Program Description Essay

The Crypto: Exhaustive Problem Solver with Elaborations solves a crypto problem of order 5. The three main functions of this program is demo(N), solve(problem(numbers(N1,N2,N3,N4,N5,goal(G)))/solve and display_bindings. When one plugs in a number to the demo function it then recursively calls itself N times until N is finally "1" which then stops the recursive call. The first line of the demo(N) function is demo(1). Within the demo(1) function it calls the solve_one function. The solve_one function generates a random crypto problem, then displays the problem, solves the problem decompositionally, and then finally displays the solution.

The solve function is a classic decomposition problem. It first calls the add_crypto_problem_to_KB which is located in my crypto_problems.pro file. This method adds the problems to the knowledge base and sets the goal of the problem. The next function call of the solve function is display_problem. This function simply prints out the problem to the console. The next function call is solve_problem_decompositionally. This function first takes the numbers that are needed to solve the goal and the goal itself and sets it to be the value of the crypto problem by calling the value_of function. The next function call of the solve_problem_decompositionally function is crypto.

The crypto function calls the comb function which is located in the gv.pro. The comb function generates all combinations of size 2 on a set S of elements. In the case of this problem, the size of our set is of length 5. The crypto function then substitutes values. After finishing up with the aforementioned function calls it calls the add_solution_to_KB function which takes the Expression as a parameter. This function simply adds the solution to the knowledge base. The last function call of the solve function is display_solution. The display_solution method checks to see whether or not a solution exists and if one does not exist then it writes "No solution to this

problem" to the console but if a solution exists it writes the result of the solution onto the console.

The last main functionality of the Crypto: Exhaustive Problem Solver with Elaborations program is display_bindings. The display_bindings function sets the value of the variable to whatever you are trying to show the binding of such as lo, hi, crypto_problem, and solution. It then writes the values of the variable names and prints to the console until it can not print anymore.