title: Operating System and System Programming
Total Marks: 60 Time: 3 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 is operating system? "An operating system is similar to a government"-justify this statement with proper sketching. 4

   b) Describe the differences between multiprogramming and multitasking operating systems. 3

   c) Mention set of OS functions exists for ensuring the efficient operation of the system itself via resource sharing. 3

2. a) What do you mean by process and process control block? Show a process control block for a particular process. 4

   b) Consider the following set of processes, with the length of the CPU burst given in milliseconds: 6

Process	Burst time	Arrival time
P_1	10	0
P_2	4	1
P_3	5	3
P_4	3	5
P_5	6	4

   i) Draw the Gantt chart that illustrates the execution of these processes using the SJF scheduling algorithm.
   ii) Find the response and waiting times of each process for SJF scheduling algorithm.

3. a) Draw the resource-allocation graph for the following criteria: 5
   The sets P, R, and E:
   $P = \{P_1, P_2, P_3\}$
   $R = \{R_1, R_2, R_3, R_4\}$
   $E = \{P_1 \rightarrow R_1, P_2 \rightarrow R_3, R_1 \rightarrow P_2, R_2 \rightarrow P_2, R_2 \rightarrow P_1, R_3 \rightarrow P_3, P_3 \rightarrow R_4, R_4 \rightarrow P_2\}$
   Resource instances: $R_1 = 1$, $R_2 = 2$, $R_3 = 1$, $R_4 = 4$.
   Is there exist deadlock?

   b) "A cycle in the graph is a necessary but not a sufficient condition for the existence of deadlock"-explain this by drawing the required resource-allocation graph. 5

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4. a) What is demand paging? Given that the reference string is 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 and page frames are 3. Execute the optimal page replacement algorithm. 6

   b) Explain different types of scheduling queues and types of schedulers. 4

Section-B

5. a) "Processes migrate among the various queues"-describe this by defining process migrates which queue to which queue and when. 3.5

   b) What do you mean by page-faults? When do page-faults occur? Describe the action taken by the OS when page-fault occurs? 4.5

   c) Which CPU scheduling algorithms could result in starvation and convoy effect? 2

6. a) What is safe state? Write down the safety algorithm for deadlock avoidance. 4

   b) Consider a system with five processes p_0 through p_4 and three resource types A, B, C have 10, 5, 7 instances respectively. At time T_0, the following snapshot of the system has been taken: 6

	Allocation			Max		
	A	B	C	A	B	C
P_0	0	1	0	7	5	3
P_1	2	0	0	3	2	2
P_2	3	0	2	9	0	2
P_3	2	1	1	2	2	2
P_4	0	0	2	4	3	3

   i) Find the contents of matrix available and need.
   ii) Can request for (1, 0, 2) by P_1 be granted or not?

7. a) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory? 5

   b) Explain the different operations performed on files. 2

   c) What do you mean by 80% hit ratio? Consider the hit ratio is 75% and if it takes 30 nanoseconds to search the TLB and 90 nanoseconds to access memory. Find the effective memory-access time (EAT). 3

8. a) What is Belady's Anomaly? Explain it. 5

   b) Why thread is called light weight? Explain with proper examples. 2

   c) Explain the functions of various process schedulers. 3

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Course No: CSE 300 Course Title: System Analysis and Design
Total Marks: 60 Time: 3 Hours

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) "Data may be inputted to a system for producing information"-explain this statement briefly. 2
   b) The management structure of an organization is pyramid; describe it with appropriate diagrams. 4
   c) Describe the block diagram for master file creation. 2
   d) How many information should have to use by an organization? 2

2. a) Let you are a system analyst; you have to analyze & design the information system of BSMRSTU; now describe the steps of system life cycle according to the BSMRSTU. 7
   b) Briefly describe the responsibilities of an information systems analyst. 3

3. a) Think you are a system analyst; you have to analyze & design the information system of BSMRSTU; So you have to take interview of perspective persons from BSMRSTU; now you should point out the techniques for interview. 5
   b) Mention the information sources according to the department of CSE of BSMRSTU. 3
   c) List the qualities of information. 2

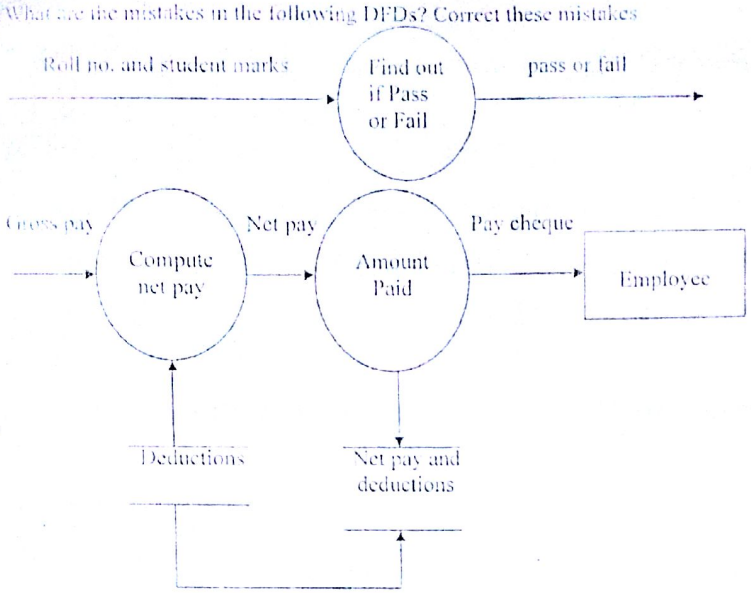
4. a) What academic qualifications are important for systems work? Explain. 2
   b) What is feasibility study? Write down the steps of feasibility study. 4
   c) Consider you are a member of receiving office of an organization; you have to receive the pre-ordered items from the vendors; now draw the DFD for receiving process. 4

Section-B

5. a) What do you mean by cost-benefit analysis? List the direct costs and indirect costs. 3
   b) A system costs 1.00 lakhs taka to install and 30,000 taka per month as recurring expenses. The benefit per month is 31,740 taka. Assuming an interest rate of 1.5%. What is the payback period of the investment? 5
   c) Give two examples of tangible and intangible benefits. 2

6. a) Draw the physical and logical DFDs for the following activity: 4
   "Getting your mark sheet from BSMRSTU."
   b) What is a context diagram? 1

6. (a) What are the mistakes in the following DFDs? Correct these mistakes 3



(b) Distinguish between a physical and a logical DFD. 2

7. (a) Briefly explain the process specification methods that are used to express computational procedures. 2

(b) An organization maintains the following policies to provide discount of the customers. Give a discount of 5% if the customer pays advance or if the purchase is for 10,000 or more and the customer is a regular customer. Write the above process using Structured English 5

(c) What is the difference between security and privacy? Do secure systems ensure privacy? 3

8. (a) Discuss the concepts of MIS and DSS. How are they related? How do they differ? 5

(b) Add a modulus-11 check digit to the code: 48467 2

(c) What are the primary objectives of control? Are there exists any differences between control and audit? If yes, you should write the differences; if no, you should limit your answer within no. 3

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
3rd Year 1st Semester B.Sc. Engineering Examination-2016

Course No: CSE 312 — Course Title: Computer Networks
Full Marks: 60 — Time: 3 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)	Discuss Open System Interconnection (OSI) layer model using appropriate figure.	6
	(b)	An organization is granted the block 211.171.80.0/24. The administrator wants to create 64 subnets. i. Find the subnet mask. ii. Find the number of addresses in each subnet. iii. Find the first and the last address in the first subnet. iv. Find the first and the last address in the last subnet (subnet 64).	4
Q.2	(a)	Give some advantages and disadvantages of connection oriented and connectionless service.	3
	(b)	An ISP is granted a block of addresses starting with 168.120.0.0/16. The ISP needs to distribute these addresses to four groups of customers as follows: i. The first group has 20 customers: each needs 256 addresses. ii. The second group has 80 customers: each needs 128 addresses. iii. The third group has 40 customers: each needs 64 addresses. iv. The fourth group has 80 customers: each needs 32 addresses Design the subblocks and find out how many addresses are still available after these allocation.	7
Q.3	(a)	What is the difference between forwarding and routing?	3
	(b)	Discuss the various channel partitioning (multiplexing) mechanisms used to access the channel.	3.5
	(c)	A host with IP address 137.23.56.23/16 sends a packet to a host with IP address 142.3.6.9/24. Is the delivery direct or indirect? Assume no subnetting.	3.5
Q.4	(a)	Why we need data compression? Briefly Describe different data compression methods.	5
	(b)	A router with IP address 125.45.23.12 and Ethernet physical address 23:45:AB:4F:67:CD has received a packet for a host destination with IP address 125.11.78.10 and Ethernet physical address AA:BB:A2:4F:67:CD. i. Show the entries in the ARP request packet sent by the router. Assume no subnetting. ii. Show the entries in the ARP packet sent in response to part a. iii. Encapsulate the packet mane in part a in a data link frame. Fill in all the fields.	5

SECTION-B

Q.5	(a)	Is registration required if the mobile host acts as a foreign agent? Explain your answer.	2.5
	(b)	Discuss different kinds of data control techniques in noisy channel.	4.5
	(c)	We would like to send a file of 2.56 Mega bits from Host A to Host B over a circuit switched network. Suppose that all links in the network use TDM with 48 slots and have a bit rate of 1.536 Mbps. Here circuit-to-circuit connection established time is 0.4s. How long does it take to send the file?	3
Q.6	(a)	Explain the following multiple Access method. a. ALOHA b. CSMA / CD	4
	(b)	A pure ALOHA network transmits 400-bit frames on a shared channel of 100 kbps. What is the throughput if the system (all stations together) produces i. 500 frames per second ii. 800 frames per second.	3
	(c)	What are the differences between persistent and non-persistent HTTP?	3
Q.7	(a)	What is the maximum size of the TCP header? What is the minimum size of the TCP header?	2
	(b)	Discuss three way handshaking using appropriate figure.	5
	(c)	What are the motivations of using sliding window?	3
Q.8	(a)	What is controlled access? Discuss different kinds of controlled access.	4
	(b)	Find the chips for a network with i.Two stations ii. Four stations iii.What is the number of sequences if we have 190 stations in our network?	3
	(c)	A DNS client is looking for the name of the computer with IP address 132.1.17.8. Show the query message.	3

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Department of computer Science & Engineering
3rd Year 1st Semester B.Sc. Engg. Examination-2016
Course No.: CSE320 Course Name: Database Management System

Marks: 60 Times: 3 Hours

N.B.
1. Answer SIX questions, taking any THREE from each section.
2. All questions are of equal values.
3. Use separate answer script for each section.

Section A

1. a) What do you mean by Database and Database Management System? 2
   b) Distinguish between the DDL and DML with example. 3
   c) Write about the following two problems for the file based system 2
      i) Integrity problems ii) Atomicity problems
   d) For what cases the DBMS should not be used. 3

2. a) Define super key and candidate key. 2
   b) Differentiate between generalization and specialization with example. 2
   c) Define the left outer join and right outer join. Compute the full outer join operation for the relation R1 and R2 given below- 4

R1

A	B	C
a1	b1	c1
a3	b2	c2

R2

D	A	F
d1	a1	f1
d1	a2	f2

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

3. a) What is Data dictionary? 1
   b) Differentiate reserved space and list representation. 2
   c) What is RAID? Explain RAID levels in briefly 4
   d) What are possible ways of organizing the records in files? What does reorganization do? 3

4. a) What is entity relationship model? 1
   b) Define the following: 3
      i. Composite attribute
      ii. Multivalued attribute
      iii. Derived attribute
   c) Define mapping cardinalities. Discuss each type of mapping cardinalities. 4
   d) Why will you use percent and underscore in SQL? 2

Section B

5. a) Briefly describe the main parts of SQL. 3
   b) What is aggregate function? Discus different types of aggregate function. 3
   c) Consider the relational database of Figure-1, where the primary keys are underlined. 4

TRAIN (Name, Start, Destination)
TICKET (PNR_NO, Start, Destination, Fare)
PASSENGER (Name, Address, PNR_NO)

Figure-1

Write SQL expressions for the following queries:

(i) List the names of passengers who are travelling from the start to the destination station of the train.
(ii) Insert a new Karnaphuli train from Rajshahi to Dhaka.
(iii) Cancel the ticket of Gorky.
(iv) Find the name of all passengers whose address includes the substring "Raj".

6. a) What is Database Normalization? 1

b) What do you know about functional dependency and data redundancy? 2

c) Explain what is meant by repetition of information, inability to represent information and loss of information. Explain why each of these properties may indicate a bad relational database design. 4

d) What do you know about third normal form? Explain briefly. 3

7. a) What is Thomas' Write Rule? 1

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

c) Differentiate between Two-Phase locking and Strict Two-Phase Locking. 2

d) How does Log-based recovery work? 3

8. a) What are data replication and data fragmentation? 2

b) Differentiate between homogeneous and heterogeneous database system. 3

c) Describe several architectural models for parallel machines. 5