Fifth Semester B.E Semester End Examination, JANUARY_MARCH_2021

COMPUTER NETWORKS

Time: 3 hrs

Max. Marks :100

Instructions :1.Answer FIVE full Questions selecting at least ONE Question from Each Unit.

	L	CO	PO	M

MODULE 1

1a. Define the term protocol. Discuss the internet protocol stack with a neat diagram.

	[2]	[1]	[1]	[10]

1b. Provide a nuts and bolts description of the internet with neat diagram.

	[2]	[1]	[1]	[10]

OR

2a. Discuss digital subscriber line internet access and hybrid fiber coaxial access network with neat diagrams for each.

	[2]	[1]	[1]	[10]

2b. Explain circuit switched network with a neat diagram.

	[2]	[1]	[1]	[10]

MODULE 2

3a. Compare client server architecture with P2P architecture taking file distribution as example

	[4]	[2]	[3]	[10]

3b. Contrast on FTP protocol with its commands.

	[3]	[2]	[1]	[10]

OR

4a. Contrast the Persistent-HTTP and non-persistent HTTP.

	[3]	[2]	[1]	[10]

4b. Compare the working of SMTP and POP3 protocol

	[4]	[2]	[1]	[10]

MODULE 3

5a. Discuss TCP segment structure with neat diagram with a brief description of each field.

	[2]	[3]	[1]	[10]

5b. Discuss Go Back N protocol with neat diagram.

	[2]	[3]	[1]	[10]

OR

6a. Discuss UDP segment structure with neat diagram. What are the reasons that make many applications well suited for UDP?

	[2]	[3]	[1]	[10]

6b. Explain Selective Repeat protocol with neat diagram

	[2]	[3]	[1]	[10]

MODULE 4

7a. Differentiate routing and forwarding at network layer.

	[4]	[4]	[3]	[7]

7b. Demonstrate the Classless Inter Domain Routing taking 200.23.16.0/23 as example

	[3]	[4]	[3]	[5]

7c. Explain the working of router with its structure.

	[2]	[4]	[1]	[8]

OR

8a. Explain the IPV4 packet format.

[2]   [4]   [1]   [10]

8b. Demonstrate the working of internet control message protocol along with commands used in it

[3]   [4]   [1]   [10]

MODULE 5

9a. Differentiate the IP address and MAC address for any system in an LAN

[3]   [5]   [1]   [6]

9b. Demonstrate the CRC for error detection for the following data:
Data: 1011 and devisor: 1000

[3]   [5]   [3]   [8]

9c. Compare the single bit parity and 2D bit parity checking used in error detection

[4]   [5]   [1]   [6]

OR

10a. Demonstrate the working of TDMA and FDMA

[3]   [5]   [3]   [10]

10b. Contrast upon CDMA along with CSMA/CA and CSMA/CD

[3]   [5]   [3]   [10]

Fifth Semester B.E Semester End Examination, JANUARY MARCH 2021

OBJECT ORIENTED MODELING AND DESIGN

Time: 3 hrs   Max. Marks :100

Instructions :1. Answer FIVE full Questions selecting at least ONE Question from Each Unit.

	MODULE 1	L	CO	PO	M

1a. What is object-oriented development? List and explain the OO themes

| | | [2] | [1] | [1] | [10] |

1b. Explain the three models used in object-oriented modelling and design

| | | [2] | [1] | [1] | [10] |

OR

2a. Define the following terms with example:

   1. Links and associations
   2. Multiplicity
   3. Association end names
   4. Ordering
   5. Bag and sequence

| | | [2] | [1] | [1] | [10] |

2b. What is generalization? Explain the generalization with example

| | | [2] | [1] | [1] | [10] |

MODULE 2

3a. Define state diagram. Construct a state diagram for telephone line.

| | | [3] | [2] | [3] | [7] |

3b. What is an event? Explain different types of events with an example.

| | | [2] | [1] | [2] | [7] |

3c. Explain the different behaviors of state diagrams with example for each one.

| | | [2] | [1] | [2] | [6] |

OR

4a. List the significance of state modeling.

| | | [1] | [1] | [2] | [5] |

4b. What are nested states? Explain the concept of nested states with an example.

| | | [2] | [1] | [2] | [8] |

4c. Analyze the working of Microwave Oven Home Appliance, Identify & describe States, Events for the same.

| | | [4] | [2] | [3] | [7] |

MODULE 3

5a. Prepare a use case diagram by analysing the steps involved in sending a mail through computer system. List the actors and explain the relevance of each other with corresponding use case

| | | [4] | [2] | [3] | [10] |

5b. List and explain the guidelines for use case diagrams

| | | [2] | [1] | [1] | [6] |

5c. Sketch a sequence diagram for a session with an online stock broker.

| | | [3] | [2] | [3] | [4] |

OR

6a. List and explain the guidelines for sequence model

| | | [2] | [1] | [1] | [5] |

6b. What is an activity diagram? Write an activity diagram by analyzing the scenario of executing order in a stock brokerage system

| | | [4] | [2] | [3] | [10] |

L

6c. Write a note on

    1. Include relationship
    2. Extend relationship

MODULE 4

[2] [1] [1] [5]

7a. Explain the following steps required to construct a Domain Class Model with an example.
    a) Finding Classes
    b) Keeping the Right Classes
    c) Finding Associations
    d) Shifting the level of Abstraction
    e) Group classes into packages

7b. What do you mean by domain state model? Identify and describe the steps required for constructing a domain state model.

[2] [3] [3] [10]

OR

8a. Explain the different criteria in discarding the unnecessary and incorrect associations.

[3] [2] [3] [10]

8b. Illustrate with an example the steps to organize the classes by using inheritance to share common structure.

[2] [2] [3] [10]

MODULE 5

[2] [3] [5] [10]

9a. How activity diagram can be used in the application interaction model. Construct an Activity diagram for ATM card verification.

9b. What is Application class model? List steps involved in Application class model. Explain briefly.

[3] [3] [5] [10]

OR

[2] [3] [2] [10]

10a. Explain the following steps related to Application Interaction Modeling.

    a) Determine the system boundary
    b) Find Actors
    c) Find use cases
    d) Find Initial and Final events
    e) Add variation and exception scenarios.

10b. What do you mean by Class design? Identify the steps involved in class design.

[2] [3] [2] [10]

[3] [1] [2] [10]

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UNIX SYSTEM PROGRAMMING

Time: 3 hrs   Max. Marks :100

Instructions :1.Answer FIVE full Questions selecting at least ONE Question from Each Unit.

	MODULE 1	**L**	**CO**	**PO**	**M**

1a. What do you understand by the term feature test macros? List all the five feature test macros along with their meanings.

[2] [2] [1] [10]

1b. Write a C/C++ program to check the following limits using function defined by POSIX during runtime.

1. Number of clock ticks per second
2. Maximum number of child process
3. Maximum number of opened files
4. Maximum path length
5. Maximum number of links in a filename.

[3] [2] [1] [10]

OR

2a. Write a C/C++ program to display the C preprocessor symbols.

[] [1] [1] [5]

2b. Explain the following commands related to UNIX:

1. mkdir
2. rmdir
3. cp
4. cat
5. mv

[2] [2] [1] [5]

2c. What are API common characteristics? List and explain any seven values of the global variable errono along with their meanings whenever API's fail.

[2] [2] [1] [10]

MODULE 2

3a. List and explain the various file types in UNIX along with the commands to create them.

[2] [1] [1] [10]

3b. Explain the UNIX kernel support for files with a neat diagram.

[2] [1] [1] [10]

OR

4a. Explain the 'fcntl ( )' API along with its syntax. Write a C/C++ program using fcntl ( ) API to impose a write a lock by both the parent process and child process and then the parent process unlocks it.

[3] [1] [2] [10]

4b. Explain the following:

1. Device File APIs
2. FIFO File APIs

[2] [1] [1] [10]

MODULE 3

5a. Explain the UNIX Kernel support for process with a neat diagram.

[2] [1] [1] [10]

5b. Explain the memory layout of a C program. Analyze the code and identify the various memory segments.

```
#include<stdio.h>
int a=5;
int b;
int data[10];
const int i=5;
int main()
{
int x;
int *ptr = malloc(50);
return 0;
}
```
                                                              [4]   [1]   [3]   [10]
<div align="center">OR</div>

6a. Explain the getrlimit( ) and setrlimit( ) functions in UNIX along with the syntax. List all the resource limit constants along with its meaning. Write a sample C/C ++ program to demonstrate the use of same.

                                                              [3]   [1]   [2]   [10]
6b. What are environment variables? Explain the following related to environment variables:

   1.How to obtain the value of a specific environment variable
   2.How to set a specific environment variable
                                                              [2]   [1]   [2]   [10]

<div align="center">MODULE 4</div>

7a. Explain the following APIs along with syntax related to signals:

   1.signal( )
   2.sigprocmask( )
                                                              [2]   [4]   [1]   [10]
7b. Explain the following APIs along with its syntax:

   1.kill
   2.alarm
   3.sleep
                                                              [2]   [4]   [1]   [10]

<div align="center">OR</div>

8a. What is a daemon process? Discuss the basic coding rules.
                                                              [2]   [4]   [1]   [10]
8b. With a neat block diagram explain the process of error logging with SVR4 stream log driver.
                                                              [2]   [4]   [1]   [10]

<div align="center">MODULE 5</div>

9a. What are pipes? List its limitations. Write a C/C++ program to create a pipe from parent to child and send the data down the pipe.
                                                              [3]   [3]   [2]   [10]
9b. What are FIFOs? With a neat diagram, explain the client – server communication using the FIFOs.
                                                              [2]   [3]   [1]   [10]

<div align="center">OR</div>

10a. What are message queues? Write the structure of message queue and explain each member in detail.
                                                              [2]   [3]   [1]   [10]
10b. What are the different system calls available to create and manipulate semaphores? Explain in detail.
                                                              [2]   [3]   [1]   [10]

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FORMAL LANGUAGES AND AUTOMATA THEORY

Time: 3 hrs   Max. Marks :100

Instructions :1. 1. Answer FIVE full Questions selecting at least ONE Question from Each Unit.

<div align="center">MODULE 1   L   CO   PO   M</div>

1a. Define the terms Alphabet, Strings, Power of an alphabet, Language, transition diagram. Design a DFA to accept the language L={ w | w is of even length and begins with 01 }.

<div align="right">[2]   [1]   [1]   [10]</div>

1b. Design a NFA which accepts strings of 0'and 1's that have the symbol 1 in the second last position. Convert NFA to equivalent DFA.

<div align="right">[3]   [1]   [1]   [10]</div>

<div align="center">OR</div>

2a. Design a DFA

i. To accept strings of a's and b's except those containing the substring aab.

ii. To accept strings of 0's and 1's ending with the string 011.

<div align="right">[3]   [1]   [1]   [10]</div>

2b. Define Epsilon closures with an example. Convert the following ε-NFA to DFA.

δ	a	b	c	e
→q0	q0	ϕ	ϕ	q1
q1	ϕ	q1	ϕ	q2
*q2	ϕ	ϕ	q2	ϕ

<div align="right">[2]   [1]   [3]   [10]</div>

<div align="center">MODULE 2</div>

3a. Define Regular Expression and construct the Regular Expression for the following languages.

1. L={ W | W ends with "01" or "10" where W ∈ {0, 1}* }
2. L= {a^{n}b^m| n>=4, m<=3 }
3. L={a^{n}b^m| m>=1, n>=1 and nm>=3 }
4. L={ |W| mod 3 =0 and |W| mod 2 =0 where W ∈ {a, b}* }

<div align="right">[3]   [2]   [3]   [10]</div>

3b. If L1 and L2 are Two regular languages then Prove that the regular languages are closed under set operations namely, UNION, CONCATENATION, STAR CLOSURE , COMPLIMENT and INTERSECTION

<div align="right">[2]   [2]   [12]   [10]</div>

<div align="center">OR</div>

4a. State and prove Pumping Lemma for Regular Languages and apply the same and justify the following language to be Non regular

L = { WW^R| W∈{a+b}* } is not Regular

<div align="right">[3]   [2]   [12]   [10]</div>

4b. Define Distinguishable and Indistinguishable states. Evaluate the minimized DFA by making use of Table filling algorithm.

δ	a
→*1	2
2	3
*3	2

<div align="right">[4]   [2]   [12]   [10]</div>

<div align="center">MODULE 3</div>

5a. Consider the context free grammar with productions.

E→I E→E+E

E→E*E E→(E)

I→a I→b

I→Ia I→Ib

I→I0 I→I1

Write leftmost derivation and parse tree for the string (a101+b1)*(a1+b).

<div align="right">[2]   [3]   [2]   [10]</div>

5b. Eliminate Useless symbols in the grammar.

S → aA | bB
A → aA | a
B → bB
D → ab | Ea
E → aC | d

[3]   [3]   [2]   [10]

OR

6a. Obtain a context free grammar to generate a language consisting of equal number of a's and b's. Define sentential form with an example.

[3]   [3]   [1]   [10]

6b. Eliminate all ϵ-productions from the grammar.

S → ABCa|bD
A → BC|b
B → b| ϵ
C → c | ϵ
D → d

[3]   [3]   [1]   [10]

MODULE 4

7a. Define Non Deterministic Push down Automata (NPDA) and Develop NPDA to accept the following Language by final state.

L={ a^i b^j c^k | j=i + k for j>=0, k>=0}

Draw the transition diagram and write Instantaneous Description (ID) for i=2 and j=3

[4]   [4]   [3]   [10]

7b. Define the language acceptance of NPDA by empty STACK and develop NPDA to accept the following language through grammar by empty STACK.

S®0S1 | A
A®1A0 | S |e

write Instantaneous Description (ID) for the input string w = 001011

[4]   [4]   [3]   [10]

OR

8a. Define the following terms
   1.Turing Machine
   2.Instantaneous Description (ID) with respect to Turing machine.
   3.Language acceptance of Turing machine

[1]   [4]   [1]   [8]

8b. Design a Turing machine to accept the following language and show the sequence of moves made by the Turing Machine for the string" aababb"

L= { w | w ϵ (a+b)* abb }

[4]   [4]   [3]   [12]

MODULE 5

9a. What is LEX ? With suitable example discuss the Lex specification format, disambiguity rules and running the LEX program.

[2]   [5]   [12]   [10]

9b. Write a LEX program to implement the followings

   1.Number of vowels and consonants in an English text
   2.Given a list of constants, Count the number of positive and negative constants (both integer and floating point).

[4]   [5]   [3]   [10]

OR

10a. What is YACC ? With suitable example discuss the followings :
1. YACC specification format
2. Parser and lexer communication
3. Compiling and running the YACC program

[2]   [5]   [3]   [10]

10b. Write a YACC program to validate and evaluate the arithmetic expression made up of +,-,* and / operators.

[4]   [5]   [3]   [10]