183.634 Software Maintenance and Evolution

Lab1: Re-Engineering

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Introduction

The PL/1 script is a guessing colors game. When it is executed the script chooses randomly 4 colors and the user has to guess the colors chosen by the script.

There are 6 options which can chosen by the user if the color chosen by the user does not match any of the 6 colors this color the options then is ignored and he is going to be informed about it.

The game is in a loop which means it continues until the user has chosen everything right. It is a simple game that does not provide any level change or stop option.

Technologies

Technologies used to re-write the game:

- Java 8
- Maven
- Junit
- Slf4j

A new java application was written to rewrite the script. It uses Maven to build the application, JUnit for the tests and slf4j for the logs.

Building and Running

To build the application is necessary to have Maven installed. Then go to the project folder and execute the following commands:

mvn clean install
mvn exec:java

By executing the commands above the automated tests will be also executed.

Functionalities Description

Basically the PL/1 scripts contains 4 functions/procedures described below:

RANDOM:

It receives nothing as parameter and it returns one scalar variable. In this case it returns one color.

The curious fact about this assignment is that the function RANDOM returns one scalar variable but it is used to assign values to a vector. Since the behavior of PL/1 in this case was not found in the documentation. It can be assumed that the system could have the following behaviors in this case:

1. Syntax error
2. Random function is going to be called the same number of times as the vector size. That means if the Vector has size 4 the function is going to be called 4 times.
3. The function is called just once and the same value is assigned to every position in the vector. Considering that the game does not want to have just one color in all the positions, this possibility is very unlikely to be true.

TRANSLATE:

It receives a vector of char and vector of color which has size 4. It does not return anything but since the parameters are also global variables their values are also visible to the rest of the script.

Essentially this function converts the user input into an array of colors. The script assumes that the user will use space as separator, so it splits the string or in this case a vector of chars. To avoid misspelling and errors the system convert everything to lowercase and validates it as well. Validations like empty string are important to prevent crashes and unexpected behaviors.

During the translation if the user enters more than 4 colors only the first four will be considered. In case the user tries to use another char as a split character it will not be recognized and the color will be always invalid.

EVALUATION:

It receives 4 parameters: Code - Random vector created by the script; Tip - Vector containing user's answers; Hits - Hits in correct position; HitsOtherPosition - hits in other positions.
It does not return anything either but since the parameters are also global variables their values are also visible to the rest of the script like in the TRANSLATION function.

This is the function is responsible to evaluate the user answer. Basically it it calculates 2 things:

Hits: How many colors are predicted correctly, that includes right color and right vector position.

Hits other position: It calculates how many colors in the tips are present in the systems random vector but in another position.

MAIN:

This method is executed when the script is called. It does not have any name and its main functionality is to assign values to the variables calling the corresponding function.

First of all the main method calls the RANDOM function assigning its result to a vector. This vector is the one the user has to predict. Once the random vector is created the script reads the user input, calls the TRANSLATION function and it receives an answer vector.
If the translated vector is the same as the random vector the game is finished, if not it calls the evaluation function.

Evaluation function makes an analysis of the user's answers and random vector created then it returns the correct hits results: Hits and Hits Other Position.

This function is a while(true) method that means the user will be in a loop while the colors are not right predicted.