

**University of Technology**  
**Computer Engineering and Information Technology Department**  
**Final Examination 2007/2008, 2<sup>nd</sup> attempt**

السيد الوائيد  
Date:  
Time allowed: 180 min.

**Subject: Advanced Software Engineering**  
**Class: fourth (SE)**  
**Examiner: Dr. Hassan Waheed**

*Note: Answer Any Seven Questions*

**Q1/** A software team has completed four object-oriented projects to date. The following data have been collected for all size projects;

Project	NSS	NKC	NSUB	Effort (days)
1	54	76	5	1123
2	97	80	6	4354
3	65	49	7	1000
4	80	102	5	2340

A new project is in early stages of OOA. It is estimated that 64 use-cases will be developed for the project. Estimate; (a) NKC that will be required to implement the system, (b) The total number of classes that will be required, (c) the total amount of effort required to implement the system.

**Q2/** There is a software system contains four classes, A, B, C and D that has the following characteristics;

Class	Locally defined methods	Inherited methods	Overridden methods
A	25	3	1
B	11	9	3
C	25	7	7
D	20	4	2

Calculate the Specification Index (SI) for class B that resides in the first level of the system architecture. Calculate the Method Inheritance Factor (MIF) for the system.

**Q3/** Describe the details of the Spiral model that is used in the OO software engineering.

**Q4/** Whenever a new class is to be created, the software engineer has a number of options. List these options.

**Q5/** What is the meaning of the Polymorphism characteristic that is restricted by the object technology? Give an example shows how it can be applied.

**Q6/** Within the Object-Oriented Design, UML is organized into two major activities. Briefly show these two activities.

**Q7/** Describe with Example the object-relationship model. How that model can be derived?.

**Q8/** Describe the Class-Responsibility-Collaborator modeling. When it is used? Determine its sections in details with drawing.

**Q9/** A class K has 9 operations. Cyclomatic complexity has been computed for all operations in the OO system and the average value of module complexity is 4. For class K, the complexity for operations 1 to 9 is 3, 4, 4, 6, 4, 2, 5, 1, 8 respectively. Compute the weighted method per class (WMC).

الدراسات

<< Final Exam-2 >>

Note: This is an OPEN BOOK Exam .. Answer 3 Questions only ...Q4 must be solved

Q1/ Write the required function or statements for each requirement:

- a. To read a text from Edit Box.
- b. To send a text to List Box.
- c. To get a cursor selection from List Box.
- d. To set a range (0, 100) to a Track Bar.

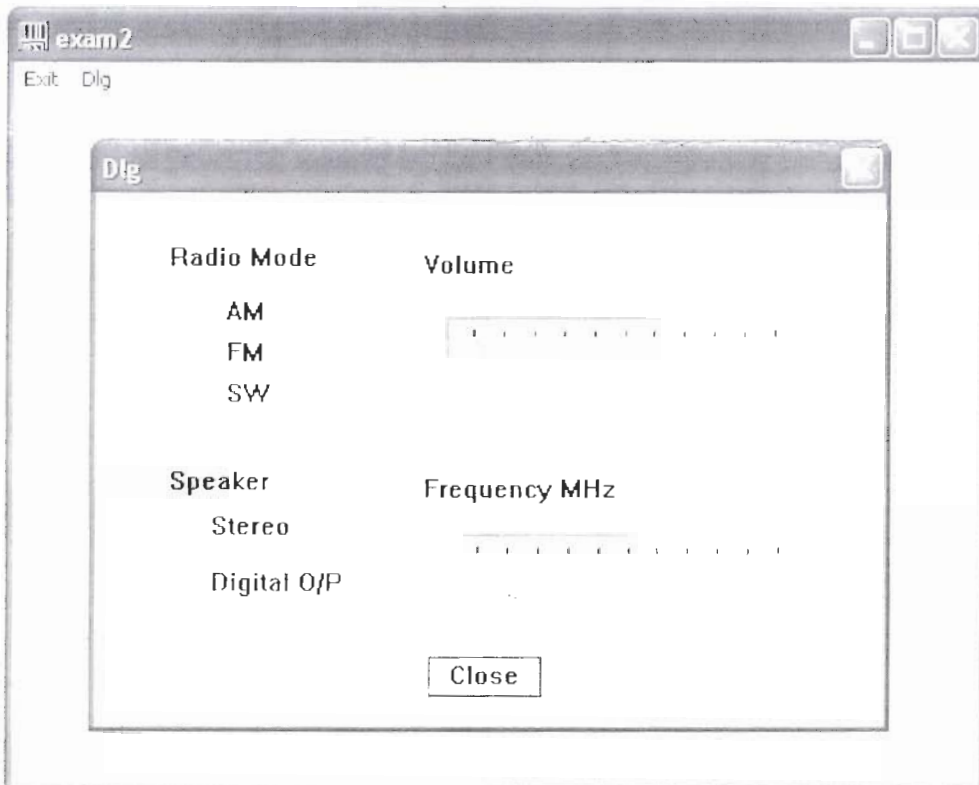
Q2/ Write a sample function to design the following Status Bar with 3 parts.

Name : Computer	Status	21 / 5 / 2008
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Q3/ Write a sample code to draw the following shapes



Q4/ Write a Win32 program (header, resources, WindowFun, DialogFun) to create and deal with the following GUI:



You must send a message box to the screen when user selects any one of controls indicating the status or value of that control.

**University of Technology**  
**Computer Eng. & Information Technology Department**

**Subject: Information Technology**  
**Class: Forth**

**time: 3 Hours**  
**Date:**

**Final Examinations**

**Note: Answer four questions only**

**Q1 \ A\ List the building blocks of IT system with diagram.**

**\B\ why IT system is important?**

**Q2\ define the Groupware software, and then list the categories of it.**

**Q3\ Fill the blanks with the appropriate words:**

1. The WAP is the abbreviation for -----
2. Span of control is also called ----- or -----
3. The specialized Software tools are ----- , ----- , -----
4. A path -----.
5. ----- are network in which an organization has the exclusive right to use the comm. Facility.

**Q4 \ Define the IT net work and what net works allow people, to do, then graph the IT network.**

**Q5- A \ List the goals of the WAP architecture.**

**B\ Define the (WWW) architecture with figure of its model.**

الدراساتي

**University of Technology**  
**Computer Eng.& Information Technology Department**  
**Subject: Computer Security** **Time:3 Hours.**  
**Class: Fourth Year** **Date:6-2008**

**Final Examination**

**Note: Answer only Three:**

- Q1) A) Information hiding is a hot subject in security science. Discuss its properties and explain how can we use it to protect secret information ( Image, Audio and Text ).  
B) ) Explain the cyclic structure of Key generation process of Data Encryption Standard (DES) keys.
- Q2) A) If you have LFSR with 5 stages and the connection polynomial is  $(x^4+x^3+x^2+1)$  with initial states (11001).Find 40 bit output sequence and test the random of it by using some statistical tests.  
B) How many possible keys if you have 52 alphabet letters using the multiplication cipher method to encrypt a messages.
- Q3) A)One of the security (crypto) system problems is the distribution and management of keys. Give your ideas to solve this problem in a network system .  
B)You have the following phrase "Computer Department" ,try to encrypt it using a traditional method with key "University", send it through a communication line.
- Q4) A) Signature the message "OK " by using O, K=14,10 , A(d,n) =7 ,39,B(e,n)=5,11.  
B) There are two types of cipher system, symmetric and asymmetric. For each type there many properties. Compare between these two types.

GOOD LUCK

الدراستي

University of Technology

Computer Engineering and Information Technology Department

Subject: Adaptive Systems

Date: 14/9/2008

Class: Forth year

Time allowed: 180 min.

Examiner: Dr. Mohammad Najim Abdullah

Supplementary Examination

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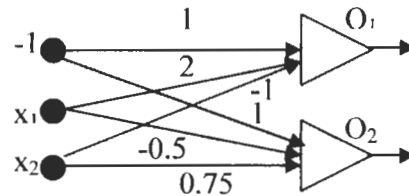
Answer Any Four Questions

Q1:

Apply a genetic algorithm to perform two generations  $G_0$  and  $G_1$  for the function:  
 $F(x) = 4x - x^2$  for  $0 \leq x \leq 15$ ; assume the selected population consists of the following chromosomes:  $P = \{3, 5, 2, 8, 4, 14\}$   
 And fitness ratio =  $F(x_i) / \sum F(x_i)$

Q2:

The neuron's outputs has been measured as  $O_1 = 0.42$  and  $O_2 = -0.91$  for the network shown in fig 1, which uses bipolar continuous activation function with  $\lambda = 0.35$ . Find input vector  $x = [x_1 \ x_2]$ .



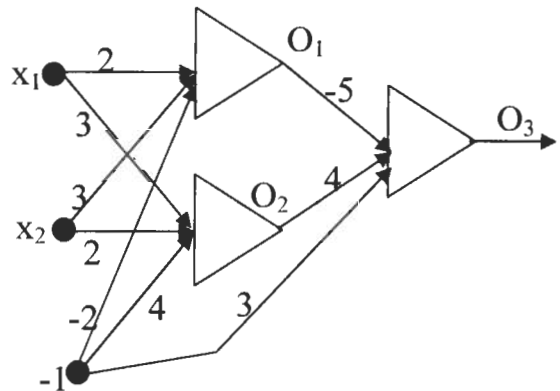
Q3:

A system with the following logical expression:  
 $F(x_1, x_2, x_3, x_4) = \sum(1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15)$   
 a. Is the system linear separable? Why?  
 b. Realize the given function with the minimum number of threshold logic gates.  
 The Chow parameter/weights table is given below:

$b_i$	8000	6222	4440	160000	142222	124440	106622	88800	88444	66666
$w_i$	1000	2111	1110	10000	31111	21110	32211	11100	22111	11111

Q4:

Analyze a single feed forward and back-propagation step for the initialized network shown in fig.(2); when the network is properly trained should respond with  $O_3 = 0.89$  to the input pattern  $[x_1 \ x_2 \ -1] = [2.5 \ 4.9 \ -1]$  Assuming bipolar continuous activation function is used.  $\lambda = 0.2$ , and  $\eta = 0.11$



Q5:

- Determine the types of activation functions that may use for neural networks.
- Consider the genetic algorithms, state:
  - The variation in genetic algorithms.
  - The outline of the basic genetic algorithm.

الجامعة  
التكنولوجية

University of Technology  
Computer Engineering and IT Department

Class : 4<sup>th</sup> IT

Subject: Digital Communication

Examiner: Dr. Salih H. Ali

Time: 3 Hrs.

Date: 16/9/2008

Answer Any four Questions

- Q1. a. An 8-PSK modulation system is used to transmit information over an ideal AWGN channel  $N_0 = 10^{-6}$  W/Hz. Find the minimum transmitted signal amplitude that results in average probability of bit error  $10^{-10}$ .
- b. Explain the idea of layering in communication networks
- Q2. a. A QAM communication system transmits data with AWGN ( $N_0 = 10^{-6}$  W/Hz), a rate 1 Msymbols/sec (band), a bit rate equal to 2 Mbits/sec. Determine the bit amplitude required to achieve an error probability of  $10^{-6}$ .
- Q3. a. For the binary data stream (1 1 0 0 0 1 1 0) draw the timing and constellation diagrams for BPSK, QPSK, DBPSK and DQPSK.
- b. What are the Baud, BPS, and Maximum Effective Through put.
- Q4. a. Explain the ideal structure of a QPSK transmitter and receiver.
- b. What is the purpose of digital modulator and digital demodulator.
- Q5. a. Sketch  $x(t) = \Pi(\frac{3}{2}t)$  and their Fourier transform.
- b. There are three types of optical light source, explain these types.

Note : Use the following approximation of the Gaussian Q function  $Q(x) \approx \frac{1}{2} e^{-x^2/2}$

**Good Luck**

السؤال الثاني

University of Technology

Computer Engineering and Information Technology Department

Subject: Networks

Time: 3 Hours

Class: 4<sup>th</sup>

Date: / 6 / 2008

Examiner: Rawnak M.A.

Final Examination

**ANSWER ONLY FOUR QUESTIONS INCLUDING QUESTION TWO**

**Q1):**

- A. What are functions of the following?
  - o Network and session of OSI Reference Model
  - o \* Transport and internet of TCP/IP Reference Model
- B. Ethernet implement a rule known us 5-4-3 rule, Explain it?
- C. Define 3 of the following:  
Data packet, CSU/DSU, Transceiver, virtual circuit switching.

**Q2)**

- A. Give four points differences between pure ALOHA and slotted ALOHA?
- B. Fill the following blanks:
  - 1. Two approaches that are used to implement spread spectrum for WLAN transmissions are \_\_\_\_\_, \_\_\_\_\_.
  - 2. For Cisco router, physical connectivity provided by \_\_\_\_\_ or \_\_\_\_\_ connector.
  - 3. Circuit switching network establish a fixed bandwidth circuit between \_\_\_\_\_ and \_\_\_\_\_ before the user may communicate.
  - 4. Network access layer also called \_\_\_\_\_ layer.
- C. Hubs come in three basic types, explain it?

**Q3)**

- A. What are the Similarities and differences between TCP/IP and OSI Reference model? (Give four points each).
- B. Give the reason for the following:
  - 1. Persistent and nonpersistent CSMA protocols is an improvement over ALOHA.
  - 2. Break up a large LAN in to smaller and more easily managed segments.

**Q4)**

- A. Explain the P-Persistent CSMA protocol?
- B. The Bridge depends on the Destination MAC addresses to pass signals, Explain each type of process it do?
- C. What are meaning of the following with an example for each one?
  - Packet switching and circuit switching

**Q5)**

- A. What is the router responsible for?
- B. Define the bandwidth, what is the importance of it?
- C. What are the benefits of Ethernet switch (give four points)

الممر الثاني

بسم الله الرحمن الرحيم

University of technology

Computer Eng.&Information Technology Department

Subject: A.I

Time:6/2008

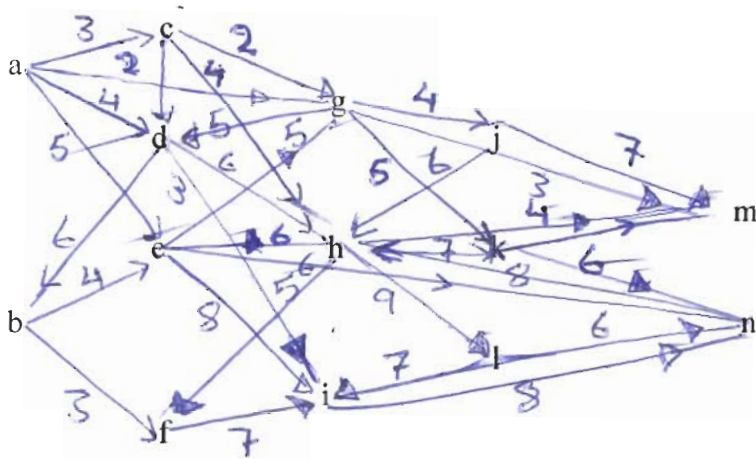
Class: forth class

Data:salmah.abdala

Final Examination

**Note:- Tray any Four Question**

Q1//



- a// Find the path between (a and n) using Depth –first search
- b// Find the path between (b and n ) using Breath –first search .
- c// Write the Best –first algorithms , and then use it to find the path from (b to m), ( minimization).

Q2// consider the following rules and facts:-

R1:w(Z):-r(X), z(Y) ,Z=X+Y.

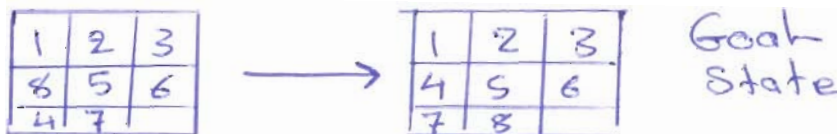
R2:a(M),b(N),X=M\*N

R3:c(W),Y=W-1

a(1). a(2). b(3). b(6). c(3).

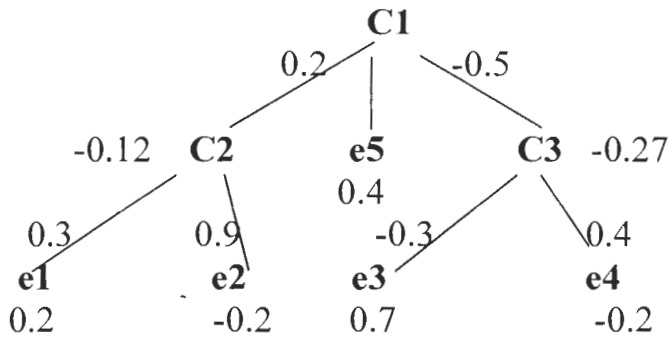
a/ Use forward chining.List the rules successes and failures?

Q3//Consider the 8-Puzzel with following configuration



- Write two heuristic function for 8-puzzle problem then show how you can implement them. By using Best -First search?

**Q4//** compute the certainty of the following **nonreversible** tree:-



**a//** Find certainty factor for **C1**.

**b//** Find all simple rules.

**Q5//**

**a//** Write grammar to compelled parse the following sentences:

-John saw the boy in the park with a telescope.

-John saw the boy in the park with a dog.

-John saw the boy in the park with a statue.

**B//**consider the following:" saad was hungry. He went to ask his mother for a money to buy ice cream, but he couldn't find her. So he went to get an apple from the refrigerator. But the refrigerator was practically empty. To take his mind off his empty stomach , he went out to play."

-Draw semantic net and conceptual graph for the text.?

**good luck**

**ANSWER ONLY FOUR QUESTIONS INCLUDING QUESTION TWO**

**Q1):**

- A. What are functions of the following?
- Application and Transport of OSI Reference Model
  - Application and network access layer of TCP/IP Reference Model
- B. What are the ways to perform switching, define each one with an example?
- 

**Q2)**

- A. Define two only?  
Transceiver, PDU, TCP, bandwidth
- B. Fill the following blanks:
1. Packets are encapsulation in frames at \_\_\_\_\_ layer of OSI model.
  2. TCP/IP combines the OSI \_\_\_\_\_ and \_\_\_\_\_ layers in to one layer.
  3. In a packet switching, packets are routed to their destination by \_\_\_\_\_.
  4. Network access layer also called \_\_\_\_\_ layer.
- C. Explain a router with DSL connection?
- 

**Q3)**

- A. Explain TCP/IP Reference model layers, with a protocol graph?
- B. Give the reason for the following:
1. 1-Persistent CSMA protocol.
  2. Layered of network model.
- 

**Q4)**

- A. Explain the non-Persistent CSMA protocol?
- B. All switching equipment performs two basic operations, define each one?
- C. What are meaning of the following?
- Filtering and flooding process in a bridge.
- 

**Q5) Answer three only**

- A. What are the two common wireless technologies used for networking, explain each one?
- B. What is the specification of NT1?
- C. Define the DCE and DTE for a router?
- D. What are the specification of slotted ALOHA

**“Good Luck”**

**University of Technology**  
**Computer Engineering and Information Technology Department**  
**Final Examination 2007/2008**

**Subject: Advanced Software Engineering**  
**Class: fourth (SE)**  
**Examiner: Dr. Hassan Waheed**

**Date:**  
**Time allowed: 180 min.**

*Note: Answer Any Four Questions*

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**Q1/**

- A) A class N has 6 operations. Cyclomatic complexity has been computed for all operations in the OO system and the average value of module complexity is 4. For class N, the complexity for operations 1 to 6 is 2, 8, 7, 9, 2, 3 respectively. Compute the weighted method per class (WMC). Also compute the lack of cohesion in method (LCOM) factor for class N if just 4 of the six operations were access the same attribute.
- B) There is a software system contains three classes, A, B, and C that has the following characteristics;

Class	Locally defined methods	Inherited methods	Overridden methods
A	30	2	3
B	15	4	2
C	20	5	0

Calculate the Specification Index (SI) for class C that resides in the second level of the system architecture. Calculate the Method Inheritance Factor (MIF) for the system.

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**Q2/**

- A) Explain the concurrency and subsystems allocation. What is the strategy that can be used for the design of the object to manage the concurrent tasks?.
- B) In UML, the system is represented using different views that describe the system from distinctly different perspectives. Briefly explain these views.
- 

**Q3/**

- A) Determine the domain analysis process with the series of activities that must be followed to achieve this process.
- B) List the steps that must be performed by the software engineer within the object-oriented design.
- 

**Q4/**

- A) Determine the details of the four layers that are used by the object-oriented design phase.
- B) In object-oriented design, the subsystems may compete on the available system resources; Show how the hardware resources can be managed.
- 

**Q5/**

- A) Describe the role of the object-behavior model within the object-oriented analysis. Explain with example the state representations and the event trace diagram.
- B) Explain in details the Encapsulation, Inheritance, and Polymorphism terms that are the basic characteristics for the object technology.

**University of Technology**  
**Computer Engineering and IT Department**

Class : 4<sup>th</sup> IT  
Subject: Digital Communication  
Examiner: Dr. Salih H. Ali

Time: 3 Hrs.  
Date: 5/6/2008

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**Answer Any four Questions**

- Q1. a. A digital communication system transmits data using QAM signaling over a voice-band telephone channel with AWGN ( $N_0 = 10^{-10}$  W/Hz), a rate 100 ksymbols/sec (band). Determine the bit amplitude required to achieve an error probability of  $10^{-5}$  for a bit rate equal to:
- i. 200 kbits/sec
  - ii. 300 kbits/sec
- b. There are two basic fiber cable designs, explain these cable designs and where they are used.
- Q2. a. Explain the ideal structure of a QAM transmitter and receiver.  
b. How do you connect the modem to your computer, then explain why do you need communications software.
- Q3. a. For the binary data stream (1 0 1 1 0 0 0 1) draw the timing and constellation diagrams for BPSK, QPSK, DBPSK and DQPSK.  
b. What are the limitations in electrical communication.
- Q4. a. An 8-PSK modulation system is used to transmit information over an ideal AWGN channel  $N_0 = 10^{-10}$  W/Hz. Find the minimum transmitted signal amplitude that results in average probability of bit error  $10^{-6}$ .  
b. The most important of signal processing operations is modulation, explain why modulate.
- Q5. a. Sketch  $x(t) = \Pi(t - 3) + \Pi(t + 3)$  and their Fourier transform.  
b. Define the important performance and compatibility requirements for optical detectors.

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Note : Use the following approximation of the Gaussian Q function  $Q(x) \approx \frac{1}{2}e^{-x^2/2}$

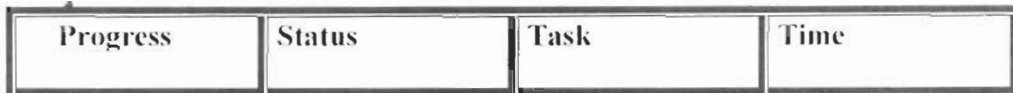
**Good Luck**

**Note: This is an OPEN BOOK Exam .. Answer 3 Questions only ...Q4 must be solved**

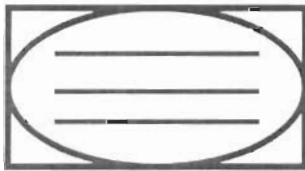
**Q1/ Write the required function or statements for each requirement:**

- a. To advance 1 step in 10 steps Progress Bar.
- b. To send a text to List Box.
- c. To get a cursor selection from List Box.
- d. To set a range (0, 50) to a Track Bar.

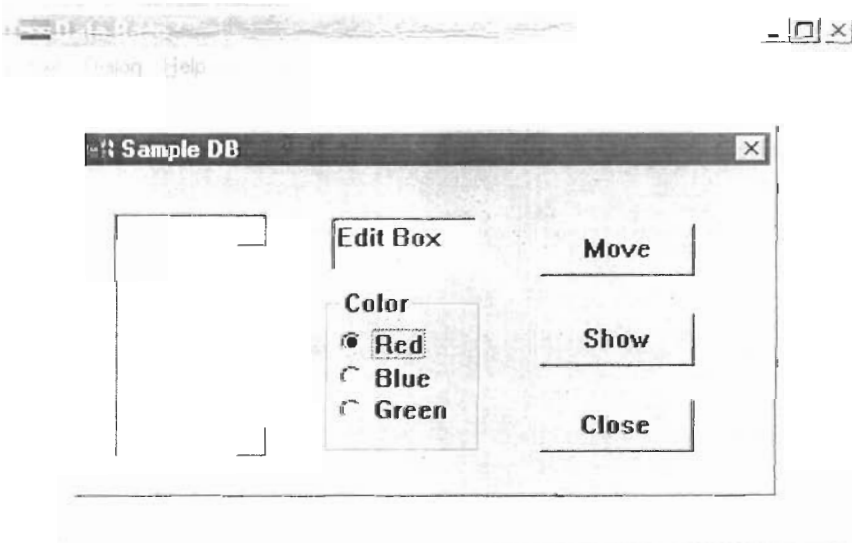
**Q2/ Write a sample function to design the following Status Bar with 4 parts.**



**Q3/ Write a sample code to draw the following shapes**



**Q4/ Write a Win32 program (header, resources, WindowFun, DialogFun) to create and deal with the following GUI:**



<b>** Events **</b>	<b>** Methods **</b>
Exit has been clicked	End Program
Dialog has been clicked	Show Dialog (Sample DB)
Help has been clicked	Display Help in MB
Move has been clicked	Move the text in EB to LB
Show has been clicked	Display color and edit text in MB
Close has been clicked	End Dialog

بسم الله الرحمن الرحيم

University of technology

Computer Eng.&Information Technology Department

Subject: A.I

Time:6/2008

Class: forth class

Data:salmah.abdalla

Final Examination

**Note:- Tray any Four Question**

**Q1//**

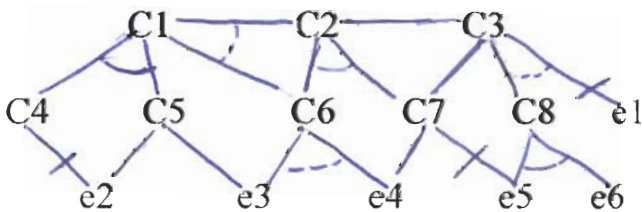
a// Put the following predicate expression into clause form.

$$\forall(D)(P(D) \Rightarrow [\forall(E)[P(E) \Rightarrow P(P(D,E))] \wedge \neg \forall(E)[\neg P(D,E) \Rightarrow P(E)])$$

b// why Breadth\_ First Search best then Depth \_first search .&write complete Algorithm for breadth \_First search ?

**Q2\\**

Suppose you have the following inference net:



-Write the simple rule of the tree?

- Find certainty factor for the node C2, where the certainty factor for e1=0.5, e2=0.6, e3=0.7, e4=0.8, e5=0.9, e6=0.4 .all rule are reversible and implication certainties for OR-AND logic equal to 0.8.

**Q3//** consider the following rules

a:-m. f:-y. e:-p. b:-p

l:-b,c x:-c,m. n:a,e.

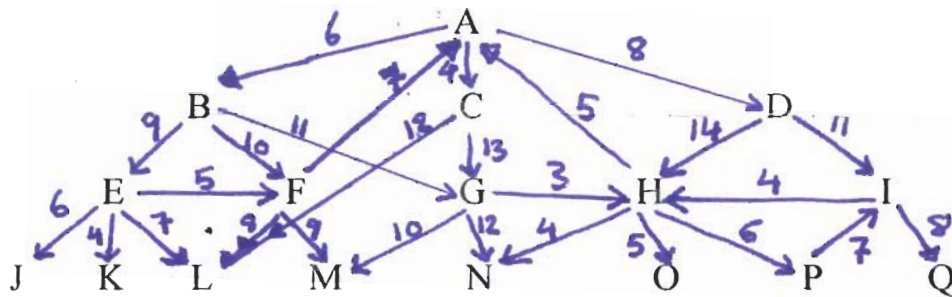
z:-n,l. w:-z,x. m:-f,c. m:- not(f).

Suppose that only facts a. b. c. are true.

Prove "w" using backward chining.

**Q4//** Write two heuristic function for 8-puzzle problem then show how you a can implement them .with an example?

Q5//



- a/ Find the path between (A and N ) using Depth and Breadth first search .
- b/ Find the bath between (A and M ) using A – algorithms and Best -first search (minimization)

**good luck**

**University of Technology**  
**Computer Eng.& Information Technology Department**  
**Subject: Computer Security** **Time:3 Hours.**  
**Class: Fourth Year** **Date:6-2008**

**Final Examination**

**Note: Answer only Three:**

- Q1) A) One of the security (crypto) system problems is the distribution and management of keys. Give your ideas to solve this problem in a network system.  
 B) Use some tests to ensure that the following string is random or not in stream cipher 000111101010101110001111110010
- Q2) A) Encrypt the following message using columnar transpositions with the key (3 5 2 6 1 4): "SHIP EQUIPMENT ON THE FOURTH OF JULY". Comment on the Encipherment /Decipherment complexity of transpositions cipher.  
 B) Cryptography is a part of a security system , explain how we apply it to protect a system.
- Q3) A) Information hiding is a hot subject in security science. Discuss its properties and explain how can we use it to protect secret information ( Image, Audio and Text ).  
 B) Encrypt the following: "University" by using RSA cipher system,  $e=59, p=5, q=23$ .
- Q4) A) The national institute for standards and technology (NISI) has developed a check list for minimal security functional requirements . Discuss this check list.  
 B) In the 16<sup>th</sup> round of the DES algorithm you get  
 R15=10110111100000011010011110100011  
 L15=01111100011100011010101100010101  
 And the result of the S-boxes is 00110011010100111100101101101011  
 What is the cipher text , if the  $IP^{-1}$  table is

40	8	48	16	56	24	64	32
39	7	47	15	55	23	63	31
38	6	46	14	54	22	62	30
37	5	45	13	53	21	61	29
36	4	44	12	52	20	60	28
35	3	43	11	51	19	59	27
34	2	42	10	50	18	58	26
33	1	41	9	49	17	57	25

GOOD LUCK

**University of Technology**

**Computer Engineering and Information Technology Department**

**Subject: Adaptive Systems**

**Date: 19/6/2008**

**Class: Forth year**

**Time allowed: 180 min.**

**Examiner: Dr. Mohammad Najim Abdullah**

**Final Examination**

#####

**Answer Any Four Questions**

Q1: A system with the following logical expression:

$$F(x_1, x_2, x_3, x_4) = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$$

- Is the system linear separable? Why?
- Realize the given function with the minimum number of threshold logic gates.

The Chow parameter/weights table is given below:

$b_i$	8000	6222	4440	160000	142222	124440	106622	88800	88444	66666
$w_i$	1000	2111	1110	10000	31111	21110	32211	11100	22111	11111

Q2: A single neuron network using  $f(\text{net}) = \text{sgn}(\text{net})$  has been trained using the pairs of  $x_i, d_i$  as shown below:

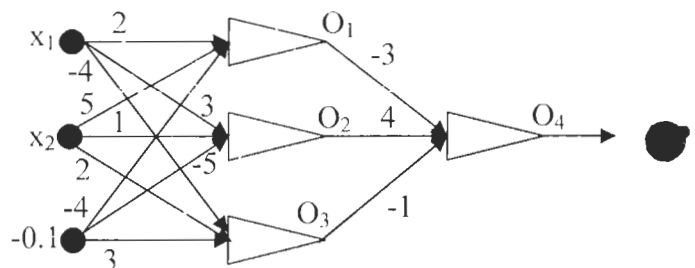
$$x_1 = [3 \ -1 \ -2 \ 4], \quad d_1 = -1; \quad x_2 = [-1 \ 0 \ 3 \ -2], \quad d_2 = 1; \quad x_3 = [0 \ -1 \ -2 \ 1], \quad d_3 = -1;$$

The final weights obtained using perceptron rule are  $w^4 = [4 \ 7 \ 1 \ 5]^T$ . Knowing that correction has been performed in each step for  $\alpha = 0.5$  determine the following:

- $w^3, w^2, w^1$  (back tracking the training)
- $w^5, w^6, w^7$  obtained for steps 4, 5, and 6 of training by reusing the sequence  $(x_1, d_1), (x_2, d_2)$  and  $(x_3, d_3)$

Q3:

Analyze a single feed forward and back-propagation step for the initialized network shown in fig.(1); when the network is properly trained should respond with  $O_4 = 0.87$  to the input pattern  $[x_1 \ x_2 \ -0.1] = [0.3 \ 0.5 \ -0.1]$  Assuming bipolar continuous activation function is used.  $\lambda = 0.5$ , and  $\eta = 0.2$



Q4:

How is an individual represented in genetic algorithm? How big should the population be?

Consider the multivariable function:

$$F(x,y) = (x-5)^2 + (y-3)^2$$

Apply genetic algorithm to find the value of  $x$  and  $y$  in which the function is maximum (find G1 and G2) for  $0 < x < 31$  and  $0 < y < 31$ . Crossing point is 4 and assumes the selected population consists of the following chromosomes:  $P_0 = \{(5,2), (2,4), (3,9), (1,5), (9,7), (7,1)\}$ ,

and fitness ratio =  $F(x_i, y_i) / \sum F(x_i, y_i)$

Q5:

- Determine the types of an ANN learning rules then describe the specifications for each one type.
- Consider the genetic algorithms, state:
  - The variation in genetic algorithms.
  - The applications of genetic algorithms.

Supplementary Examination (2)

#####

Answer Any Four Questions

Q1:

Perform two training steps for single perceptron neural network using delta learning rule for  $\lambda = 1$ , and  $\eta = 0.25$ . Train the network using the following data pairs:  $\mathbf{x}_1 = [ 2 \ 0 \ 1 ]$ ,  $d_1 = -1$ ,  $\mathbf{x}_2 = [ 1 \ -2 \ -1 ]$ ,  $d_2 = 1$ , the initial weights are  $\mathbf{w}^1 = [ 1 \ 0 \ 1 ]$ . Assuming bipolar continuous activation function is used.

Q2:

Consider the multivariable function:

$$F(x,y) = 3x^2 + 2y^2 - 5$$

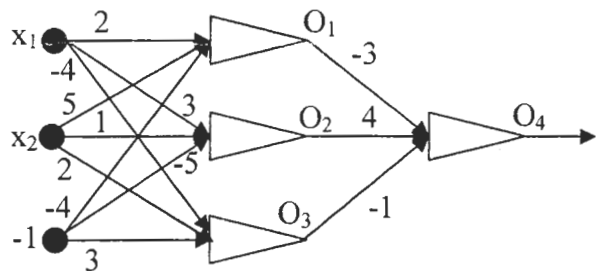
Apply genetic algorithm to find the value of x and y in which the function is maximum (find G1 and G2) For  $0 < x < 15$  and  $0 < y < 15$ . Crossing point is 3 and P0 is of six individuals

Q3:

- How is an individual represented in genetic algorithm? How big should the population be?
- Determine the types of an ANN learning rules then describe the specifications for each one type.

Q4:

Analyze a single feed forward and back-propagation step for the initialized network shown in fig.(1); when the network is properly trained should respond with  $O_4 = 0.96$  to the input pattern  $[ x_1 \ x_2 \ -1 ] = [ 4 \ 3 \ -1 ]$  Assuming uni polar continuous activation function is used.  $\lambda = 0.4$ , and  $\eta = 0.15$



Q5:

A system with the following logical expression:

$$F(x_1, x_2, x_3, x_4) = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$$

- Is the system linear separable? Why?
- Realize the given function with the minimum number of threshold logic gates.

The Chow parameter/weights table is given below:

$b_i$	8000	6222	4440	160000	142222	124440	106622	88800	88444	66666
$w_i$	1000	2111	1110	10000	31111	21110	32211	11100	22111	11111

الدراسات

**University of Technology**  
**Computer Eng.& Information Technology Department**  
**Subject: Computer Security** **Time:3 Hours.**  
**Class: Fourth Year** **Date:6-2008**

**Final Examination**

**Note: Answer only Three:**

- Q1: A) Explain how to design a security system to protect the information (even the computers connected to information networks). What are the Shannon's criteria to evaluate the cipher system?  
B) How many possible keys if you have 52 alphabet letters by using the multiplication cipher method to encrypt a message.
- Q2) A) Information hiding (steganography+watermarking) and cryptography are used to protect information. Compare between these two techniques.  
B) Sign the message OK by using  $O, K=14, 10$  and  $A(d, n)=7, 39, B(e, n)=5, 11$ .
- Q3) A) If you have LFSR with 5 stages and the connection polynomial is  $(x^4+x^3+x^2+1)$  with initial states (11001). Find 40 bit output sequence and test the randomness of it by using some statistical tests.  
B) Compare between DES (Data Encryption Standard) method and the RSA (Public Key) method.
- Q4) A) Explain the means of perfect security.  
B) What do we mean by an index of coincidence (IC) method. Suppose the following of letters frequencies  $A, F, G=10, E, M, R, L, S=22, H, K, Y=7$  others =0. What can you conclude about the number of alphabets used to encrypt this message.

GOOD LUCK

بسم الله الرحمن الرحيم

University of technology

Computer Eng.&Information Technology Department

Subject: A.I

Time:6/2008

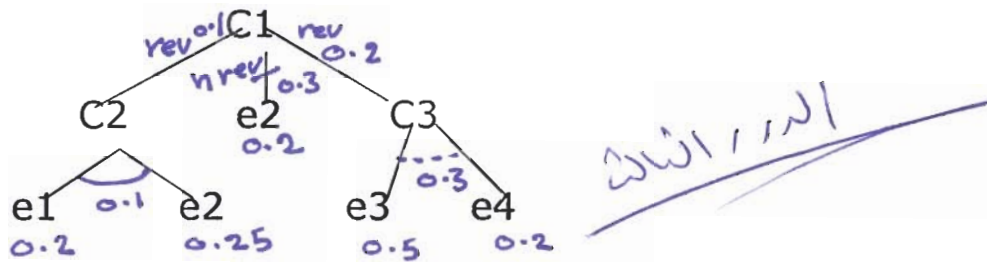
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Final Examination

**Note:- Tray any Four Question**

**Q1//** compute the certainty factor of C1 of the following tree:-



**Q2//** Write a complete parse to the following sentences:

" Ali is brave man in all the battles"

"Ahmed is not a lazy man, but he is busy man"

"Maha go to the school by her fathers car "

**Q3//** Consider the following rules :-

$l(2,3). l(1,4). r(3,2). r(4,1). r(1,1).$

$t(A,B,3,D):-b(A,B,D),r(X,B).$

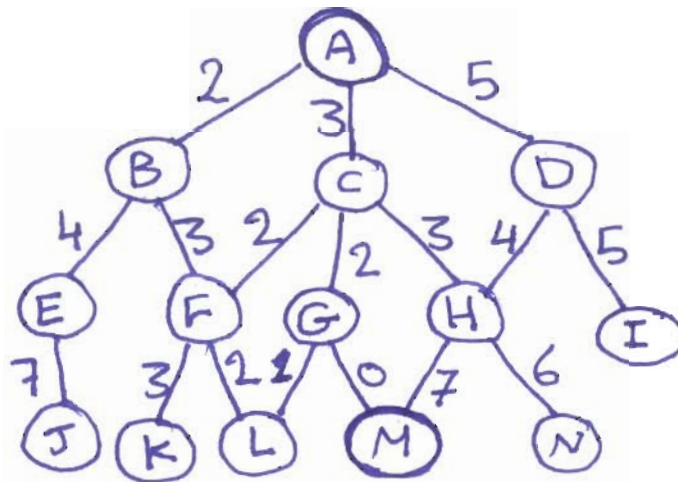
$t(A,4,C,D):-l(X,Z),r(Y,Z)$

$b(X,Y,Z):-r(X,Y).$

-List all provable predicates using Backward and Forward –chining.

**Q4//** Write two heuristic function for 8-puzzle problem then show how you a can implement them .with an example?

Q5// You have the following tree



Find the path between start (A) and goal (M) using

- 1- Depth First search Method.
- 2- Best First Search Method.
- 3- A-Algorithm.

**good luck**