PROJECT 03: PROLOG PROGRAMMING

ARTIFICIAL INTELLIGENCE

CSE 537

INTRODUCTION

The problem statement in this project is to arrange a tour package for a group of conference attendees in the city of New York. The package must involve a number of activities for the attendees. There are multifarious tour operators offering their best packages and these bundles come with a price depending upon the units incorporated for each of the activities involved.

Our task is to collect these offers from different participating vendors and select packages satisfying the below constraints:

- Price and unit(s) of activities is a positive integer
- An offer can be accepted as a whole and not more than once, i.e. no partial acceptance
- If the number of units of activities provided is greater than needed, then the exceeding quantity can be discarded
- Minimum cost criteria, i.e. the cost of the visit must be minimum
- Only 'K' offers from one tour operator must be accepted

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PROLOG CONCEPTS USED

Prolog is a logic programming language associated with artificial intelligence and computational linguistics.

We are supposed to use XSB Prolog in this project. XSB is a dialect of the Prolog programming language and developed in Stony Brook University. The open source XSB implementation includes an interface to the Java programming language.

We used some custom-made functions and below predicates/concepts of Prolog:

- Findall – the built-in predicate findall() is used to collect a list of all items that satisfy some goal

- Length – this predicate is a true relation and can be used to find the length of a list or produce a list of specified length

- ! – it is called cut/1 and tells Prolog to freeze all the decisions made so far in this predicate

- Member – this predicate is True if the element passed is a member of the list

- Subset – True if all the members of the subset belong to Set. A set is defined as an unordered list of elements without duplicates

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APPROACH TO THE PROBLEM

We approached the problem statement by calculating the total number of operators and validating if the count meets minimum criteria. This is done by finding all the members of the operator list to get the total count of the operators.

Another function was created to compare the available units of products as provided by the operator with the needed quantity. This predicate validates if the actual need per activity is satisfied by the provided package or not.

We, then computed all the possible combinations of packages and collected them for various operators.

Based on the minimum qualifying conditions, i.e. the units required to select a package, operators are chosen and price per package is calculated from the list of operators and activity.

Finally, a function called totalcost is maintained to compute the cost of each selected package fulfilling the criteria of required units per activity. From this list of packages, minimum priced packages (K) are chosen and returned which helps in making the selection process easier.

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