Heaven's Light is Our Guide
Computer Science & Engineering
Rajshahi University of Engineering & Technology

Lab Manual

Module- 7

Course Title: Sessional based on CSE 2101
Course No. : CSE 2102

Experiment No. 7

Name of the Experiment: Relation

Duration: 1 Cycle

Background Study: Kenneth H. Rosen, "Discrete Mathematics and its Application", 6th Edition: Chapter 7 (Relation)

Algorithm 1. A procedure for computing the transitive closure
Algorithm 2. Warshall Algorithm
Algorithm 3. Topological Sorting

Experiments/Problems: Write programs with these input and output.

[1] Given the matrix representing a relation on a finite set, determine whether the relation is reflexive and/or irreflexive.
[2] Given the matrix representing a relation on a finite set, determine whether the relation is symmetric and/or antisymmetric.
[3] Given the matrix representing a relation on a finite set, determine whether the relation is transitive.
[4] Given a positive integer n, display all the relations on a set with n elements.
[5] ∗Given a positive integer n, determine the number of transitive relations on a set with n elements.
[6] ∗Given a positive integer n, determine the number of equivalence relations on a set with n elements.
[7] ∗Given a positive integer n, display all the equivalence relations on the set of the n smallest positive integers.
[8] Given an n-ary relation, find the projection of this relation when specified fields are deleted.
[9] Given an m-ary relation and an n-ary relation,and a set of common fields, find the join of these relations with respect to these common fields.
[10] Given the matrix representing a relation on a finite set, find the matrix representing the reflexive closure of this relation.
[11] Given the matrix representing a relation on a finite set, find the matrix representing the symmetric closure of this relation.
[12] Given the matrix representing a relation on a finite set, find the matrix representing the transitive closure of this relation by computing the join of the Boolean powers of the matrix representing the relation.
[13] Given the matrix representing a relation on a finite set, find the matrix representing the transitive closure of this relation using Warshall's algorithm.
[14] Given the matrix representing a relation on a finite set, find the matrix representing the smallest equivalence relation containing this relation.
[15] Given a partial ordering on a finite set, find a total ordering compatible with it using topological sorting.

Report:

Your completed work must be submitted through a LAB REPORT.

Read:

[1] Kenneth H. Rosen, "Discrete Mathematics and its Application", 7th Edition: Chapter 9 (Relation).