Class Test 1

Course No: CSE 4111 Course Title: Computer Networks

Marks: 30

M. Raihan

1. The following character encoding is used in a data link protocol:

   A: 01000111 B: 11100011 FLAG: 01111110 ESC: 11100000

   Show the bit sequence transmitted (in binary) for the four-character frame: A B ESC FLAG when each of the following framing methods are used:

   a) character count b) Flag bytes with byte stuffing
   c) Starting and ending flag bytes, with bit stuffing.

2. A bit stream 10011101 is transmitted using Hamming code with even parity method.

   i) Show the actual bit string transmitted
   ii) Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

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Applied Probability and Queuing Theory

Ist class Test, Total: 10

1. Two cards are randomly selected from a deck of 52 playing cards. (05)

   i) What is the probability they constitute a pair (that is, that they are the same denomination)?

   ii) What is the conditional probability they continue a pair given that they are of different suits?

2. If X is a random variable with mean μ and variance σ^2, then, for any value $k > 0$, (05)

$$P\{|X-\mu| \geq k\} \leq \frac{\sigma^2}{k^2}$$

Class Test #2

CSE 4121

Marks: 10, Time:

1. What is Markov Chain? Derive Chapman-Kolmogorov equation for n transactions (05)

2. Suppose that the chance of rain tomorrow depends on previous weather conditions only through whether or not it is raining today and not on past weather conditions. Suppose also that if it rains today, then it will rain tomorrow with probability 0.6; and if it does not rain today, then it will rain tomorrow with probability fifty-fifty. (05)

Calculate the probability that it will rain three day from today given that it is not raining today.

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BSc Engg. CSE – HCI – CT-1

1	Define anti-aliasing? What is VR motion-sickness? Discuss in details.	5
2	Define haptic. How haptic research help us to develop intuitive UI design. How touch provide important feedback about environment.	5
3	What do you mean by WYSIWYG in HCI? Do you think that study of HCI is important as a CSE graduate, also mention why?	5
4	What is virtual memory? Discuss in brief how virtual memory works.	5
5	Define following terms: • PC STM • Human LTM – Semantic Network • QWERTY Layout • Eyegaze • Moor's law	5
6	How logical and spatial grouping of controls relate to physical layout design.	5

Raihan 110246

Class Test 02

CSE 4105 (Compiler Design)

Time: 30 Minutes Marks: 15

1. What is Regular Expression? Write regular definitions for the following languages- 01+04
   i) All strings of letters and digits beginning with a digit.
   ii) All strings of letters and digits beginning and ending with double quotation.
   iii) All strings of letters beginning with **int** or **float.**
   iv) All strings for generating 10, 123456, 10.50, 0.2345, ...

2. Construct DFA directly from the regular expression **(a|b)*a(a|b)**. Following outputs are necessary: 10
   i. Syntax Tree
   ii. Firstpos, Lastpos and Followpos
   iii. DFA

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HCI – CT 2, 30 marks, 30 min

1	Discuss in details the Donald Norman's model.	8
2	Define following terms: • Indirect manipulation • Ergonomics • Fluidity • WIMP • Spreadsheets • Human factor	12
3	What is the difference between glass interface and industrial interface, discuss briefly.	5
4	What is context? How context affect in case of UI design?	5

Raihan 110246

Computer Science and Engineering Discipline
Class Test 01
Course No: CSE 4105
Course Title: Compiler Design
Time: 30 Mins **Full Mark: 15**

01. Draw the block diagram of a hybrid compiler. 01

02. Consider the following output of a lexical analyzer- 10

$$id_1 = id_2 + id_3 - id_4 * 84$$

and the symbol table entry-

index	id_name	id_type
1	id	float
2	id	float
3	id	float
4	id	float

Write the outputs of the following phases of a compiler:

i. Syntax Analyzer
ii. Semantic Analyzer
iii. Intermediate Code Generator
iv. Machine Independent Code Optimizer and
v. Code Generator

03. What are the components of a Context-free grammar? Separate the terminals and non-terminals from the following code segment: 04

stmt → **for** (int i = 0 ; *i* < *10* ; *i*++) { *sum* = *sum* + *i* ;}

M. Raihan , 110246

01-06-15

Khulna University, Khulna

Computer Science and Engineering Discipline

4th Year, Term I, Examination **2015** Session: **2013-2014**

Course No: **CSE 4129** Full Title of Course: **Human Computer Interaction**

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.

1. a) Define Human Computer Interaction. Why Human Computer Interaction is important for better interaction design? 04
   b) Define usability with regard to Human Computer Interaction. 02
   c) Define reasoning. Discuss various types of reasoning. 04

2. a) Discuss how human interpret the signal by following factors- 03
   i) Size and depth ii) Brightness iii) Colour
   b) What is virtual reality (VR)? Discuss in brief the VR motion sickness. 03
   c) Define a paper prototype for a web based email application. 04

3. a) Comment on the use of different forts (casing, face, etc.) for printed text or on screen. 2.5
   b) Briefly discuss some factors that can limit the speed of an interactive system. 2.5
   c) Briefly describe the Norman's model of interaction. 05

4. a) There are three types of human memory. What is the purpose of short term memory although human have other two types of human memory. 02
   b) Discuss in details the different evaluation techniques for good interface design. 04
   c) Discuss about Abowd and Beale framework for interaction design. 04

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SECTION B

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

5. a) What are the advantages and disadvantages of touch sensitive screen? 02
   b) What are optical illusions? Discuss with appropriate figure. 04
   c) What is prototyping? What is the benefit of video prototyping over paper prototyping? 03
   d) What is batch processing? 01

6. a) Briefly discuss sensor-based and context-aware interaction. 02
   b) Explain the interaction design process with an appropriate figure. 05
   c) How do you get to know your users? 03

7. a) How logical and spatial grouping of contents relate to physical layout design? Discuss in the context of HCI. 03
   b) What are ~~neural~~ mental models and why are they important in interface design? 03
   c) Define haptic. How haptic researches help us to develop intuitive UI design? 03
   d) What is Moor's law of processing speed and memory? 01

8. a) Consider that you need to submit a paper to a world renowned HCI conference. So your professor told you to test your system in a real environment. You decided to conduct a usability study in your laboratory environment. Discuss how you will conduct the usability testing. 03
   b) What is evaluation? What are the types of evaluation? Discuss cognitive walk through evaluation technique. 04
   c) What do you know about aesthetics and minimalist design? 01
   d) What is protocol analysis? Discuss automated analysis – EVA. 02

Raihan/110246

21-06-15

Khulna University, Khulna

Computer Science and Engineering Discipline

4th Year, Term I, Examination **2015**

Course No: **CSE 4103** Session: **2013-2014**

Full Marks: **60** Full Title of Course: **Computer Graphics**

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.

1. a) What is a digital image? What is the resolution of an image? 02
   b) What is aspect ratio of an image? Can a 5 by 3.5 inch image be presented at 6 by 4 inch without introducing geometric distortion? 03
   c) If we use direct coding of RGB values with 2 bits per primary colour, how many possible colours do we have for each pixel? 2.5
   d) If we use 2-byte pixel values in a 24-bit lookup table representation, how many bytes does the lookup table occupy? 2.5

2. a) Define scan conversion and aliasing effect. Briefly explain the aliasing effects of scan conversion. 2+3
   b) What is overstrike? Identify where overstrike occurs. How can we eliminate overstrike? 04
   c) What is meant by 'Koch Curve'? 01

3. a) Indicate which raster locations would be chosen by Bresenham's algorithm when scan converting a line from pixel coordinate (2,3) to (8,7). 04
   b) Derive the equation of Bresenham's line algorithm for the line whose slope is between 45^0 and 90^0. 04
   c) Define transformation. Classify it. 02

4. a) Derive the transformation that rotates an object point θ^0 about the origin. Write the matrix representation for this rotation. 03
   b) Show that the order in which transformations are performed is important by the transformations of triangle A(1,0), B(0,1), C(1,1) by (a) rotating 45^0 about the origin and then translating in the direction of vector I, and (b) translating and then rotating. 04
   c) Show that, $T_{v1}.T_{v2} = T_{v2}.T_{v1} = T_{v1+v2}$ 03

M. Raihan Roll:110246

SECTION B

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

5. a) Define Normalization transformation. Derive the equation of this transformation. 04
   b) Discuss Cohen-Sutherland algorithm of line clipping. 06

6. a) Find the normalization transformation N which uses the rectangle A(1,1), B(0,3), C(4,5), D(5,3) as a window and the normalized device screen as a viewport. 04
   b) The pyramid defined by the coordinates A(0,0,0), B(0,0,1), C(0,1,0) and D(1,0,0) is rotated 45^0 about the line L that has the direction **V = I + K** and passing through point C(0,1,0). Find the coordinates of the rotated figure. 04
   c) Align the vector **V = I + J + K** with the vector **K**. 02

7. a) Show that the alignment transformation satisfies the relation $A_v^{-1} = A_v^T$ 03
   b) Define oblique projection. Classify it and define each type. 02
   c) Find the transformation for a) Cavalier with $\theta = 45^0$ and b) Cabinet projection with $\theta = 30^0$. Draw the projection of the unit cube for each transformation. 05

8. a) Define projection. What are the techniques of perspective projection? 2.5
   b) Define Axonometric projection. Classify it and briefly explain. 3.5
   c) Using the origin as the centre of projection, derive the perspective transformation onto the plane passing through the point $R_0(x_0,y_0,z_0)$ and having the normal vector $\mathbf{N} = n_1\mathbf{I} + n_2\mathbf{J} + N_3\mathbf{K}$. 04

08-06-15

Khulna University, Khulna

Computer Science and Engineering Discipline

Session: **2013-2014**

4th Year, Term I, Examination **2015**

Full Title of Course: **Computer Networks**

Course No: **CSE 4111**

Time: **03** Hours

Full Marks: **60**

- 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.

1. a) Differentiate between Distributed System and Computer Networks. 02
   b) Explain Social Issues of Computer Networks. 04
   c) Discuss Various types of Transmission Technology. 04
2. a) Distinguish between connection-oriented and connectionless services. 03
   b) With a neat diagram explain in short about the network architecture. 05
   c) Define Protocol and Protocol Stack. 02
3. a) Explain various types of interfaces of fibre optic networks. 04
   b) Transmission lines suffer from three major problems. What are those? Define them. 03
   c) What is the difference between Internet architecture and OSI architecture? 03
4. a) Define piggybacking. Write down its advantages and disadvantages. 03
   b) A bit stream 11100011 is transmitted using the standard CRC method. The generator polynomial is x^3+1. Show the actual bit string transmitted. Suppose the fourth bit from the left is inverted during transmission, show that this error is detected at the receiver's end. 04
   c) The following character encoding is used in a data link protocol: 03
   A: 01000111 B: 11100011 FLAG: 01111110 ESC: 11100000
   Show the bit sequence transmitted (in binary) for the four-character frame: A B ESC FLAG when each of the following framing methods are used.
   i) Character count
   ii) Flag bytes with byte stuffing
   iii) Starting and Ending flag bytes, with bit stuffing.

SECTION B

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

5. a) Explain frame format of unnumbered mode operation of PPP. 04
   b) Write down the disadvantages of static channel allocation. 02
   c) Suppose a LAN has ten stations that have the numbers 8, 2, 4, 5, 1, 7, 3, 6, 9, and 0. The next three stations to send data are 4, 3, and 9, in that order. Explain this situation of data transmission, if the LAN uses 04
   i) Binary countdown protocol
   ii) Modified (MOK and WARD's) version of binary countdown protocol.
6. a) Compare Go-Back-N and selective repeat protocols. 03
   b) Compare the maximum throughput of ALOHA and slotted ALOHA protocols. 04
   c) What is traffic shaping? What are the methods of shape traffic? 03
7. a) What is optimality principle? Explain count-to-infinity problem of Distance Vector Routing. 01+03
   b) Consider the subnet of figure 7(b). Show the link state packets for this subnet. 02

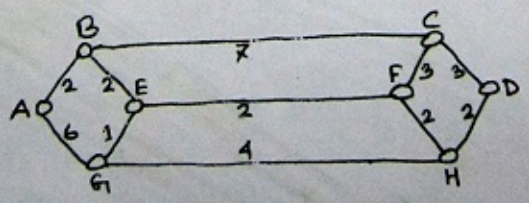

Figure – 7(b)

   c) Explain routing for mobile hosts. 04
8. a) Explain the three way handshake protocol to establish the transport level connection. 05
   b) Briefly explain DNS with reference to its components and working. 05

Date: 25.06.2015

KHULNA UNIVERSITY, KHULNA

Computer Science and Engineering Discipline

4th Year, 1st Term

Session: **2013-2014**

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.

1(a) What is the difference between a compiler and an interpreter? 04

(b) Describe some of the tasks that an assembler needs to perform. 03

(c) Give a short description of some commonly used compiler construction tools. 03

2(a) What are the components of a context-free grammar? Consider the context-free grammar: 04

$$S \rightarrow SS+ \mid SS* \mid a$$

Show how the string $aa+a*$ can be generated by this grammar.

(b) Convert the infix expression into postfix expression and show each processing step: 03

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

(c) Define annotated parse tree. Why bottom up parsing is stronger than top down parsing? 03

3(a) What is ambiguity? Consider the following grammar fragment: 05

$$stmt \rightarrow \textbf{if } expr \textbf{ then } stmt$$
$$\mid \textbf{if } expr \textbf{ then } stmt \textbf{ else } stmt$$
$$\mid \text{other}$$

Where other stands for the other statements in the language.

i. Show that this grammar is ambiguous with respect to the string **if** E_1 **then if** E_2 **then** S_1 **else** S_2

ii. Eliminate ambiguity from this grammar

(b) Describe input buffering scheme 'buffer pair'. What is the disadvantage of this technique? 04

(c) What are the differences between substring and sub-sequence of a string? 01

4(a) What do you mean by regular definition? Write regular definitions for the following language: 03

i. All strings of letters and digits starting with letter or underscore.

ii. All strings of digits with no repeated digit.

(b) Consider the following regular definitions: 02

$$digit \rightarrow 0|1| \ldots\ldots\ldots\ldots |9$$
$$digits \rightarrow digit^+$$
$$op_fraction \rightarrow (.digits)?$$
$$op_exponent \rightarrow (E(+|-)?\, digits)?$$
$$num \rightarrow digits\ op_fraction\ op_exponent$$

Draw the transition diagram for num.

(c) Define NFA. Construct NFA for the following regular expression: 05

$$(a|b)^*a(a|b)(a|b)$$

Using Thompson's construction rule.

SECTION B

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

5(a) Briefly describe the following error recovery strategies: 03

i. Panic mode

ii. Error productions and

iii. Global correction

(b) Construct DFA without constructing any NFA for the regular expression $(c|d)^*cdd$. 05

(c) Is the following grammar left recursive? If so, eliminate left recursion. 02

$$S \rightarrow Aa|b$$
$$A \rightarrow Ac|Sd|\epsilon$$

6(a) Determine first and follow for all the non-terminals of the following grammar: 03

$$E \rightarrow E+T|T$$
$$T \rightarrow T*F|F$$
$$F \rightarrow (E)|id$$

(b) What do you mean by LL(1)? Table 6(b) is a predictive parsing table. Show the moves made by predictive parser on input $id*id+id$. Is the input a valid input? 05

Table 6(b)

NON-TERMINAL	INPUT SYMBOL					
	id	+	*	(	)	$
E	$E \rightarrow TE'$			$E \rightarrow TE'$		
E'		$E' \rightarrow +TE'$			$E' \rightarrow \epsilon$	$E' \rightarrow \epsilon$
T	$T \rightarrow FT'$			$T \rightarrow FT'$		
T'		$T' \rightarrow \epsilon$	$T' \rightarrow *FT'$		$T' \rightarrow \epsilon$	$T' \rightarrow \epsilon$
F	$F \rightarrow id$			$F \rightarrow (E)$		

(a) Define symbol table. Why is symbol table necessary? 05

7(a) Construct LR(1) parsing table for the following grammar: 05

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

(b) Show that the following grammar-

$$S \rightarrow AaAb|BbBa$$
$$A \rightarrow \epsilon$$
$$B \rightarrow \epsilon$$

is LL(1) but not SLR(1). 03

8(a) What is the way to represent array accesses in a DAG? 02

(b) Construct the DAG for the basic block $x = a[i], a[j] = y, z = a[i]$. 03

(c) Write down the machine instructions for the following three-address instructions: 02

$$x = y + z$$

(d) Define instruction selection, register allocation, register assignment and retargetable compiler.

Date: 23.12.2012

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2012
Session: 2011-2012
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

1. (a) Define resolution and aspect ratio of an image with example. 03
   (b) If we use 12-bit pixel values in a 24-bit lookup table presentation 02
   (i) How many entries does the lookup table have?
   (ii) How many bytes does the lookup table occupy?
   (c) Briefly explain the Direct Coding Technique of image representation. Write down its advantages and disadvantages. 03+02

2. (a) Derive the equation of Midpoint Circle algorithm. Write down the algorithm also. 04+02
   (b) Explain the major side effects of Scan Conversion. 04

3. (a) Distinguish between Geometric transformation and Coordinate transformation. 02
   (b) Perform a 45° rotation of a triangle A (5, 2), B (0, 0), C (1, 1) about P (-1, -1). 04
   (c) Find the form of the matrix for reflection about a line L with slope m and y intercept (0, b). 04

4. (a) Show that the order in which transformations are performed is important by the transformation of triangle A (1, 0), B (0, 1), C (1, 1) by 06
   (i) Rotating 45° about origin and then translating in the direction of vector I, and
   (ii) Translating and then rotating.
   (b) Define Uniform Scaling. Show that, $S_{a,b} \cdot S_{c,d} = S_{c,d} \cdot S_{a,b} = S_{ac,bd}$ 01+03

Section B

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

5. (a) Explain Line Clipping process of Cohen-Sutherland algorithm. 06
   (b) 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 a workstation viewport with x extent 1 to 10 and y extent 1 to 10 on the physical display device. 04

6. (a) The pyramid defined by the coordinates A (0, 0, 0), B (0, 2, 0), C (0, 0, 2) and D (2, 0, 0) is rotated 45° about a line L that has the direction V = I + J and passing through point C (0, 0, 2). Find the coordinates of the rotated figure. 06
   (b) Find a transformation which aligns the vector V = I + J + K with the vector N = 2I – J- K 126 page chapter 6 Ex 6.10 04

7. (a) Define projection. What are the perspective anomalies? 130 03
   (b) The unit cube in Fig. - 7(b) is projected onto XY plane. Draw the projected image using the standard perspective transformation with d = 10, where d is the distance from the view plane. 04

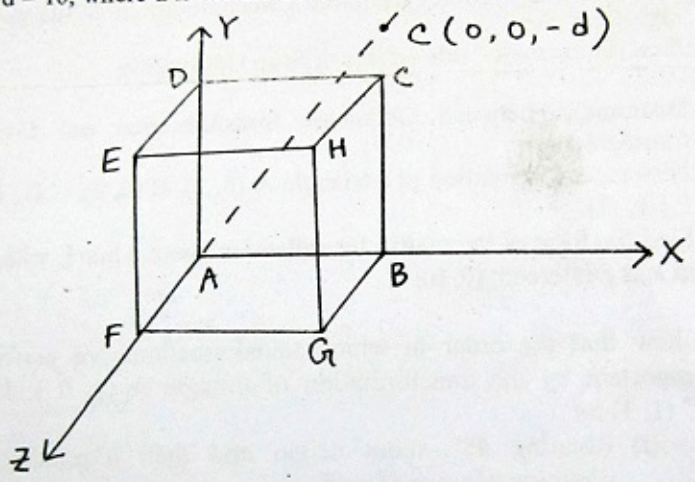

Fig. - 7(b)

   (c) Describe one-principal and two-principal vanishing-point perspective. 03

8. (a) Define planar polygon, and polyhedron. Represent a cube by using 02+02
      (i) Polygon listing and
      (ii) Explicit edge listing.
   (b) Write down the properties of Bézier curve. 02
   (c) Given B_0 (1, 1), B_1 (2, 3), B_2 (4, 3) and B_3 (3, 1) the vertices of a Bézier polygon. Determine five points on the Bézier curve. 04

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Date: 17.01.2013

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2012
Session: 2011-2012
Course No: CSE 4121
Full Title of Course: Applied Probability and Queuing Theory

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

1. (a) Define probability. Prove that 04

$$P(E|F) = \frac{P(EF)}{P(F)}$$

(b) State the axioms of probability. Page-(4) 02

(c) The probability that a lab specimen contains high levels of contamination is 0.10. Five samples are checked, and the samples are independent. 04

(i) What is the probability that none contains high levels of contamination?

(ii) What is the probability that exactly one contains high levels of contamination?

(iii) What is the probability that at least one contains high levels of contamination?

2. (a) Calculate E[X] if X is Poisson random variable with parameter λ. – Ex 2.19 Page 38 04

(b) If X is a random variable that takes only nonnegative values, then for any value a>0. 03

$$P\{X \geq a\} \leq \frac{E[X]}{a}$$

book 254

(c) Show that exponential distribution has memory less property. 03

3. (a) The joint density of X and Y is given by 04

$$f(x,y) = \begin{cases} \frac{1}{2} y e^{-xy} & , 0 < x < \propto, \quad 0 < y < 2 \\ 0 & , otherwise \end{cases}$$

What is $E\left[e^{\frac{X}{2}} \mid Y = 1\right]$? 105

(b) Let the probability density of X is given by Ex 34-2 06

$$f(x) = \begin{cases} C(4x - 2x^2) & , 0 < x < 2 \\ 0 & , otherwise \end{cases}$$

(i) What is the value of C?

(ii) $P\left\{\frac{1}{2} < x < \frac{3}{2}\right\} = ?$

4. (a) What do you mean by Stochastic Process? Write different types of Stochastic Process. 03

(b) What is Markov Process? Compute the n-step transition probability for discrete time Markov Process. 04

(c) Consider the Markov chain consisting of the three states 0, 1, 2 and having transition probability matrix 03

$$P = \begin{bmatrix} \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ 0 & \frac{1}{3} & \frac{2}{3} \end{bmatrix}$$

Verify if it is irreducible or not.

Section B

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

5. (a) What do you mean by continuous time Markov Chain? What are the properties of it? 373 03

(b) What do you mean by birth-death process? 374 02

(c) Derive Kolmogorov backward and forward equation. 388 05

6. (a) Define queue. Write the balance equation for M/M/1 queue and show that 05

$$P_n = \left(\frac{\lambda}{\mu}\right)\left(1 - \frac{\lambda}{\mu}\right), n \geq 1$$ 503, 504

Where λ and μ represent arrival and service rates.

(b) Suppose that customers arrive at a Poisson rate of one per every 12 minutes, and that the service time is exponential at a rate of one service per 8 minutes. What are the average number of customers and average waiting time in the system? page 507 (Ex 8.2) 03

(c) What do you mean by traffic intensity of a queuing system? Not 02

7. (a) Derive Chapman- Kolmogorov equation. 02

(b) Let the transition probability matrix of a two state Markov chain be given 04

$$P = \begin{Vmatrix} P & 1-P \\ 1-P & P \end{Vmatrix}$$

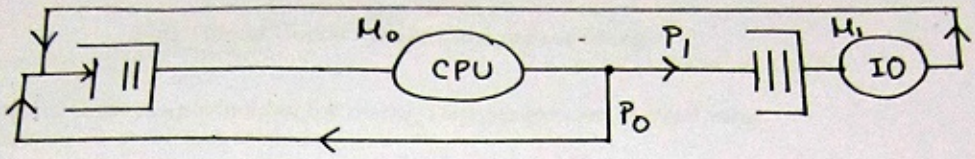
Show by mathematical induction that

$$p^{(n)} = \begin{Vmatrix} \frac{1}{2} + \frac{1}{2}(2P-1)^n & \frac{1}{2} - \frac{1}{2}(2P-1)^n \\ \frac{1}{2} - \frac{1}{2}(2P-1)^n & \frac{1}{2} + \frac{1}{2}(2P-1)^n \end{Vmatrix}$$

(c) Prove that if the number of states in a Markov Chain is M and if state j can be reached from state i, then it can be reached in M steps. 04 chapter Ex 15 4 page 222

8. (a) What do you mean by open queuing network and close queuing network? 2.5

(b) State the balance equations and state diagram for the following closed cyclic queuing model as in figure 8(b). 3.5



(c) For a tandem queuing system with two server, show that 04

$$P_{n,m} = \left(\frac{\lambda}{\mu_1}\right)^n \left(1-\frac{\lambda}{\mu_1}\right)\left(\frac{\lambda}{\mu_2}\right)^m \left(1-\frac{\lambda}{\mu_2}\right)$$

528 [illegible]

Where, (n, m) pair represents that n customers at server 1 and m customers at server 2, and μ_i is service rate for server i, where i= 1, 2... and λ is arrival rate.

Date: 10.01.2013

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2012
Session: 2011-2012
Course No: CSE 4125
Full Title of Course: Digital Image Processing

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

1. (a) What is an image? Explain how the image of an object is mapped into the camera. 01+04
   (b) "Orthographic projection is sometimes used as an approximation of the perspective projection". Explain. 02
   (c) Show mathematically what happens if you take a picture without taking the cap off the lens of the camera. 03

2. (a) Contrast between Zooming and Shrinking of a digital image. 04
   (b) Why sampling and quantization are needed to create a digital image. Discuss those processes in brief. 04
   (c) What is false contouring? 02

3. (a) Show how the histograms of two different images can be same. 03
   (b) Write the conditions to be met for a distance function D for the pixels p(x, y), q(s, t) and z(v, w). 02
   (c) Give the condition(s) under which the D_4 distance between two points p and q is equal to the shortest 4-path between these points. Is this path unique? 03+02

4. (a) Define horizontal neighbors, vertical neighbors, connected set and connected component. 02
   (b) Consider the two image subsets S_1 and S_2 shown in figure 4(b). For V= {1}, determine if these two subsets are (i) 4- adjacent, (ii) 8-adjacent or (iii) m- adjacent. 4.5

	S_1				S_2				
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1	1	0	0	0
0	0	1	1	1	0	0	0	0	0
0	1	0	1	1	0	1	1	0	1

Figure 4(b)

   (c) Describe histogram equalization. 3.5

Section B

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

5. (a) What are the differences between spatial domain and frequency domain image processing? 03
   (b) Write short notes on the principal two categories of spatial processing. 03
   (c) What is filtering? Why is it used? What is the effect of filter size in the processed image? 01+01+02

6. (a) Define correlation and convolution. Why are they used? 02+02
   (b) Illustrate the correlation and convolution of the 1D function f and filter w as shown below: 04

f	w
0 0 0 1 0 0 0 0	1 2 3 2 8

   (c) Show the condition for the correlation and convolution to be same. 02

7. (a) Why do we need the compression of multimedia data? 02
   (b) Show how Haar Wavelet transforms the following 1D image with a resolution of 4 pixels having the pixel values – 9, 7, 3, 5 04
   (c) Write the equations for MSE and PSNR used for the image quality measurement. How are they related? 04

8. (a) Describe basic concepts of the JPEG coding scheme. 03
   (b) Discuss merits and demerits of RGB and HSV color model. 03
   (c) Describe color segmentation in RGB vector space. 04

KHULNA UNIVERSITY

Date: 24.01.2013

Computer Science and Engineering Discipline

4th year, term I Examination 2012

Session: 2011-2012 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.

1 a) Define Compiler. State the differences between a compiler and an interpreter. 03

b) What are the phases of a compiler? 03

c) Draw the Syntax tree and parse tree A := B + C * 50 04

2 a) What are the properties of parse tress? 02

b) What is ambiguity? Consider the following grammar fragment: 05

stmt → if expr then stmt
| if expr then stmt else stmt
| other

where other stands for other statement in the language.

(i) Show that the grammar is ambiguous.

(ii) Eliminate the ambiguity from the grammar

c) Consider the context free grammar: 03

A → AA+ | AA* | a

Show how the string aa+a* can be generated by this grammar.

3 a) Define lexeme and pattern. Write the advantages of buffered I/O with sentinels. 03

b) What do you mean by regular definition? Consider the following regular definition: 04

digit → 0 | 1 | 2 | ..... | 9

digits → digit$^+$

number → digits (.digits) ? (E(+ | -)?digits)?

Draw the transition diagram for numbers.

c) Give the formal definition of the following operations using languages L and M. 03

i) Union: LUM

ii) Concatenation: LM

iii) Positive closure: M^+

4 a) What is recognizer? How does NFA differ from DFA? 03

b) Construct an NFA from the regular expression(a|b)*a(a|b) using Thompson's construction. 03

c) Write regular definition for the following languages 04

i) All strings of digits with no repeated digit

ii) All strings of a's and b's of length 10

SECTION B

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

5 a) What is the difference between substring and subsequence of a string? Explain with example. 02

b) Translate the infix expression into postfix expression: (9-5)+(2+5)+7 02

c) Construct DFA from the regular expression (a | b)*abb without constructing NFA 06

6 a) What do you mean by left recursive grammar? Eliminate left recursion from the following grammar: 04

$A \rightarrow A+B \mid B$

$B \rightarrow B*C \mid C$

$C \rightarrow (A) \mid id$

b) Give the formal definition of LL(1) grammar. Show that the following grammar 06

$S \rightarrow AaAb \mid BbBa$

$A \rightarrow \square$ d

$B \rightarrow \square$ d

Is LL(1)

7 a) Write short notes on following error recovery strategies: 03

(i) Panic-mode recovery

(ii) Global correction

b) Consider the following grammar: 06

$S \rightarrow CC$

$C \rightarrow aC$

$C \rightarrow d$

Construct the LR(1) parsing table for this grammar.

c) Why bottom up parsing is stronger than top-down parsing. 01

8 a) Write the syntax directed definition of a simple desk calculator. 03

b) Construct directed acyclic graph for the expression 02

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

c) Explain different types of static checking. 03

d) Define synthesized attributes and inherited attributes. 02

Date: 06.01.2013

Khulna University

Computer Science and Engineering Discipline

4th year, term I Examination 2012

Session: 2011-2012 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.

1 a) Discuss Client/Server System. Give Example. 04
b) Compare between computer network and distributed system. 02
c) What are e-commerce and m-commerce? Explain with examples. 04

2 a) Define protocol and protocol stack. 02
b) Name the layers in OSI model. What are the principal responsibilities of each of these layers? 05
c) Why does ATM use fixed sized cells? 02
d) What is a virtual circuit? 01

3 a) What advantages does a circuit switched network have over a packet switched network? 02
b) What is crosstalk in twisted pair cable? 01
c) What is bit-stuffing? Why is it used? 02
d) Discuss the binary countdown protocol with appropriate example. 05

4 a) Discuss the implication of physical address and logical address. What is NIC? 02
b) What is ARP? Discuss how ARP delivers frames from one host in a LAN to another host connected to other LAN only knowing the IP address. 04
c) Define framing. A bit string, 0111101111101111110 needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? 04
d) Write short notes on the following items i) Repeater ii) Hub iii) Bridge iv) Switch 02

SECTION B

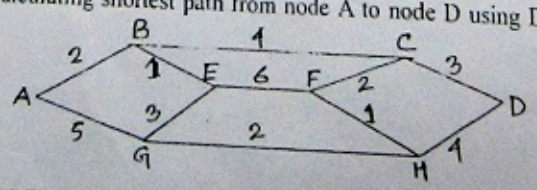
There are FOUR questions in this section. Answer any THREE questions

5 a) Categorize different kinds of multiple access protocols. 02
b) Show that slotted ALOHA achieves the double throughput than that of pure ALOHA. 04
c) Discuss CSMA/CD. Why does it use jam signal. 04

6 a) What is flooding? 01
b) A network in the internet has a subnet mask of 255.255.240.0. What is the maximum number of host it can handle? 02
c) What is traffic throttling in the Internet? 02
d) What is QoS? Write down the techniques for achieving good quality of service. 05

7 a) Why wireless networks cannot use CSMA/CD? 03
b) Discuss CSMA/CD protocol with flow diagram. What is IFS? 04
c) What are exposed station and hidden station problem? 03

8 a) Discuss distance vector routing algorithm. What are its disadvantages? 03
b) Show the steps of calculating shortest path from node A to node D using Dijkstra's algorithm. 04



c) What is cryptography? Discuss a simple encryption model. 03

Date: 02-04-2014

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2014
Session: 2012-2013
Course No: CSE 4103
Full Title of Course: Computer Graphics

Time: 03 Hours

Marks: 60

- 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

(a) What do you mean by the term 'Computer Graphics'? What is its difference with Image Processing? 02
(b) What is the limitation/disadvantage of direct coding technique? Explain how it can be solved. 05
(c) 'Two images with different aspect ratio can have same resolution and vice versa'- explain this term with example. 03

(a) Write down the steps to plot a line whose slope is between 0° and 45° using DDA algorithm. 04
(b) Indicate which raster locations would be chosen by Bresenham's circle algorithm when scan converting a circle of radius 5 and center at (0, 0). 06

(a) (i) Find the matrix which represents rotation of an object by 30° about the origin. 02
(ii) What are the new coordinates of the point P(2, 3) after the rotation? 02
(b) What is inverse geometric transformation? 02
(c) Magnify the triangle ΔABC with A(0, 0), B(1, 1) and C(5, 2) to twice its size while keeping C(5, 2) fixed. 04

(a) What is meant by transformation? Classify it and briefly explain. 03
(b) 'Mirror reflection is one type of scaling'. Comment in favor of this answer. 03
(c) Derive the equation for Midpoint Circle algorithm. 04

Section B

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

(a) Find the condition under which we have $S_{sx,\,sy}.\ R_\theta = R_\theta.\ S_{sx,\,sy}$ 04
(b) Define shearing. Reflect the diamond shaped polygon whose vertices are A(-1, 0), B(1, 0), C(0, -3) and D(0, 3) about the line y = x – 5 01+05

(a) Discuss the Sutherland-Hodgman algorithm for polygon clipping. 06
(b) Find out a 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 can be preserved. 04

(a) Define tilting as a rotation about the x axis followed by a rotation about the y axis: 03×2 = 06
(i) Find the tilting matrix
(ii) Does the order of performing the rotation matter?
(b) Find a transformation A_v which aligns a given vector V with the vector K along the positive z axis. 04

(a) Derive the equation and matrix for standard perspective projection. 03
(b) Define Axonometric Projection. Classify it and briefly explain. 04
(c) Derive the equations of Parallel Projection onto the xy plane in the direction of projection 03

$$V = a\hat{i} + b\hat{j} + c\hat{k}$$

Date: 20.04.2014

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2014
Session: 2012-2013
Course No: CSE 4105
Full Title of Course: Compiler Design

Time: 03 Hours

Full Marks: 60

- 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

1. (a) What are the advantages of (i) a compiler over an interpreter (ii) and interpreter over a compiler? 03
1. (b) Write down the phases of a compiler. 02
1. (c) Consider the following source program – 05
Profit = investment – cost*2.0
Here, profit, investment and cost are integer values. Write the outputs of all the phases of compilation considering the above input program.

2. (a) Translate the infix expression into its equivalent postfix expression (9-5) + (2*7). 02
2. (b) What are the component of a context-free grammars? Separate the terminals and Non-terminals from the following production- 03
Stmt → switch(id) {case value : stmt break ; }
2. (c) What is ambiguity? Consider the following grammar fragment : 05
Stmt → if expr then stmt
| if expr then stmt else stmt
| other
Where other stands for other statement in the language.
(i) Show the grammar in ambiguous.
(ii) Eliminate the ambiguity from the grammar.

3. (a) Write short notes on: syntax analysis and semantic analysis. 04
3. (b) What is regular Expression? write the regular definition for the following langue's – 04
(i) All the strings of letter and digits beginning with a digit. D (L ∪ D)*
(ii) All the strings of digits beginning with USD. $ D*
(iii) All the strings of x's and y's of length 5. (x|y)^5
3. (c) How do you differ subsequences from substring of a string S? 02

$ | r

4. (a) What do you mean by DFA? How does NFA differ from DFA? 03
4. (b) Construct an NFA from the regular expression r = (a | b)*abb using Thompson's construction. 03
4. (c) What do you mean by the analysis – synthesis model of compilation? Draw the block diagram of a language process system. 04

Section B

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

5. (a) Construct DFA directly from the regular expression (x | y)*xyy. 06

5. (b) When do you call a grammar left recursive? Elimination left recursion from the following grammar: 04

$E \rightarrow E+T \mid T$

$T \rightarrow T*F \mid F$

$F \rightarrow (E) \mid id$

6. (a) Determine first and follow for all the non-terminals of the following grammar : 03

$A \rightarrow BA'$

$A' \rightarrow -BA' \mid \epsilon$

$B \rightarrow CB'$

$B' \rightarrow +CB' \mid \epsilon$

$C \rightarrow (A) \mid id$

6. (b) Show the following grammar is LR(1) but not LALR(1) 05

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$

$A \rightarrow d$

$B \rightarrow d$

6. (c) Write short note on panic- mode error recovery strategy. 02

7. (a) Show that the following grammar – 06

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow d$

Is not SLR (1).

7. (b) Why is bottom – up parsing stronger then top-down parsing? 02

7. (c) Define Synthesized attributes and inherited attributes. 02

8. (a) Consider the Syntax directed definition for a simple calculator is given in figure – 1. Using this SDD, Illustrate an annotated pares tree for the expression (3+4)*(5+6) n. 04

Figure – 1 – SDD for simple calculator

PRODUCTION	SEMANTIC RULES
1) $L \rightarrow En$	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 * 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

8. (b) Construct directed acyclic graph for the expression : x + x * (y-z) + (y-z) * w 03

8. (c) Write short note on – 03

(I) Dependency graph

(II) Dynamic type checking

Khulna University

Computer Science and Engineering Discipline

4th Year Term I Final Examination 2014

Session: 2012-2013

Course No: CSE 4111

Full Title of Course: Computer Networks

Time: 03 Ho

Full Marks: 60

- 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

1. (a) Distinguish between Computer Networks and Distributed System.
   (b) Define Uni casting, Multi casting and Broad Casting.
   (c) Is LAN a subnet of MAN? Explain why or why not.

2. (a) What is the relationship between TCP/IP and internet?
   (b) What is DNS? How name resolution is done in DNS? Give example.
   (c) Consider an e-commerce site that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies.
   (d) What are the advantages of circular DHT?

3. (a) What do you mean by a handshaking protocol?
   (b) Why do HTTP, FTP, SMTP and POP3 run on TCP rather than on UDP?
   (c) Show that P2P approach is better than Client/Server approach for distributing file of size F to N clients.
   (d) Contrast between persistent and non-persistent TCP connection.

4. (a) What is congestion? Why congestion occurs?
   (b) Describe how congestion control is performed by leaky bucket algorithm.
   (c) What is choke packet? How is it used for congestion control?

Section B

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

5. (a) What is HOL blocking? Does it occur in input ports or output ports?
   (b) Compare and contrast IPV4 and IPV6 header fields. Do they have any fields in common?
   (c) Consider the network below

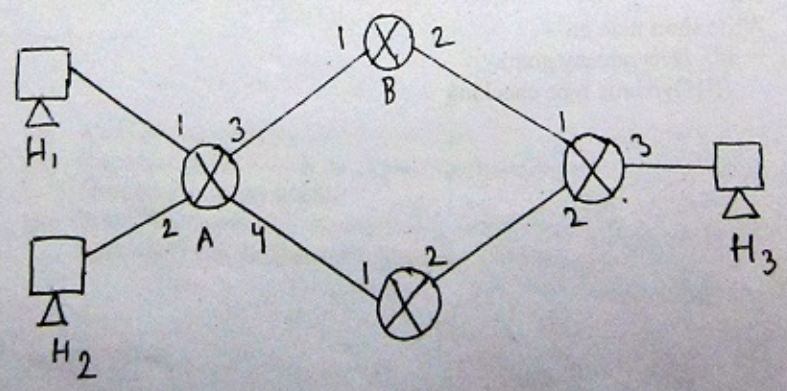


Figure. 5(c)

...se that this is a datagram network. Show that the forwarding table is router A, such that all traffic destined to host H3 is forwarded through interface 3.

(d) Now suppose that network is a virtual circuit network and that there is one ongoing call between H1 and H3, and another ongoing call between H2 and H3. Write down a forwarding table in router A, such that all traffic from H1 destined to host H3 is forwarded through interface 3, while all traffic from H2 destined to host H3 is forwarded through interface 4.

(a) Suppose Host A sends two TCP segments back to back to host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. 04

(i) How much data is in the first segment?

(ii) Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgement that Host B sends to Host A, what will be the acknowledgement number?

(b) Draw the FSM for receiver side of protocol rdt3.0. 03

(c) Compare Go-back-N and selective repeat protocols. 03

(a) What is vulnerable period? How it affects the performance in MAC protocol? 03

(b) Calculate the maximum throughput of ALOHA and slotted ALOHA protocols. 04

(c) How performance is improved in CSMA/CD protocol compared to CSMA protocol? 03

(a) Consider the subnet of figure 8(a). 03

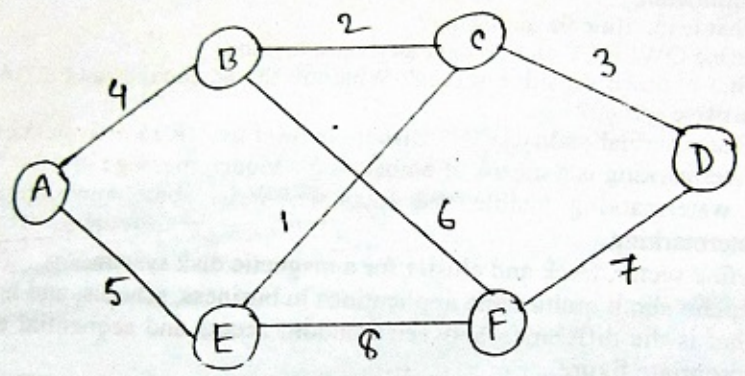


Figure. 8(a)

Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); from E: (7, 6, 3, 9, 0, 4).

The measured delays to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.

(b) Distinguish between traffic shaping and traffic policing. 02

(c) Explain the transport service primitives. 05

Date: 13

Khulna University

Computer Science and Engineering Discipline

4th year, term 1 Examination 2014

Session: 2012-2013 Course No: CSE 4127

Full Title of Course: **Multimedia**

Time: 03 Hours

Full Marks: 60

- 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.

1. a) Give a definition of a multimedia system. 02
   b) What are the key characteristics of a multimedia system? 04
   c) What are the elements of a multimedia? Discuss about linear vs. non-linear multimedia. 03
   d) What is multimedia authoring? 01
2. a) Define QWERTY and Dvorak keyboard layouts. 02
   b) What is touch sensitive screen? What are the advantages and disadvantages of touch sensitive screen? 03
   c) What is virtual reality (VR)? Discuss in brief the VR motion sickness. 03
   d) Watermarking is a means of embedding a hidden message in data. There are two types of watermarking visible and Invisible. Write some application of two types of watermarking. 02
3. a) Define sector, track and cluster for a magnetic disk system. 03
   b) Explain about multimedia applications in business, schools, and home. 02
   c) What is the difference between Random access and sequential access? Discuss with appropriate figure. 05
4. a) What is RAID system and SSDs? In what cases we need to use RAID? 03
   b) Briefly explain why we need to have less than 24-bit color representations (typically down to 8-bit) and why this is sometimes a problem? 03
   c) Which do you think has less detectable flicker, PAL in Europe or NTSC in North America? Justify your conclusion. 03
   d) What are the advantages of digital video? 01

SECTION B

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

5. a) What are the most salient differences between ordinary TV and HD TV?
   b) One solution that removes the problems of interlaced video is to de-interlace it. Why can we not just overlay the two fields to obtain a de-interlaced image? Suggest some simple de-interlacing algorithms that retain information from both fields.
   c) Discuss the three types of video signals.
   d) Mention the frame rate and number of scan line for the following TV system: NTSC, PAL and SECAM
6. a) My old sound blaster card is an 8-bit card. What is it 8 bits of?
   b) Define Nyquist theorem with appropriate example.
   c) What is Signal to Noise Ration? If a set of ear protectors reduces the noise level by 30dB, how much do they reduce the intensity (the power)?
   d) Define RLE or Run-length-Coding technique. What is the RLE for the message: AABBCDDAAA? Why RLE is not good for all the cases in data compression.
7. a) What are called HTML tags?
   b) Write short notes on (i) Hyperlink and (ii) DHTML
   c) Write the algorithm of Huffman coding.
8. a) What is loss less and lossy compression? In what cases lossy compression is better than lossless compression?
   b) What is the significance of different colors for CDs/DVDs?
   c) Discuss in details, linking video and Audio clips in the timeline window.
   d) How is information recorded onto optical media?

Student ID: 1 0 0 2 1 4

Class Test 02

CSE 4105 (Compiler Design)
Time: 40 Minutes Marks: 15
Computer Science and Engineering Discipline
Khulna University, Khulna

1.	What is Regular Expression? Write regular definitions for the following languages- i) All strings of digits beginning with BDT. ii) All strings of letters beginning with **int** or **float.**	01+02
2.	Define Nondeterministic Finite Automata. Construct NFA for the regular expression **abbd(c|d)** using *Thompson's Construction.*	01+03
3.	Construct DFA directly from the regular expression (a|b)*aac.	08

Class Test 02

090208

CSE 4105 (Compiler Design)
Time: 45 Minutes Marks: 15
Computer Science and Engineering Discipline
Khulna University, Khulna

1. Define Lexeme and Pattern. 01

2. What is Regular Expression? Write regular definitions for the following languages- 01+03

L(LUD)* ← i) All strings of letters and digits beginning with a letter.

BDT D* ← ii) All string of digits beginning with BDT.

"(LUD)* iii) All strings of letters and digits beginning and ending with double quotation.

(int|float)L* iv) All strings of letters beginning with **int** or **float.**

3. Define Nondeterministic Finite Automata. Construct NFA for the regular expression **abbc(c|d)** using *Thompson's Construction.* 01+03

LUD

4. Construct DFA directly from the regular expression (a|b)*abb. 06

Date: 24.01.2013

KHULNA UNIVERSITY

Computer Science and Engineering Discipline

4th year, term I Examination 2012

Session: 2011-2012 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.

1 a) Define Compiler. State the differences between a compiler and an interpreter. 03

b) What are the phases of a compiler? 03

c) Draw the Syntax tree and parse tree A := B + C * 50 04

2 a) What are the properties of parse tress? 02

b) What is ambiguity? Consider the following grammar fragment: 05

stmt → if expr then stmt

| if expr then stmt else stmt

| other

where other stands for other statement in the language.

(i) Show that the grammar is ambiguous.

(ii) Eliminate the ambiguity from the grammar

c) Consider the context free grammar: 03

A → AA+ | AA* | a

Show how the string aa+a* can be generated by this grammar.

3 a) Define lexeme and pattern. Write the advantages of buffered I/O with sentinels. 03

b) What do you mean by regular definition? Consider the following regular definition: 04

digit → 0 | 1 | 2 | .....| 9

digits → digit+

number → digits (.digits) ? (E(+ | -)?digits)?

Draw the transition diagram for numbers.

c) Give the formal definition of the following operations using languages L and M. 03

i) Union: LUM

ii) Concatenation: LM

iii) Positive closure: M^+

4 a) What is recognizer? How does NFA differ from DFA? 03

b) Construct an NFA from the regular expression(a|b)*a(a|b) using Thompson's construction. 03

c) Write regular definition for the following languages 04

i) All strings of digits with no repeated digit

ii) All strings of a's and b's of length 10

SECTION B

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

5 a) What is the difference between substring and subsequence of a string? Explain with example. 02

b) Translate the infix expression into postfix expression: (9-5)+(2+5)+7 02

c) Construct DFA from the regular expression (a | b)*abb without constructing NFA 06

6 a) What do you mean by left recursive grammar? Eliminate left recursion from the following grammar: 04

$A \rightarrow A+B \mid B$

$B \rightarrow B*C \mid C$

$C \rightarrow (A) \mid id$

b) Give the formal definition of LL(1) grammar. Show that the following grammar 06

$S \rightarrow AaAb \mid BbBa$ 4.65

$A \rightarrow \epsilon$

$B \rightarrow \epsilon$

Is LL(1)

7 a) Write short notes on following error recovery strategies: 03

(i) Panic-mode recovery

(ii) Global correction

b) Consider the following grammar: 06

$S \rightarrow CC$

$C \rightarrow aC$

$C \rightarrow d$

Construct the LR(1) parsing table for this grammar.

c) Why bottom up parsing is stronger than top-down parsing. 01

8 a) Write the syntax directed definition of a simple desk calculator. 03

b) Construct directed acyclic graph for the expression 02

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

c) Explain different types of static checking. 03

d) Define synthesized attributes and inherited attributes. 02

281

9 - 5 × 2

banana

baan ana

nana

~~2 + 7 + 7~~

(9-5)+ 2

95 - + 25 + 7 + +

95 - 2 +

closure

Date: 20.04.2014

Khulna University

Computer Science and Engineering Discipline
4th Year Term I Final Examination 2014
Session: 2012-2013
Course No: CSE 4105
Full Title of Course: Compiler Design

M. Raihan

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

1. (a) What are the advantages of (i) a compiler over an interpreter (ii) and interpreter over a compiler? 03
1. (b) Write down the phases of a compiler. 02
1. (c) Consider the following source program – 05
Profit = investment – cost*2.0
Here, profit, investment and cost are integer values. Write the outputs of all the phases of compilation considering the above input program.

2. (a) Translate the infix expression into its equivalent postfix expression – (9-5) + (2*7). 02
2. (b) What are the component of a context-free grammars? Separate the terminals and Non-terminals from the following production- 03
Stmt → switch(id) {case value : stmt break ; }
2. (c) What is ambiguity? Consider the following grammar fragment : 05
Stmt → if expr then stmt
| if expr then stmt else stmt
| other
Where other stands for other statement in the !anguage.
(i) Show the grammar in ambiguous.
(ii) Eliminate the ambiguity from the grammar.

3. (a) Write short notes on: syntax analysis and semantic analysis. 04
3. (b) What is regular Expression? write the regular definition for the following langue's – 04
(i) All the strings of letter and digits beginning with a digit.
(ii) All the strings of digits beginning with USD.
(iii) All the strings of x's and y's of length 5.
3. (c) How do you differ subsequences from substring of a string S? 02

4. (a) What do you mean by DFA? How does NFA differ from DFA? 03
4. (b) Construct an NFA from the regular expression r = (a | b)*abb using Thompson's construction. 03
4. (c) What do you mean by the analysis – synthesis model of compilation? Draw the block diagram of a language process system. 04

Section B

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

5. (a) Construct DFA directly from the regular expression (x | y)*xyy. 06

5. (b) When do you call a grammar left recursive? Elimination left recursion from the following grammar: 04

$E \rightarrow E+T \mid T$
$T \rightarrow T*F \mid F$
$F \rightarrow (E) \mid id$

6. (a) Determine first and follow for all the non-terminals of the following grammar : 03

$A \rightarrow BA'$
$A' \rightarrow -BA' \mid \epsilon$
$B \rightarrow CB'$
$B' \rightarrow +CB' \mid \epsilon$
$C \rightarrow (A) \mid id$

6. (b) Show the following grammar is LR(1) but not LALR(1) 05

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$ ~~4.6.5~~ 4.7.5
$A \rightarrow d$
$B \rightarrow d$

6. (c) Write short note on panic- mode error recovery strategy. 02

7. (a) Show that the following grammar – 06

$S \rightarrow Aa \mid bAc \mid dc \mid bda$ 4.7.4
$A \rightarrow d$
Is not SLR (1).

7. (b) Why is bottom – up parsing stronger then top-down parsing? 02

7. (c) Define Synthesized attributes and inherited attributes. 02

8. (a) Consider the Syntax directed definition for a simple calculator is given in figure – 1. Using this SDD, Illustrate an annotated pares tree for the expression (3+4)*(5+6) n. Ex (5.1.1) 04

Figure – 1 – SDD for simple calculator

PRODUCTION	SEMANTIC RULES
1) $L \rightarrow En$	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 * 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

8. (b) Construct directed acyclic graph for the expression : x + x * (y-z) + (y-z) * w 03

8. (c) Write short note on – 03

(I) Dependency graph Chapter 8
(II) Dynamic type checking

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Engineering Discipline

4th Year Term I Final Examination 2014

Session: 2012-2013

Course No: CSE 4129

Full Title of Course: Human Computer Interaction

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.

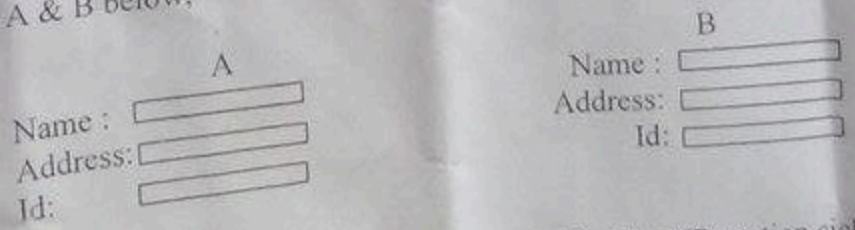
Section A

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

1. (a) Define usability with regard to human-computer-interaction. 02
1. (b) Why do we need to be concerned with designing user friendly interface? 03
1. (c) Define reasoning Discuss various types reasoning. 05

2. (a) What is haptic perception? Why is haptic perception important in virtual Reality? 03
2. (b) Discuss how human interpret the signal by following factor – 03
   i) Size and depth
   ii) Brightness
   iii) Colour
2. (c) What are the purpose of the layout design of the Qwerty Keyboard? Describe the strengths and weakness of the Alphabetic keyboard design layout. 04

3. (a) Describe what a good error message should include. 02
3. (b) Explain a situation where speech input would be useful. 02
3. (c) Describe advantages and disadvantages of using a touch screen as an input Device. 02
3. (d) In "fillin" forms, field labels are typing on the left of the input field for US use. Give one good thing and one bad thing about each of the designs A & B below, 04



4. (a) What is Virtual Reality (VR)? Discuss in brief the VR motion sickness. 1+2
4. (b) Design a paper prototype for an ATM machine. 06
4. (c) Define The following Term – 01
   (I) WIMP interface
   (II) Persona

Section B

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

5. (a) In icon design, What do syntax and dynamics refer to? 02
5. (b) Mention And Discuss the basic principle in screen design and layout. 03
5. (c) Using an example, discuss the available tools for screen design and layout. 05

6. (a) What do you mean by aesthetic and minimalist design? 01
6. (b) The human eye has a number of limitations. Give three examples. 02
6. (c) There are three types of human memory. What is the purpose of short term memory although human have other two type human memory? 02
6. (d) What is the aim of evaluation? Who Should use evaluation? 02
6. (e) Describe two technique for evaluation, high lighting their key points and the difference between them. 03

7. (a) Describe Norman's model of interception using a relative example. 04
7. (b) List the Advantages and Disadvantages of natural language interfaces. 02
7. (c) For an interface of a computerized airport management system, give examples of a good and bad icon that indicates where arriving flights can be found. Why is the former icon good? Why exactly is the later bad? Draw as well as you can. 04

8. (a) What is meant by accessibility? Give three examples of how web bites can aid accessibility. 03
8. (b) You have been asked to re-design a popular web page so that people can access it using mobile phone. What factor might you have to take into account in re-designing the site? 03
8. (c) Discuss in details the different evaluation techniques for good interface design. 04

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