

Department of Information and Communication Engineering

Pabna University of Science and Technology

B.Sc. (Engineering) 2nd Year 1st Semester Examination 2019

Session: 2017-2018

Course Code: ICE-2106

Course Title: Discrete Mathematics and Numerical Methods Sessional

List of Laboratory Problems

Sl	Problem Description
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- Let A be the set {1, 2, 3, 4}. Write a program to find the ordered pairs are in the relation
I) $R_1 = \{(a, b) \mid a \text{ divides } b\}$ II) $R_2 = \{(a, b) \mid a \leq b\}$.
- Suppose that $A = \{1, 2, 3\}$ and $B = \{1, 2\}$. Let R be the relation from A to B containing (a, b) if $a \in A$, $b \in B$, and $a > b$. Write a program to find the relation R and also represent this relation in matrix form if $a_1 = 1$, $a_2 = 2$, and $a_3 = 3$, and $b_1 = 1$ and $b_2 = 2$.

3. Write a program for graph coloring by Welch- Powell's algorithm.

4. Write a program to find shortest path by Warshall's algorithm.

5. Suppose that the relations R_1 and R_2 on a set A are represented by the matrices

$$M_{R_1} = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \text{ and } M_{R_2} = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}. \text{ Write a program to find the } M_{R_1 \cup R_2} \text{ and } M_{R_1 \cap R_2}.$$

6. The following table gives the population of a town during the last six censuses. Write a program to find the population in the year of 1946 using Newton-Gregory forward interpolation formula.

Year:	1911	1921	1931	1941	1951	1961
Population:	12	15	20	27	39	52

7. Write a program to find $f(7.5)$ from the following table using Newton-Gregory backward interpolation formula.

x:	1	2	3	4	5	6	7	8
f(x):	1	8	27	64	125	216	343	512

8. Write a program to find the value of $f(15)$ from the following table using Newton's divided difference formula for unequal intervals.

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

9. The values of y and x are given as below:

x:	5	6	9	11
y:	12	13	14	16

Write a program to find the value of y when $x=10$ using Lagrange's interpolation formula for unequal intervals.

10. Write a program to find a real root of the equation $x^2 - 4x - 10 = 0$ that lies between -2 and -1.5 using bisection method.
11. Write a program to find a root of the function $x^2 - x - 2 = 0$ in the range $1 < x < 3$ using false position method.