ASP Challenge Problem: Insurance Referee Assignment Problem

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**Abstract**

This project's objective is to demonstrate the problem of assigning insurance referees and try to solve it using knowledge representation and reasoning while keeping all of these restrictions in mind.

# Problem Statement

A provider of insurance must assess the validity of client assertions in insurance cases. This is done by dispatching judges to different places to evaluate damages (like wrecked cars) and to generate a report. The insurance company can authorize external evaluators to manage a case in addition to using its own internal judges. With a mix of strong and weak restrictions, the general objective is to assign judges to insurance cases. The number of working minutes determines how much work a judge can finish each day and the utmost task that can be assigned to them. Referees gradually receive regional tasks based on their opinions.

While judges might be experts in particular disciplines like passenger vehicles or trucks, the use of postal codes and specific areas can help distinguish certain regions. Referees are divided among different case groups to encourage diversity in choices for areas. Based on the estimated handling time in working minutes, the estimated harm in euros, and the compensation that would be provided to an outside judge appointed to the case, insurance cases are categorized. officials are allocated to cases while making sure that each case is assigned to one referee, taking into consideration the officials who are accessible, for a single work day.

# Progress Made

As a risk management tactic, insurance entails one party paying a premium in return for the right to reimburse another in the case of a particular loss, harm, or injury. Protecting oneself from possible financial damage is the goal of insurance. A claim can be made with the insurer and will be managed by a claims administrator if the insured suffers a loss that might be covered by their insurance policy. According to the insurance policy's conditions, the insured must pay a deductible early before the claim can be settled.

After briefly outlining the issue, I'd like to suggest a fully automated method for completing the insurance referral job quickly and almost errorlessly. I have decided to use Answer Set Programming (ASP) to address this issue because it provides default logic, which is crucial for common sense thinking. Answer set programming (ASP), a type of declarative programming, is intended for difficult search issues. It is based on the steady model semantics of logic programming. Since the search problems are simplified to computing stable models, answer set solvers—programs for building stable models—are used to carry out search in ASP. The computational method that is improved in the creation of numerous answer set solvers uses the DPLL algorithm, and in principle, it always terminates. Additionally, using the simple and powerful modeling language of ASP, combinatorial issues can be represented as logic programs. The Clingo system then computes response sets that represent solutions to the given issue using such a logic program. Additionally, it is very easy to specify the real time constraints in our scenario using Clingo language.

The job at hand involves a collection of data that includes a list of potential referees, a list of cases that need to be managed, a set number of external referees, and desires for particular case categories and geographic areas. Additionally, the endeavor includes accounting for both strong and weak limitations. In order to show this project, the data is arranged and examined to identify the best answers within the parameters.

# Challenges Encountered and Resolution Plan

I've described the challenges I ran into with the part I actually accomplished. A list of the challenges I'm having with the components I need to perform is also comprised.

* I regularly track the time a judge spends on each given case to make sure their workload does not go over the allotted working minutes. This entails routinely making sure that the overall task and case intricacy for each referee stay within acceptable bounds.
* A new regulation will be put into place to handle the problem of assigning cases to referees who aren't in charge of the pertinent region. This regulation will take into account any additional pertinent limitations in addition to the referees' pref scores for a specific postc. For that specific instance, referees with higher pref scores will be granted preference. Referees will not be given any cases pertaining to a postc for which they have a pref number of 0.
* A judge who lacks power or knowledge regarding the specifics of the case cannot be assigned to it. To overcome this difficulty, one must choose a referee who has a stronger predilection for the case while also taking into consideration any other pertinent limitations. If a particular referee is chosen for a case, care must be taken to make sure that judge has no bias or predilection in favor of the case.
* I'm putting into practice a solution where instances that incur more harm than what is permitted for external judges are directed to an internal referee for review. This allows for the internal handling of any situations that cause more damage than the externalMaxDamage level.

# Task Accomplished

The projects-related duties listed below have already been finished.

* I developed a technique to ensure that the general job, which includes the total amount of work put into all the cases assigned to a particular judge, does not exceed the allowed maximum number of working minutes.
* The reasoning I developed makes sure that a referee who has no biases for particular areas won't be given a case. In other words, case orders will only be given to judges who have preferences for certain regions.
* Because of the logic I've laid out, a case cannot be given to a referee who isn't in control of that specific category of cases.
* According to the justification I've provided, instances involving damages that are higher than a particular benchmark should only be given to judges who work for the organization.
* My method of explaining the rationale seeks to highlight the significance of particular case categories and geographic areas when the judge is managing cases, suggesting that these variables should be given more weight in the decision-making process.

# Future Tasks / Completion Plan

The upcoming tasks that need to be finished for this undertaking are listed below:

* I need to put the logic into practice so that cases are fairly assigned to referees (internal and external), balancing their total workload.
* I have to put the reasoning into practice so that cases for external referees should be assigned fairly, i.e., their total compensation should be equal.
* I have to put the logic into practice so that internal referees are favored in order to save money on external referees.
* I'll attempt to make the processes even more efficient.

I have already begun putting my plans into action, and I will complete and make all of the deadlines for the aforementioned tasks in my future plan.

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