V CS, IS S

USN | | | | | | | | | | **10IS51**

Fifth Semester B.E. Degree Examination, June/July 2015
Software Engineering

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. What is Software Engineering?   **(02 Marks)**
   b. List the attributes of good software system and key challenges facing software engineering.
                                                                                      (10 Marks)
   c. What are legacy systems? Explain components of legacy systems.   **(08 Marks)**

2 a. Explain dimensions of dependability properties and system properties that are related to dependability.   **(08 Marks)**
   b. Explain the approaches to improve reliability.   **(03 Marks)**
   c. With figure explain the phases of RUP.   **(05 Marks)**
   d. Explain testing phases with figure.   **(04 Marks)**

3 a. Distinguish between functional and non functional requirements with example.   **(04 Marks)**
   b. Explain the types of non functional requirements with example.   **(06 Marks)**
   c. Identify the stakeholders of ATM system and classify them according to viewpoints.
                                                                                      (10 Marks)

4 a. Explain any 2 types of object models in detail.   **(08 Marks)**
   b. Explain state machine model of micro oven.   **(06 Marks)**
   c. Differentiate between milestones and deliverables.   **(02 Marks)**
   d. List the activities of risk management with figure.   **(04 Marks)**

PART – B

5 a. Explain client server architecture with example.   **(06 Marks)**
   b. Explain with figures centralized control and event driven systems.   **(10 Marks)**
   c. List the proposals made about how to identify object classes.   **(04 Marks)**

6 a. What is pair programming? Write its advantages.   **(04 Marks)**
   b. What is extreme programming? List principles of agile method.   **(06 Marks)**
   c. Explain activities involved in reengineering process with figure.   **(10 Marks)**

7 a. Write the difference between verification and validation.   **(10 Marks)**
   b. Explain the clean room software development process with figure in detail.   **(05 Marks)**
   c. List classes of interface errors.   **(05 Marks)**

8   Write short notes on the following:
   a. Factors governing staff selection.
   b. PCMM levels
   c. Submodels of COCOMO II
   d. Maslow's hierarchy of needs.   **(20 Marks)**

* * * * *

Fifth Semester B.E. Degree Examination, June/July 2015
Systems Software

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Give any two differences between SIC and SIC/XE machine architecture.   **(04 Marks)**
     b.   Explain in detail the architecture of a SIC/XE machine.   **(10 Marks)**
     c.   Write a subroutine in SIC/XE to read a 100-byte record from a device 'F5' into BUFFER use immediate and register-to-register instructions.   **(06 Marks)**

2   a.   What is a forward reference? How to solve this forward reference in assembler?   **(04 Marks)**
     b.   What are the 3 different records used in object program and write their formats?   **(06 Marks)**
     c.   Generate the object code for the instructions shown below: **(10 Marks)**

1) 0006 CLOOP	+JSUB	RDREC
2) 0017	J	CLOOP
3) 0020	LDA	#3
4) 103C	+LDT	#4096
5) 002A	J	@RETADR

Note: JSUB = 8, J = 3C, LDA = 00, LDT = 74, RDREC = 1036, RETADR = 0030

3   a.   Enlist the various machine independent assembler features.   **(05 Marks)**
     b.   With suitable example, explain the use of LTORG assembler directive.   **(05 Marks)**
     c.   Explain the multi pass assembler with example.   **(10 Marks)**

4   a.   What are basic functions of a loader? Develop an algorithm for a bootstrap loader.   **(10 Marks)**
     b.   What is the difference between linkage editor and linking loader?   **(04 Marks)**
     c.   Explain various data structures used for a linking loader.   **(06 Marks)**

PART – B

5   a.   Explain the relationship between editing and viewing buffers with relevant diagram.   **(10 Marks)**
     b.   Differentiate between tracing and traceback functions in a debugging system.   **(04 Marks)**
     c.   Mention the different precessions for future assembler and compiler consistent interface with debugging system.   **(06 Marks)**

6   a.   List the different tables used for a macroprocessor. Explain their functions.   **(08 Marks)**
     b.   Explain with example, concatenation of macro parameter and generation of unique lables.   **(12 Marks)**

7   a.   Explain the structure of LEX specification with example.   **(10 Marks)**
     b.   What is symbol table? Write a LEX program to implement symbol table.   **(10 Marks)**

8   a.   What is YACC? Explain the different sections used in writing the YACC specification.   **(10 Marks)**
     b.   Explain conflicts in YACC with example.   **(05 Marks)**
     c.   Write YACC program to check whether the given string $b^n a^n (n > 0)$ is accepted by grammar or not.   **(05 Marks)**

* * * * *

Fifth Semester B.E. Degree Examination, June/July 2015
Operating Systems

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. What are the activities for which the operating system is responsible for, in connection with :
       i) Process management ii) File management.   **(10 Marks)**
    b. Explain any two types of system calls.   **(05 Marks)**
    c. What are virtual machines? Explain the benefit of creating virtual machines.   **(05 Marks)**

2   a. With a diagram, explain different states of a process.   **(04 Marks)**
    b. Differentiate between direct and indirect interprocess communication.   **(04 Marks)**
    c. Explain any three multithreading models in brief.   **(03 Marks)**
    d. Consider the following set of processes :

Process	Arrival time	Burst time
P_1	0	5
P_2	1	1
P_3	2	4

Compute average turn around d time and average waiting time using FCFS, preemptive SJF
and RR (quantum – 4).   **(09 Marks)**

3   a. Explain Peterson's solution to critical section problem.   **(06 Marks)**
    b. Describe the mutual – exclusion implementation with TestAndSet().   **(06 Marks)**
    c. Mention three classical problems of synchronization. Explain any one in detail. **(08 Marks)**

4   a. Consider the following snapshot of a system :

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
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			

Answer the following questions using banker's algorithm
   i) What is the content of the matrix need?
   ii) Is the system in a safe state?
   iii) If a request from process P_1 arrives for (1, 0, 2), can the request be granted
        immediately?   **(12 Marks)**
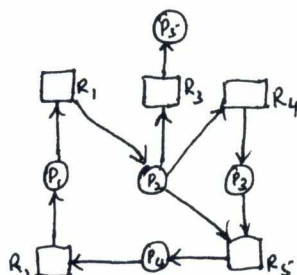   b. For the following resource-allocation graph, write the corresponding wait – for graph.
                                                                                       (04 Marks)

Fig. Q4(b)

    c. Explain the different methods used to recover from deadlock.   **(04 Marks)**

PART – B

5 a. With a supporting paging hardware, explain in detail concept of paging with an example for a 32 –byte memory with 4 – type pages with a process being 16-bytes. How many bits are reserved for page number and page offset in the logical address. Suppose the logical address is 5, calculate the corresponding physical address, after populating memory and page table.
(10 Marks)

 b. Discuss on the performance of demand paging. (05 Marks)

 c. What is Belady's anomaly? Explain with an example. (05 Marks)

6 a. Mention any five :
   i) File attributes
   ii) File operations. (05 Marks)

 b. With supporting diagrams distinguish between single-level and two-level directory structure. (05 Marks)

 c. Compare contiguous and linked allocation methods for disk space. (05 Marks)

 d. Explain bit vector free-space management technique. (05 Marks)

7 a. With an illustrative example, distinguish between SSTF, FCFS, SCAN and LOOK DISK schedulings. (08 Marks)

 b. What are boot block and bad blocks? Explain. (06 Marks)

 c. Explain the goals and principles of protection. (06 Marks)

8 Write short notes on :
 a. Design principles of Linux system
 b. Linux virtual memory system
 c. Segmentation
 d. LRU page replacement algorithm. (20 Marks)

* * * * *

Fifth Semester B.E. Degree Examination, June/July 2015
Database Management Systems

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Discuss the main characteristics of the database approach.   **(08 Marks)**

      b.   Explain the three-schema architecture. What is the difference between logical data independence and physical data independence?   **(08 Marks)**

      c.   Define the database and briefly explain the implicit properties of the database.   **(04 Marks)**

2   a.   Define the following terms with an example:
         i)   Composite attribute
         ii)   Complex attribute
         iii)   Participation constraints
         iv)   Cardinality ratio
         v)   Ternary relationship.   **(10 Marks)**

      b.   Design an ER diagram for an insurance company. Assume suitable entity types like CUSTOMER, AGENT, BRANCH, POLICY, PAYEMENT and the relationship between them.   **(10 Marks)**

3   a.   Briefly discuss how the different updata operations on a relation deal with constraint violations?   **(08 Marks)**

      b.   Consider the following schema for a COMPANY database:
         EMPLOYEE (Fname, Lname, Ssn, Address, Super-ssn, Salary, Dno)
         DEPARTMENT (Dname, Dnumber, Mgr-ssn, Mgr-start-date)
         DEPT-LOCATIONS (Dnumber, Dlocation)
         PROJECT (Pname, Pnumber, Plocation, Dnum)
         WORKS-ON (Essn, Pno, Hours)
         DEPENDENT (Essn, Dependent-name, Sex, Bdate, Relationship)
         Write the queries in relational algebra.
         i)   Retrieve the name and address of all employees who work for 'Sales' department.
         ii)   Find the ssns of employees who work on all the projects controlled by the department number 3.
         iii)   List the names of all employees with two or more dependents.
         iv)   Retrieve the names of employees who have no dependents.   **(12 Marks)**

4   a.   Consider the database schema of Fig.Q.3(b), write the SQL query for the following:
         i)   List the names of managers who have at least one dependent.
         ii)   Retrieve the list of employees and the projects they are working on, ordered by department and, within each department, ordered alphabetically by last name, first name.
         iii)   For each project, retrieve the project number, the project name, and the number of employees who work on that project.
         iv)   For each project on which more than two employees work, retrieve the project number, the project name, and the number of employees who work on the project.
         v)   For each project, retrieve the project number, the project name, and the number of employees from department 4 who work on the project.   **(10 Marks)**

b. List and explain the basic data types available for attributes in SQL and give example.

(05 Marks)

c. Explain how the GROUP BY clause works. What is the difference between the WHERE and HAVING clause?

(05 Marks)

PART – B

5 a. Explain insert, delete and update statements in SQL and give example for each. **(08 Marks)**

b. Write a note on:
   i) Views in SQL
   ii) Aggregate functions in SQL
   iii) Database stored procedures and functions. **(12 Marks)**

6 a. Explain the informal design guidelines for relation schemes. **(08 Marks)**

b. Define and explain the first, second and third normal forms. **(12 Marks)**

7 a. Define multivalued dependency. Explain 4NF with an example. **(10 Marks)**

b. Let R = {Ssn, Ename, Pnumber, Pname, Plocation, Hours} and D = {R_1, R_2, R_3} where
   R_1 = EMP = {Ssn, Ename}
   R_2 = PROJ = {Pnumber, Pname, Plocation}
   R_3 = WORKS-ON = {Ssn, Pnumber, Hours}
   The following functional dependencies hold on relation R.
   F = {Ssn → Ename; Pnumber → {Pname, Plocation};
       {Ssn, Pnumber} → Hours}
   Prove that the above decomposition of relation R has the lossless join property. **(10 Marks)**

8 a. Draw a state diagram and discuss the typical states that a transaction goes through during execution. **(10 Marks)**

b. Explain the problems that can occur when concurrent transactions are executed. Give example. **(10 Marks)**

* * * * *

10CS55

Fifth Semester B.E. Degree Examination, June/July 2015
Computer Networks – I

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. What is data communication? What are the five components of data communication system?
(06 Marks)
    b. Explain the OSI reference model, listing the functions of each layer in brief.   **(10 Marks)**
    c. What are the four level of addresses used in internet employing TCP/IP.   **(04 Marks)**

2   a. Using Shannon's theorem, compute the maximum bit rate for a channel having a band width of 3100 H_2 and signal to noise ratio of 20 db.   **(06 Marks)**
    b. Sketch the signal waveforms when 01001110 is transmit using following line coding schemes : i) R_2 ii) NRZ – L   iii) Manchester coding.   **(06 Marks)**
    c. Explain different types of transmission modes.   **(08 Marks)**

3   a. Four 1 – kbps connections are multiplexed together a unit is 1 bit. Find : i) the duration of 1–bit before multiplexing ii) the duration of a timeslot, iii) the duration a frame.   **(06 Marks)**
    b. Define direct sequence spread spectrum (DSSS) and explain how it achiever band with spread using relevant sketch.   **(08 Marks)**
    c. What is virtual circuit network? List the five characteristics of the same.   **(06 Marks)**

4   a. Given the data word 1001 and divisor 1011 :
       i) Show the generation code word at the sender site
       ii) Show the checking of code word at receiver site (assume no error).   **(10 Marks)**
    b. Explain process of error detection and error detection using block coding.   **(06 Marks)**
    c. What is internet check sum? List the steps under taken by sender to calculate check sum.lss.   **(04 Marks)**

PART – B

5   a. With neat diagram of point – to point protocol (PPP) frame format, explain each of the fields.   **(08 Marks)**
    b. Explain stop and wait automatic repeat request protocol.   **(06 Marks)**
    c. What is framing? With necessary sketches explain bit stuffing and unstuffing.   **(06 Marks)**

6   a. With neat diagram explain TDMA.   **(06 Marks)**
    b. Mention different categories of standard Ethernet and explain implementation of 10 base 5 – thick Ethernet.   **(08 Marks)**
    c. Mention the five goals of fast Ethernet. And give the importance of "AUTONEGOTIATION".   **(06 Marks)**

7   a. What is blue tooth? Explain its architecture.   **(06 Marks)**
    b. Explain the following connecting devices :
       i) Hub   ii) Bridge   iii) Router   iv) Gateway.   **(08 Marks)**
    c. Discuss cellular telephone in brief.   **(06 Marks)**

8   a. List the deficiencies of IPV4 and advantages of IPV6 over IPV4.   **(10 Marks)**
    b. Draw format of an IPV6 datagram and explain.   **(10 Marks)**

* * * * *

Fifth Semester B.E. Degree Examination, June/July 2015
Formal Languages and Automata Theory

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Design a DFA to read strings mode up of letters "CHARIOT" and recognize these strings that contains the word "CAT" as a substring. **(08 Marks)**

    b.   Draw DFA to accept the language L = {ω : ω has add number of 1's and followed by even number of 0's. Completely define DFA and transition function. **(06 Marks)**

    c.   Convert the following NFA to its equivalent DFA. **(06 Marks)**

2   a.   Prove that if L = L(A) for some DFA, then there is a regular expression R such that L = L(R). **(06 Marks)**

    b.   For the following DFA, obtain regular expressions $R_{ij}^{(0)}$ and $R_{ij}^{(1)}$. **(09 Marks)**

States	Σ 0	1
→q_1	q_2	q_1
q_2	q_3	q_1
q_3	q_3	q_2

    c.   Construct NFA for regular expression $V = (01 + 10)^+$. **(05 Marks)**

3   a.   State and prove pumping Lemma for regular languages. **(05 Marks)**

    b.   Show that $L = \{A^{n!} \mid u \geq 0\}$ is not regular. **(05 Marks)**

    c.   Construct 0 minimum automaton equivalent to given automation 'M' whose transition table given below :

States	input 0	1
→q_0	q_0	q_3
q_1	q_2	q_5
q_2	q_3	q_4
q_3	q_0	q_5
q_4	q_0	q_6
q_5	q_1	q_4
q_6 *	q_1	q_3

(10 Marks)

4   a.   What is a grammer? Explain the classification of grammers with examples. **(07 Marks)**

    b.   Obtain the grammer to generate the following languages :
      i)   L = {ω : $n_a(\omega)$ mod 2 = 0 where ω ∈ (a, b)*}
      ii)   L = {ω : ω is a palindrome, where ω ∈ (a, b)*}
      iii) $L = a^n b^{2n} \mid u \geq 1$. **(06 Marks)**

    c.   Show that the following grammer is ambiguous :
      S → a | Sa | bSS | SSb | SbS. **(07 Marks)**

PART – B

5 a. Construct PDA for the language and simulate this PDA
      L = {$a^i b^j c^k$ | j = i + k, i, k ≥ 0.   **(10 Marks)**
   b. Define PDA. Explain the language accepted by PDA.   **(05 Marks)**
   c. Explain the PDA with two stocks.   **(05 Marks)**

6 a. Simplify the grammer by eliminating useless productions.
      S AB
      $A \rightarrow a$
      $B \rightarrow C \mid b$
      $C \rightarrow D$
      $D \rightarrow E \mid bC$
      $E \rightarrow d \mid Ab$.   **(06 Marks)**
   b. Convert the following CFG to CNF.
      $S \rightarrow aB \mid bA$
      $A \rightarrow a \mid aS \mid bAA$
      $B \rightarrow b \mid aS \mid aBB$.   **(06 Marks)**
   c. Prove that context free languages are closed under union, concatenation and star.   **(08 Marks)**

7 a. Explain the programming techniques for turing machine.   **(10 Marks)**
   b. Construct a TM for L = {$a^u b^u c^u$ | u ≥ 1}. Give the graphical representation for the obtained TM.   **(10 Marks)**

8   Explain the following :
   a. Post correspondence problem
   b. Recursively enumerable language
   c. Recursive languages
   d. Universal languages.   **(20 Marks)**

* * * * *