**Instituto Tecnológico y de**

**Estudios Superiores de Monterrey**

**Campus Querétaro**

**Curse**

The Prolog Text Adventure

Documentation

Programming Languages

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**What Is A Text Adventure?**

Text adventures, also referred to as interactive fictions, date back to the year 1976. They are a form of software in which the user is presented with a text-based description of various environments, situations and/or characters. These elements can be interacted with and influenced using simple text commands. Interactive fictions are also viewed as a form of video games, usually belonging to the adventure games or role-playing game (RPGs) genres thanks to the nature of their functionality. In text adventure games, the player normally takes on the role of a main character in the narrative, interacting by first reading what the program describes, and then inputting a command congruent to what is outputted onto the screen.

Even though these games lack a use of a graphic interface, there is a physical dimension in which the game takes place. In-game descriptions include imagery of the player’s surroundings, such as the current room, interactive items and other non-player characters (NPCs). The player can input commands such as “go north” or “take object” to move from one room to another or interact with the characters and objects in each room, prompting the program to give a feedback description of how the world changes as the player affects the environment. Some notable examples of famous text adventures include Colossal Cave Adventure (1976), the Zork series (1980, 1981, 1982) and Cypher. Figure 1 shows a screenshot taken from an online version of Zork I[[1]](#footnote-1). In it, the gameplay can be appreciated, the player’s input is shown after the ‘>’ and the game feedback and descriptions follow each command given.

Text

Description automatically generated

Figure 1

**Objective**

The objective of this project is to apply and expand on the acquired knowledge of the logic programming paradigm to design and code a functional text adventure. The game will be coded using the Prolog programming language.

**Result**

The project resulted in the text adventure game named Curse (the source file’s name is curse.pl). Curse is a fantasy adventure RPG text adventure game with light horror elements. It was coded using the Prolog programming language and the logic programming paradigm. The player can advance through the game’s plot by inputting some of the classic commands also present in other famous text adventures like the “look.” command to look about the player’s surroundings or “i.” to check their inventory. The game has a concrete plot an objective and an ending.

**Functionality**

Since Curse was programmed in Prolog, the functionality of the game is based on a series of rules and facts, as well as unification of different values to various variables. To understand the basic concepts of Prolog, a tutorial for beginners available in the following link: <http://www.doc.gold.ac.uk/~mas02gw/prolog_tutorial/prologpages/>. This tutorial will explain some central concepts like facts, arguments, unification and recursion, as well as interactive examples that will help get a better understanding of them.

In the source code of Curse, there are some techniques and predicate properties being used that are not explained in the aforementioned tutorial. These techniques are as follows:

**dynamic/1**

dynamic/1 is a predicate property that indicates that the definition of the indicated predicate may change during execution. To cycle between the various possible definitions of a dynamic predicate, the use of the assert/1 and retract/1 terms is needed. The use of dynamic/1 can be observed in line number six of the curse.pl source file.

**Graphical user interface, text

Description automatically generated**

Figure 2

Figure 2 shows the sixth line of Curse’s source code. The predicate property dynamic/1 is being used to modify the predicates actual\_position/1, at/2, holding/1, talked/1, examined/1 and time/1.

**assert/1**

assert/1 is a meta-predicate in Prolog that adds the argument it receives to the Prolog knowledge base. It is useful when a new rule or fact needs to be added to the knowledge base during the execution of a Prolog program. It is important to note that it can only be applied to dynamic predicates. It has two variants: asserta/1 and assertz/1. The former pushes its argument to the beginning of the knowledge base, while the latter adds it at the end. Though deprecated, assert/1 functions the same way as assertz/1. A use case example for assert/1 is shown below:

?- assert(rich(mary)).

true.

?- rich(mary).

true.

?- assert((happy(X) :-

rich(X),

healthy(X))).

?- assert(healthy(mary)).

true.

?- happy(X).

X = mary

**retract/1**

retract/1 is a meta-predicate in Prolog that removes the argument it receives from the Prolog knowledge base. It works in conjunction with assert/1, making it important to note that it can only be applied to dynamic predicates as well. A use case example for retract/1 is shown below:

?- assert(likes(mary, pizza)).

true.

?- likes(mary, pizza).

true.

?- retract(likes(mary, pizza)).

true.

?- likes(mary, pizza).

false.

assert/1 and retract/1 are both used various time throughout the source file of Curse. Figure 3 shows an example of a situation in which they are used.

Text

Description automatically generated

Figure 3

Here, assert/1 and retract/1 work together to change the players current position, retracting is previous position fact from the knowledge base and asserting the new one.

**retractall/1**

retractall/1 functions in the same manner as retract/1, except it eliminates from the knowledge base all of the predicates that match its argument. Figure 4 shows the usage of retractall/1 in the source code of Curse. In this instance, it is being used to clean the knowledge base before assigning actual definitions to some of the dynamic predicates.

**discontiguous/1**

discontiguous/1 is a meta-predicate that indicates that the defining clauses of the predicate that it receives as argument, are not restricted to be consecutive, whereas they can appear anywhere in the source file. This is an example of how to use discontiguous/1:

:- discontiguous dog/1.

dog(spike).

cat(mittens).

cat(tabby).

dog(spot).

In this example, the different predicates for dog are not defined one after the other. Without the first line of the example, this would output a warning. In the source file for Curse, discontiguous/1 is used as follows:

Text

Description automatically generated

Figure 4

Figure 4 shows how discontiguous/1 is being applied to the isNPC/1, in/1 and requires/1 predicates.

**Setup**

To be able to play Curse, it is recommended to run the code using the SWI-Prolog IDE. This is available to be downloaded from the following link: <https://www.swi-prolog.org/download/stable>. Please note that there exists an online version of SWI-Prolog, however, this version does not allow for the adequate functionality to work properly[[2]](#footnote-2). Once SWI-Prolog has been installed, running it should open a window like the one shown in figure 5 (screenshot taken on macOS).

Text

Description automatically generated

Figure 5

Due to the nature of the Prolog language, the game’s code is a series of predicates that have to be consulted and queried in order to play through it. To load the game’s source code file into SWI-Prolog and start playing, run the following command, using the absolute path of where the source file is saved:

?- consult('<file/absolute/path.pl>').

Example:

?- consult('/Users/lalogonzalez/repos/Curse/curse.pl').

**Walkthrough (and all possible paths)**

To begin to play Curse, the aforementioned setup must be completed prior to beginning. Once the setup is done, enter the following command to start the game:

?- start.

After the command has been executed (which in reality is a query), the game controls will be explained, followed by the initial game scenario description. The following output should be displayed:

-------------------------------------

Enter commands using standard Prolog syntax.

start. to start the game.

n. s. e. w. to move in given direction.

take(Object). to pick up an object.

i. to check your inventory.

talk(Character). to talk to other characters.

look. to look around you again.

controls. to show controls again.

halt. to end game and quit.

-------------------------------------

The year is 1310. You are the town of Eadburgh's local priest.

Lately, people have been disappearing, there have been rumors of a

vampiric curse menacing the town. You can trust no one.

The time is late at night when you hear someone knocking at your door...

asking for help. As the priest, you cannot deny help to townspeople.

You open the door to find a cloaked figure who suddenly attacks you,

too fast to even try to defend yourself!

While lying on the floor, you notice the cloaked figure stepping inside the church

closing the doors behind it.

You black out...

You wake, lying on the floor before your church. You feel an acute pain

to the neck. You touch it with your fingers to discover you have been

bitten! "I've been cursed with vampirism", you figure, "I've got to

find a way to revert the curse, and kill whatever thing cursed me."

-------------------------------------

You are in the church plaza.

You can hear violent noises coming from inside the church.

- To the north is the church.

- To the south is the main plaza.

- To the west is your house.

-------------------------------------

**Output Format**

Curse’s output will always be formatted in a specific way. To explain its format, the game’s first output will be used as an example below:

-------------------------------------

Enter commands using standard Prolog syntax.

start. to start the game.

n. s. e. w. to move in given direction.

take(Object). to pick up an object.

i. to check your inventory.

talk(Character). to talk to other characters.

look. to look around you again.

controls. to show controls again.

halt. to end game and quit.

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The year is 1310. You are the town of Eadburgh's local priest.

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The various parts in which the output is divided are the following:

1. Controls
2. Context
3. Current location
4. Nearby locations

**Bibliography**

Lu, J. (N. D.) Prolog A Tutorial Introduction. Computer Science Department. Bucknell University. Accessed on: October 2020. Available at: http://academicos.azc.uam.mx/cbr/Cursos/UEA\_12p\_Log/PrologIntro\_eng\_good.pdf

Burnett, I. (2015) The Text Adventure: Relic of Gaming History, or Timeless Medium? The Artifice. Accessed on: October 2020. Available at: https://the-artifice.com/text-adventure-gaming-history/

Ireson-Paine, J. (2020) Why Use Prolog? Joselyn Ireson-Paine Consultancy. Accessed on: October 2020. Available at: http://www.j-paine.org/why\_prolog.html

N. A. (2020) Predicate consult/1. Prolog Documentation. Accessed on: October 2020. Available at: <https://www.swi-prolog.org/pldoc/man?predicate=consult/>1

N. A. (2020) Predicate dynamic/1. Prolog Documentation. Accessed on: October 2020. Available at: https://www.swi-prolog.org/pldoc/man?predicate=dynamic/1

N. A. (N. D.) Zork I. Classic Reload. Accessed on: October 2020. Available at: https://classicreload.com/zork-i.html

1. https://classicreload.com/zork-i.html [↑](#footnote-ref-1)
2. The game works by asserting and retracting the different predicate definitions, and this does not work properly in the online IDE. [↑](#footnote-ref-2)