Khulna University, Khulna

Computer Science and Engineering Discipline

4th Year, Term I, Examination 2016

Session: **2014-2015**

Course No: **CSE-4103**

Full Title of Course: **Computer Graphics**

Full Marks: 60 **Time: 03 Hours**

- The Figures in the margin indicate full marks. The questions are of equal value
- Use separate sheet for each section

SECTION A

There are **FOUR** questions in this section. Answer any **THREE** questions

Q. 1(a)	Define Scan-conversion and Anti-aliasing.	02
(b)	What is the raster of an image? If we want to cut a 512 X 512 sub-image out from the center of an 800 X 600 image, what are the coordinates of the pixel in the large image that is at the lower left corner of the small image?	03
(c)	Write short notes on RGB and CMY color model.	03
(d)	If we use direct coding of RGB values with 10 bits per primary color, how many possible colors do we have for each pixel?	02
Q.2(a)	Why do many color printers use black pigment?	01
(b)	If we use 2-byte pixel values in a 24-bit lookup-table representation, how many bytes does the lookup table occupy?	02
(c)	Write short note on Scan-converting a point with figures.	03
(d)	What steps are required to plot a line whose slope is between 0° and 45° using Bresenham's method?	03
(e)	How can we eliminate overstrike?	01
Q. 3(a)	What are the three major adverse side effects of scan conversion? Explain them with figures.	03
(b)	Write short note on C curve and Koch curve.	03
(c)	What is the relationship between the rotations R_θ, $R_{-\theta}$ and R_θ^{-1}?	02
(d)	Define Geometric and Coordinate transformation.	02
Q. 4(a)	Find out the aspect ratio of the raster system using 8 x 10 inches screen and 100 pixel/inch.	01
(b)	A unit square is transformed by 2 x 2 transformation matrix. The resulting position vector are: $\begin{pmatrix} 0 & 2 & 8 & 6 \\ 0 & 3 & 4 & 1 \end{pmatrix}$ Find out the transformation matrix.	04
(c)	Discuss i) Boundary-fill algorithm ii) Flood-fill algorithm	05

SECTION B

There are **FOUR** questions in this section. Answer any **THREE** questions

Q. 5(a) Find the form of the matrix for reflection about a line L with slope m and y intercept (0, b). 05

(b) Show that reflection about the line y = x is attained by reversing coordinates. That is, M_L (x, y) = (y, x). 02

(c) Show that $T_{v1} \cdot T_{v2} = T_{v2} \cdot T_{v1} = T_{v1+v2}$. 03

Q. 6(a) Show that $S_{a,b} \cdot S_{c,d} = S_{c,d} \cdot S_{a,b} = S_{ac,bd}$. 02

(b) Find the condition under which we have $S_{sx,sy} \cdot R_\theta = R_\theta \cdot S_{sx,sy}$. 03

(c) Find the complete viewing transformation that maps a window in world coordinates with x extent 1 to 10 and y extent 1 to 10 onto a viewport with x extent ¼ to ¾ and y extent 0 to ½ in normalized device space, and then maps a workstation window with x extent ¼ to ½ and y extent ¼ to ½ in the normalized device space into workstation viewport with x extent 1 to 10 and y extent 1 to 10 on the physical display device. 05

Q. 7(a) Define World and Normalized device coordinate system. 02

(b) Write short note on Midpoint Subdivision algorithm of line clipping with figure. 03

(c) Find the normalized transformation from the window whose lower left corner is at (0, 0) and upper right corner is at (4, 3) onto the normalized device screen so that aspect ratios are preserved. 03

(d) Define Translation and Scaling for three-dimensional transformation. 02

Q. 8(a) The pyramid defined by the coordinates A(0,0,0) , B(1,0,0), C(0,1,0) and D (0,0,1) is rotated 45^0 about the line L that has the direction V=J+K and passing through point C(0,1,0). Find the coordinates of the rotated figure. 07

(b) Find the transformation for mirror reflection with respect to *xy* plane. 3

Khulna University, Khulna

Computer Science and Engineering Discipline

4th Year, Term I, Examination 2016

Session: 2014-2015

Course No: CSE-4111

Full Title of Course: Computer Networks

Full Marks: 60 Time: 03 Hours

- The Figures in the margin indicate full marks. The questions are of equal value
- Use separate sheet for each section

SECTION A

There are **FOUR** questions in this section. Answer any **THREE** questions

Q. 1(a)	Differentiate between Distributed system and Computer Networks	02
(b)	Define protocol and protocol stack.	02
(c)	Distinguished between Connection-oriented and Connectionless Services.	03
(d)	Compare Go-Back-N and selective repeat protocols.	03
Q. 2(a)	What are the differences between TCP/IP Reference Model and OSI Reference Model?	03
(b)	Define Piggybacking. Write the advantages and disadvantages of Piggybacking.	03
(c)	A bit stream 11100011 is transmitted using the standard CRC method. The generator polynomial is x^3+1. Show the actual bit stream transmitted. Suppose the fourth bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.	04
Q. 3(a)	What are the functions of data link layer?	02
(b)	Briefly describe the service primitives.	04
(c)	State Nyquist theorem and maximum data rate of a channel. Describe Shanon's theorem about using channel.	02
(d)	If a binary signal is sent over 3KHz channel whose signal to noise ratio is 20dB, then determine the maximum achievable data rate.	02
Q. 4(a)	Discuss the IP address classes A, B, C and D. Discuss 'classless' inter domain routing in brief.	03
(b)	Describe the internal structure of Unshielded Twisted pair cable.	02
(c)	Describe OSI Reference model in brief.	05

SECTION B

There are four questions in this section. Answer any three questions

Q. 5(a)	What is framing? Discuss "Character count" and "Flag bytes with byte Stuffing" framing techniques.	04
(b)	Discuss One-bit Sliding Window Protocol.	04
(c)	What is the problem of One-bit Sliding Protocol?	02
Q. 6(a)	What is QoS? Write the techniques for achieving good quality of service.	04
(b)	Briefly describe Slotted ALOHA protocols.	03
(c)	Contrast between the Leaky Bucket algorithm and the Token Bucket algorithm.	03

Q. 7(a) Describe bit map protocol. What is the problem of bit map protocol? 04

(b) Write the disadvantages of Static Channel Allocation 02

(c) Explain the advantages of a single-server network over a peer-to-peer network when there are 30 computers on the network. 04

Q. 8(a) Discuss Manchester Encoding and Differential Manchester encoding technique with examples. 03

(b) What is the problem of Flooding Algorithm? What are the measures for avoiding this problem? 02

(c) Consider the subnet of Figure 8(c). Show the first six steps for Shortest Path routing algorithm considering A as the source router. 03

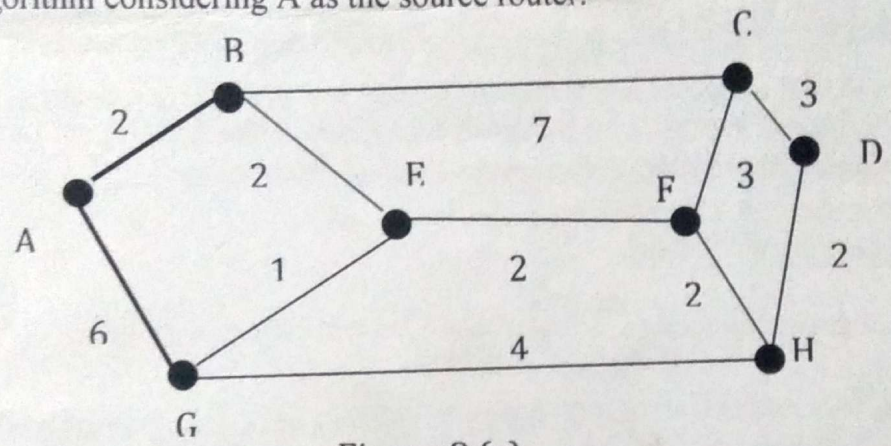

Figure 8 (c)

(d) Differentiate between: 02

(i) Repeater and Hub

(ii) Bridge and Switch

Khulna University, Khulna

Computer Science and Engineering Discipline
4^{th} Year, Term I, Examination 2016
Session: **2014-2015**
Course No: **CSE-4105**
Full Title of Course: **Compiler Design**

Full Marks: **60** Time: **03** Hours

- The Figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

SECTION A

There are **FOUR** questions in this section. Answer any **THREE** questions.

Q1. a) What is compiler? Draw the block diagram of a hybrid compiler? **02**

b) What are the phase of a compiler? Consider the following source program- **06**

$$result = a + (b - cost) * 84.55 \text{ // an arithmetic expression}$$

Here, a, b and cost contain integer values. Write the outputs of very phase of a compiler considering the above input program.

c) Why symbol table is necessary to compile a program? **02**

Q2. a) Show that the following grammar is ambiguous **03**

$$S \rightarrow iCtS \mid iCtScS \mid a$$
$$C \rightarrow b$$

Write the unambiguous grammar for the above grammar.

b) Convert the following infix expression into postfix expression – **03**

$$(a + b) + c * d - (b + a)$$

c) What are the components of a context-free grammar? Consider the following context-free grammar- **04**

$$A \rightarrow AA + \mid AA * \mid b$$

Show how the string $bb + bb +*$ can be generated by the grammar.

Q3. a) Explain the recursive descent parser with backtracking. **03**

b) Describe input buffering technique with sentinels. **04**

c) What do you mean by strings and languages? Differentiate between substring and subsequence of a string with example. **03**

Q4. a) Define regular expression. Write the regular definitions for the following languages: **03**

i. All strings of 0's and 1's starting with 1010.
ii. All strings of letters and digits having length of 0 to infinity.

b) Construct the predictive table for the following grammar: **03**

$$S \rightarrow a \mid \uparrow \mid (T)$$
$$T \rightarrow T, S \mid S$$

c) Construct NFA for the following regular expression using Thompson's construction: **04**

$$aaa(a|b)^+(a|b)b$$

SECTION B

There are **FOUR** questions in this section. Answer any **THREE** questions.

Q5. a) Define transition diagram. Consider the following regular definitions: **03**

$$D \rightarrow 0|1|2|\ldots\ldots\ldots\ldots\ldots\ldots|9$$
$$L \rightarrow A|B|C|\ldots\ldots|Z|a|b|c|\ldots\ldots\ldots\ldots|z$$
$$ID \rightarrow \$(L \cup D)^*$$

Draw the transition diagram for ID.

b) Construct DFA directly from the regular expression $(a|b)^*abbb$. **07**

Q6. a) Define the quadruples, triples and indirect triples. Give their representation for the assignment statement $A = B * (C + D)$ by generating an appropriate 3-address code. **04**

b) Consider the following grammar. 03

$$A \rightarrow A + BC|C$$
$$E \rightarrow E + T|T$$
$$T \rightarrow E + F|F$$
$$F \rightarrow F(E) * |b$$

Eliminate left recursion from the above grammar.

c) Show that the following grammar is LL(1). 03

$$S \rightarrow iEtSS'|a$$
$$S' \rightarrow eS| \in$$
$$E \rightarrow b$$

Q7. a) What do you mean by LR (K)? Table 7(a) is a simple LR parsing table for the grammar- 04

1. $E \rightarrow E + T$
2. $E \rightarrow T$
3. $T \rightarrow T * F$
4. $T \rightarrow F$
5. $F \rightarrow (E)$
6. $F \rightarrow id$

Show the moves made by SLR parser on input $id + id * id$ and check its validity.

Table 7(a)

STATE	ACTION						GOTO		
	id	+	*	(	)	$	E	T	F
0	s5			s4			1	2	3
1		s6				acc			
2		r2	s7		r2	r2			
3		r4	r4		r4	r4			
4	s5			s4			8	2	3
5		r6	r6		r6	r6			
6	s5			s4				9	3
7	s5			s4					10
8		s6			s11				
9		r1	s7		r1	r1			
10		r3	r3		r3	r3			
11		r5	r5		r5	r5			

b) Show that the following grammar 06

$$S \rightarrow Aa|bAc|Bc|bBa$$
$$A \rightarrow d$$
$$B \rightarrow d$$

is LR(1).

Q8. a) Define annotated parse tree. The syntax directed definition in Fig. 8(a) is for a desk calculator program. 04

Fig. 8(a)

	PRODUCTION	SEMANTIC RULES
1)	$L \rightarrow E$ **n**	$L.val = E.val$
2)	$E \rightarrow E_1 + T$	$E.val = E_1.val + T.val$
3)	$E \rightarrow T$	$E.val = T.val$
4)	$T \rightarrow T_1 * F$	$T.val = T_1.val \times F.val$
5)	$T \rightarrow F$	$T.val = F.val$
6)	$F \rightarrow (E)$	$F.val = E.val$
7)	$F \rightarrow$ **digit**	$F.val =$ **digit**.lexval

Construct an annotated parse tree for the input $10 * 5 + 6n$ using the syntax directed definition in Fig. 8(a).

b) What do you mean by directed acyclic graph? Draw directed acyclic graph for the expression 03

$$c + c * (b - d) + (b - d) * (a + e)$$

c) Explain the syntax-directed translation of switch-statements. 03