Université d'Ottawa
Faculté de génie

École de science informatique
et de génie électrique

uOttawa

L'Université canadienne
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University of Ottawa
Faculty of Engineering

School of Electrical Engineering
and Computer Science

CSI 3120, Fall 2017, **Assignment 4 - part 1**
Due date: December 6, 2017, 11:59PM

1. Write a report with the answers for the theoretical questions and the code for the programming questions;
2. On your report, you should specify which interpreter and IDE you used for the programming part;
3. Submit a (compressed) zip file containing 6 files: the source files for the PHP and Ruby implementations;
4. Comment every section of your code on the report and source files.

Implement the problems of the Assignment 1 using both Ruby and PHP:

1. Tic-tac-toe *(1.5 pts.)*

The tic-tac-toe is a game for two players. The structure of the game is a board with 3x3, where players mark 'X' or 'O' in each field of the board. To win the game, one of the players has to control (occupy) a row, column or an entire diagonal. If the board is filled and none of the lines is controlled by one player the match is a draw. **Write a Prolog program capable of playing tic-tac-toe with a human user.**

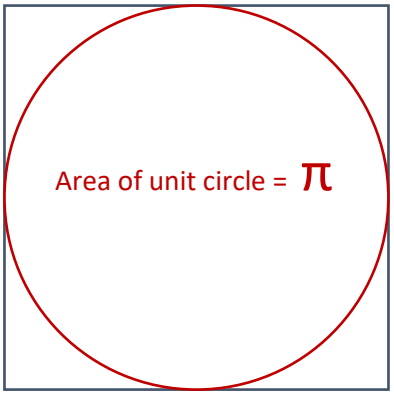
Figure from "https://en.wikipedia.org/wiki/Tic-tac-toe"

2. Queens Placement *(1.5 pts.)*

In the game of chess, a Queen can move and attack any number of squares in any direction (rows, columns, and diagonals). Given a chess board of 8x8 squares and 8 queens, **write a Prolog program that places the 8 queens in a board without them attacking each other**. There are over 4 billion ways to place randomly place 8 queens on a board, please don't use brute force.

3. Estimating Pi using random points *(1.5 pts.)*

π is the ratio of a circle's circumference to its diameter, a method for computing π is to draw a circle inscribed in a square, and randomly placing points in the square. Assuming an *infinite* (a large enough) number of points, the ratio of points inside the circle to the total number of points is equal to **π/4**. **Write Scheme functions to estimate the value of π using this method.** Assume the value of the radius of the circle to be 1 and, the side of the square is equal to the diameter of the circle.



Area of the square = 4