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10CS62

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
UNIX Systems Programming

Time: 3 hrs. Max. Marks:100

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

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.

PART – A

1 a. Explain the major difference between ANSI 'C' and K and R 'C' with example. **(10 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. Mention any 4 compile time limits with their values. **(02 Marks)**

2 a. Explain the different types of files in UNIX. **(10 Marks)**

b. Explain the UNIX Kernel support for files. **(10 Marks)**

3 a. Explain the working of the open function with prototype. **(10 Marks)**

b. Write a C++ program to implement following UNIX command i) *ln* ii) mv. **(10 Marks)**

4 a. Write a C/C++ program to demonstrate the use of outexit function. **(10 Marks)**

b. Explain briefly the memory layout of a C program. **(10 Marks)**

PART – B

5 a. What is fork and vfork? Explain with an example program for each. **(08 Marks)**

b. What is zombie process? Write a C program to avoid zombie process by forking twice. **(06 Marks)**

c. Explain the six different forms of exec API. **(06 Marks)**

6 a. What is signal? Explain with a program how to setup a signal handler. **(10 Marks)**

b. What is daemon process? Explain daemon characteristics and relation to session and process groups. **(10 Marks)**

7 a. What are pipes? Write a C/C++ program to send data from parent to child over a pipe. **(10 Marks)**

b. What are FIFO's? With a neat diagram explain the client server communicating FIFO's. **(10 Marks)**

8 a. Explain the following socket programming functions with their prototype:
i) Socket; ii) Connect; iii) Listen; iv) Accept. **(10 Marks)**

b. Explain the different client server connection functions, with example program. **(10 Marks)**

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10CS63

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Compiler Design

Time: 3 hrs. Max. Marks:100

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

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

1 a. Explain the various phases of a compiler with the help of neat diagram. **(08 Marks)**

b. Write the transition diagram along with program code to recognize the token below.
i) Relop (relational operator) ii) Unsigned number **(12 Marks)**

2 a. Give the rules for constructing FIRST and FOLLOW sets. **(08 Marks)**

b. Construct the predictive parsing table by making necessary changes to the grammar given below and show the parsing of string
id + id * id (LL parsing)
$E \rightarrow E + T \mid T$
$T \rightarrow T^* F \mid F$
$F \rightarrow (E) \mid id$ **(12 Marks)**

3 a. What is shift reduce parser? Explain its actions and conflicts by taking an example. **(10 Marks)**

b. Design SLR parser for the following grammar by computing LR(0) items and show the parsing of string ((a))
$A \rightarrow (A) \mid a$ **(10 Marks)**

4 a. Construct CLR parser by finding LR(1) items for the following grammar
$S \rightarrow AA$
$A \rightarrow aA \mid b$ **(12 Marks)**

b. Construct LALR parser for the grammar of Q4(a) using LR(1) items. **(08 Marks)**

PART – B

5 a. Define inherited and synthesized attributes. Give examples. **(06 Marks)**

b. Give the SDD for simple desk Calculator and draw Annotated parse Tree for expression (3+4) * (5+6). **(10 Marks)**

c. Define syntax directed definition for a simple type declaration. **(04 Marks)**

6 a. Construct DAG and three address code for the following expression :
a + a * (b – c) + (b – c) * d **(08 Marks)**

b. Explain the following with an example: i) Quadruples ii) Triples. **(08 Marks)**

c. Generate three address code to the following statement :

```
Switch (ch)
{
 case 1 : C = a + b ; break ;
 case 2 : C = a – b ; break ;
}
```

(04 Marks)

7 a. With a neat diagram, describe the general structure of an activation record. **(06 Marks)**

b. Explain the strategies for reducing fragmentation in heap memory. **(08 Marks)**

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

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

b. For the following program segment :

```
for  i  = 1 to 10 do
for   j = 1 to 10 do
    a[i, j] = 0.0
for i = 1 to 10 to
a [ i, j] = 1.0
```

Generate intermediate code and identify basic blocks. **(10 Marks)**

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10CS64

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Networks – II

Time: 3 hrs. Max. Marks:100

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

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

1 a. What is virtual–circuit packet switching? Explain. **(06 Marks)**
b. List and explain the goals of routing algorithms. **(06 Marks)**
c. Explain Bellman-Ford algorithm with example. **(08 Marks)**

2 a. Describe the FIFO and priority queues. **(06 Marks)**
b. What is weighted fair queuing? Explain. **(06 Marks)**
c. Explain Dijkstra's algorithm. Find the shortest path for the below network using Dijkstra's algorithm. **(08 Marks)**

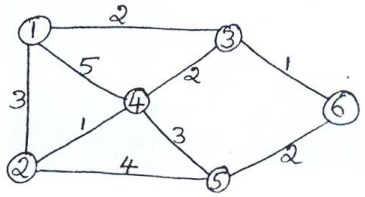

Fig. Q2(c)

3 a. Explain TCP/IP architecture with neat diagram. **(10 Marks)**
b. Describe the IPV6 header format with neat diagram. **(10 Marks)**

4 a. What is OSPF? Explain OSPF operations with aid of diagram. **(10 Marks)**
b. Explain multicast routing with example. **(10 Marks)**

PART – B

5 a. What is the purpose of network management? Explain the characterization of network management. **(06 Marks)**
b. Consider a plaintext message m = 9, get the cipher-text message by using RSA algorithm. Assume that a = 3, b = 11. Also find the public and private keys. **(06 Marks)**
c. What is DNS? Also explain the domain name space and DNS message format. **(08 Marks)**

6 a. Explain the queuing model of leaky – bucket traffic shaping algorithm. **(06 Marks)**
b. Give the significance of differentiated services of QoS. **(06 Marks)**
c. What are VPNs? Explain the types of VPNs and benefits of VPNs. **(08 Marks)**

7 a. What is signal sampling? Explain the sampling process with the types of signal samplings. **(06 Marks)**
b. Explain the SIP components with neat diagrams. **(06 Marks)**
c. Explain the different lossless compression methods with example. **(08 Marks)**

8 a. Explain the different table driven routing protocols used in Ad-hoc networks. **(10 Marks)**
b. Explain DEEP clustering protocol algorithm. **(10 Marks)**

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10CS65

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Graphics & Visualization

Time: 3 hrs. Max. Marks:100

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

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

1 a. Discuss the applications of computer graphics. **(04 Marks)**

b. Describe the working of a pen plotter model. Write a code fragment of a simple program in pen plotter that would generate the output shown in Fig. Q1 (b). **(06 Marks)**

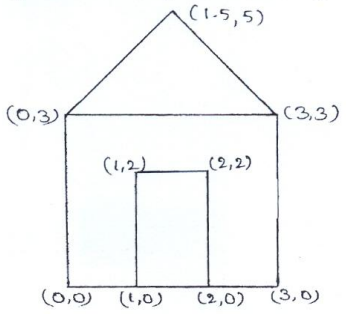

Fig. Q1 (b)

c. Explain the elements of a graphics system, with a neat diagram. **(10 Marks)**

2 a. Write an OpenGL recursive program for 3D Sierpinski Gasket by subdivision of a tetrahedron. **(10 Marks)**

b. Write the different OpenGL primitives, explain each primitive with an example. **(10 Marks)**

3 a. List the three input modes and discuss them with the figures where ever required. **(10 Marks)**

b. Write an OpenGL program to draw a small box at each location on the screen where the mouse cursor is located at the time, that the left button is pressed and right button to terminate the program. **(10 Marks)**

4 a. Explain the procedure of converting a world object frame into camera or eye frame using model view matrix. **(10 Marks)**

b. Explain the following:
i) Affine space.
ii) Vector-vector addition. **(04 Marks)**

c. Given a 2D object with the vertices {(1, 1), (3, 1), (2, 3)}. Rotate this object about the origin by 90°. Calculate the new values by using 2D rotation matrix. Draw the original and the rotated object. **(06 Marks)**

PART – B

5 a. Define and represent the following 3D transformations in homogeneous co-ordinate system:
i) Translation ii) Scaling **(10 Marks)**

b. What is concatenation of transformation? Explain 3D rotation about a fixed point. **(10 Marks)**

6 a. Bringout the differences between perspective and parallel projections. **(06 Marks)**
b. Explain the z-buffer algorithm. **(04 Marks)**
c. Derive the simple perspective projection matrix. **(10 Marks)**

7 a. List and explain different classification of light material interactions. **(10 Marks)**
b. Explain the Phong lighting model. Indicate the advantages and disadvantages of this model. **(10 Marks)**

8 a. Explain Cohen-Sutherland line clipping algorithm with an example. **(10 Marks)**
b. Discuss the Bresenham's rasterization algorithm. **(06 Marks)**
c. Explain antialiasing. **(04 Marks)**

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10CS/IS661

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Operations Research

Time: 3 hrs. Max. Marks:100

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

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.

PART – A

1 a. What are different phases of operation research? Briefly explain phases of operations research study. **(08 Marks)**

b. Old hens can be brought at ₹50/each but young ones cost ₹100/- each. The old hens lay 3 eggs/week and young ones lay 5 eggs/week. Each egg sold at ₹2/-. A hen costs ₹5/week to feed. If a person has only ₹3000/- to spend for hens. Formulate the problem to decide how many of each kind of hen should he buy? Assume that he cannot house more than 50 hens. **(06 Marks)**

c. Define the following with respect to a LPP. Give example for each :
(i) Feasible solution
(ii) Feasible region
(iii) Infeasible solution **(06 Marks)**

2 a. Solve the following LPP by using graphical method:
Maximize $Z = 5x_1 + 4x_2$
Subject to $6x_1 + 4x_2 \le 24$
$x_1 + 2x_2 \le 6$
$-x_1 + x_2 \le 1$
$x_2 \le 2$
where $x_1, x_2 \ge 0$ **(08 Marks)**

b. What are methods of post optimality analysis of LPP? **(02 Marks)**

c. Solve the following LPP by using Simplex method.
Maximize $Z = 5x_1 + 3x_2$
Subject to $x_1 + x_2 \le 2$
$5x_1 + 2x_2 \le 10$
$3x_1 + 8x_2 \le 12$
where $x_1, x_2 \ge 0$ **(10 Marks)**

3 a. Solve the following by using Big-M method.
Maximize $Z = 6x_1 + 4x_2$
Subject to $2x_1 + 3x_2 \le 30$
$3x_1 + 2x_2 \le 24$
$x_1 + x_2 \ge 3$
where $x_1, x_2 \ge 0$ **(10 Marks)**

b. Solve the following LPP by using Two-phase Simplex method.
Maximize $Z = 5x_1 + 3x_2$
Subject to $2x_1 + x_2 \le 1$
$x_1 + 4x_2 \ge 6$
where $x_1, x_2 \ge 0$ **(08 Marks)**

c. Mention software packages used to solve LPP. **(02 Marks)**

4 a. Solve the following LPP by using revised Simplex method.
Maximize $Z = 2x_1 + x_2$
Subject to $3x_1 + 4x_2 \leq 6$
$6x_1 + x_2 \leq 3$
where $x_1, x_2 \geq 0$ **(10 Marks)**

b. Explain the following terms :
(i) Weak duality property (ii) Strong duality property (iii) Complimentary solution property. **(06 Marks)**

c. Write the dual of the following :

(i) Maximize $Z = 4x_1 + 10x_2 + 25x_3$
Subject to $2x_1 + 4x_2 + 8x_3 \leq 25$
$4x_1 + 9x_2 + 8x_3 \leq 30$
$6x_1 + 2x_3 \leq 40$
where $x_1, x_2, x_3 \geq 0$

(ii) Minimize $Z = 20x_1 + 40x_2$
Subject to $2x_1 + 20x_2 \geq 40$
$20x_1 + 3x_2 \geq 20$
$4x_1 + 20x_2 \geq 30$
where $x_1, x_2 \geq 0$

(04 Marks)

PART – B

5 a. Briefly explain about sensitivity analysis. **(05 Marks)**

b. Explain primal-dual relationship with an example. **(05 Marks)**

c. Solve the following by using dual simplex method.
Minimize $Z = 2x_1 + 2x_2 + 4x_3$
Subject to $2x_1 + 3x_2 + 5x_3 \geq 2$
$3x_1 + x_2 + 7x_3 \leq 3$
$x_1 + 4x_2 + 6x_3 \leq 5$
where $x_1, x_2, x_3 \geq 0$ **(10 Marks)**

6 a. Solve the following transportation problem by using (i) North-West corner method (ii) Vogel's approximation method.

		Destination				
		1	2	3	4	Supply
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	

(10 Marks)

b. Solve the following assignment problem.

		Subject			
		S_1	S_2	S_3	S_4
Professor	P_1	2	10	9	7
	P_2	15	4	14	8
	P_3	13	14	16	11
	P_4	3	15	13	8

Find the schedule so as to minimize the total subject preparation time for all subjects. **(10 Marks)**

7 a. Explain following terms with example :
(i) Saddle point (ii) Value of the game (iii) Payoff matrix **(06 Marks)**

b. Solve the following game by dominance principle :

		Player B				
		1	2	3	4	5
Player A	1	2	5	10	7	2
	2	3	3	6	6	4
	3	4	4	8	12	1

(07 Marks)

c. Solve optimally using graphical method by considering the payoff matrix of player A as shown below:

		Player B				
		1	2	3	4	5
Player A	1	3	6	8	4	4
	2	-7	4	2	10	2

(07 Marks)

8 Explain the following terms:
a. Metaheuristics, advantages and disadvantages
b. Tabu search algorithm
c. Genetic algorithm
d. Simulated annealing **(20 Marks)**

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