Assignment No. 3
EECS 210
Discrete Structures
Due: 11:59 PM, Thursday, September 29, 2022
Submit deliverables in a single zip file to Canvas
Name of the zip file: FirstnameLastname_Assignment3 (with your first and last name)
Name of the Assignment folder within the zip file: FirstnameLastname_Assignment3

Deliverables:
1. Copy of Rubric3.docx with your name and ID filled out (do not submit a PDF).
2. Source code.
3. Screen print showing the successful execution of your code or copy and paste the output from a console screen to a Word document and PDF it.

Assignment:
- You may use any language you want, but if you want help from me or one of the SIs, you should probably use C++ or Python.
- Label each output with a description, e.g., "1a. Union of R1 and R2"
- Use the methods or functions inherent in the language and/or using methods or functions you create. Like previous assignments, don't "hard code" a solution you did on paper as the output.
- Create a program for the following:
  1. For the relations:
     R_1 = {(1,1), (2,2), (3,3)} and R_2 = {(1,1), (1,2), (1,3), (1,4)}
     perform the following set operations and display the results:
     a) $R_1 \cup R_2$
     b) $R_1 \cap R_2$
     c) $R_1 - R_2$
     d) $R_2 - R_1$
  2. Display S ∘ R, where:
     R is the relation from A = {1, 2, 3} to B = {1, 2, 3, 4} with
     R = {(1, 1), (1, 4), (2, 3), (3, 1), (3, 4)}
     S is the relation from B = {1, 2, 3, 4} to C = {0, 1, 2} with
     S = {(1, 0), (2, 0), (3, 1), (3, 2), (4, 1)}
  3. For R = {(1, 1), (1, 4), (2, 3), (3, 1), (3, 4)}, show R^2.
  4. For the relation R = {(x, y) | x + y = 0} on the set {-10, …, -1, 0, 1, …, 10}:
     a) Show R as a set of ordered pairs.
     b) Show whether R is reflexive or not.
     c) Show whether R is symmetric or not.
     d) Show whether R is antisymmetric or not.
     e) Show whether R is transitive or not.
- Provide comments that explain what each line of code is doing. See rubric below.

Rubric for Program Comments		
Exceeds Expectations (90-100%)	**Meets Expectations (80-89%)**	**Unsatisfactory (0-79%)**
Software is adequately commented with prologue comments, comments summarizing major blocks of code, and comments on every line.	Prologue comments are present but missing some items or some major blocks of code are not commented or there are inadequate comments on each line.	Prologue comments are missing all together or there are no comments on major blocks of code or there are very few comments on each line.

Adequate Prologue Comments:
- Name of program contained in the file (e.g., EECS 210 Assignment 3)
- Brief description of the program, e.g.:
    - Python code for demonstrating operations on relations and properties of relations.
- Inputs (e.g., none, for a function, it would be the parameters passed to it)
- Output, e.g.,
    - Print out of the name of each exercise, followed by the exercise's output.
- Author's full name
- Creation date: The date you first create the file, i.e., the date you write this comment

Adequate comments summarizing major blocks of code and comments on every line:
- Provide comments that explain what each line of code is doing.
- You may comment each line of code (e.g., using //) and/or provide a multi-line comment (e.g., using /* and */) that explains what a group of lines does.
- Multi-line comments should be detailed enough that it is clear what each line of code is doing.

Remember:
- Your Programming Assignments are individual-effort.
- You can brainstorm with other students and help them work through problems in their programs, but everyone should have their own unique assignment programs.