Federal State Autonomous Educational Institution

Higher education

National Research University Higher School of Economics

Faculty of Computer Science

Educational program “Data Science”

**Contexto Game**

(Project Name)

Performed by student.

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(Full name)

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*(Signed)*

**Project Manager:**

Dmitry I. Ignatov

*(position, full name of the project manager)*

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*(assessment)*

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*(Date) (Signed)*

**Moscow 2023**

# **Introduction:**

Contexto is an online game, where the player is required to find a secret word using their intuition, and previous knowledge of the contexts of life. The player has an unlimited number of guesses and for each guess the game will give them a number which shows how close is the guessed word to the secret word, for example “wall” is really close to the word “building” but far from the word “sea”.

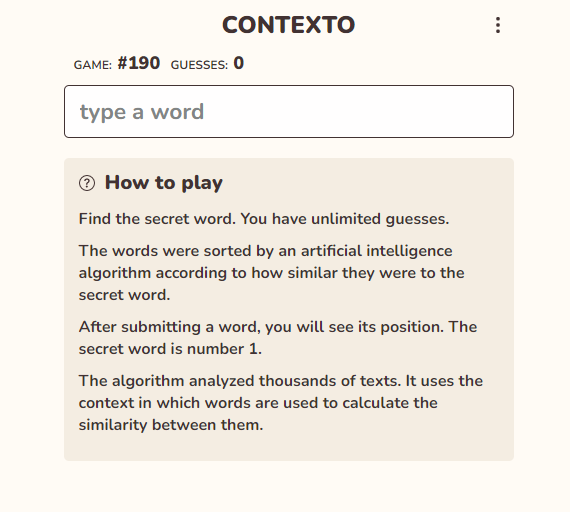


Figure 1: the user interface of the contexto game. (Group, n.d.)

In this project, we will attempt to reimplement this game on our own, and specifically in this report, I will explain my work in reimplementing the game and creating the graphical user interface.

# **The tools:**

To implement this game, I am going to use python programing language “Python 3.10.10”, and to create the graphical user interface “GUI” I will use the open-source python app framework “Streamlit” (streamlit library, n.d.).



# **The** **code**:

to implement our code, we want to split the code into two main classes, the first class “game” will be a wrapper for the game environment, while the second class “application” will be used to create the GUI,

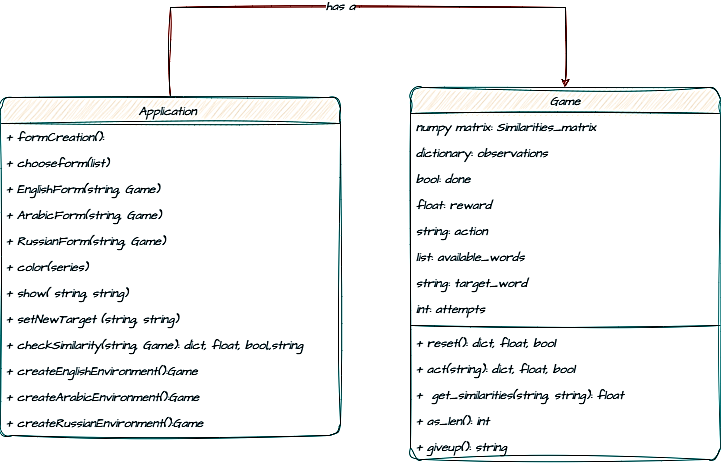


Figure 2: the class diagram for the game.

## ~~The “Game” class:~~

~~This class will act as a wrapper for the game, this architecture was inspired by the Reinforcement learning game environments, we will only talk about the case of the English language.~~

***~~The attributes:~~***

***~~similarity matrix:~~*** ~~We tried first to implement this class using the “GoogleNews-vectors-negative300” model, but this model is huge and it has 3 million tokens, so defining this model at every run was taking a lot of time, especially since the Streamlit library, has the problem of rerunning the whole code every time we interact with the GUI, so using the model and defining it at each step was taking far too long, which mean the player will lose interest easily, and to solve this problem, we wrote a preprocessing code that will define this model and create a similarity matrix that stores the similarity values from this model for each two tokens, the result is included in the txt file titles googleOffline”~~

~~Another problem is each language has a huge number of tokens and processing all of these tokens will take a lot of time, so I decided to choose only the most famous words in English almost 3000 words “the list of words is included in the txt file titles nouns”~~

~~So lets assume that N is the number of most famous word in English , then the similarity matrix is of the shape [N x N].~~

***~~Observations~~***~~: is a dictionary to store all the guessed words and their similarities.~~

***~~Done:~~*** ~~is a Boolean variable that indicates if the player had guessed the target word or not yet.~~

***~~Action~~***~~: is a string to store the word that the player has chosen to be compared with the target word.~~

***~~Available\_words~~***~~: is a list of all the words that our game can identify, this are the words that exists in the similarity\_matrix.~~

***~~Target\_word~~***~~: is the secret word that the player is trying to find.~~

***~~Attempts~~***~~: are the number of attempts that the player has already taken to reach the secret word.~~

***~~The methods:~~***

***~~Reset():~~*** ~~this method is responsible for resetting all the variables of the class.~~

~~Act(sting): this method is called when the player~~

In this project, I was mainly responsible for creating the Graphical User Interface. To implement this game, I am going to use python programing language “Python 3.10.10”, and to create the graphical user interface “GUI” I will use the open-source python app framework “Streamlit” (streamlit library, n.d.).

To implement this task, I decided to split the application into two classes, a wrapper class “Game” and an “Application” class.

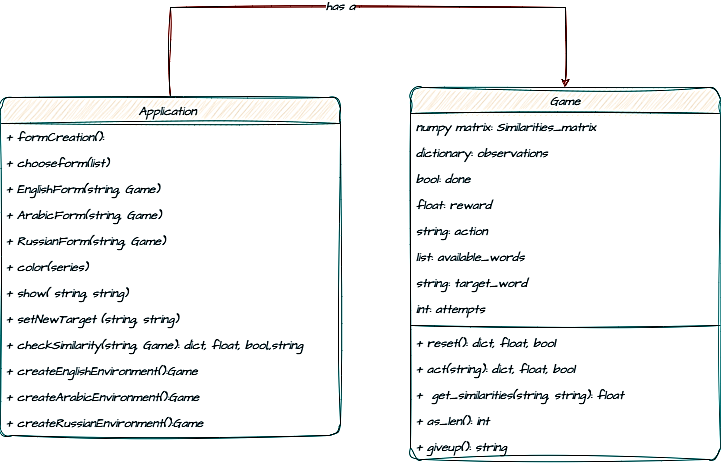


Figure 3: class diagram of the programs structure.

The previous figure, shows the initial design of the program, and this design was inspired by the Reinforcement learning game libraries, so I tried to implement all the methods that we could need from the game environment such as:

* ***act(string):*** this function is responsible for interacting with the environment, and it outputs the similarity value between the target and the inputted guess from the player, and a Boolean to check if the player had guessed the secret game, and finally a new target chosen randomly from the list of available words that we provided.

*This wrapper was then given to my team mates to wrap their codes in it, and this class got changed to suit their needs.*

The second class is the core of my work, which is creating the GUI, I was inspired by user interface of the main game of Contexto (Group, n.d.)

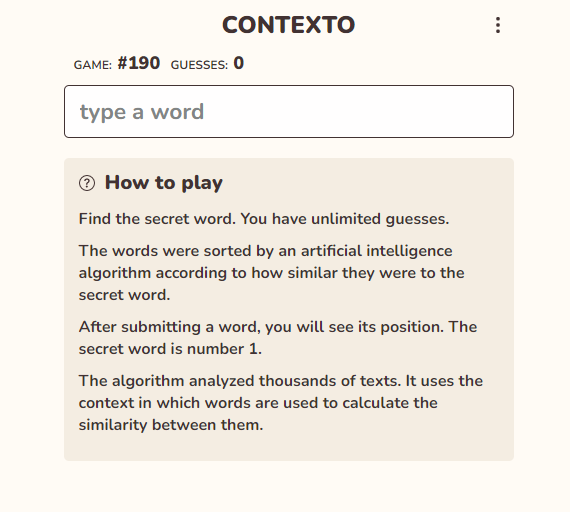


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