Programming Assignment #2

Practice on programming the exercises in 5 different programming languages: *COBOL*, *Java*, *ML*, *Prolog*, and *R*.

- **Programming Exercise #1**: Given the following facts:

  Fact #1: Andy, Bob, Cecil, Dennis, Edward, Felix, Martin, Oscar, Quinn are male, and Gigi, Helen, Iris, Jane, Kate, Liz, Nancy, Pattie, Rebecca are female.

  Fact #2: Bob and Helen are married, Dennis and Pattie are married, and Gigi and Martin are married.

  Fact #3: Andy is Bob's parent, Bob is Cecil's parent, Cecil is Dennis' parent, Dennis is Edward's parent, Edward is Felix's parent, Gigi is Helen's parent, Helen is Iris' parent, Iris is Jane's parent, Jane is Kate's parent, Kate is Liz's parent, Martin is Nancy's parent, Nancy is Oscar's parent, Oscar is Pattie's parent, Pattie is Quinn's parent, and Quinn is Rebecca's parent.

  Define the following relations in your program:

  Relation #1: If X and Y are married, and X is Z's parent, then Y is also Z's parent.

  Relation #2: If X is Y's parent, and X is Z's parent, then Y and Z are siblings.

  Relation #3: If X and Y are siblings, X is male, and Y is male, then X and Y are brothers.

  Relation #4: If X and Y are siblings, X is female, and Y is female, then X and Y are sisters.

  Relation #5: If W and X are siblings, W is Y's parent, and X is Z's parent, then Y and Z are cousins.

  Program Requirement: Your program needs to answer the relationship of any two persons correctly. For example: are Liz and Rebecca cousins?

  A) Write a *Java* program for this exercise.
  B) Write an *ML* program for this exercise.
  C) Write a *Prolog* program for this exercise.

  Demonstration Requirement: The Java program needs to be demonstrated on local installation of Java compiler and virtual machine, while the ML and Prolog programs need to be demonstrated on specified cloud environments.

  A) Java: Install Java on your computer.
  B) ML: https://sosml.org/editor
  C) Prolog: https://www.onlinegdb.com/

- **Programming Exercise #2**: There are 3 tables for this exercise:

  Table #1 Student-Main: the main table with Student ID, Name, and Payment Type.

  Table #2 Fees: the Amount of fees required for each Payment Type.

  Table #3 Student-Payment: the Amount paid by students before due.

  Program Requirement: Your program needs to do the following computations correctly:

  Computation #1: the total amount received from students before due.

  Computation #2: list all the students that did not pay the required fees with the amount short.

  A) Write a *COBOL* program to do the computations.

  B) Write an *R* program to do the computations.

  Demonstration Requirement: The R program needs to be demonstrated on local installation of R compiler and studio, while the COBOL program needs to be demonstrated on specified cloud environments.

  A) R: Install R or R-Studio on your computer.

  B) COBOL: https://www.onlinegdb.com/

Guideline:

1. You have to demonstrate your program in person and have the report in paper with you.
2. Bonus due for demonstrating program is June 10th/12th, noon. Official due for demonstrating program is June 17th/19th, noon. After that, 40% penalty will be given for lateness, **if accepted by TA**. More precisely, if you get *X* in demonstration, and *Y* for the report:
   - (Bonus due) Your score = *X* * 70% * 110% + *Y* * 30%
   - (Official due) Your score = *X* * 70% + *Y* * 30%
   - Late = (*X* * 70% + *Y* * 30%) * 60%
3. Your report has to include the following elements:
   - A cover page.
   - The problem description.
   - Highlight of the way you write the program.
   - The program listing.
   - Test run results.
   - Discussion.