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18CS61

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
System Software and Compilers

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain the following with concept to SIC/XE machine architecture :
       i) Registers   ii) Data formats   iii) Instruction formats   iv) Addressing modes.   **(10 Marks)**
   b. What is a loader? What are the basic functions the loader has to perform?   **(03 Marks)**
   c. What is program relocation? Illustrate how modification record is used in relocation of the program.   **(07 Marks)**

OR

2 a. Generate the object code for the following SIC/XE source program.

SUM	START	0
FIRST	CLEAR	X
	LDA	#0
	+LDB	#TOTAL
	BASE	TOTAL
LOOP	ADD	TABLE, X
	TIX	COUNT
	JLT	LOOP
	+STA	TOTAL
COUNT	RESW	1
TABLE	RESW	2000
TOTAL	RESW	1
	END	FIRST

   CLEAR = B4, LDA = 00, LDB = 68, ADD = 18, TIX = 2C, JLT = 38, STA = 0C   **(10 Marks)**
   b. State SIC assembler directives.   **(03 Marks)**
   c. Explain in detail program blocks.   **(07 Marks)**

Module-2

3 a. Show a typical language processing system with a diagram.   **(06 Marks)**
   b. Write an algorithm for "look ahead code with sentinels"   **(04 Marks)**
   c. Relate handling reserved words and identifiers during recognition of tokens. Illustrate the transition diagrams for the following: i) Relop   ii) unsigned number.   **(10 Marks)**

OR

4 a. State the three types of software productivity tools.   **(06 Marks)**
   b. Explain the role of lexical analyzer.   **(04 Marks)**
   c. Explain regular expression, extended regular expression and regular definition. Write the regular definition of id and int.   **(10 Marks)**

Module-3

5 a. Eliminate left recursion from the following grammar S → A ; A → aB|ac|Aab|Ade ; B → bBc|ef. (04 Marks)

b. Explain how the error recovery strategies in predictive parsing can be realized with example. (03 Marks)

c. For the grammar: S → (L) |a L → L, S|S. Construct predictive parsing table and show the moves made by the parser on the input (a, (a, a)). (08 Marks)

OR

6 a. Write an algorithm for a recursive descent parser. (04 Marks)

b. What is ambiguous grammar? Prove the following grammar is ambiguous : E → E + E| E * E| (E)|id and write its equivalent un-ambiguous grammar with proper reasoning. (08 Marks)

c. Explain the possible four actions of SR parser. For the following grammar S → 0S1|01, show bottom up parsing for the given string "000111". (08 Marks)

Module-4

7 a. Show the structure of a lex program. (04 Marks)

b. State any three LEX – YACC variables and functions. (06 Marks)

c. Demonstrate the following regular expressions with example : i) [ ]   ii) { }   iii) /   iv) ( )   v) ^ (10 Marks)

OR

8 a. What are LEX and YACC? (04 Marks)

b. Explain regular expressions to identify the following : i) identifier   ii) negative integer   iii) positive number. (06 Marks)

c. Write a YACC program to design a simple calculator. (10 Marks)

Module-5

9 a. Differentiate synthesized and inherited attributes. Obtain SDD for simple declaration statement. Construct a dependency graph for "float a, b, c" and give its evaluation order. (08 Marks)

b. Obtain the directed acyclic graph for the expression x + x *(y + z) + (y + z) * w, along with the steps. (06 Marks)

c. Explain the common three – address instruction forms. (06 Marks)

OR

10 a. Define SDD and its types. Write SDD for simple desk calculator and give annotated parse tree for the expression $(7 - 2)*(8 - 1)n$. (08 Marks)

b. Translate the assignment statements: a = b[i] + c[j] into : i) a syntax tree   ii) quadruples   iii) triples. (06 Marks)

c. Generate code for the following three – address statements assuming a and b are arrays whose elements are 4-byte values.

x = a[i]
y = b[j]
a[i] = y
b[j] = x

(06 Marks)

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Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain Refresh Cathode Ray Tube with diagram. (10 Marks)
   b. Write Bresenham's line drawing algorithm for |m| < 1.0. Digitize the line with end points (20, 10) and (30, 18). (10 Marks)

OR

2 a. Compare random scan display with raster scan display and explain the applications of computer graphics. (10 Marks)
   b. Write Midpoint Circle Algorithm. Given a circle with radius r = 10, demonstrate the midpoint circle algorithm by determining positions along circle octant in first quadrant from x = 0 to x = y. (Assume circle centre is positioned at origin). (10 Marks)

Module-2

3 a. Explain General Scan line polygon fill algorithm. Also explain Open GL polygon fill primitives. (10 Marks)
   b. Explain Translation , Scaling , Rotation in 2D homogeneous coordinate system with matrix representations. (10 Marks)

OR

4 a. Explain two dimensional viewing transformation pipeline with example. (10 Marks)
   b. Explain general two dimensional pivot Point rotation and derive the composite matrix. (10 Marks)

Module-3

5 a. What is Clipping? Explain with example the Sutherland – Hodgman polygon clipping algorithm. (10 Marks)
   b. Describe 3D translation and Scaling, with examples. (10 Marks)

OR

6 a. Define Color model. With neat diagram, explain RGB and CMY color model. (10 Marks)
   b. Describe Phong lighting model. Also explain the different types of light sources supported by OpenGL. (10 Marks)

Module-4

7 a. Explain Orthogonal Projections. (10 Marks)
   b. Write and explain Depth Buffer Algorithm. Also explain Back – Face detection method with example. (10 Marks)

OR

8 a. Explain the Perspective Projections with reference point and Vanishing Point with neat diagrams. (10 Marks)
   b. Explain the OpenGL 3 D Viewing functions and OpenGL Visibility detection functions. (10 Marks)

Module-5

9 a. What is the necessity of Programming event driven input? Describe window events and keyboard event.   **(10 Marks)**

     b. Write a short notes on :
       i) OpenGL Curve and Surface functions   ii) Bezier Curve and Surfaces.   **(10 Marks)**

OR

10 a. What are Display lists? Explain the steps to develop Interactive models and Animating interactive programs.   **(10 Marks)**

     b. Write a short notes on :
       i) Curve and Quadric surfaces   ii) Logic Operations (Graphics).   **(10 Marks)**

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Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Web Technology and its Applications

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a.   Discuss the HTML 5 Semantic structure elements.   (07 Marks)
    b.   Explain the two types of URL referencing with suitable scripts in HTML 5.   (07 Marks)
    c.   Illustrate the CSS box model with suitable example.   (06 Marks)

OR

2   a.   List and explain the different CSS Selectors, with suitable scripts.   (08 Marks)
    b.   Explain the need of CASCADE in CSS. Explain the 3 principles of CASCADE with suitable CSS Script Segments.   (08 Marks)
    c.   Explain the following HTML elements with example :
         i)   <div>   ii)   <a>   iii)   <P>   iv)   <meta>.   (04 Marks)

Module-2

3   a.   With simple HTML form, explain how forms work.   (05 Marks)
    b.   Explain the basic structure of a TABLE in HTML. Explain rowspan and colspan, with suitable script.   (08 Marks)
    c.   Explain different form widgets can be created by using <input> tag.   (07 Marks)

OR

4   a.   Explain different ways of positioning elements in CSS layout techniques.   (10 Marks)
    b.   What is Responsive design? Discuss the key components that make responsive design work.   (10 Marks)

Module-3

5   a.   Explain Java Script's screen output and Keyboard input functions.   (08 Marks)
    b.   Design a Java script program to check whether the given number is palindrome or not.   (08 Marks)
    c.   Explain any 4 Java Scripts array methods.   (04 Marks)

OR

6   a.   Discuss the different approaches for event handling in Java Script with suitable example.   (08 Marks)
    b.   Design a PHP code to greet the user based on current time of the server.   (08 Marks)
    c.   Write a PHP program to print the sum of digits.   (04 Marks)

Module-4

7   a.   Briefly explain the array operations in PHP, with suitable script.   (08 Marks)
    b.   Illustrate how data will flow from HTML from to PHP $ - GET and $-POST array.   (08 Marks)
    c.   How do you read or write file on server from PHP? Give an example.   (04 Marks)

OR

8 a. Define Class. Describe the accessibility of a class member. (06 Marks)
   b. Explain the support for inheritance in PHP with UML class diagram. (06 Marks)
   c. Write a PHP program to create a class student with the following specifications :
   Data members   : Name , USN
   Member functions : Read (getters) and write (setters).
   Use the above specification to read and print the information of 10 students. (08 Marks)

Module-5

9 a. What is Caching? Explain two basic strategies of caching web application. (08 Marks)
   b. With suitable PHP script, explain loading and processing of an XML document in Java Script. (08 Marks)
   c. What are Cookies? How do we write and read a cookie in PHP? (04 Marks)

OR

10 a. Define AJAX. Explain AJAX request by writing UML diagram. (10 Marks)
   b. Explain Java Script pseudo – classes with example. (10 Marks)

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Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
System Modeling and Simulation

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Give the advantages and disadvantages of simulation.   **(10 Marks)**
    b. With a neat flow diagram, explain the steps in simulation study.   **(10 Marks)**

OR

2 a. A small shop has one checkout counter. Customers arrive at this checkout counter at random from 1 to 8 minutes apart. Each possible value of inter-arrival time has the same probability of occurrence. Service times vary from 1 to 6 minutes with probability shown below:

Service time	1	2	3	4	5	6
Probability	0.05	0.10	0.20	0.30	0.25	0.10

Develop simulation table for 10 customers.
Find: i) Average waiting time   ii) Average service time
iii) Average time customer spends in the system.
The random digits for arrivals as: 191, 721, 150, 394, 301, 921, 751, 230, 309 and for service times are 84, 10, 74, 53, 17, 79, 91, 67, 89, 38 respectively.   **(10 Marks)**
    b. Explain event scheduling algorithm by generating system snapshots at clock = t and clock = t1.   **(10 Marks)**

Module-2

3 a. Explain: i) Uniform distribution   ii) Exponential distribution.   **(10 Marks)**
    b. Explain nonstationary Poisson process.   **(10 Marks)**

OR

4 a. Explain characteristics of queuing systems.   **(10 Marks)**
    b. Give the queuing notations for parallel server systems.   **(10 Marks)**

Module-3

5 a. Explain the techniques for generating random numbers.   **(10 Marks)**
    b. The sequence of random numbers have been 0.44, 0.81, 0.14, 0.05, 0.93 generated. Use Kolmogorov Smirnov test with $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0, 1] can be rejected. [Where $D_{0.05} = 0.565$].   **(10 Marks)**

OR

6 a. Give step by step procedure to generate random variates using the inverse transform technique for exponential distribution.   **(10 Marks)**
    b. What is acceptance-rejection technique? Generate three Poisson variates with mean $\alpha = 0.2$. The random numbers are as follows: 0.4357, 0.4146, 0.8353, 0.9952, 0.8004, 0.7945, 0.1530.   **(10 Marks)**

Module-4

7 a. List and explain the important points to be noted while collecting data. **(10 Marks)**

b. Explain the chi-square goodness of fit test. Apply it to Poisson assumption with alpha = 3.64, data size = 100 and observed frequency
$O_i = 12, 10, 19, 17, 10, 8, 7, 5, 5, 3, 3, 1.$ **(10 Marks)**

OR

8 a. Explain: i) Point estimation   ii) Confidence-Interval estimation. **(10 Marks)**

b. Explain output analysis for terminating simulations. **(10 Marks)**

Module-5

9 a. Explain output analysis for steady-state simulations. **(10 Marks)**

b. Explain error estimation for steady-state simulation. **(10 Marks)**

OR

10 a. Explain with a neat diagram, model building, verification and validation process. **(10 Marks)**

b. Describe the three steps approach to validation by Naylor and Finger. **(10 Marks)**

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