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06CS52

Fifth Semester B.E. Degree Examination, June 2012
System Software

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Explain the instruction formats and addressing modes of SIC/XE machine. (10 Marks)
- b. Write a program in both SIC and SIC/ XE to copy a character string 'system software' to another string. (10 Marks)

- 2 a. Explain the five fundamental functions of an SIC assembler. (05 Marks)
- b. Explain the data structures used in assembler algorithms. (05 Marks)
- c. Generate the object code for each statement and write the object programs for the following SIC/XE program.
(Given that : LDX = 04, LDA = 00, LDB = 68, ADD = 18, TIX = 2C, JLT = 38, STA = 0C, RESUB = 4C).

SUM	START	O
FIRST	LDX	# O
	LDA	# O
	+LDB	# TABLE 2
	BASE	TABLE 2
LOOP	ADD	TABLE, X
	ADD	TABLE2, X
	TIX	COUNT
	JLT	LOOP
	+STA	TOTAL
	RSUB	
COUNT	RESW	1
TABLE	RESW	2000
TABLE2	RESW	2000
TOTAL	RESW	1
	END	FIRST

(10 Marks)

- 3 a. List the machine independent features of assembler. Explain any two. (10 Marks)
- b. Explain the features of load-and-go assembler. (05 Marks)
- c. Compare MASM assembler with SIC assembler. (05 Marks)

- 4 a. Write the code for boot strap loader. Explain briefly. (05 Marks)
- b. Explain the data structures used in linking loaders. (05 Marks)
- c. State and explain the various loader design options. (10 Marks)

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PART – B

- 5 a. Explain the four tasks involved in user–computer–dialogues of an editing system. (04 Marks)
b. Explain the editor structure, with diagram. (08 Marks)
c. Explain the debugging functions and capabilities of interactive debugging system. (08 Marks)
- 6 a. Explain the data structures involved in macroprocessor algorithms. (06 Marks)
b. Write an algorithm for one–pass macroprocessor. (08 Marks)
c. Explain the features of general purpose macroprocessors. (06 Marks)
- 7 a. Explain the three basic sections of a LEX program. (06 Marks)
b. Write a LEX program to count number of words, characters and lines in a given file. (06 Marks)
c. Explain the following regular expressions, with example :
i) [] ii) { } iii) / iv) (). (08 Marks)
- 8 a. Define YACC tools. What are two types of conflicts in YACC? Give examples. (10 Marks)
b. Write a YACC program to validate a simple arithmetic expression involving operators +, -, *, /. (10 Marks)

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06CS53

Fifth Semester B.E. Degree Examination, June 2012
Operating Systems

Time: 3 hrs.

Max. Marks: 100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1. a. What is an operating system? Bring out the requirements of,
 - i) Real time operating systems. (10 Marks)
 - ii) Distributed operating systems. (10 Marks)
- b. What are system calls? Explain the different categories of the system calls. (10 Marks)
2. a. Explain the process states with a diagram. What is the need for a context switch? (07 Marks)
- b. What are the differences between user level threads and kernel supported threads? (05 Marks)
- c. For the following example calculate average waiting time and average turn around time by using FCFS, preemptive SJF and RR (1 time unit) CPU scheduling algorithms. (08 Marks)

Jobs	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

3. a. What is critical section problem? How does a semaphore solve the critical section problem? Discuss whether semaphores satisfy the three requirements for a solution to the critical section problem. (08 Marks)
- b. What are monitors? Explain with an example program request. (04 Marks)
- c. Describe the monitor solution to the classical dining philosopher's problem. (08 Marks)
4. a. What is deadlock? Explain the necessary conditions for its occurrence. (06 Marks)
- b. Explain with an example how resource allocation graph is used to describe the deadlock. (06 Marks)
- c. System consists of five processes (P₀, P₁, P₂, P₃, P₄) and three sources (R₁, R₂, R₃). Resource type R₁ has 10 instances, resource type R₂ has 5 instances and R₃ has 7 instances. The following snapshot of the system has been taken:

Jobs	Allocation			Max			Available		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃
P ₀	0	1	0	7	5	3	3	3	2
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			

Calculate the content of matrix need and find out safe sequence by using Banker's algorithm. (08 Marks)

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PART – B

- 5 a. Distinguish between :
- i) Logical address space and physical address space.
 - ii) Internal fragmentation and external fragmentation. (06 Marks)
 - iii) Paging and segmentation. (10 Marks)
- b. Explain with the help of supporting hardware diagram how the TLB improves the performance of a demand paging system. (04 Marks)
- c. Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) how would each of the first fit, best fit and worst fit algorithms work place processes of 212 K, 417 K, 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory? (05 Marks)
- 6 a. Explain the different types of files. (08 Marks)
- b. Name the different file allocation methods. Explain the linked allocation of file implementation with merits and demerits. (07 Marks)
- c. Define file system. Explain the different directory structure. (10 Marks)
- 7 a. What is disk scheduling? Explain any 3 disk scheduling methods with examples. (05 Marks)
- b. What is swap space management? Explain. (05 Marks)
- c. What is access matrix? Explain access matrix with domains as objects. (06 Marks)
- 8 Write short notes on the following:
- a. Process management in Linux. (08 Marks)
 - b. Page replacement algorithms. (06 Marks)
 - c. Steps in handling a page fault. (06 Marks)

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06CS54

Fifth Semester B.E. Degree Examination, June 2012

Database Management Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Discuss the main characteristics of the database approach. How does it differ from traditional file systems? (10 Marks)
- b. Explain the component modules of DBMS and their interaction, with the help of a diagram. (10 Marks)
- 2 a. With a diagram, describe the three schema architecture of database systems. (04 Marks)
- b. Discuss with examples, different types of attributes. (06 Marks)
- c. Design an ER diagram for keeping track of information about a hospital database taking into account atleast four entities. (10 Marks)
- 3 a. Consider the following two tables T_1 and T_2 . Show the results of the following operations. (Assume T_1 and T_2 are union compatible).

P	Q	R
10	a	5
15	b	8
25	a	6

A	B	C
10	b	6
25	c	3
10	b	5

- i) $T_1 \bowtie_{T_1.P=T_2.A} T_2$
- ii) $T_1 \bowtie_{T_1.P=T_2.A} T_2$
- iii) $T_1 \bowtie_{T_1.P=T_2.A \text{ AND } T_1.R=T_2.C} T_2$
- iv) $T_1 \cup T_2$
- v) $T_1 \bowtie_{T_1.Q=T_2.B} T_2$ (10 Marks)
- b. Give the ER to relational mapping algorithm. Discuss each step, with an example. (10 Marks)
- 4 a. Consider the following schema :
 SAILORS (sid, sname, rating, age)
 BOATS (bid, bname, color)
 RESERVES (sid, bid, day)
 Write the queries in relational algebra to :
 - i) Find the names of sailors who have reserved boat number '103'.
 - ii) Find the names of sailors who have reserved a 'red' and a 'green' boat.
 - iii) Find the names of sailors who have reserved at least one boat.
 - iv) Find the names of sailors with age over 20 years, who have not reserved a red boat. (12 Marks)
- b. Explain IN and EXISTS operators of SQL with suitable examples. (08 Marks)

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PART – B

- 5 a. How is a 'view' created and dropped? What are the problems associated with updation of views? (10 Marks)
b. What is embedded SQL? With an example, illustrate how would you connect to a database, fetch records and display. Also explain the concept of stored procedure, in brief. (10 Marks)
- 6 a. What is a functional dependency? Write an algorithm to find the minimal cover for a set of functional dependencies. (10 Marks)
b. Why normalization is required? Explain the first, second and third normal forms with an example. (10 Marks)
- 7 a. Explain multivalued dependency and fourth normal form, with an example. (10 Marks)
b. What are ACID properties? Explain. (06 Marks)
c. Write and explain two phase locking protocol. (04 Marks)
- 8 a. What is write-ahead logging? What is forced to disk at the time a transaction commits? (06 Marks)
b. Write and explain time stamp based ordering algorithm. (08 Marks)
c. Write a note on check pointing. (06 Marks)

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06CS55

Fifth Semester B.E. Degree Examination, June 2012
Computer Networks – I

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

- 1 a. What is data communication? What are the four important fundamental characteristics? (06 Marks)
- b. What is a protocol? Briefly explain its key elements. (05 Marks)
- c. Explain the responsibilities of transport layer in OSI reference model. (09 Marks)
- 2 a. Define bandwidth. A periodic signal has bandwidth of 20Hz. The highest frequency is 60Hz. What is the lowest frequency? Draw the spectrum if the signal contains all frequencies of the same amplitude. (04 Marks)
- b. Calculate the Shanon channel capacity in the following cases :
i) Bandwidth = 20 kHz $SNR_{dB} = 40$; ii) Bandwidth = 200 kHz $SNR_{dB} = 6$. (06 Marks)
- c. Define line coding. Describe unipolar NR2, polar NR2–L, bipolar AMI and Manchester encoding by applying on the information sequence 101011100. (10 Marks)
- 3 a. An analog signal has a bit rate of 8000 bps and a band rate of 1000 band. How many data elements are carried by each signal element? How many signal elements do we need? (05 Marks)
- b. Explain phase modulation with a neat diagram. (05 Marks)
- c. What is time division multiplexing? Explain how statistical TDM overcomes the disadvantages of synchronous TDM. (10 Marks)
- 4 a. Briefly explain the coaxial cable and optical fiber with their applications. (08 Marks)
- b. Find the codeword, using CRC given data word “1001” and generator “1011”. (06 Marks)
- c. What is internet checksum? With an example list the steps undertaken by the sender and receiver for error detection. (06 Marks)

PART – B

- 5 a. Explain selection repeat ARQ with neat diagrams. (08 Marks)
- b. What is piggybacking? List its usefulness. (04 Marks)
- c. Explain the frame format and transitional phases of point-to-point protocol. (08 Marks)
- 6 a. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system produces 1000 frames per second. (06 Marks)
- b. With a neat diagram explain CSMA/CD protocol. (08 Marks)
- c. Explain the MAC sublayer of gigabit Ethernet (06 Marks)
- 7 a. Explain the architecture of IEEE 802.11. (08 Marks)
- b. Differentiate between repeater and amplifier. (02 Marks)
- c. How does a VLAN reducer network traffic? (04 Marks)
- d. Differentiate between bus backbone and star backbone. (06 Marks)
- 8 a. Explain in detail, the architecture of a SONET system. (10 Marks)
- b. Give the architecture of ATM. Show how VPs and VCs are established. (06 Marks)
- c. Write a short note on AMPS. (04 Marks)

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- 4 a. Design CFG for the following :
Set of all strings of O's and 1's, whose number of O's equal to number of 1's. (06 Marks)
- b. Consider the grammar $S \rightarrow s b s / a$. This grammar is ambiguous: show that particular string $aba ba ba$ has two
- Parse trees
 - Left most derivations
 - Right most derivation. (10 Marks)
- c. Write any one application of CFG with example. (04 Marks)

PART - B

- 5 a. Design a PDA P to accept language L_{ww^r} . Show that how PDA accepts string 1111 with TD. (10 Marks)
- b. Prove that for a PDA P there exist CFG such that $L(G) = N(P)$. (10 Marks)
- 6 a. Consider the grammar
 $S \rightarrow ASB/\epsilon$
 $A \rightarrow aAS/a$
 $B \rightarrow sbs/bb$
- Eliminate useless symbols
 - Eliminate ϵ - productions
 - Eliminate unit productions
 - Put the grammar into CNF. (10 Marks)
- b. If L_1 and L_2 are CFL, then prove that family of context free languages are closed under union and combination. (10 Marks)
- 7 a. What is Turing machine and multi tape Turing machine? Show that languages accepted by these machines are same. (10 Marks)
- b. Design Turing machine to accept the language consisting of all palindromes of O's and 1's. (10 Marks)
- 8 Write short notes on :
- Recursive languages
 - Post's correspondence problems
 - Universal Turing machine
 - Language that is not recursively enumerable. (20 Marks)

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06IS51

Fifth Semester B.E. Degree Examination, June 2012
Software Engineering

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the types of software process model. (05 Marks)
b. What are professional and ethical responsibility of software engineering? (05 Marks)
c. Differentiate between technical computer based system and socio–technical system. (05 Marks)
d. With a relevant figure, bring out different disparities involved in software engineering. (05 Marks)
- 2 a. Explain the concept of safety and security in system. (08 Marks)
b. Bring out the different factors of system dependability. (06 Marks)
c. Explain the software specification, with neat diagram. (06 Marks)
- 3 a. Briefly list out eh non–functional requirements of software system. (10 Marks)
b. Explain the requirement engineering process, with relevant figures. (10 Marks)
- 4 a. Explain the different system models which can be created during analysis process. (10 Marks)
b. Explain the management activities of a software manager. (10 Marks)

PART – B

- 5 a. What is need of architectural design decision? List out different models that can be developed. (08 Marks)
b. Describe the concept of client – server model with a neat diagram. (06 Marks)
c. Explain the centralized control model. (06 Marks)
- 6 a. Explain the principles of agile methods. (08 Marks)
b. Explain the different types of software maintenance. (06 Marks)
c. Explain the software evolution process. (06 Marks)
- 7 a. With a neat diagram, explain the inspection process. (08 Marks)
b. Explain the stages involved in automatic static analysis. (06 Marks)
c. Explain the performance testing. (06 Marks)
- 8 a. Describe the four factors of people management. (05 Marks)
b. Explain the Maslow concept of motivating people (05 Marks)
c. Describe the cost estimation techniques, with relevant example. (10 Marks)

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