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Roll No.

FOURTH SEMESTER

B.E. (IT)

MID SEMESTER EXAMINATION **MARCH 2005**

IT-211 SYSTEM ANALYSIS AND DESIGN

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.
Assume suitable missing data, if any.

- 1 Describe the waterfall model for software development life cycle. What are its advantages over build and fix model?
(4)
- 2 Name various techniques used for scheduling a software project.
(2)
- 3 Consider the problem of developing software for controlling a small chemical plant. The plant has a number of emergency situations where specified actions have to be taken. Some of these are :
 - [a] If the temperature exceeds T_1 , then the water shower is turned on.
 - [b] If the temperature is below T_2 , then the heat is turned on
 - [c] If the pressure is above P_1 , the valve V_1 is opened but if it is above P_2 ($P_2 > P_1$) then both valves V_1 and V_2 are opened.
 - [d] If the chemical quantity is more than M and the temperature is more than T_3 , then the water shower is turned on and a counter chemical is added
 - [e] If the pressure is above P_2 and temperature is above T_1 , then the water shower is turned on, valves V_1 and V_2 are opened and alarm bells are sounded.

Write the requirements for this control system in the form of a decision table.
(5)

4 What is a data-dictionary? Explain briefly the notations used for describing data dictionary. Write the data dictionary entry for a credit card. (4)

5 Define the following :

- [a] Entity
- [b] Process
- [c] Store
- [d] Data flow
- [e] Terminator

Also draw the symbol used to represent them. (5)

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FOURTH SEMESTER**B.E. (IT)****MID SEMESTER EXAMINATION MARCH 2005****IT-212 ANALOG & DIGITAL COMMUNICATION***Time: 1 Hour 30 Minutes**Max. Marks : 20*

Note : Answer **ALL** questions.
Assume suitable missing data, if any.

- 1 Classify the following signals into energy type, power type and neither energy type nor power type signals. For energy-type and power type signals, find the energy or the power content of the signal

- [a] $x_1(t) = e^{-t} \cos t u(t-1)$.
 [b] $x_2(t) = \text{sgn}(t)$
 [c] $x_3(t) = A \cos 2\pi f_1 t + B \cos 2\pi f_2 t$.

(3x2=6)

- 2[a] Show that the Hilbert transform of an even signal is odd and vice versa. (2)

- [b] Show that $x(t)$ and its Hilbert transform $\hat{x}(t)$ are orthogonal i.e

$$\int_{-\infty}^{\infty} x(t) \hat{x}(t) dt = 0. \quad (2)$$

- 3 Let $m(t) = \text{Sinc}^2(t)$ and let $x(t) = m(t) \cos \omega_0 t - \hat{m}(t) \sin \omega_0 t$ represent a bandpass signal.

- [a] Find the pre envelope $Z(t)$, and the lowpass equivalent signal to $x(t)$.
 [b] Determine and plot the Fourier transform of the signal $x(t)$. What is the bandwidth of $x(t)$?

(2+3=5)

- 4 An AM signal is generated by modulating the carrier $f_c = 800 \text{ kHz}$ by the signal

$$m(t) = \sin 2000\pi t + 5 \cos 4000\pi t$$

The AM signal

$$u(t) = 100[1 + m(t)] \cos 2\pi f_c t$$

is fed to a 50Ω load.

- [a] Determine the spectrum of the AM signal.
- [b] Determine the average power in the carrier and in sidebands.
- [c] What is the modulation index?
- [d] What is the peak power delivered to the load?

(2+1+1+1)

FOURTH SEMESTER

B.E. (IT)

MID SEMESTER EXAMINATION MARCH 2005

IT-213 OPERATING SYSTEM

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer *ALL* questions.
Assume suitable missing data, if any.

- 1[a] A program is in a dormant state if it is not engaged in any activity (it may be waiting for an action by a user). Comment on the validity of the following statement : "A dormant program also consumes O S resources. (2)
- [b] When is batch processing the preferred strategy for work to be done by computer? When is time sharing the preferred strategy. (2)
- 2[a] What is the purpose of system programs? What is the main advantage of the layered approach to system design? (2)
- [b] Describe the difference among short-term, medium-term and long term scheduling? (2)
- 3[a] What resources are used when a thread is created? How do they differ from those used when a process is created? (3)
- [b] Give two programming examples of multithreading that do not improve performance over a single threaded solution. (2)
- 4 Show that if the wait and signal operations are not executed atomically the mutual exclusion may be violated. (4)
- 5 Define the difference between preemptive and non preemptive scheduling. State why strict non preemptive scheduling is unlikely to be used in a computer enter? (3)

FOURTH SEMESTER

B.E. (IT)

MID SEMESTER EXAMINATION MARCH 2005

IT-214 COMPUTER GRAPHICS

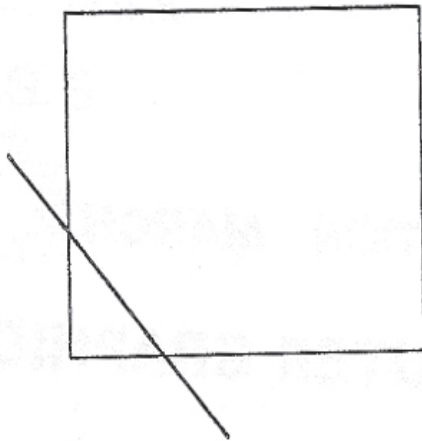
Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.
Assume suitable missing data, if any.

- 1 Answer in short :
 - [a] Aspect Ratio
 - [b] World coordinate system and screen coordinate system
 - [c] Write the 3-D z-axis rotation matrix in homogenous coordinate form.
 - [d] Given viewpoints 1(x_1, y_1, x_2, y_2) and 2(x'_1, y'_1, x'_2, y'_2) For a point (x, y) in view port 1, give equation of the relative position of the same in view port 2.
 - [e] Give the reflection transformation matrix for both x and y coordinate reflections. (5)
- 2 Given a start point (1,1) and end point (8,8). Draw a line between the points. Show all the intermediate steps and discuss the terminating condition. Use Bresenham's Algorithm. (4)
- 3 Given an object with coordinates $\{(1,1), (3,1), (3,3)\}$. Find a composite transformation matrix if the object is rotated through an angle θ ,
 - [a] scaled by a factor S both in x and y directions
 - [b] translated in x direction by a factor T
 - [c] reflected about x-axis. (4)

- 4 Discuss the importance of region codes in cohen-sutherland algorithm



Dial

In Dial, discuss all the necessary steps to clip the line. (4)

- 5 Discuss the blending function of b-spline curve. (3)

FOURTH SEMESTER**B.E. (IT)****MID SEMESTER EXAMINATION MARCH 2005****IT-215 COMPUTER ARCHITECTURE**

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer **ALL** questions.
Assume suitable missing data, if any

1. Design an arithmetic circuit with one selection variable 'S' and two n bit data inputs A and B. The circuit generates the following four arithmetic operations in conjunction with the input carry C_{in} . Draw the circuit for the first two stages

S	$C_{in} = 0$	$C_{in} = 1$	
0	$D = A$	$D = A + 1$	
1	$D = A - 1$	$D = A$	2

2. For each of the following statements specify :

- (i) the register whose contents should be placed on the bus
- (ii) the register whose LD control input must be active
- (iii) a memory load or write operation (if needed)
- (iv) operation performed in adder & logic circuit (if any)

[a] $IR \leftarrow M[AR]$

[b] $M[AR] \leftarrow TR$

[c] $AC \leftarrow DR, DR \leftarrow AC$ (simultaneously).

2

3. Can the following micro operations be done in a single clock pulse. If not given reasons and specify a sequence of micro operations that will perform the operation

[a] $IR \leftarrow M[PC]$

[b] $AC \leftarrow AC + TR$

[c] $DR \leftarrow DR + AC$ 1+1+2=4

4. Give the sequence of micro operation for the basic computer for

[a] fetch phase

[b] LDA instruction from timing cycle T_3

[c] ISZ instruction from timing cycle T_4 4 ½

5. An instruction is stored at location 300 with its address field at location 301. The address field has value 400. A processor register R1 contains the number 200. Evaluate the effective address for the following addressing modes:

[a] direct

[b] immediate

[c] relative

[d] register indirect

[e] index with R1 as index register 2 ½

6. Formulate a mapping procedure that provides eight consecutive micro instructions for each routine. The opcode has six bits and control memory has 2048 words. 2

7. Write symbolic micro program for the exchange instruction. 3