Ira A. Fulton Schools of Engineering
Arizona State University

CSE 579: Knowledge Representation and Reasoning

Insurance Referee Assignment Problem

Purpose

In this course project, you will engage in independent work to address real-world problems through the application of logic programming. The project is modeled after the ASP Challenge 2019. The ASP Challenge offers a platform for showcasing your proficiency in contributing to the industrial applications of knowledge representation and reasoning, with a focus on the practical utilization of answer set programming (ASP) in industry settings. This project involves meeting milestones by submitting deliverables at various points in the course. This project is eligible for inclusion in the MCS Portfolio Project Report Inclusion Request.

Objectives

Learners will be able to:

- Show that you can represent various hard and weak constraints in KR languages and automate reasoning using KR tools.

Technology Requirements & Resources

You will be required to write weak constraints in Clingo. The following resources are provided as an introduction to weak constraints:

- PDF Presentation of Weak Constraints
- Section 3.1.13 in the following Clingo Guide (about two pages long)

2019 Official ASP Challenge Details:

This resource is a reference. The scoring schema in the document will not be used in the course for project evaluation. View problem details and access example instances by downloading the project package via the link that follows.
http://www.mat.unical.it/~dodaro/aspchallenge2019/insurancereferees.package.zip
The package consists of the following elements:

- description.pdf: a problem description
- simpleInstances/: a folder containing five instances (and a zip file of these five instances) NOTE: The simple instances are the test cases that will help you debug your code.

In addition to the downloaded package, you will need to use a report kit as the template to write your project reports. In addition, you will be submitting files via and responding to prompts in staff-graded assignments. Please download the "Project Report Kit" that follows. It is adapted from the Author Kit used by the Association for the Advancement of Artificial Intelligence, the organization whose conventions and style manual you will be expected to use for the project reports.

Insurance Referee Assignment Problem Project Description

In this project, the scenario involves an insurance company tasked with determining if customer claims are justified. To achieve this, the company dispatches referees, also known as insurance or claims "adjusters" in the United States for on-site inspections of damages, such as damaged cars, and to generate corresponding reports. While the company employs internal referees, it also has the flexibility to authorize external referees for cases that require additional capacity.

The challenge is to strategically assign referees to insurance cases, considering both hard and weak constraints. The assignment process utilizes the clingo program to identify solutions that satisfy the specified input constraints. Notably, this problem is characterized as a static world problem, indicating that the status of each object remains constant over time, such as the unchanging nature of case payments throughout the evaluation.

The “desciption.pdf” file from the ASP Challenge 2019 includes more information about the scenario, constraints, additional directions, and examples for this challenge.

Directions

This project is broken down into milestones with specific deliverables. Please follow the project descriptions and directions for each milestone. The outline for the deliverables and associated milestone files can be found on the Project Overview page in your Canvas course. A reminder will appear in the weeks a milestone deliverable is due.

Below, is the project schedule at a glance. In general, Milestone 1 and Milestone 2 ensure that you are ready to run logic programs for this project, Milestone 3 checks your midterm progress, and

Milestone 4 requires the final project report. Milestone 5 is optional and is for students who want to request that they be allowed to include this project in their final MCS Portfolio.

Module	Milestone	Deliverables
2	1	* Solution to Introductory Clingo Program
3	2	* Solutions to Basic Clingo Problems
5	3	* Individual Progress Report
7	4	* Individual Project Report - Final project Submission
8	5 (OPTIONAL)	* MCS Portfolio Inclusion Request (OPTIONAL)

To prepare for this project you will start to write hard constraints from the first milestone and will learn how to write more complex hard constraints in Week 4 and Week 5. You will also need to learn how to write weak constraints by Week 5. An introduction to weak constraints is provided with the project resources.

Submission Directions for Project Deliverables

There will be specific modules to submit your project deliverables in Canvas. Your final project submission will be in module 7.

Evaluation

In general, points will be awarded based on effort and the degree to which you adhere to the problem's requirements and follow its specifications regarding what has to be represented, computed, and delivered. There are 300 total points for this project.

In the actual ASP competition, all entries were submitted to the challenge platform's checker.sh, and not delivering exactly what was required led to entries being disqualified. For this project, however, you will be evaluated on whatever you are able to achieve and how well you present your results and

the approach you took to achieving those results. Put another way, even students that are not able to fully meet their project's requirements will report what they did and be graded on that.
Detailed evaluation criteria are provided for each milestone as you progress through the project in the "Review Criteria" section (or an equivalent) for each deliverable, usually in the instructions for each submission or other milestone task. Below is a high-level summary of the evaluation criteria.

Milestone	**Deliverable(s)**	**Points**	**Evaluation Criteria**
1	* Solution to Introductory Clingo Program	15	*Completion
2	* Solutions to Basic Clingo Problems	45	*Completion *Standards met
3	* Individual Progress Report	90	*Completion *Standards met *Progress made
4	* Individual Project Report	150	*Completion *Standards met
5 (OPTIONAL)	* MCS Portfolio Inclusion Request (OPTIONAL)	n/a	*Completion *Standards met