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10CS62

Sixth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
UNIX System Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the major differences between K and R 'C' and ANSI 'C' with examples. **(08 Marks)**
b. List all feature test macros along with their effect if defined in a system. **(05 Marks)**
c. Explain why calling API's is more time consuming than calling library functionary? List any six error status codes returned by API's with their meaning. **(07 Marks)**

2 a. Explain the different file types supported by UNIX/ POSIX systems. **(08 Marks)**
b. Explain UNIX Kernel support for files, with a neat diagram. **(07 Marks)**
c. What are hard link and symbolis links? Write any four differences between them. **(05 Marks)**

3 a. Explain the following API's along with prototypes
i) open ii) stat( ) & fstat( ) iii) read( ). **(09 Marks)**
b. Describe the use of fcntl( ) function for file and record locking. **(06 Marks)**
c. Explain device and FIFO file API's with prototype. **(05 Marks)**

4 a. With a neat diagram, explain how a 'C' program is stated and how it is terminated. **(06 Marks)**
b. Explain memory layout of a 'C' program, with a neat diagram. **(06 Marks)**
c. Explain the use of getrlimit( ) and setrlimit( ) functions along with prototypes. What are the rules that govern the changing of resource limits? **(08 Marks)**

PART – B

5 a. Explain fork( ) along with prototype write a program to illustrate the use of fork( ). **(07 Marks)**
b. Explain wait( ) and waitpid( ) functions along with prototypes. **(05 Marks)**
c. What is job control? What support is need for job control? Briefly summarize job control features along, with a diagram. **(08 Marks)**

6 a. Discuss signal concept. Explain any five signals briefly. **(07 Marks)**
b. Explain the following signal functions :
i) Sigprocmask( ) ii) Sigaction( ). **(06 Marks)**
c. Explain Daemon process? What are its coding rules? Write a program that initializes itself as a daemon. **(07 Marks)**

7 a. What are pipes? What are its limitations? Write a program to send data form parent to child over a pipe. **(07 Marks)**
b. With a neat diagram, explain interprocess communication using FIFO. **(06 Marks)**
c. What are the different system calls available to create and manipulate semaphores? **(07 Marks)**

8 a. Along with prototype, explain the following functions related to shared memory :
i) shmget ii) shmctl( ). **(08 Marks)**
b. What are stream pipes? Write a program to drive the add2 filter using stream pipe. **(12 Marks)**

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10CS63

Sixth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
Complier Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the various phases of complier. Show the translations for an assignment statement. Position = initial + rate * 60, clearly indicate the output of each phase. **(12 Marks)**

b. Write the regular definition for an unsigned number. Also write the transition diagram. **(06 Marks)**

c. What is printed by the following C code?

```
# define a (x + 1)
  int x = 2 ;
  void b( ) {int x  =1; printf("%d ln", a)'}
  void c( ){printf("%d ln", a); }
  void main( ) {b( ) ; c( );}.
```

(02 Marks)

2 a. Describe an algorithm used for eliminating the left recursion. Eliminate left recursion from the grammar :

$S \rightarrow Aa \mid b \quad A \rightarrow Ac \mid Sd \mid a.$ **(06 Marks)**

b. Show that the following grammar is ambiguous :

$E \rightarrow E + E \mid E * E \mid (E) \mid id$. Write an equivalent unambiguous grammar for the same. **(06 Marks)**

c. What are the key problems with top down parse? Write a recursive descent parser for the grammar :

$S \rightarrow cAd \quad A \rightarrow ab \mid a.$ **(08 Marks)**

3 a. Given the grammer :

$S \rightarrow aABb$

$A \rightarrow c \mid \in$

$B \rightarrow d \mid \in$

i) Compute FIRST and FOLLOW sets

ii) Construct the predictive parsing table

iii) Show the moves made by predictive parser on the input ; acdb. **(10 Marks)**

b. Explain with a neat diagram, the model of a table driven predictive parser. **(05 Marks)**

c. What is handle pruning? Give a bottom – up parse for the input : aaa * a++ and grammar :

$S \rightarrow SS + \mid SS * \mid a.$ **(05 Marks)**

4 a. Given the grammar :

$S \rightarrow CC$

$C \rightarrow cC \mid d$

i) Obtain the sets of canonical collection of sets of valid LR(0) items

ii) Design SLR parsing table. **(10 Marks)**

b. Write an algorithm used to compute LR (1) sets of items. **(06 Marks)**

c. Write a note on the parser Generator – Yacc. **(04 Marks)**

PART – B

5 a. Explain the concept of syntax – directed definition. **(05 Marks)**

b. The SDD to translate binary integer number into decimal is shown below :

Productions	Semantic rules
$BN \rightarrow L$	BN.val= L. val
$L \rightarrow L_1 B$	L. val =2 $\times L_1$.val + B. val
$L \rightarrow B$	L. val = B .val
$B \rightarrow 0$	B. val = 0
$B \rightarrow 1$	B. val = 1

Construct the parse tree and annotated parse tree for the input string : 11001. **(05 Marks)**

c. Give a SDT for desktop calculator and show its parser stack implementation. **(10 Marks)**

6 a. Translate the arithmetic expression : a + - (b + c) into quadruples, triples and indirect triples. **(06 Marks)**

b. Give a semantic action for : $S \rightarrow$ if (B) S_1 else S_2. **(06 Marks)**

c. Develop SDD to produce directed a cyclic graph for an expression. Show the steps for constructing the directed acyclic graph for the expression : a + a * (b – c) + (b – c) * d. **(08 Marks)**

7 a. Describe the general structure of an activation record. Explain the purpose of each field in the activation record. **(08 Marks)**

b. A C – code to compute Fibonacci numbers recursively is shown below :

```
int f(int n)
 { int t, s ;
   if(n < = 2) return 1 ;
    s = f(n -1) ;
    t = f(n -2) ;
    return (s + t);
 }
```

i) Draw the activation tree for the call : f(5)

ii) What is the largest number of activation records that ever appear together on the stack? **(06 Marks)**

c. Explain the performance metrics to be considered while designing a garbage collector. **(06 Marks)**

8 a. Discuss the issues in the design of a code generator. **(10 Marks)**

b. Write the tree address code and construct the basic blocks for the following program segment.

```
sum = 0 ;
for(i = 0; i < = 10 ; i ++)
    sum = sum +a[i] ;
```

(05 Marks)

c. Give the code generation process for operations. **(05 Marks)**

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10CS64

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Computer Networks – II

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Differentiate between connection oriented and connectionless services. **(04 Marks)**

b. Define routing and its goals. **(04 Marks)**

c. Consider the network, in the following Fig.Q.1(c):

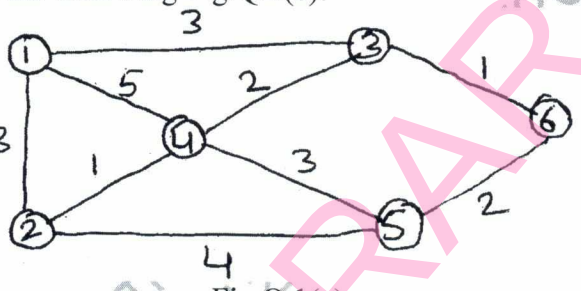

Fig.Q.1(c)

i) Use the diJkstra's algorithm to find the set of shortest path from node 4 to other nodes.

ii) Find the set of associated routing table entries. **(12 Marks)**

2 a. Explain the leaky bucket algorithm for policing the traffic at flow control. **(10 Marks)**

b. Explain fair queing at the packet level. Show the transmission sequences for field flow and packet by packet system by considering the two logical buffers (buffer 1, buffer 2). Assume each has a single L-bit packet to transmit at t = 0 and no sub-sequent packets arrive, assume C = L bits/second = 1 packet/second. **(10 Marks)**

3 a. Write the advantages and disadvantages of UDP. **(06 Marks)**

b. What do you mean by tunneling? What are the needs to changes from IPV4 to IPV6? Write the IPV6 basic header and describe its fields. **(10 Marks)**

c. What is routing information protocol (RIP)? What is the maximum width of a RIP networks? **(04 Marks)**

4 a. With a neat diagram, explain the TCP state transition diagram. **(08 Marks)**

b. Explain in detail, the operation of OSPF (open shortest path first) by considering on example network. **(12 Marks)**

PART – B

5 a. Explain DNS message format with a neat diagram. **(06 Marks)**

b. Apply RSA and do the following:

i) Encrypt a = 3, b = 11, x = 3 and m = 9.

ii) Find the corresponding y.

iii) Decrypt the ciphertext. **(06 Marks)**

c. What is SNMP? List the PDUs of SNMPV2? Explain SNMP PDU format. **(08 Marks)**

6 a. List the benefits of creating VPN's. Explain VPN types. **(10 Marks)**
b. Explain need for overlay networks and P2P connection. **(10 Marks)**

7 a. What is an MPLS network? Explain with diagram how the packets are forwarded using MPLS. **(08 Marks)**
b. Write a note on VOIP signaling. **(04 Marks)**
c. Discuss the differentiated services QOS approach. **(08 Marks)**

8 a. List and explain the applications and features of adhoc networks. **(08 Marks)**
b. Explain the structure of a typical sensor node. **(07 Marks)**
c. Write short notes on Zigbee technology. **(05 Marks)**

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10CS65

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Computer Graphics and Visualization

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 computer graphics? How is it different from photography? Discuss the major categories of applications of computer graphics. **(10 Marks)**

b. Explain the different graphics architectures in detail, with the aid of functional schematics. **(10 Marks)**

2 a. Write a typical main function that is common to most non-interactive applications and explain each function call in it. **(10 Marks)**

b. Explain the major categories of graphics API functions. **(07 Marks)**

c. Explain "Color Cube" in brief. **(03 Marks)**

3 a. What are the major characteristics that describe logical behaviour of an input device? Explain the various classes of logical input devices supported by openGL. **(08 Marks)**

b. What is double buffering? How does openGL support this? Discuss. **(06 Marks)**

c. Enlist the features of a good interactive program. **(06 Marks)**

4 a. Explain the mathematical entities – point, scalar and vector with examples for each. **(06 Marks)**

b. How do you model a cube? Write a function "Cube" which models and renders a $2 \times 2 \times 2$ cube. **(10 Marks)**

c. Explain Bilinear interpolation method of assigning colors to points inside a quadrilateral. **(04 Marks)**

PART – B

5 a. Explain the basic affine transformations in 3D along with their matrix forms. **(08 Marks)**

b. How does instance transformation help in generating a scene? Explain. **(06 Marks)**

c. Explain openGL transformation matrices along with their syntax. **(06 Marks)**

6 a. List the differences between perspective projection and parallel projection. **(04 Marks)**

b. Derive the matrices for simple perspective projection and orthogonal projection. **(08 Marks)**

c. Explain the perspective projection and parallel projection along with their openGL functions. **(08 Marks)**

7 a. Explain Phong lighting model. **(08 Marks)**

b. How does openGL support different light sources? Discuss. **(06 Marks)**

c. How does openGL support different material specifications? Discuss. **(06 Marks)**

8 a. What is clipping? Explain Cohen-Sutherland line-clipping algorithm in 2D. **(06 Marks)**

b. Clip the following polygon using Sutherland-Hodgeman algorithm shown in Fig. Q8 (b). **(06 Marks)**

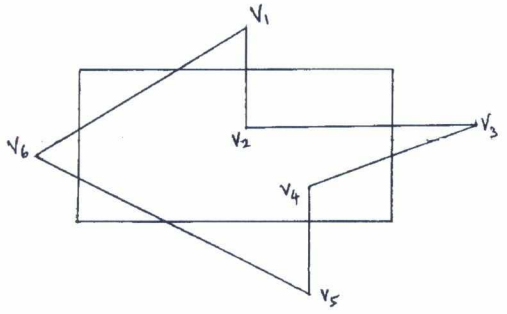

Fig. Q8 (b)

c. Write short notes on:
i) DDA algorithm.
ii) Z-buffer algorithm. **(08 Marks)**

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10IS65

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Software Testing

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 software testing? Why it is so important in SDLC? **(05 Marks)**

b. Explain the triangle problem statement along with flow chart for traditional implementation. **(07 Marks)**

c. Explain the IEEE error and fault taxonomy and IEEE standard anomaly process. **(08 Marks)**

2 a. Justify the usage of boundary value analysis with function of two variables and highlight the limitations of boundary value analysis. **(05 Marks)**

b. Explain weak normal and strong robust equivalence class testing with next date problem as an example. **(05 Marks)**

c. Discuss the usage of decision table method to device test cases with example of commission problem and triangle problem. **(10 Marks)**

3 a. Define DD-path. Draw DD-graph for triangle problem. **(04 Marks)**

b. Justify strongly connected graph is the number of linearly independent circuits in the graph using cyclomatic complexity metric. **(04 Marks)**

c. Define predicate node, du-paths and dc-paths. Give du-paths for stocks, locks, total locks, sales and commission for commission sale problem. **(12 Marks)**

4 a. Explain the simple ATM application with the help of, (i) Level 1 data flow diagram. (ii) Upper level finite state machine. **(10 Marks)**

b. Distinguish between top-down integration and bottom-up integration. **(04 Marks)**

c. Explain call graph-based integration with the help of,
(i) Pair-wise integration (ii) Neighborhood integration. **(06 Marks)**

PART – B

5 a. Define the below terms:
(i) Threads (ii) MM-path (iii) Data (iv) Actions (v) Ports **(10 Marks)**

b. Explain single-processor static interaction and single-processor dynamic interaction. **(10 Marks)**

6 a. Explain verification trade-off dimensions. **(08 Marks)**

b. Briefly discuss the dependability properties in process framework. **(08 Marks)**

c. Why organizational factors are needed in process framework. **(04 Marks)**

7 a. Define below terms with respect to fault based-testing:
i) Original program ii) Program location.
iii) Alternate expression iv) Alternate program. **(08 Marks)**

b. Explain mutation analysis software fault based testing. **(04 Marks)**

c. List the Fault-based adequacy criterias. **(03 Marks)**

d. Explain hardware fault-based testing. **(05 Marks)**

8 Write a short note on:
a. Quality and process.
b. Test planning.
c. Risk planning.
d. Organizing documents.
e. Test design specification document. **(20 Marks)**

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06CS64

Sixth Semester B.E. Degree Examination, December 2011
Computer Networks – II

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Differentiate between connection oriented and connectionless servicess. **(04 Marks)**
b. Compare the datagram packet switching and virtual circuit packet switching. **(06 Marks)**
c. Define routing algorithm. Explain the Bellman – Ford algorithm, with an example. **(10 Marks)**

2 a. Differentiate between the leaky bucket and token bucket algorithms for congestion control. **(08 Marks)**
b. What are all the possible subnet masks for the class C address space? List all the subnet masks on dotted – decimal notation, and determine the number of hosts per subnet supported for each subnet mask. **(06 Marks)**
c. With an example, explain the classless interdomabin routing. **(06 Marks)**

3 a. Define funneling. Briefly explain the changes from IPv4 to IPv6. **(08 Marks)**
b. Explain the three – way handshake for establishing a TCP connection. **(08 Marks)**
c. Write a short note on routing information protocol. **(04 Marks)**

4 a. Explain any five QoS parameters of ATM networks. **(10 Marks)**
b. Briefly explain ATM addressing with ATM formets. **(05 Marks)**
c. Write a note on classical IP over ATM. **(05 Marks)**

PART – B

5 a. Define the network management. Explain the SNMP with SNMP messages. **(08 Marks)**
b. Explain the routing table poisoning and denial – of – service attacks. **(08 Marks)**
c. For an RSA encryption of a 4 – bit message 1001 with a = 3 and b = 11, find the public and private keys. **(04 Marks)**

6 a. With a neat diagram, explain the differentiated services QoS. **(08 Marks)**
b. Explain the various types of resource allocation schemes. **(06 Marks)**
c. Define VPN. Discuss the concept of tunneling and point – to – point protocol in VPN. **(06 Marks)**

7 a. Briefly explain the MPEG standards and frame types for compression. **(06 Marks)**
b. Explain the Huffman encoding, with an example. **(06 Marks)**
c. With a neat diagram, explain the H.323 components and list the steps in signaling. **(08 Marks)**

8 a. Explain the wireless routing protocol for AD – Hoc networks. **(05 Marks)**
b. Briefly explain the direct and multihop routing of intracluster routing protocol, with the help of relevant diagrams. **(06 Marks)**
c. Write short notes on :
i) Clustering in sensor networks
ii) Security vulnerabilities of AD – Hoc networks. **(09 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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10CS/IS661

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Operations Research

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 six phases of OR study. **(12 Marks)**

b. A retailer deals in two items only, item A and item B. He has ` 50,000 to invest and a space to store at most 60 pieces. An item 'A' costs him ` 2,500 and 'B' costs ` 500. A net profit to him on item 'A' is ` 500, and item 'B' is ` 150. If he can sell all the items he purchases, how should he invest his amount to have maximum profit?
(i) Give mathematical formulation to the LPP
(ii) Use graphical method to solve the problem. **(08 Marks)**

2 a. Explain the concept of Tie breaking in simplex method. **(10 Marks)**

b. Solve the following LPP by simplex method:
Maximize $Z = 2x_1 + 2x_2$
Subject to $5x_1 + 3x_2 \le 8$
$2x_1 + 4x_2 \le 8$ and $x_1, x_2 \ge 0$ **(10 Marks)**

3 a. Explain the post optimality analysis of linear programming. **(10 Marks)**

b. Solve the following LPP by Big-M method.
Maximize $Z = 4x_1 + x_2$
Subject to $3x_1 + x_2 = 3$
$4x_1 + 3x_2 \ge 6$
$x_1 + 2x_2 \le 3$ and $x_1, x_2 \ge 0$ **(10 Marks)**

4 a. Apply revised simplex method to solve the following problem:
Maximize $Z = 6x_1 - 2x_2 + 3x_3$
Subject to $2x_1 - x_2 + 2x_3 \le 2$
$x_1 + 4x_3 \le 4$ and $x_1, x_2, x_3 \ge 0$ **(10 Marks)**

b. Explain the following:
(i) The essence of duality theory (ii) Primal dual relationship **(10 Marks)**

PART – B

5 a. Solve the following LPP by using dual simplex method:
Minimize $Z = 10x_1 + 6x_2 + 2x_3$
Subject to $-x_1 + x_2 + x_3 \ge 1$
$3x_1 + x_2 - x_3 \ge 2$ and $x_1, x_2, x_3 \ge 0$ **(10 Marks)**

b. Explain general procedure for sensitivity analysis. **(10 Marks)**

6 a. Explain Hungarian algorithm with example. **(10 Marks)**

b. The transportation costs per truck load of cement (in hundred of rupees) from each plant to each project site are as follows:

	Project Site				
	2	3	11	7	6
Factories	1	0	6	1	1 Supply
	5	8	15	9	10
	7	5	3	2	17

Determine the optimal distribution for the company so as to maximize the total transportation cost. **(10 Marks)**

7 a. Two players 'A' and 'B' throw 2 coins on a table 'A' wins `8 when both coins show heads and `1 when both are tail. 'B' wins `3 when coin does not match. Prepare the payoff matrix and determine optimal strategies for each player. **(10 Marks)**

b. With reference to game theory define the following, with an example:
(i) Pure strategy (ii) Mixed strategy (iii) Saddle point
(iv) Payoff matrix (v) Two-person-zero-sum- game **(10 Marks)**

8 Explain briefly the following :
a. Tabu search algorithm
b. Genetic algorithm
c. Metaheuristics
d. Simulated Annealing algorithm **(20 Marks)**

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