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Tanta University
Faculty of Engineering
Computer and Aut. Control Eng. Dep.
Forth Year

Computer Networks
First Term – Final Exam
Time allowed: 3 Hrs.
2010/2011

Answer the Following (4) Questions and Assume any Missing Data

Question 1: $25^{o} = (4^{o} + 5^{o} + 6^{o} + 10^{o})$

1) In the Medium Access Control Sub-layer, explain the difference between the Persistent and Non-persistent CSMA.
2) Describe the five IP address classes showing the network and host division in each class, then discuss the effect of these divisions on the IP exhaust problem.
3) A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/29. What are the first and last addresses in the block?
4) Use VLSM technique to design a class C network (199.202.11.0) with 7 subnets as follows:

Network ID	N0	N1	N2	N3	N4	N5	N6
Number of Hosts	8	3	8	31	32	30	6

Question 2: $25^{o} = (3^{o} + 4^{o} + 6^{o} + 6^{o} + 6^{o})$

1) Explain the type and maximum length of the cable segment in the *100BaseTX* and *1000BaseSX* Ethernet standards.
2) A router has the following entries in its routing table:

Address/mask	Next hop
130.23.64.0/22	*Interface 0*
130.40.128.0/22	*Interface 1*
192.50.96.0/23	*Router A*
Default	*Router B*

For each of the following IP addressed, what does the router do if a packet with that address arrives? And why?

i. 130.23.65.18
ii. 130.40.139.30
iii. 192.50.176.60
iv. 130.23.66.14

3) What is the routing loops problem in the Distance-Vector Routing protocols? Explain two different techniques that can solve this problem.
4) In the routing protocols, explain the meaning of the following: Route Invalid Timer - Route Flush Timer - Holddown timer; then state the value of these timers in RIP and IGRP.
5) If router K receives two updates listing the same remote network L as follows: Update KL1 has AD = w and metric = x, while update KL2 has AD = y and metric = z. Which update will be considered by router K in the following cases, and why?

$w > y$ and $x < z$ b) $w = y$ and $x < z$

Assume that the metric is: i) delay ii) throughput

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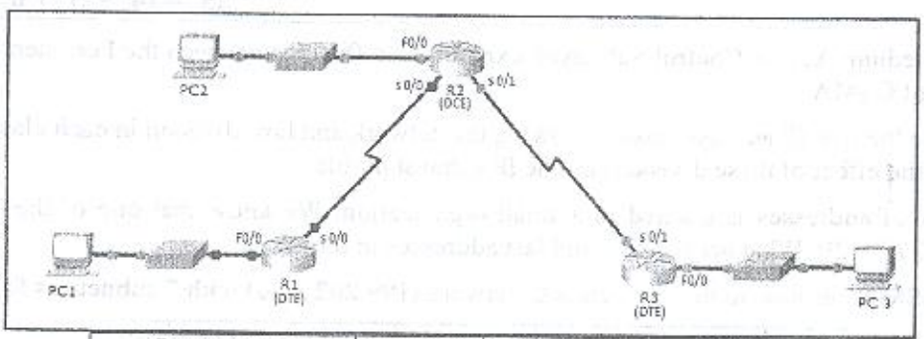
Question 3: 20°

1) For the following figure and table:



Device Name	Interface	IP address	Mask
R2	S0/0	192.168.4.1	255.255.255.0
R2	S0/1	192.168.5.1	255.255.255.0
R2	F0/0	192.168.2.1	255.255.255.0
R1	F0/0	192.168.1.1	255.255.255.0
R1	S0/0	192.168.4.2	255.255.255.0
R3	S0/1	192.168.5.2	255.255.255.0
R3	F0/0	192.168.3.1	255.255.255.0
PC1	NIC	192.168.1.10	255.255.255.0
PC2	NIC	192.168.2.10	255.255.255.0
PC3	NIC	192.168.3.10	255.255.255.0

Write down the necessary commands and the exact configuration mode for configuring the following:

a. Configure a hostname for R2.
b. Configure a telnet password on R2 to allow access for 6 connections at a time.
c. Configure a strong secret password for R2 to be used between user mode and privilege exec mode.
d. Configure the serial interface (s 0/0) to have an up and running interface.
e. Write the necessary RIP routing commands to be applied on R2.
f. Save your Running-configuration.

Question 4: 20°

Answer the following MCQs considering that: ***Each correct choice <u>provides 1°</u> while each wrong choice <u>deducts 1°</u>.***

1. **What type of network cable is used between a terminal and a console port?**
   a. cross-over
   b. straight-through
   c. rollover
   d. patch cable
2. **What are the features of the User Datagram Protocol (UDP). (Choose three.)**
   a. no guaranteed delivery of datagrams
   b. connection-oriented
   c. provides reliable full-duplex data transmission
   d. reliability provided by the application layer
   e. connectionless
   f. utilizes sliding windowing techniques

3. **Which of the following describes the RIP version 1 routing protocol?**
   a. Cisco proprietary hybrid protocol
   b. distance vector protocol that uses hop count as the only metric
   c. link state protocol supporting multiple routed protocols
   d. distance vector protocol that uses delay, bandwidth, load, and reliability metrics
4. **A company with a Class B license needs to have a minimum of 1,000 subnets with each subnet capable of accommodating 50 hosts. Which mask below is the appropriate one?**
   a. 255.255.0.0
   b. 255.255.240.0
   c. 255.255.255.0
   d. 255.255.255.192
   e. 255.255.255.224
5. **What does VLSM allow a network administrator to do?**
   a. utilize one subnet mask throughout an autonomous system
   b. utilize multiple subnet masks in the same IP address space
   c. utilize IGRP as the routing protocol in an entire autonomous system
   d. utilize multiple routing protocols within an autonomous system
6. **Which command would a network administrator use to determine if the routers in an enterprise have learned about a newly added network?**
   a. router# show ip address
   b. router# show ip route
   c. router# show ip networks
   d. router# show ip interface brief
   e. router# debug ip protocol
7. **Which ICMP message type notifies source hosts that a receiving host or network is not available?**
   a. time exceeded
   b. redirect
   c. destination unreachable
   d. source quench
   e. parameter problem
   f. echo reply
8. **Which type of message is generated by a host when the ping command is entered?**
   a. ICMP echo request
   b. ICMP echo reply
   c. UDP echo request
   d. UDP error message
9. **What is the purpose of using port numbers in the transport layer?**
   a. to identify the segment as being either TCP or UDP
   b. to provide reliability during data transport
   c. to identify the interface port number used by the router when forwarding data
   d. to track multiple conversations that occur between hosts
10. **What do distance vector algorithms require each router in the network to send?**
    a. a partial routing table to each router in the LAN
    b. a partial routing table to each router in the WAN
    c. the entire routing table to each neighboring router
    d. the entire routing table to each router in the autonomous system
11. **Which address represents a unicast address?**
    a. 224.1.5.2
    b. FFFF. FFFF. FFFF.
    c. 192.168.24.59/30
    d. 172.31.128.255/18
    e. 255.255.255.255
12. **Which port numbers are commonly assigned for FTP use? (Choose two.)**
    a. 19
    b. 20
    c. 21
    d. 22

13. Which of the following are TCP services? (Choose three.)
a. address resolution
b. end-to-end communication
c. flow control
d. reliability of data delivery
e. path determination
f. data representation

14. When does a distance vector routing protocol set a hold-down timer on a route?
a. when the metric value of the route decreases
b. when the route is marked as inaccessible
c. when the metric value for the route improves
d. when a regular update is received from a neighboring router

15. IP packet field will prevent endless loops?
a. type-of-service
b. identification
c. flags
d. time-to-live
e. header checksum

16. What is the subnet for the host IP address 201.100.5.68/28?
a. 201.100.5.0
b. 201.100.5.32
c. 201.100.5.64
d. 201.100.5.65
e. 201.100.5.31
f. 201.100.5.1

17. Which of the following is the official name for the address assigned to each network interface card (NIC) by its manufacturer?
a. NIC address
b. MAC address
c. IP address
d. Source Address

18. In a UTP crossover cable, which pairs of pins are crossed? (Choose two.)
a. 1 and 2
b. 3 and 5
c. 7 and 8
d. 3 and 6
e. 5 and 7
f. 1 and 3

19. What does TCP use to begin the three-way handshaking process?
a. The destination host sends an ACK segment.
b. The sending host sends a SYN segment.
c. The sending host sends a SYN and ACK segment.
d. The destination host sends a SYN segment.

20. A small company has a class C network license and needs to create five usable subnets, each subnet capable of accommodating at least 20 hosts. Which of the following is the appropriate subnet mask?
a. 255.255.255.0
b. 255.255.255.192
c. 255.255.255.224
d. 255.255.255.240

Good Luck

Dr. Tarek El.Ahmady El.Tobely

[15] The ..... functionality of a message queue installs a handler to be called when a message is put into the specified queue.

(a) PUT	(b) GET
(c) NOTIFY	(d) POLL

[16] ..... transmission mode of continuous media defines a maximum and minimum end-to-end delay.

(a) Asynchronous	(b) Synchronous
(c) Isochronous	(d) Stream-oriented

[17] Client/Server computing is generally based on a model of ..... communication.

(a) persistent asynchronous	(b) persistent synchronous
(c) transient asynchronous	(d) transient synchronous

[18] The ..... level of hierarchical name-space implementation is the least changing level.

(a) administrational	(b) global
(c) managerial	(d) directory

[19] ..... require that If a process reads the value of a data item x, any successive read operation on x by that process will always return that same or a more recent value.

(a) Monotonic reads	(b) Monotonic writes
(c) Read-your-writes	(d) Write-follows-reads

[20] ..... arrangement keeps track of access counts per file, aggregated by considering server closest to requesting clients

(a) Permanent replicas	(b) Server-initiated replica
(c) Client-initiated replica	(d) All (a), (b) and (c)

[21] Primary-backup protocol is a ..... protocol.

(a) content replication	(b) synchronization
(c) naming	(d) consistency

[22] ..... EJB is a persistent, stateful object that can be invoked during different sessions.

(a) Stateless session bean	(b) Stateful session bean
(c) Entity bean	(d) Message-driven bean

[23] In Java RMI, ... is server-side stub for handling network I/O.

(a) skeleton	(b) proxy
(c) object adapter	(d) security object

[24] ..... techniques used to access files in parallel.

(a) striping	(b) NFS
(c) virtual file system	(d) File sharing

[25] Google File System divides files to ..... chunks.

(a) 64 KB	(b) 64 MB
(c) 64 GB	(d) 64 TB

Q2. For each of the following sentences, state whether it's TRUE or FALSE. Explain if it's FALSE. (10 points)

[1] A fault-tolerant system means that it will never have faults.
[2] HTTPS protocol uses port 80 for operation.
[3] Synchronous C/S communication means that the client can do other work while waiting for reply.
[4] LDAP is an example of a flat naming scheme.
[5] A quorum-based protocol for replicated writes of N processes require the following relations between read and write quorums to be valid: $N_R + N_W \geq N$ and $N_W \geq N/2$

Q3. Describe the following: (20 points)

[1] Information systems transactions and their ACID properties.
[2] The concept of a proxy in distributed systems and its implementation in Java RMI.
[3] The primary-backup protocol for implementing consistency of replicated systems.
[4] Attribute-based naming with LDAP as an example.
[5] QoS for streams.
[6] NFS.
[7] IDL compiler.
[8] Publish/subscribe messaging.

Q4. Compare between: (15 points)

[1] Cluster Computing and Grid Computing.
[2] Processes and Threads.
[3] Transient objects and persistent objects.
[4] Flat naming resolution and hierarchical naming resolution.
[5] TCP and UDP communication protocols.
[6] Process VM and VM Monitor

GOOD LUCK

Tanta University

Department: Computers & Automatic Control Engineering
Total Marks: 70 Marks

Faculty of Engineering

Course Title: Microcontroller Systems	Course Code: CCE4127	Year: 4th
Date: Jan 17th 2011 (First term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: All questions are for the 8051 microcontroller. Use the provided data sheet. Make neat answers.

Question (1) (20 points)

Complete the following sentences

[1] A microcontroller chip normally contains components such as ....., ..., ..., ... in addition to the CPU

[2] In a battery-based embedded product, the most important factor in choosing a microcontroller would be its .....

[3] The 8051 has ..... bytes of ROM and ..... bytes of RAM on chip.

[4] The DPTR register is ..... bit in size.

[5] A programmer puts the first opcode at address 100H. When the microcontroller is powered up, it executes the instruction at address .....

[6] The highest hex value that the 8051 Program Counter register can take is .....

[7] The number of register banks of the 8051 is .....

[8] The ADD instruction affects the ....., ..., and ..... flags.

[9] When the 8051 is powered up, the Stack Pointer register contains the value .....

[10] After a PUSH instruction on the 8051, the Stack pointer is ..... by one.

[11] Using 8051 C compilers, to access the byte-size Special Function Registers, we use the ..... data type.

[12] The hardware way of starting and stopping the timer by an external source is achieved by making .....=1 in the ..... register

[13] In mode 2 timer, the ..... register is loaded with the initial count value which will be automatically loaded into the ..... register.

[14] During serial transmission, if data can go both ways at a time, it is called ..... transmission.

[15] ..... is an 8051 8-bit register used solely for holding data sent or received during serial communication.

[16] For the 8051, the types of activation signals for triggering external hardware interrupts are ..... and .....

[17] For a level-triggered interrupt of the 8051, to ensure the activation of the hardware interrupt at the INTn pin, the number of machine cycles at which the low-level signal should be kept is ....., but no more.

[18] The serial interrupt is used mainly for data .....

[19] For the ADC804 Chip, calculating the digital data output from the analog voltage, and the device's step size, we use the formula .....

[20] The LM34 and LM35 temperature sensors output ..... mV for each degree of Fahrenheit/Celsius temperature.

Question (2) (12 points)

State whether True or False. Explain if false.

[1] The DB assembler directive is used to define a constant without occupying a memory location.

[2] Using the 8051 assembly, an action can be repeated 300 times using a single loop.

[3] In order to make any port an input, the port must be programmed by writing 0 to all the bits.

[4] The sbit data type is not a standard C programming data type.

[5] The TF bit of a timer is used for starting it.

[6] For serial communication, the start bit is always a 1 (high) and the stop bit(s) is 0 (low).

[7] An interrupt service routine is never interrupted.

[8] For ADC804 Chip, if the analog input range needs to be 0 to 4 volts, Vref/2 is connected to 2 volts.

Question (3) (18 points)

(a) Write an 8051 assembly program to find the sum of 79H, F5H and E2H and put the sum in registers R0 (low byte) and R5 (high byte).

(b) A switch (SW) is connected to pin P1.5. Write an assembly program to check the status of the switch and perform the following:

i. If SW=0, send letter 'N' to P1
ii. If SW=1, send letter 'Y' to P2

Use the carry flag to check the switch status.

(c) Write an 8051 C program to read the P1.0 and P1.1 bits and issue an ASCII character to P0 according to the following table.

P1.1	P1.0	
0	0	send '0' to P0
0	1	send '1' to P0
1	0	send '2' to P0
1	1	send '3' to P0

(d) List the steps for programming the 8051 timer 0 in mode 1. Show how to calculate the values loaded into the timer's registers for a given XTAL frequency f.

Question (4) (20 points)

(a) List the steps involved in programming the 8051 to receive character bytes serially showing the importance of the RI flag in this process.

(b) Write an 8051 C program to transfer serially the message "The earth is but one country" continuously at 57,600 baud rate.

(c) Write an 8051 C program using interrupts to do the following:

i. Generate a 10 KHz frequency on P2.1 using timer 0 8-bit auto-reload
ii. Use timer 1 as an event counter to count up a 1-Hz pulse and display it on P0. The pulse is connected to EX1.

Assume that XTAL = 11.0592 MHz. Set the baud rate at 9600.

(d) Explain what is meant by signal conditioning in the area of data acquisition.

GOOD LUCK

Data Sheet

TMOD register

(MSB) (LSB)

GATE	C/T	M1	M0	GATE	C/T	M1	M0
Timer1				Timer0			

M0	M1	Mode
0	0	Mode 0
0	1	Mode 1
1	0	Mode 2
1	1	Mode 3

Interrupt vector table

Interrupt	ROM Location (hex)	Pin
Reset	0000	9
External HW (INT0)	0003	P3.2 (12)
Timer 0 (TF0)	000B	
External HW (INT1)	0013	P3.3 (13)
Timer 1 (TF1)	001B	
Serial COM (RI and TI)	0023	

IE (Interrupt Enable) Register

D7 D0

EA	--	ET2	ES	ET1	EX1	ET0	EX0

EA (enable all) must be set to 1 in order for rest of the register to take effect

EA	IE.7	Disables all interrupts
--	IE.6	Not implemented, reserved for future use
ET2	IE.5	Enables or disables timer 2 overflow or capture interrupt (8952)
ES	IE.4	Enables or disables the serial port interrupt
ET1	IE.3	Enables or disables timer 1 overflow interrupt
EX1	IE.2	Enables or disables external interrupt 1
ET0	IE.1	Enables or disables timer 0 overflow interrupt
EX0	IE.0	Enables or disables external interrupt 0

PCON register

SMOD	--	--	--	GF1	GF0	PD	IDL

TCON register

TF1	TR1	TF0	TR0	IE1	IT1	IE0	IT0

TF1	TCON.7	Timer 1 overflow flag
TR1	TCON.6	Timer 1 run control bit
TF0	TCON.5	Timer 0 overflow flag
TR0	TCON.4	Timer 0 run control bit
IE1	TCON.3	External interrupt 1 edge flag
IT1	TCON.2	Interrupt 1 type control bit. Set/cleared by software to specify falling edge/lowlevel triggered external interrupt
IE0	TCON.1	External interrupt 0 edge flag
IT0	TCON.0	Interrupt 0 type control bit. Set/cleared by software to specify falling edge/lowlevel triggered external interrupt

SCON register

SM0	SM1	SM2	REN	TB8	RB8	TI	RI

SM0	SM1	Mode
0	0	Mode 0
0	1	Mode 1
1	0	Mode 2
1	1	Mode 3

Interrupt Flag Bits

Interrupt	Flag	SFR Register Bit
External 0	IE0	TCON.1
External 1	IE1	TCON.3
Timer 0	TF0	TCON.5
Timer 1	TF1	TCON.7
Serial Port	TI	SCON.1

Interrupt Priority Upon Reset

Highest To Lowest Priority	
External Interrupt 0	(INT0)
Timer Interrupt 0	(TF0)
External Interrupt 1	(INT1)
Timer Interrupt 1	(TF1)
Serial Communication	(RI + TI)

C compiler interrupt numbering

Interrupt	Name	Numbers
External Interrupt 0	(INT0)	0
Timer Interrupt 0	(TF0)	1
External Interrupt 1	(INT1)	2
Timer Interrupt 1	(TF1)	3
Serial Communication	(RI + TI)	4

Interrupt Priority Register (Bit-addressable)

D7 D0

--	--	PT2	PS	PT1	PX1	PT0	PX0

--	IP.7	Reserved
--	IP.6	Reserved
PT2	IP.5	Timer 2 interrupt priority bit (8052 only)
PS	IP.4	Serial port interrupt priority bit
PT1	IP.3	Timer 1 interrupt priority bit
PX1	IP.2	External interrupt 1 priority bit
PT0	IP.1	Timer 0 interrupt priority bit
PX0	IP.0	External interrupt 0 priority bit

٤ حاسبات جديد

Tanat University	Department: Computer and control engineering	Faculty of Engineering

Title: Pattern recognition and digital image processing
Final exam, Date: 22/1/2011, **Total marks:** 85
Course code: CCE4130 **Year:** Fourth year
Allowed time: 3 hours **Number of pages:** 3

Workout the following questions

Question 1 (10 marks: one for each item)

Determine if each of the following statements is true or not. If it is not, modify it to become true.

a) When the acquisition of an image is done using a single sensor both x and y dimension resolutions are controlled by the precession of mechanical movement
b) When the acquisition of an image is done using a sensor strip both x and y dimension spatial resolutions are controlled by the precession of mechanical movement
c) If two pixels are 8-adjacent then they are 4-adjacent
d) The pixels having a D_4 distance from (x , y) less than or equal to some value r form a circle centered at (x, y)
e) Appling a logarithmic intensity mapping function on a gray scale image tends to wash the image while applying an inverse logarithmic intensity mapping on the same image increases its contrast
f) Gama ray imaging are typically used in exploring minerals and oil.
g) Correlation could be used to apply median filtering
h) In digital image processing, decreasing the contrast decreases the dynamic range of the image.
i) Nearest neighborhood interpolation gives better results than bilinear interpolation when dealing with digital images
j) When dealing with intensity values as random variable. Its variance is proportional to the image contrast.

Question 2 (15 Marks: 5 for each item)

I. Electromagnetic and acoustic are two different imaging modalities. The source energy is passed (or reflected) through (or by) the objects to be imaged. This energy is then sensed and converted to a digital image.
   a) Mention some applications for each modality
   b) Choose one imaging application for each of the two modalities and give details about it.

II. Prove that finding the maximum intensity value in a digital image is a nonlinear operation

III. A common measure of transmission for digital data is the *baud rate*, defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information, and a stop bit. Using these facts, answer the following:
   a) How many minutes would it take to transmit a 1024 x 1024 image with 256 intensity levels using a 56Kbps baud modem?
   b) What would the time be at 3000Kbps baud, a representative medium speed of a phone DSL (Digital Subscriber Line) connection?

Tanta University

Department: Computers & Automatic Control Engineering
Total Marks: 70 Marks

Faculty of Engineering

Course Title: Selective Topic 2 (Distributed Systems)	Course Code: CCE4131	Year: 4th
First term 2011	Allowed time: 3 hrs	No. of Pages: (3)

Q1. Choose the correct answer. (25 points)

[1] ..... transparency deals with hiding the coordination of activities between objects to achieve consistency at a higher level.

(a) Location	(b) Relocation
(c) Access	(d) Concurrency

[2] ..... should be able to interact with services from other systems.

(a) A transparent distributed	(b) An open distributed
(c) A scalable distributed	(d) A standard distributed

[3] Replication/caching techniques are used to make distributed systems .....

(a) scalable	(b) fault-tolerant
(c) well-performing	(d) all (a), (b) and (c)

[4] Grouping lots of heterogeneous dispersed resources in virtual organizations is used with .....

(a) grid computing	(b) cluster computing
(c) client/server architecture	(d) distributed objects systems

[5] ..... architectures decouple distributed components in space and time.

(a) Layered	(b) Distributed Objects
(c) Shared dataspace	(d) Publish/subscribe

[6] In a traditional three-layered system, the ..... layer contains implementation of business logic.

(a) interface	(b) processing
(c) data	(d) presentation

[7] BitTorrent is an example of ..... system.

(a) a structured P2P	(b) an unstructured P2P
(c) a hybrid C/S with P2P	(d) a C/S

[8] ..... creation/termination is done entirely independent of the operating system.

(a) Process	(b) Application
(c) Service	(d) Thread

[9] ..... aims at allowing applications written for a specific platform to run on a different platform.

(a) Threading	(b) Replication
(c) Virtualization	(d) Migration

[10] A server that keeps track of the status of its clients is a ..... server.

(a) stateful	(b) stateless
(c) scalable	(d) fault-tolerant

[11] TCP and UDP connection protocols rely on communication facilities provided by the ..... layer of the network.

(a) physical	(b) session
(c) data link	(d) transport

[12] The opposite type of communication to persistent communication is .....

(a) synchronous communication	(b) transient communication
(c) asynchronous communication	(d) RPC communication

[13] Message-oriented middleware aims at high level ..... communication.

(a) persistent asynchronous	(b) persistent synchronous
(c) transient asynchronous	(d) transient synchronous

[14] The ..... operation of Berkley sockets attaches a local address to a socket.

(a) LISTEN	(b) ACCEPT
(c) CONNECT	(d) BIND