

NATIONAL INSTITUTE OF TECHNOLOGY, AGARTALA
Department of Computer Science & Engineering
B. Tech (CSE), Mid Term Examination 2019-20

Subject Code: UCS05C04

Max. Marks: 50

Subject Name: Software Engineering

Time: 2 Hrs

Section-A

Attempt ALL Parts

5*4=20

1. Explain the major differences between software engineering and other traditional engineering disciplines. Discuss major areas of the application of the software.
2. List five desirable characteristics of a good SRS document. Create sample SRS for office automation system.
3. What are symptoms of present software crises? What factors have contributed to making of present software crises? What are possible solutions to present software crises?
4. Explain how the inheritance feature of object oriented paradigm helps in code reuse. Explain the Pseudo Code with examples.

Section-B

Attempt any two Parts

10*2=20

5. Discuss the significance and use of requirement engineering. What are the problems in the formulation of requirements?
6. Which life cycle model would you follow for developing software that includes many risks? Mention the reasons behind your choice of a particular life cycle model. Explain this model in detail.
7. Draw a DFD for result preparation automation system of B. Tech. Course of NIT, Agartala. Clearly describe the working of the system and draw use case diagram. Also mention all assumption made by you.
8. Which life cycle model you prefer when the desired system needs to have a lot of interaction with the end users and end user not sure about the complete requirements. Explain this model in detail. What is the effect of this model on the overall cost of the software project and compare this model with waterfall model.

Section-C

Attempt Any One Part

10*1=10

9. Discuss the objective of modular software design. What do you mean by term coupling and cohesion in context of software design and explain the types of coupling and cohesion.
10. Estimate the Cost, Duration and number of Software Engineers required for an Office Automation System, if the Size of Different Phases of Software Development are as follows:

Design= 120 KLOC

Coding= 325 KLOC

Testing= 295 KLOC

$n = 14$

$E = 3.6$
 $D = 2.8$

Answer all the questions

1. (a) Define circuit correspondence.

(b) Determine the number of vertices for a graph G with 16 edges and vertex has degree 5. Is the graph G a simple graph?

(c) Draw a graph with at least five vertices which has an Eulerian circuit but no Hamiltonian cycle. (1+2+2=5)

2. (a) State Menger's theorem and prove it with suitable example.

(b) Convince yourself that an Euler graph cannot have a cut-set with odd number of edges.

(c) Let G be a graph in which the degree of every vertex is two. Prove that G contains a cycle.

(d) 4 cubes are given whose 6 faces are colored with R, G, B and W. Check whether it is possible to stack the cubes one on top of the other such that each side shows only one color. Explain your answer.

R	R		B		R		B
R	W	G	G	B	G	W	R
	R			W		R	
	B			R		W	

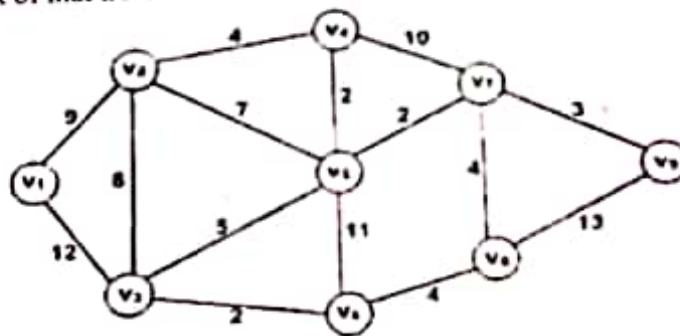
(4+2+3+6=15)

3. (a) Prove that a simple graph with
- n
- vertices and
- k
- components can have at most
- $(n-k)(n-k+1)/2$
- edges.

(b) Define infinite graph.

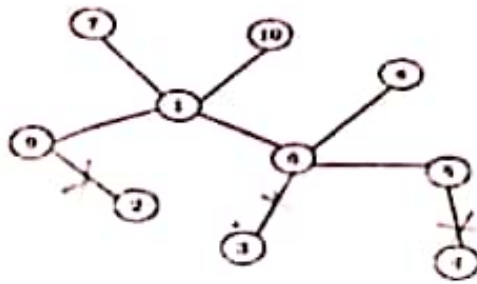
(c) What is the largest number of vertices in a graph with 35 edges if all vertices are of degree at least 3?

(d) Apply Kruskal's algorithm to find the minimum cost spanning tree from the given graph. Find the weight of that tree.

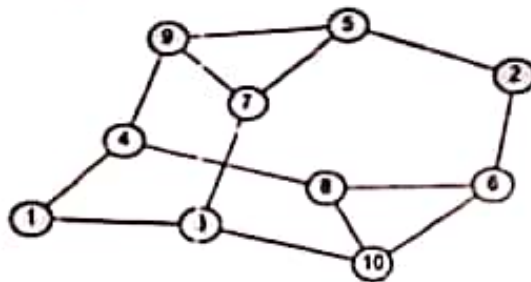


(4+2+3+6=15)

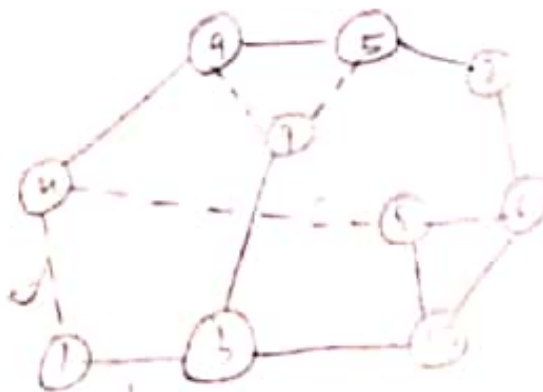
4. (b) Compute the Prufer Sequence from the given tree and reform the tree from the derived sequence. Show each step.



- (c) Find out fundamental cut-set and fundamental circuit from the given graph and discuss the relation between them.



(4+7+4=15)



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Enrollment No.

S.(UCS05B07)CSE

B.Tech 5th Semester Mid Term Examination- 2019

Name of Subject: Data Communication

Paper Code: UCS05B07

Full Marks: 50

Time: 2 Hours

[The figures in the margin indicate full marks for the questions]

1. a) Draw the star bus topology connecting three star networks consisting of four computers. Write three drawbacks of mesh topology. (5+2+3=10)
b) Why start and stop bits are used in Asynchronous Transmission. List main drawback of. (5+2+3=10)
c) Compare Half-Duplex and Full-Duplex mode with a suitable example. (5+2+3=10)
2. a) We have a channel with a 2 MHz bandwidth. The SNR for this channel is 31. What are the appropriate bit rate and signal level? (4+4+2=10)
b) Does the Nyquist theorem bit rate agree with the intuitive bit rate described in baseband transmission.
c) Define crosstalk. (4+4+2=10)
3. a) Draw the graph of the NRZ-I scheme, Differential Manchester scheme, and pseudo ternary scheme using the following data streams: 0011001100110011
b) Which of the three digital-to-analog conversion techniques (ASK, FSK, PSK) is the most susceptible to noise? Defend your answer. (3+2+5=10)
c) Differentiates between FM and PM. (3+2+5=10)
4. a) A multiplexer combines four 100 kbps channels using a time slot of 2 bits. Show the output with arbitrary inputs. What is the frame rate? What is frame duration? What is bit rate? What is the bit duration? (4+3+3=10)
b) Which of the three multiplexing techniques is common for fibre optic links? Explain the reason.
c) What is the use of guard band in FDM? (4+3+3=10)
5. a) Define flat-top sampling in PCM with suitable diagram
b) Assume we have a sample signal. The values are as follows: -7.1, 8.5, 17.2, 19.4, 10.3, -6.6, -12.9, -9.8, -5.3
The sample amplitude between -20 to +20 V. we decide to have 8 levels. Calculate normalized error, quantization code and the encoded words for that sample signal in PCM. (3+7=10)
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Enrollment No.

S5 (UCS05B05) CSE

B.Tech 5th Semester Mid Term Examination- 2019

Name of Subject: : Microprocessor & Applications

Paper Code: UCS05B05

Time: 2 Hours

Full Marks: 50

[The figures in the margin indicate full marks for the questions]

SECTION -A

(5x2=10)

1. Answer the Followings:

a) Consider the sequence of instruction given below:

XRA A
MVI B,6B H
SUI 45 H
ANA B
HLT

X B ← A → 0091

Find the content of register A and B.

b) Consider the following 8085 assembly program :

MVI B,8A H
MOV A,B
MOV C,A
MVI D,37 H
OUT PORT 1
HLT

Find output at PORT1

c) Consider the following loop

XRA A
LXI B,0006 H
LOOP: DCX B
JNZ LOOP

Calculate how many times loop will be executed?

d) Consider the following assembly language program.

START: MVI B,87H
MOV A,B
JMP NEXT
MVI B,00H
XRA B
OUT PORT 1
HLT
NEXT: XRA B
JP START
OUT PORT 2
HLT

What will be the result after execution of the above program in an 8085 microprocessor?
e) Write steps involved to fetch a byte in 8085.

SECTION - II

2. (a) Explain the followings of 8085 microprocessor. (5X2=10)

- (i) HOLD (ii) LXI (iii) RAL (iv) FLAGS (v) ORA.
PPIA theory

3. (a) Draw timing diagram for the instruction PUSH R_r and explain it. (6+4=10)

(b) Consider the following assembly language program:

```
MVI B, 28H
LOOP: NOP
      DCR B
      JNZ LOOP
      HLT
```

Consider $T = 0.25 \mu\text{sec}$. Calculate total time to execute the program.

4. (a) Point out the differences between: (4+6=10)

- (i) POP and PUSH
(ii) CALL and Return

(b) Explain the block diagram of 8085 in details.

5. (a) Discuss the addressing modes of 8085 in details with one example (6+4=10)

(b) Explain Briefly What Happens When The INTR Signal Goes High In The 8085?

3:00 = theory
3:15 = Prac

Enrollment No. 11300451400

S5 (UCS05B06) CSE

B.Tech 5th Semester Mid Term Examination- 2019
Name of Subject: : OPERATING SYSTEM
Paper Code: UCS05B06

Full Marks: 50

Time: 2 Hours

1a) Consider a set of 5 processes whose arrival time, CPU time needed and the priority of the Processes are given below (5+5)

Process	Arrival time in ms	CPU burst time	Priority
P1	0	10	5
P2	0	5	2
P3	2	3	1
P4	5	20	4
P5	10	2	3

Answer the next five questions based on the above information (Smaller the number higher the priority)

- If the CPU Scheduling Policy is FCFS what is the average waiting time?
 - If the CPU Scheduling policy is SJF without preemption what is the average waiting time?
 - If the CPU Scheduling policy is SJF with preemption what is the average waiting time?
 - If the CPU Scheduling policy is priority scheduling without preemption what is the average waiting time?
 - If the CPU Scheduling policy is priority scheduling with preemption what is the average waiting time?
- b) Consider the following four processes, with the length of CPU burst time in ms.

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

- Using SRTF scheduling, obtain a Gantt chart and Compute Average waiting time.
- Repeat with SJF Scheduling

- 2a) what is Semaphores? What is the usage of semaphore? Explain with a suitable example. (5+5)
- b) Define race condition and describe the method used to prevent race Condition.

3. Explain the difference between

(5+5)

- Multilevel queue scheduling and Multilevel Feedback Queue Scheduling algorithm
- User level thread and kernel level thread

4a) Explain different states of a process with the help of a state diagram.

(5+5)

b) What is a context Switch? Explain with Diagram

5a) Explain various multithreading models? Give two examples of multithreading that improve performance over a single threaded solution.

(5+5)

b) What are the basic operating system services?