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06CS62

Sixth Semester B.E. Degree Examination, May/June 2010
UNIX Systems Programming

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 are the major differences between ANSI 'C' and K and R 'C'? Explain with examples. (08 Marks)
b. Write a C/C ++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros. (08 Marks)
c. What is POSIX API? Why is calling an API more time consuming than calling a user function? (04 Marks)
- 2 a. Explain the different file types available in UNIX or POSIX systems. (08 Marks)
b. Discuss with a neat diagram the different data structures supported by UNIX Kernel for file manipulation. (08 Marks)
c. Bring out the differences between hard link and symbolic link. (04 Marks)
- 3 a. Explain the following APIs along with their prototype definitions :
i) Open ; ii) Write ; iii) Fcntl ; iv) Fstat. (08 Marks)
b. What are symbolic link file APIs? Write a C/C++ program to emulate the UNIX Ln command. (08 Marks)
c. Give the hierarchy structure of the file classes. (04 Marks)
- 4 a. Write a C/C++ program to demonstrate the use of atexit function. (10 Marks)
b. Explain briefly the memory layout of C program. (10 Marks)

PART – B

- 5 a. What is fork and vfork? Explain with a program for each. (10 Marks)
b. What is a controlling terminal? Explain its characteristics and relation to session and process groups. (10 Marks)
- 6 a. What is a signal? Explain with a program how to set up a signal handler. (10 Marks)
b. What is a daemon process? Explain daemon characteristics and basic coding rules. (10 Marks)
- 7 a. Explain how FIFO is used in JPC. Discuss with an example the client – server communication using FJFO. (10 Marks)
b. Explain popen and pclose functions with prototypes and write a program to demonstrate popen and pclose functions. (10 Marks)
- 8 a. Explain socket addressing, socket creation, connection establishment and data transfer with appropriate APIs. (10 Marks)
b. What are send and recv socket calls? Explain various flags used with send and recv calls. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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06CS63

Sixth Semester B.E. Degree Examination, May/June 2010
Compiler Design

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain, with a neat diagram, the phases of a compiler. (10 Marks)
b. Construct a transition diagram for recognizing unsigned numbers. Sketch the program segment to implement it, showing the first two states and one final state. (10 Marks)

- 2 a. Explain the left recursion and show how it is eliminated. Describe the algorithm used for eliminating the left recursion. (06 Marks)
b. Eliminate left recursion from the grammar:
 $S \rightarrow aB \mid aC \mid Sd \mid Se$
 $B \rightarrow bBc \mid f$
 $C \rightarrow g$ (02 Marks)
c. Given the grammar
 $S \rightarrow (L) \mid a$
 $L \rightarrow L, S \mid S$
i) Make necessary changes to make it suitable for LL(1) parsing.
ii) Construct FIRST and FOLLOW sets
iii) Construct the predictive parsing table
iv) Show the moves made by the predictive parser on the input (a, (a, a)) (12 Marks)

- 3 a. Obtain a set of canonical LR(0) items for the grammar: (08 Marks)
 $S \rightarrow L = R$
 $S \rightarrow R$
 $L \rightarrow *R$
 $L \rightarrow id$
 $R \rightarrow L$
b. Is the grammar in Q3(a) SLR(1)? Give reasons. (04 Marks)
c. What is handle pruning? Explain with the help of the grammar $S \rightarrow SS + \mid SS^* \mid a$ and input string aaa^*a++ . Give a bottom-up parse of the given input string. (08 Marks)

- 4 a. Given the grammar :
 $S \rightarrow AA$
 $A \rightarrow Aa \mid b$
i) Construct sets of LR(1) items (12 Marks)
ii) Construct canonical LR(1) parsing table. (04 Marks)
b. Write a note on the Parser generator – Yacc. (04 Marks)
c. Write the Yacc specification of a simple desk calculator with the following grammar for arithmetic expressions,
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid \text{digit}$
Where, the token digit is a single digit between 0 and 9. (04 Marks)

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PART - B

- 5 a. Explain the concept of syntax-directed definition. (04 Marks)
 b. Consider the context-free grammar given below: (08 Marks)
 $S \rightarrow EN$
 $E \rightarrow E + T \mid E - T \mid T$
 $T \rightarrow T * F \mid T / F \mid F$
 $F \rightarrow (E) \mid \text{digit}$
 $N \rightarrow ;$
 i) Obtain the SDD for the above grammar.
 ii) Construct the parse tree, syntax tree and annotated parse tree for the input string $5*6 + 7;$
 c. Obtain the post-fix SDT for the grammar in Q.5(b) and illustrate the corresponding parser stack implementation. (08 Marks)
- 6 a. Obtain the directed acyclic graph for the expression $a + a * (b - c) + (b - c) * d$. Also give the sequence of steps for constructing the same. (06 Marks)
 b. Translate the arithmetic expression $a + -(b + c)$ into quadruples, triples and indirect triples. (06 Marks)
 c. Explain the syntax-directed translation of switch-statements. (08 Marks)
- 7 a. Describe the general structure of an activation record. Explain the purpose of each item in the activation record. (06 Marks)
 b. Explain in detail, the strategy for reducing fragmentation in heap memory. (08 Marks)
 c. Explain briefly 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. What are basic blocks and how do you partition a three-address-code into basic blocks? (05 Marks)
 c. Write the three-address code and construct the basic blocks for the following program segment.
 $\text{Sum} = 0;$
 $\text{for } (i = 0 ; i \leq 10 ; i++)$
 $\text{Sum} = \text{sum} + a [i]$ (05 Marks)

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06CS64

Sixth Semester B.E. Degree Examination, May/June 2010
Computer Networks – II

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain and derive delays in datagram packet switching. (10 Marks)
- b. Consider the network given below in Fig.Q1(b). Use the Dijkstra's algorithm to find shortest paths from all nodes to destination node 2. (10 Marks)

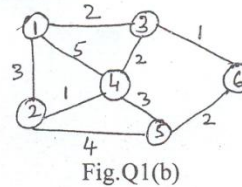


Fig.Q1(b)

- 2 a. Explain the FIFO and priority queue scheduling for managing traffic at packet level. (10 Marks)
- b. Explain the leaky bucket algorithm for policing the traffic at flow level. (10 Marks)
- 3 a. Explain the IP address classification. Identify the following IP addresses and their address class:
200.58.20.165 128.167.23.20 16.196.128.50 150.156.10.10 (10 Marks)
- b. Give the format of IPV6 basic header. Explain the importance. (10 Marks)
- 4 a. Explain the OSPF protocol and its operation. (10 Marks)
- b. Give the structure of ATM cell header and details of QOS parameters. (10 Marks)

PART – B

- 5 a. Which are the different data types used in the structure of management information? (10 Marks)
- b. Give the comparison between public key and secret key cryptographic systems. (10 Marks)
- 6 a. Explain VPN and its types based on tunneling. (10 Marks)
- b. Explain the need for overlay networks and P2P connection. (10 Marks)
- 7 a. Explain the JPEG compression method and still image processing. (10 Marks)
- b. Explain the session initiation protocol. (10 Marks)
- 8 a. With an example, explain the dynamic source routing protocol. (10 Marks)
- b. List the security issues in ad-hoc networks. Explain types of attacks. (10 Marks)

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06CS65

Sixth Semester B.E. Degree Examination, May/June 2010
Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Discuss the applications of computer graphics. (04 Marks)
- b. Giving the block diagram, explain the high-level view of a graphics system. (06 Marks)
- c. Explain the different graphics architectures. (06 Marks)
- d. Write a fragment of a simple program in pen plotter model that would generate the output shown in Fig.Q1(d). (04 Marks)

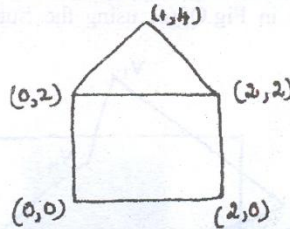


Fig.Q1(d)

- 2 a. Write a typical main function that works for moot non-interactive applications and explain each function call in it. (10 Marks)
- b. Explain the major groups of graphics functions. (07 Marks)
- c. Differentiate additive color model from subtractive color model. (03 Marks)
- 3 a. What are the major characteristics that describe the logical behaviour of an input device? Explain how open GL provides the functionality of each of the classes of logical input devices. (08 Marks)
- b. What is a display list? Give the open GL code segment that generates a display list defining a red triangle with vertices at (50, 50), (150, 50) and (100, 150). (07 Marks)
- c. What is double buffering? How is it implemented in open GL? (05 Marks)
- 4 a. Explain the different open GL frames. (07 Marks)
- b. Explain bilinear interpolation method of assigning colors to points inside a quadrilateral. (06 Marks)
- c. Explain the properties that ensure that a polygon will be displayed correctly. (03 Marks)
- d. Explain the following: (04 Marks)
 - i) Point-vector addition
 - ii) Homogeneous coordinates.

PART – B

- 5 a. Explain the basic transformations in 3D and represent them in matrix form. (07 Marks)
- b. What are the entities required to perform a rotation? Show that two rotations about the same axis commute. (07 Marks)
- c. What is concatenation? How does it affect the efficiency of transformations? (04 Marks)
- d. What are the advantages of quaternions? (02 Marks)

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- 6 a. Bring out the differences between perspective and parallel projections. (07 Marks)
 b. Derive the simple perspective projection matrix. (05 Marks)
 c. What is projection normalization? (03 Marks)
 d. Explain the z - buffer algorithm giving its pseudo code. (05 Marks)
- 7 a. What are the various methods available for shading a polygonal mesh? (07 Marks)
 b. Write the open GL code segment to approximate a sphere using subdivision. (05 Marks)
 c. Explain the different types of light sources supported by open GL. (08 Marks)
- 8 a. Use the Liang Barsky line - clipping algorithm to clip the line $P_1(-15, -30)$ to $P_2(30, 60)$ against the window having diagonally opposite corners at $(0, 0)$ and $(15, 15)$. (07 Marks)
 b. Digitize the line from $(10, 16)$ to $(16, 12)$ using the DDA algorithm. (06 Marks)
 c. Clip the polygon given in Fig.Q8(c) using the Sutherland Hodgeman polygon clipping algorithm. (07 Marks)

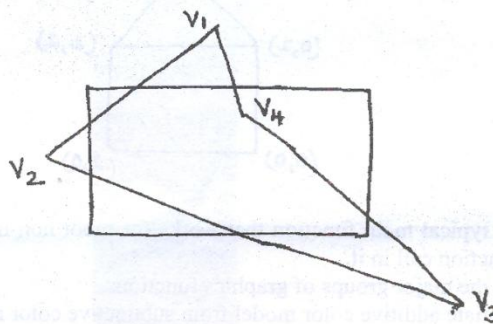


Fig.Q8(c)

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06CS/IS661

Sixth Semester B.E. Degree Examination, May/June 2010
Operations Research

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain the following :
 - i) Origin, nature and impact of OR. (10 Marks)
 - ii) Defining the problem and gathering the data. (10 Marks)
- b. A farmer has to plant two kinds of trees P and Q in a land of 4000 sq.m. area. Each P tree requires at least 25 sq.m and Q tree requires at least 40 sq.m. of land. The annual water requirements of P tree is 30 units and of Q tree is 15 units per tree, while at most 3000 units of water is available. It is also estimated that the ratio of the number Q trees to the number of P trees should not be less than $\frac{6}{19}$ and should not be more than $\frac{17}{8}$. The return per tree from P is expected to be one and half times as much as from Q tree. Formulate the problem as a LP model. (10 Marks)
- 2 a. Solve the following LPP by simplex method :
 Maximize $Z = 3x_1 + 2x_2$
 Subject to $x_1 + x_2 \leq 4$,
 $x_1 - x_2 \leq 2$
 $x_1, x_2 \geq 0$ (10 Marks)
- b. Solve the following LPP by simplex method :
 Maximize $Z = 6x_1 + 8x_2$
 Subject to $2x_1 + 8x_2 \leq 16$
 $2x_1 + 4x_2 \leq 8$
 $x_1, x_2 \geq 0$ (10 Marks)
- 3 a. Explain in detail the computer implementation of simplex method and available software option for linear programming. (10 Marks)
- b. Explain the postoptimality analysis of linear programming. (05 Marks)
- c. Explain the two phase technique procedure of solve LPP in simplex method. (05 Marks)
- 4 a. Explain the relation between the solution of the primal and the dual. (05 Marks)
- b. Find the dual of the following problem :
 Minimize $Z = 2x_2 + 5x_3$
 Subject to $x_1 + x_2 \geq 2$
 $2x_1 + x_2 + 6x_3 \leq 6$
 $x_1 - x_2 + 3x_3 = 4$
 $x_1, x_2, x_3 \geq 0$ (05 Marks)
- c. Explain the computational procedure of revised simplex method in standard form. (10 Marks)

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PART - B

- 5 a. Use dual simplex method and solve the following LPP :
 Minimize $Z = 3x_1 + x_2$
 Subject to $x_1 + x_2 \geq 1$
 $2x_1 + 3x_2 \geq 2$
 $x_1, x_2 \geq 0$ (10 Marks)
- b. Explain the role of duality theory in sensitivity analysis. (05 Marks)
- c. Explain how sensitivity analysis has been applied. (05 Marks)

- 6 a. Find an initial solution to the following transportation problem :

		Destination					
		D ₁	D ₂	D ₃	D ₄	D ₅	
Origin	O ₁	7	6	4	5	9	40
	O ₂	8	5	6	7	8	30
	O ₃	6	8	9	6	5	20
	O ₄	5	2	7	8	6	10
		30	30	15	20	5	
		Demand					

(10 Marks)

- b. The owner of a small machine shop has four machines available to assign for the jobs. Five jobs are offered to assign, with the expected profits in hundreds of rupees for each machine on each job being as follows :

		Job				
		1	2	3	4	5
Machines	A	6.2	7.8	*	10.1	8.2
	B	7.0	8.4	6.5	7.5	6.0
	C	8.7	9.2	11.1	7.0	8.2
	D	*	6.4	8.7	7.7	8.0

* indicates that machine A and D cannot perform the jobs 3 and 1 respectively. Find the assignment of jobs to machines that will result in the maximum profit. (10 Marks)

- 7 a. Solve the following game graphically : (10 Marks)

		Player B		
		B ₁	B ₂	B ₃
Player A	A ₁	2	6	22
	A ₂	16	10	4

- b. Explain in detail decision making without experimentation. (05 Marks)
- c. Explain the details of solving simple games in game theory. (05 Marks)
- 8 a. Explain in detail, the minimum spanning tree problem with constraints. (06 Marks)
- b. Outline the general procedure for generating a child from a pair of parents. (06 Marks)
- c. Explain the number of details that need to be worked out to fit structure of the problem. (08 Marks)
