

Digital system and architecture

02/11/2023

Instructions:

- 1) All questions are compulsory.
- 2) Mixing of sub questions is not allowed.
- 3) Write in clear, legible, writing.

- Q1) Attempt any four: (20)
- A) Realize the following logic equation using AND gate and OR gate.
    - a)  $A+A'B+A'B'=A+B$
    - b)  $A.B+A'B+A'B'=A'+B$
  - B) Given the logic equation  $f=ABC+BC'D+A'BC$ , simplify using K map and realize using NAND gate.
  - C) Draw and explain bus interconnection.
  - D) Write a note on direct memory access..
  - E) Draw and explain the operations of a 3 bit synchronous counter.
  - F) Draw and explain JK flip flop.
- Q2) Attempt any four: (20)
- A) Explain cache memory design issues.
  - B) Explain the operation of the magnetic disk memory.
  - C) Explain different types of RAM and ROM.
  - D) Draw and explain the instruction pipelining.
  - E) Draw and explain RISC architecture.
  - F) Explain arithmetic and logical operations of microprocessors with examples .
- Q3) Attempt any four: (20)
- A) Draw and explain the block diagram of the control unit( CU).
  - B) Explain different classification of Flynn's taxonomy.
  - C) Describe in brief hardwired implementation of control unit.
  - D) Write a note on organization of multi core computer systems.
  - E) Explain microoperations of the control unit.
  - F) Discuss the performance of multi core computer systems.
- Q4) Attempt any three: (15)
- A) Describe superscalar processor in brief.
  - B) Simplify the following 4-variable Boolean function in SOP form to obtain the minimal SOP expression.  $F(A,B,C,D)=\sum m(0,1,2,8,9,12,13)$  use K map.
  - C) Explain computer components and their functions.
  - D) Explain different addressing modes of microprocessors.
  - E) Explain instruction level parallelism.
  - F) Draw and explain processor organization.

Introduction to programming with python

03/11/2023

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Q1) Attempt any four: (20)

- A) What is lambda function?. Explain it with the help of an example.
- B) Differentiate between for loop and while loop in Python.
- C) What is break, continue, and pass in Python? Explain it with the help of an example.
- D) Write a python program to print sum of digit by creating function.
- E) Write a python program to print Fibonacci series till n. Take n as input from user.
- F) Write a python program to print factorial of a number.

Q2) Attempt any four: (20)

- A) Write a brief comparison of Python with C and Java.
- B) What are the different features of python programming language.
- C) Explain the memory management in python.
- D) Write a python program to check whether a string is palindrome or not.
- E) Write program in Python to define and call functions for suitable problem.
- F) Write a python program to find LCM and HCF in python.

Q3) Attempt any four: (20)

- A) Explain the different operators used in python.
- B) What is Arrays . Illustrate your answer with suitable example.
- C) Explain the different types of functions using examples.
- D) Write a program to implement dictionary in python for suitable problem. Demonstrate various operations on it.
- E) Write a python program to find whether a given number is odd or even.
- F) Write a Python program to demonstrate the precedence and associativity of operators.

Q4) Attempt any five: (15)

- A) What are the different input and output operations in python.
- B) What are the different Loop control statements used in python.
- C) Differentiate between list and arrays in python.
- D) Write a program to show how slicing works in tuples.
- E) Write a program to find whether a given number is prime or not.
- F) Write a program to find whether a given number is perfect or not. Take input from user.

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Max Time: 2½ hrs

LINUX

Max Marks: 75

FY- CS  
SEM- I

04/11/2023

**Instructions:**

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- Q.1 Attempt any FOUR (20)**
- A) Write a note on History of Linux Operating System.
  - B) Explain Linux architecture in detail.
  - C) Explain following commands  
i)uname ii)wc iii)mkdir iv)pwd v)cat
  - D) List and explain different file types in Linux.
  - E) Explain regular expression in detail.
  - F) What is command aliases? Explain with example.
- Q.2 Attempt any FOUR (20)**
- A) Explain Linux security in detail.
  - B) Explain file permission in detail.
  - C) What are the layers of TCP/IP model? Explain in detail.
  - D) Write a note on following i)Telnet ii)FTP
  - E) Write a note on following i)ping ii)SSH
  - F) Write a note on vi editor.
- Q.3 Attempt any FOUR (20)**
- A) What is the use of backtick? Explain with an example.
  - B) What is the use of pipes? Explain with example.
  - C) Write a note on i) while ii) until and give suitable example.
  - D) Write a shell script to perform basic arithmetic operation.
  - E) Write a short note on Job control in Linux.
  - F) Write a short note on i)at ii)batch iii)cron table
- Q.4 Attempt any FIVE (15)**
- A) What are the features of Linux? Enlist various Linux distributions.
  - B) Write a note on MAN pages.
  - C) Explain sudo command in detail.
  - D) Explain in detail domain name system.
  - E) Explain output re direction with suitable example.
  - F) Explain various Linux signals.

Open Source Tech. 06/11/2023

Instructions:

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  - 3) Write in clear and legible writing.
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Q I Attempt any **FOUR** of the following (20)

- A) Write difference between Open Source Software and Public domain Software.
- B) Write Principles of Open Source Software.
- C) Explain Open Source Development Model.
- D) What is Internationalization? Write benefits, Advantages and disadvantages of Internationalization.
- E) Write about History of BSD?
- F) Write about Open Source Philosophies

Q II Attempt any **FOUR** of the following (20)

- A) Explain freedoms of open source software.
- B) Write note on open source hardware.
- C) How Open source is useful in education.
- D) Compare open source versus closed source software
- E) Write note on GitHub.
- F) Write note on Wikipedia.

Q III Attempt any **FOUR** of the following (20)

- A) Write about different versions of Android software.
- B) What is virtualization? Explain types of operating system.
- C) Write about GNU compiler.
- D) What is container? Explain Docker.
- E) IDE is useful for programming. Justify.
- F) Write note on LibreOffice.

Q IV Attempt any **FIVE** of the following (15)

- A) Explain bazar model.
- B) Write about Licenses of Open Source software.
- C) Write note on open source Debugger.
- D) What is LAMP? Write not on software used in LAMP.
- E) Write note on Drupal.
- F) Explain any Open Source Database.

Instructions:

DM

FY-CS

Amr 605

07/11/23

- 1) All questions are compulsory.
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- 3) Write in clear, legible, writing.

Q1) Attempt any four: (20)

- A) If  $f: \mathbb{R} \rightarrow \mathbb{R}$  is defined by  $f(x) = 2x + 3$ ; the show that  $f$  is bijection and hence find  $f^{-1}$ .
- B) if  $f(x) = 2x + 3$  and  $g(x) = 1 - x^2$ . find the composite of the function define by  $(f \circ g)(x)$  and  $(g \circ f)(x)$ . Verify whether  $(g \circ f)(x) = (f \circ g)(x)$
- C) If  $A = \{1, 2, 3\}$  and  $R = \{(1, 1), (1, 2), (2, 1), (2, 2), (2, 3), (3, 1), (3, 3)\}$ . find  $M(R)$  and  $[M(R)]^2$ .
- D) Let  $A = \{1, 2, 3\}$  and  $R$  be a relation on  $A$  defined by  $xRy$  iff  $x \leq y$ . Find  $R$  and draw its graph and matrix.
- E) solve the following homogenous recurrence relation  
 $a_r = 7a_{r-1} - 10a_{r-2}$  with  $a_0 = 4, a_1 = 1$
- F) let  $A = \{1, 2, 3, 4, 5\}$  and  $R$  be a partial order relation defined as  
 $R = \{(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (5, 3), (3, 1), (4, 3), (4, 2), (4, 1), (2, 1)\}$ . Find the Hasse diagram of  $A$ .

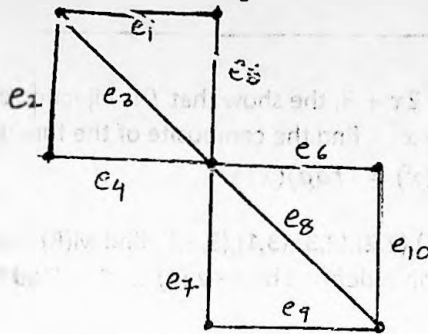
Q2) Attempt any four: (20)

- A) On an English test, a student must write two essays. For the first essay, the student must select from topics A, B, and C. For the second essay, the student must select from topics 1, 2, 3 and 4. How many different ways can student select the two essay topics? (make tree diagram and solve by counting principle)
- B) Show that a party of 20 people, there are two people who have the same number of friends
- C) An investigator interviewed 100 interviewers to determine their skills, expert in C language, expert in Oracle, expert in V.B. Report occurred is are 10 are skilled in all three, 20 are skilled in C and V.B. 30 are skilled in V.B. and Oracle, 25 are skilled in C and Oracle, 12 are skilled in C Only, 5 are skilled in V.B. only and 8 are skilled in Oracle only. Then
  - (i) How many are skilled in at least one? (ii) How many are unskilled?
  - (iii) How many are skilled in C but not in V.B, (iv) How many are skilled in V.B. and oracle but not C.
- D) Suppose that there are 9 faculty members in the mathematics and 11 in the computer science Department. How many ways are there to select a committee to develop a discrete mathematics Course at a school if the committee is to consist of three faculty members from the mathematics And four from the computer science Department?
- E) Find the coefficient of  $x^3y^3z^2$  in  $(2x - 3y + 5z)^8$ .
- F) Each user on a computer system has a password which is six to seven characters long where each character is an upper case letter or a digit. Each password must contain at least one digit how many possible password are there?

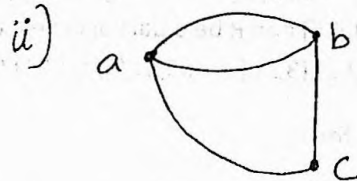
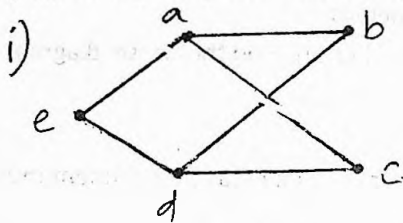
Q3) Attempt any four:

(20)

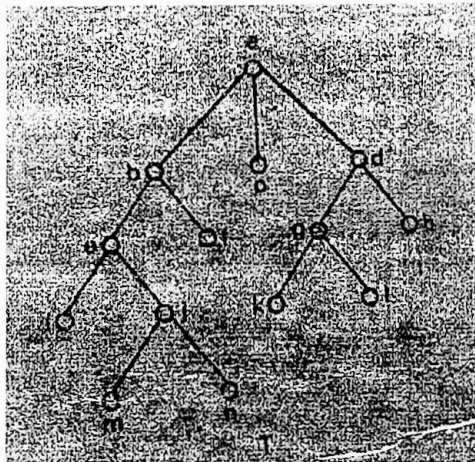
- A) Write the definition of tree. Draw all non-isomorphic trees on 6 vertices.  
 B) Draw all possible non-isomorphic spanning trees of the following graph.



- C) Write the definition of binary tree. Draw all non-isomorphic binary trees of height 2.  
 D) Find the adjacency matrix of following graph



- E) Define Euler path, Euler cycle, Hamiltonian path and Hamiltonian graph  
 F) Find the pre-order traversal of the given rooted tree T as shown in the figure.



Q4) Attempt any five:

(15)

- A) Find first six terms of the sequence defined by the following recurrence relation  
 $a_n = a_{n-1} + 3a_{n-2}$  with  $a_0 = 1, a_1 = 2$   
 B) Find characteristic equation and characteristic roots of recurrence relation  
 i)  $a_r - 7a_{r-1} + 12a_{r-2} = 0$   
 C) How that there does not exist 7 lectures each of 30 minutes from 10 am to 1 pm.  
 D) A group of 30 people have been trained as astronauts to go on the first mission to Mars.

How many ways are there to select a crew of six people to go on this mission?

E) write the properties of tree.

F) Define null graph, complete graph with example.

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DS

08/11/23

Instructions:

- 1) All questions are compulsory.
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Q1) Attempt any four:

(20)

- A) A random sample of 64 people were selected to take an IQ Test. After each person completed the test, they were assigned an IQ score based on their performance of the test. The test result are below Prepare a stem and leaf plot for above data.

111	85	83	98	107	101	100	94
105	122	104	106	90	123	102	107
141	86	91	88	98	128	93	114
99	94	94	96	106	136	102	75
107	106	68	104	91	87	105	97
107	107	85	117	93	108	91	110
85	99	99	96	101	86	93	109
87	116	78	116	110	91	105	99

- B) draw the histogram and ogive graph of the following data

Income	20000-30000	30000-40000	40000-50000	50000-60000	60000-70000
No.of families	27	35	55	35	18

- C) You measure the height of 50 students to the nearest cms and group the result. Find mean, median and mode of the following data.

Length(cm)	frequency	Length(cm)	frequency
150-154	5	170-174	9
155-159	2	175-179	11
160-164	6	180-184	6
165-169	8	185-189	3

- D) It is given that in a moderately skewed distribution median=10 and mean=12. Using these values find the approximate value of mode.
- E) Find the median of the following data. the table below gives the distance covered in in km to reach office by 26 people surveyed.



Distance in km	Number of people
2-10	44
10-18	88
18-26	55
26-34	44
34-42	55

F) The following is the distribution of marks of 60 children

Marks	10-19	20-29	30-39	40-49	50-59	60-69
No. of student	4	6	10	18	12	10

Obtain: i) Class boundaries for all classes ii) Class marks  
 iii) Width of the class intervals iv) Less than cumulative frequency distribution  
 v) More than cumulative frequency distribution.

Q2) Attempt any four:

(20)

A) ABC Ltd. is a textile manufacturer and is working upon a reward structure. The management is in discussion to start a new initiative, but they first want to know how much their production spread is. The management has collected its average daily production data for the last 10 days per (average) employee 155, 169, 188, 150, 177, 145, 140, 190, 175, 156. Use the Quartile Deviation formula to help management find dispersion. Find the range and coefficient of range also Find Coefficient of Quartile deviation.

B) Find  $Q_1$  and  $Q_3$  and find IQR, QD, coefficient of QD.

Daily wages Rs	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of workers	10	15	28	30	30	25	15	16

C) Find the Standard Deviation of the weights of std 8th students: 53, 35, 36, 41, 47, 60, 46, 42, 51, 50.

D) Consider a data set of following numbers: 22, 12, 14, 7, 18, 16, 11, 15, 13. You are required to calculate the Quartile Deviation

E) Calculate the SD of the following observation.

X	12	14	16	18	20	22
f	6	9	14	11	9	3

F) Find the range and coefficient of range of the following data.

i) 63, 89, 98, 125, 79, 108, 117, 68 ii) 43.5, 13.6, 18.9, 58.4, 61.4, 29.8

Q3) Attempt any four:

(20)

A) from the following data, find (i) the mean value of x and y

(ii) the correlation coefficients between x and y (iii) the standard deviation of y.

If variance of x is 9 and regression equation are  $8x - 10y + 66 = 0$  and  $40x - 18y = 214$ .

B) If  $\bar{x} = 65$ ,  $\bar{y} = 67$ ,  $\sigma_x = 2.5$ ,  $\sigma_y = 3.5$ ,  $r = 0.8$

Find (1) lines of regression (2) Estimate  $y$  when  $x=70$

C) Calculate the correlation coefficient between  $x$  and  $y$

X	1	3	4	5	7	8	10
y	2	6	8	10	14	16	20

D) State the properties of Covariance

E) Calculate the correlation coefficient for the following heights (inches) of father ( $x$ ) and their Sons ( $y$ ).

x	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

F) Write the difference between Correlation and regression.

Q4) Attempt any five: (15)

A) Find out the mean when you are given the median = 20.6 and the mode = 26.

B) Calculate the arithmetic mean of the following observations:

X	5	6	7	8	9	10	11
f	11	15	20	16	12	9	4

C) Calculate the range and coefficient of range of the following data.

Income	400-450	450-500	500-550	550-600	600-650
No of worker	8	12	30	21	6

D) If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the Largest value.

E) Calculate the correlation coefficient between  $x$  and  $y$

X	1	3	4	6	8	9	11	12
y	1	2	4	4	5	7	8	9

F) Write the types of Correlation.

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- Q.1 Attempt any FOUR (20)**
- A) What are soft skills? Discuss its importance in professional life.
  - B) Explain the significance of Emotional Intelligence.
  - C) Explain Maslow's Theory of need.
  - D) Explain in brief any 2 theories of motivation.
  - E) What is Professional Etiquette? What is its role in our work life?
  - F) What are the issues faced by an organization in absence of ethics.
- Q.2 Attempt any FOUR (20)**
- A) Explain the difference between good communication and effective communication.
  - B) What is non-verbal communication? Explain its types.
  - C) Elaborate on job recruitment process.
  - D) Write an unsolicited letter of application to ABC company, applying for the post of Junior data analyst.
  - E) Discuss various types of interviews.
  - F) Discuss the advantages and disadvantages of debates.
- Q.3 Attempt any FOUR (20)**
- A) Define presentation skills and elaborate on the Importance of presentation skills.
  - B) What is the significance of Creativity in workplace?
  - C) What is extrinsic motivation and what are its types?
  - D) Explain the various zones of learning.
  - E) What are the advantages of Team building?
  - F) What are the various techniques in Decision Making?
- Q.4 Attempt any FIVE (15)**
- A) Distinguish between EQ and IQ.
  - B) Write a short note on Positive Thinking.
  - C) Write a short note on the difference between solicited and unsolicited letters.
  - D) Prepare a model resume for a person from the IT field with an assumption that the person is a fresher.
  - E) Enlist different types of decision.
  - F) Write a short note on Stress management.