Educational Technology Lab

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"ChoiCo" Manual

http://etl.ppp.uoa.gr/choico

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1. CHOICO

1.1 What is ChoiCo

ChoiCo (**Choi**ces with **Co**nsequences) is a software created by the Educational Technology Lab with the aim to support students and teachers in creating their own digital games. It is available free of charge and in online form via the address http://etl.ppp.uoa.gr/choico/. ChoiCo is a "game generator" that belongs to the Point & Click and Simulation games categories. In ChoiCo games, the player can make choices among the available points displayed on the screen, keeping in mind that each choice corresponds to specific consequences that are numerically reflected in the score of the game. The main objective of the player is, by making choices, to **stay as long as possible** in the game, always **within the limits** set in the fields during the design.

ChoiCo is different from existing simulation games in the fact that the mechanism that determines choices, their consequences and the rules of the game is not closed to the user, but it is a subject for thought, discussion, negotiation and modification as the user has deep access to game functionalities.
ChoiCo software offers two different functions:

1. **Play Mode**, where the player can play a saved game with:

   i. **Load game**, which is stored in a file locally on your computer
   ii. **Online game**, through a library of created games that are already uploaded to ChoiCo platform

2. **Design Mode**, where the user can design a new game or modify an existing one using the tools and the functionalities provided by ChoiCo.

When the game is over, players can be informed of their total actions through the game statistics, which can also be downloaded as a pdf file.

1.2 The rationale of ChoiCo games

Games designed at ChoiCo are "choice-driven" games. In the context of a ChoiCo game, the player makes choices that have divergent consequences in a set of fields. The flow of the game is based on the decisions that the player will make, regarding the available options. When a game of ChoiCo is played, the player's goal is to keep making choices as long as possible so as not to cross one of the "red lines" of corresponding consistency, as defined in the respective game. The player's goal is to continue making choices while staying in the game as long as possible without crossing any of the "red lines" of a consequence as defined within the game.

The rationale of ChoiCo games harmonizes with the approach of the Educational Technology Laboratory (ETL) to learning, according to which students, through processes of tinkering, sharing and discussion on digital - and not only - contents, have the possibility for expression, production and implementation of new ideas with personal meaning for them. Thus, ChoiCo, in addition to the role of the player,

offers to even non-technical users (e.g., teachers & students) the opportunity to take on the role of designer and create their own simulation games with high-level interconnected computing capabilities.

In the same sense as above, ChoiCo gives players the opportunity to engage with socio-scientific issues (e.g. sustainability, energy crisis, eating habits, etc.), and also the ways in which someone (e.g., students) could manage them by making choices. These kinds of games attempt to simulate a real situation through the options available, the fields affected, and the programming of the rules that govern them.

2. Home Page

The first page (Home page) that appears when you open ChoiCo is the following (Figure 1).
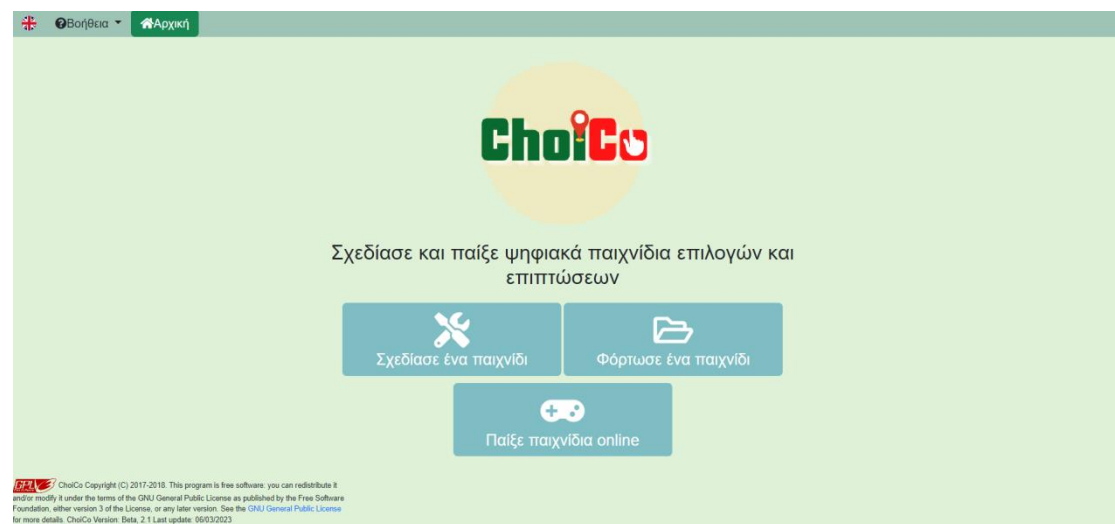

Figure 1: ChoiCo Home Page

From the **"Play Online Games"** option, you can open an existing game from those displayed in the drop-down menu (Figure 2).

Figure 2: "Play Online Games" option

From the **"Load Game"** option (Figure 3), you can load a game, locally from your computer, given the fact that such a game has been already created and saved in a ".choico" type file.
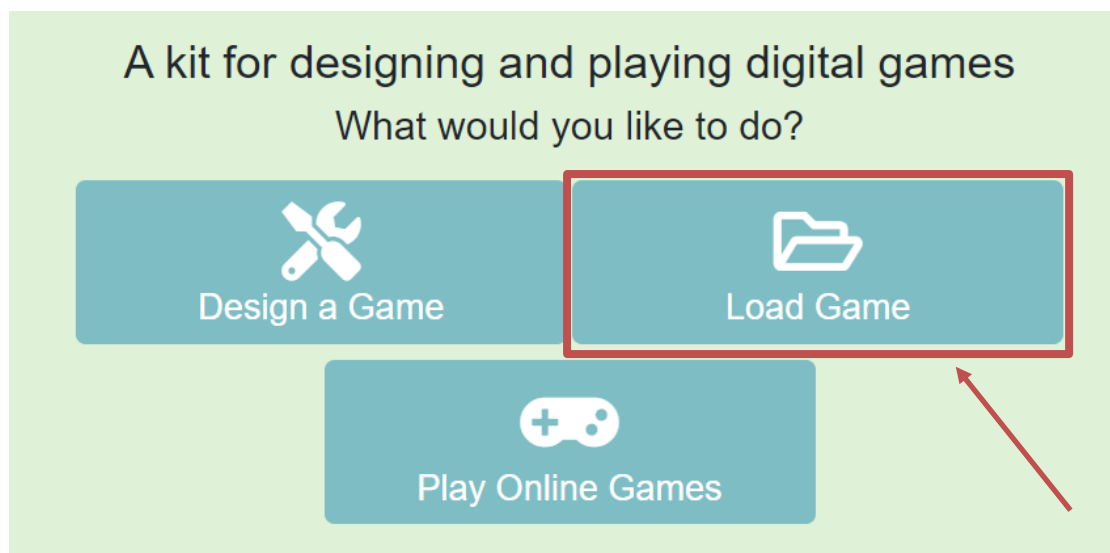

Figure 3: "Load Game" Option

By selecting the option **"Design a Game"** (Figure 4), the ChoiCo environment is transferred to design mode, where you can start creating a new game.
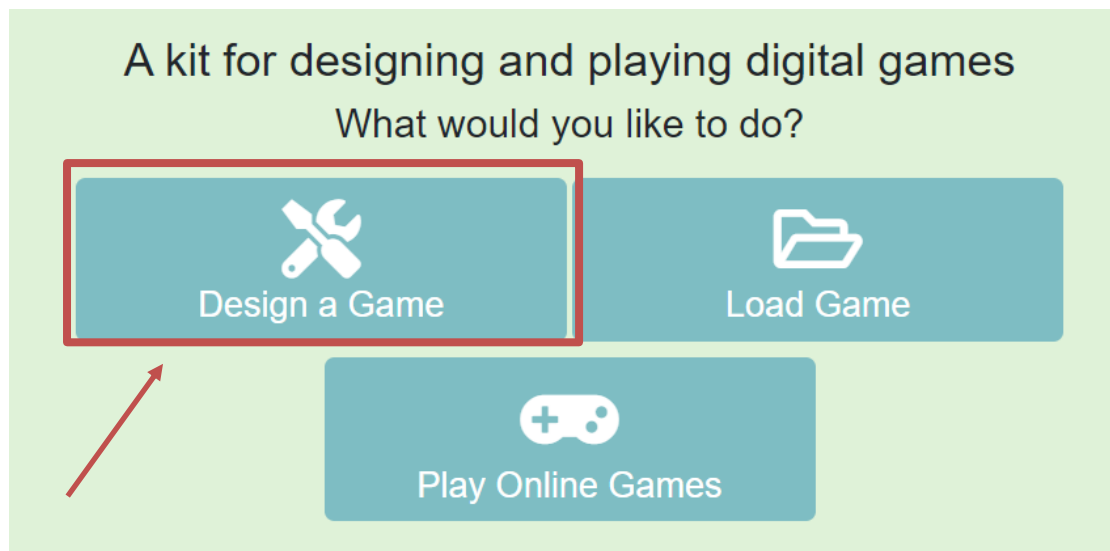
Figure 4: "Design a Game" option

3. Play Games Online – Play Mode

3.1 Choose a ready-made ChoiCo game

By selecting one of the existing online games in the "Play Online Games" category, ChoiCo enters "Game Mode" and thus enables the user to start the game (Figure 5).
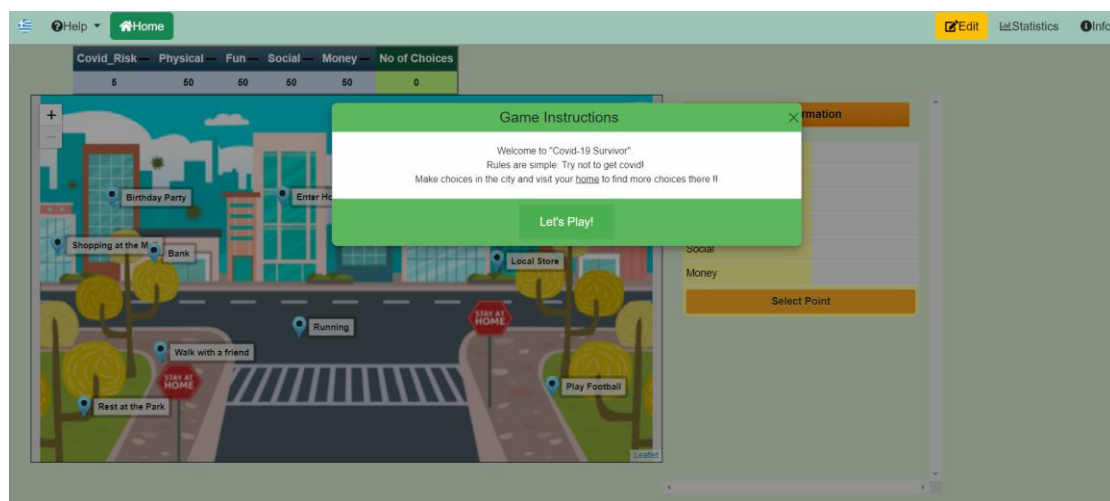

Figure 5: Opening a game in "Play Mode"

Through a pop-up window, **"Game Instructions"** (Figures 5 & 6) first appear, where information and details about the game are given, such as its story, the purpose, the objectives or any additional information you need to know about the game flow and development. To start the game, select **"Let's Play!"** button. (Figure 6).

Figure 6: Game Instructions pop-up window

3.2 ChoiCo game detailed description

A ChoiCo game consists of 3 elements (Figure 7):

> ➢ The **"Scene"**, i.e. the game interface, where the selected theme or socio-scientific issue embedded in the game is simulated with a background image (e.g. the map of a city) on which all available choices are pinned. Depending on the game scenario, these options may represent various things, such as places you can visit on a map, places or foods to eat, people you can talk to, or objects to use.

> ➢ The **"Game Values Table"**, that shows the game fields (parameters) and their current values as they change depending on the player's choices during the game.

> ➢ The **"Point Information Table"**, which shows the consequences of a choice on the values of the game fields along with other information (e.g. explanatory text).
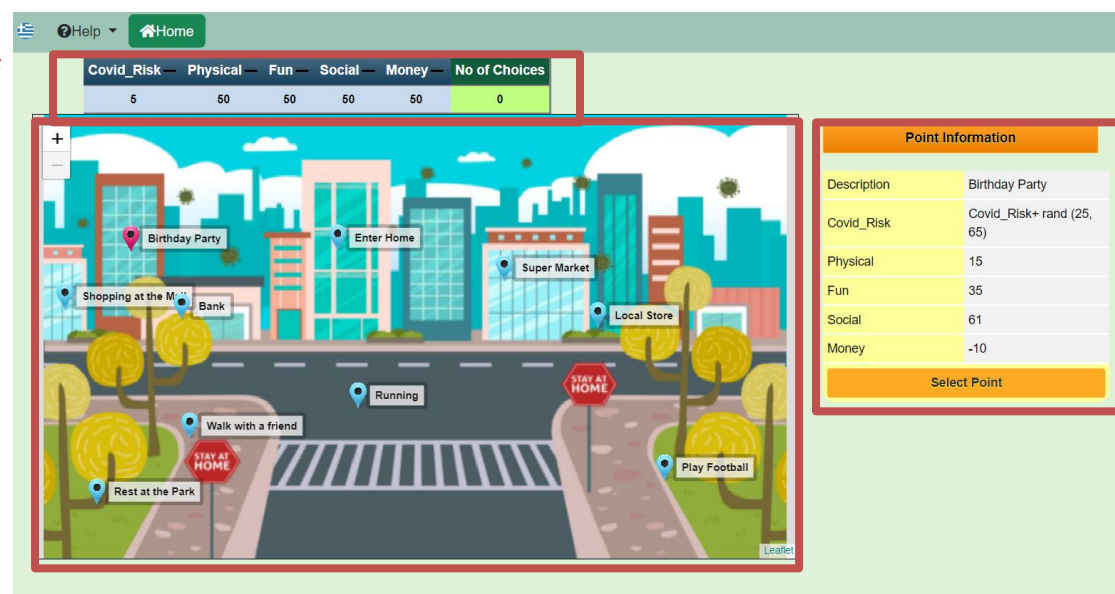

Figure 7: ChoiCo in Game Mode – Covid Survival Game

According to the example of the game "Covid Survival", the available options are pinned to an illustrated map of a city. These options represent different parts of the city that the player can visit or different activities that the player can do during the COVID pandemic (Figure 8).

Figure 8: Illustrated City Map - "Covid Survival" Game

The fields of the game and their values are displayed in the **"Game Values Table"** which is always located in the upper left part of the screen, with the last column of the table counting the total number of choices of the player (Figure 9).

Covid_Risk —	Physical —	Fun —	Social —	Money —	No of Choices
5	50	50	50	50	0

Figure 9: Game Values Table - "Covid Survival" Game

When any point on the map is clicked, the **"Point Information Table"** appears on the right of the screen. There, you can find out about the consequences that this choice will have on the values of the fields (Figure 10). Some consequences will increase the values of certain fields, while some others will decrease them. At this table, you may also have some additional information, e.g. a description or an image. The values that each field can take at the corresponding point is a subject of discussion that will be further analyzed in the section on designing and modifying a ChoiCo game.

You can select each point by clicking the **"Select point"** button (Figure 10).

Figure 10: Point Information Table - "Covid Survival" Game

For example, if you click the "Supermarket" point on the map, 15 points will be added to the Physical Condition field, since you will be moving outside the house, and 23 to the Sociability field, since when you go to the Supermarket you may meet different people. At the same time, this option will subtract 20 points from the Fun field, since it can be a tiring activity, and 20 points from the Money field, since you are going to spend money.

If you end up choosing this point, these values will be added or subtracted, respectively, from the values of the fields in the game. The game state will then be configured according to the point you selected and you will probably receive some feedback from the system (Figure 11).
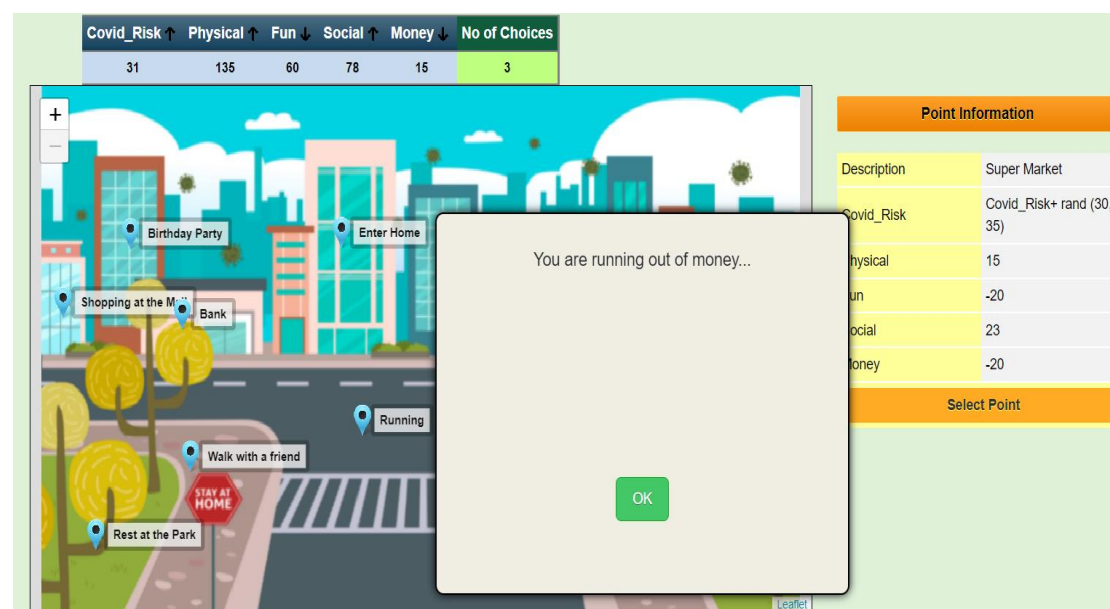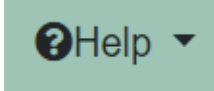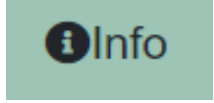

Figure 11: Pop-up window with feedback message during gameplay

3.3 Other Available Buttons

Buttons	Operations
🇬🇷	Change language to Greek
❓Help ▼	Help dropdown menu
🏠Home	Return to home page
✏Edit	Turn to Design mode
ℹInfo	Show/Hide game instructions
Statistics	Show/Hide game statistics

3.4 End Game

Whether you have chosen to play one of the ready-made examples or load a saved game from your files, the game ends when one (or more) field value crosses the "red lines" as they have been defined during the design of the game. When the game is finished, the following pop-up notification box appears (Figure 12) where you can:

1. play again by selecting the **"Play Again"** button (Figure 12).
2. display in detail the results and statistics of the game you just played by selecting the **"Show score and statistics"** button. From there, you can also download your score in a pdf file (Figure 12 & 13).
3. edit the game by selecting the **"Edit Game"** button (Figure 12). More information in Section 4.
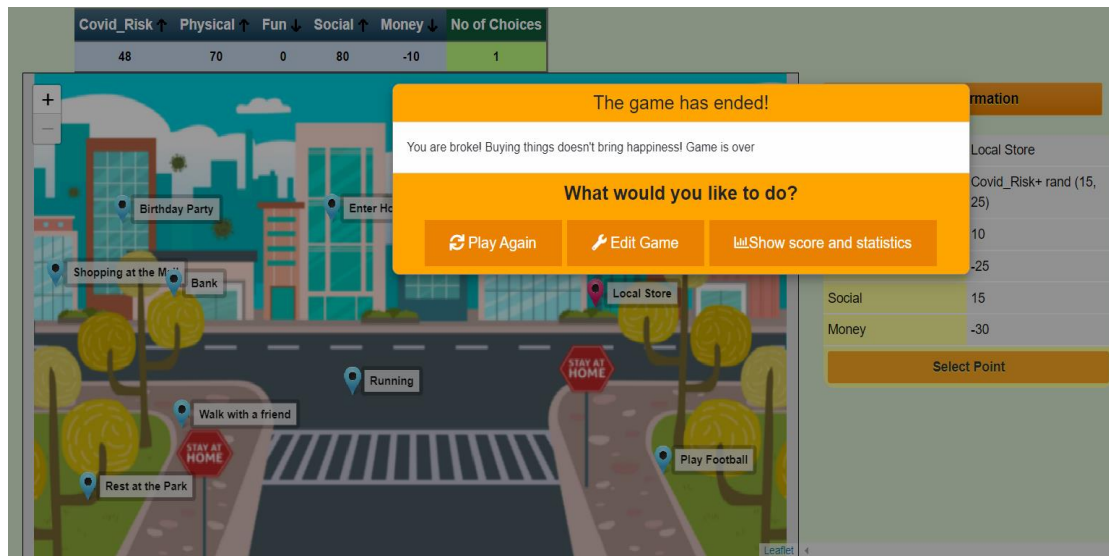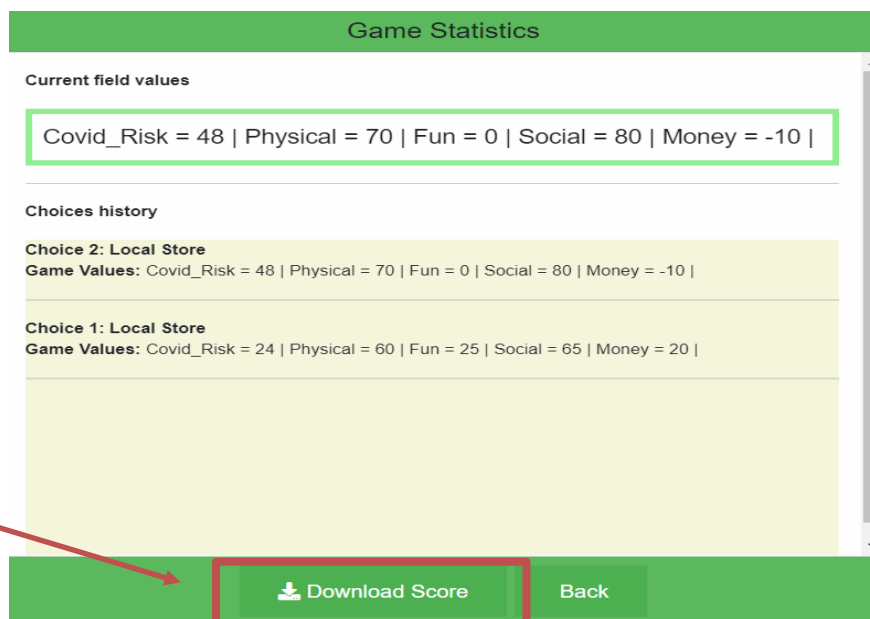
Figure 12: End game notification

Figure 13: Game Statistics - Pop-up window

4. Design a New Game – Design Mode

If you want to create a new game from scratch, you can select the option **"Design a game"** from the Home Page (Figure 4). By making this selection, you enter ChoiCo design mode. The design mode consists of four separate tabs that represent the different elements of the game you will be designing.
These tabs are:

1) Game Interface
This is where you design your game interface. This means you can edit the scene, add and modify points on it and set the consequences of each point.

2) Initial Settings

This is where you set the initial state of the game (e.g. starting values of fields).

3) Game Rules

In this tab, you define the rules according to which the game will work (e.g. warning messages).

4) End Rules

In this tab, you define the conditions that will end the game (e.g. if one or more fields get an extreme value).

In tabs 2,3 and 4, the design is realized by tile commands (Blockly Programming Language). Section 4.1 describes the functions of each tab in detail.

4.1 1st Tab - Game Interface

In this tab you can find:
1) the **"Scene"** of the game in which there is the background (by default a city map) and
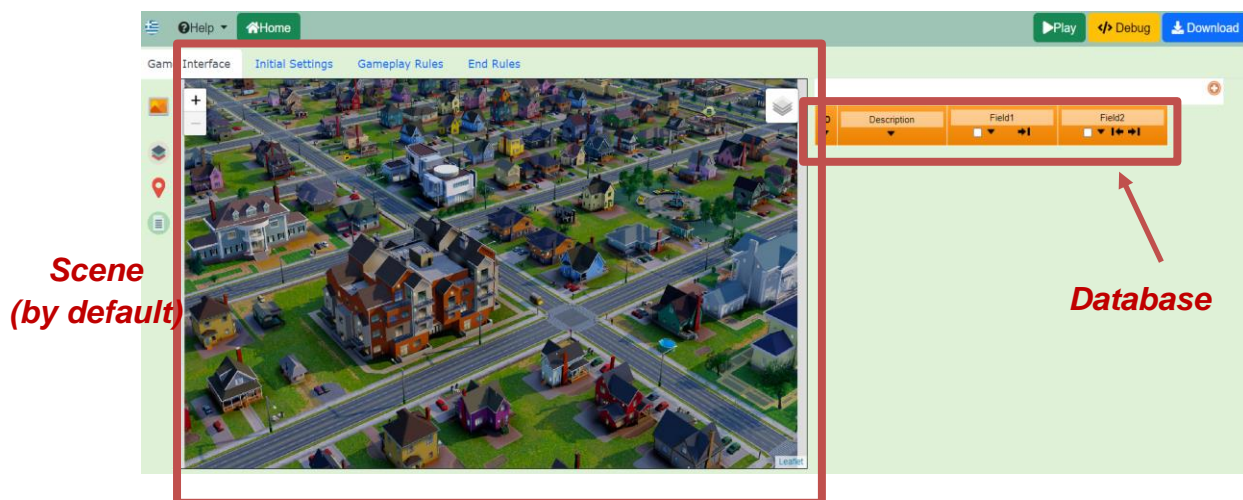2) an empty **"Database"**, as shown in Figure 14.

Figure 14: Game in Design Mode – Game Interface Tab

4.1.1 Scene Editing

The scene simulates the theme of the game and it is the main element the player interacts with while making choices.
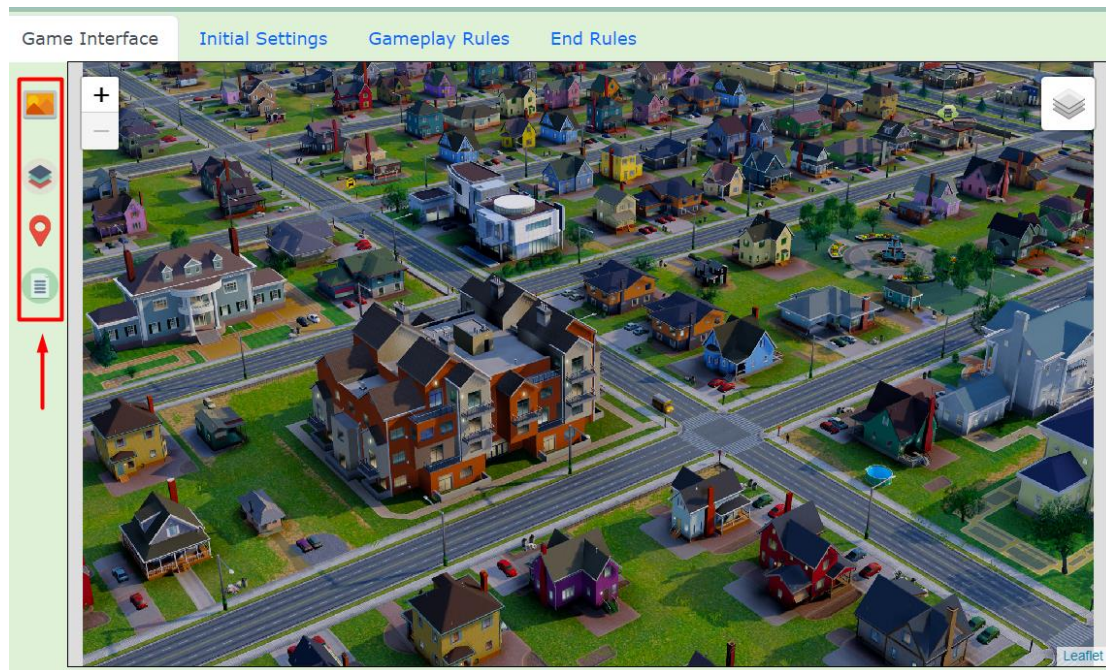
Figure 15: Game Interface Toolbar

A) Change Scene Background

If you want to change the background of the scene, click the icon [image] in the toolbar to the left of the scene (Figure 15). Then, you can select any image that is stored on your device and click OK. The image will be automatically added and adjusted as the background of the scene.

B) Add & Edit Layers

A game scene in ChoiCo can consist of several layers. All games have an initial layer called "Main". However, there is the possibility to create new layers which can act as different "regions" of a game.
Every layer has the following characteristics:

- Its name
- Its points
- Its background

Layers can be managed by clicking on the scene toolbox button which opens the window below (Figure 16). This window displays a list of all available game layers, as well as the option to add a new layer.
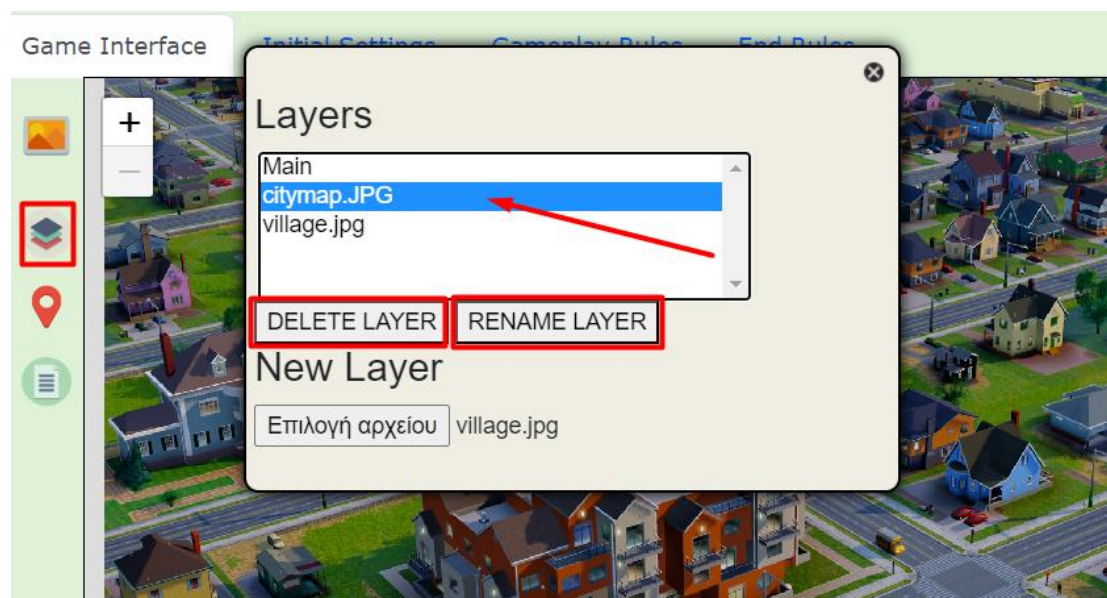
Figure 16: Manage Game Layers

Add new layer
To add a new layer, click on the "Select File" button and select an image from your computer which will be the background of the new layer. The new layer will be automatically added to the list, which will have -as its name- the name of the file of the image you loaded (e.g. citymap.jpg). This layer will not have any points.

Change layer name
If you want to change the name of a layer, select it from the list of layers and press the "Rename Layer" button (Figure 16). Then, type the new name you want. The "Main" layer cannot be renamed.

Delete layer
In order to delete a layer, select it from the list of layers and press the "Delete Layer" button (Figure 16). This action will delete the layer along with all its points.

Switch between layers
Toggling between the available game layers in the design mode can be done via the button in the top right corner of the scene (Figure 17). This way you can change the background and add points to each layer individually.

Εικόνα 17: Switching layers

In order to change layers during gameplay, you have to set the corresponding command when you program the game (See here - "Set active layer" command).

C) Add & Modify Points on the Scene

To **add** new points to the scene of any layer, click on the button from the toolbar on the left of the scene (Figure 15). By selecting this icon, you activate the "insert points" function and by clicking anywhere in the scene you can add a new point.

After you have finished inserting the points, you need to reclick on the to return to the original state of the scene.
To **delete** a point you should right-click on it and select "Delete point" (Figure 18).
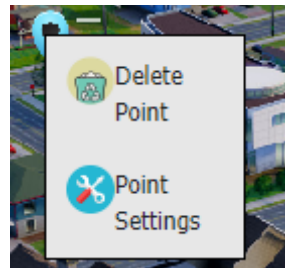

Figure 18: Delete point from the Scene

You can **move** a point in the same scene by clicking on it and dragging it to a new position within the scene. To move it to a different layer, right-click on it and select "Point Settings" (Figure 18). In the window that appears there is a list of available layers and the layer the point belongs to is selected. You can select another layer and click OK. The point will automatically be moved to the selected layer.
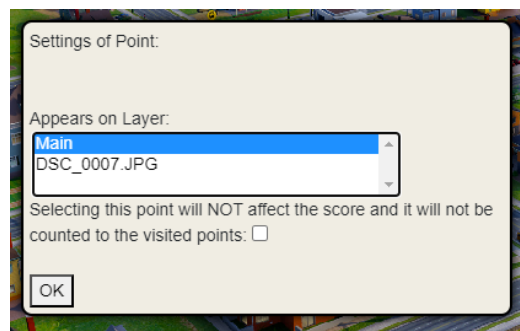

Figure 19: Move point to an other layer

D) Game Instructions

By clicking on , in the pop-up window that appears (Figure 19) you can write a text for the players, related to the instructions concerning the game.
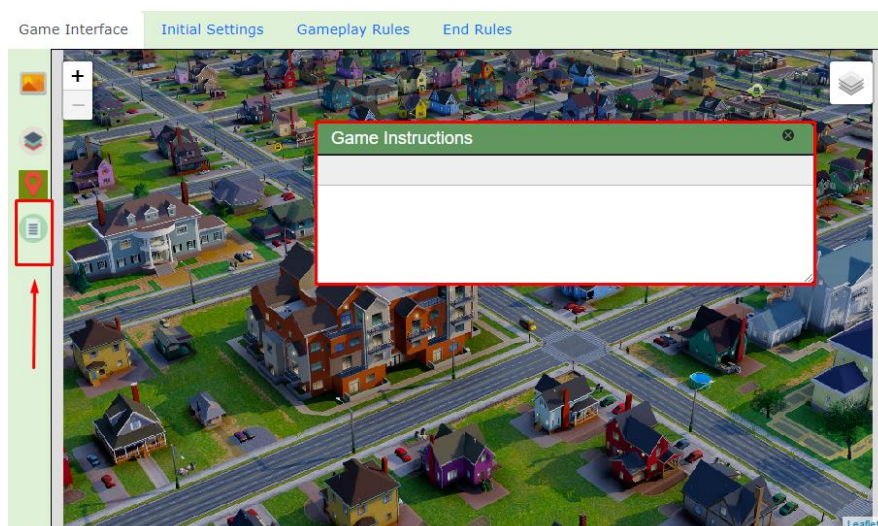
Figure 20: Writing Game Instructions

4.1.2 Database

When you add a new point on the scene, the system automatically inserts a new **line** into the Database (Figure 21). This line represents that point and allows you to change its properties. All points have common attributes, which correspond to the **columns** in the table (Figure 21). By default, there are 4 fields.: *ID, Description, Field1, Field2*.

Figure 21: Database

The **ID** is a unique number for each point and cannot be deleted or modified. The "**Description**" field refers to the name of the point, which will also be displayed on the Scene.
The names of the other attributes (Field1, 2..) can be changed.

Adding/Removing new attribute

To **add** a new attribute for the game points, you need to click on the board's ⊕ button (Figure 22). The new attribute will be added as a new column in the Table. To change the name of the property, just click on its name.
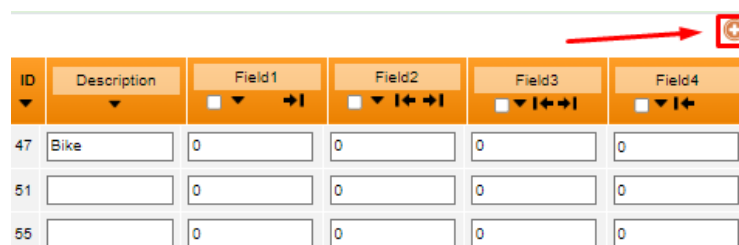
Figure 22: How to add a new attribute

To **delete** an attribute, first select its column by clicking on the small box next to its name, as shown in Figure 23. Next, click on 🗑, on top of the table. "ID" and "Description" cannot be deleted.
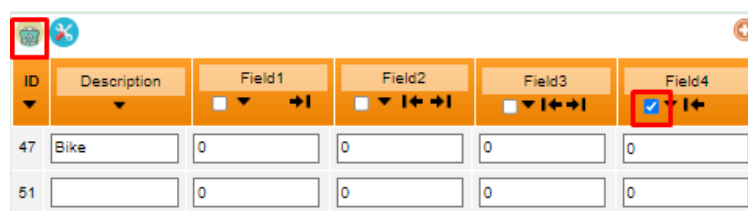

Figure 23: How to delete an attribute

How to change the type of a property

Select the property you wish to change and then click on 🔧.

Each property is identified by a data type. The data type determines how the property will be displayed and what the "function" of the property will be. The available types are as follows:

- Number: accepts only numeric values

- Text: Accepts alphanumeric characters (text + numbers)

- Image: Allows you to add an image from your device by pressing the "Choose" button

- Date: Accepts values in dd/mm/yyyy format.

- Link: accepts a connection with an external source, e.g. YouTube video, by pasting the corresponding URL.

- Formula: It allows you to create mathematical relationships between the properties of fields.

  Formulas examples:

  ⊠ By writing **rand(0,10)** in the field of a property, a random value from 0 to 10 will appear in the corresponding property every time the player selects that point.

  ⊠ The value of an attribute can be written in relation to the value of another property, e.g. if a game has the attributes "Money" and "Fun", the Fun field can contain the formula: money*2, so the value of the variable "Money" will be used.

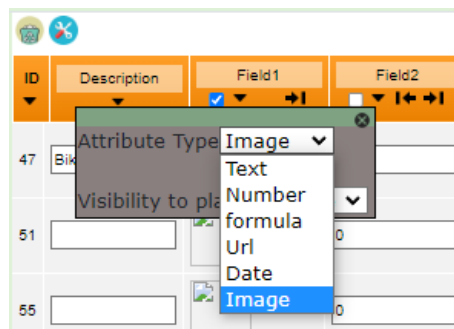You can see the available mathematical "Formulas" in detail [here](#).

Figure 24: Available Field types

The default type for each property is "Number". To change the type, select the property from the box next to its name and then click on the 🔧 button, located at the top left of the table. In the pop-up window you can select one of the above types. The type of the "Description" property is set to "Text" and cannot be changed.

How to assign values to the attributes of each point

You can set the attribute values for each point by clicking on the corresponding white box in the row of each point. Depending on the type of attribute there may be restrictions on the values. For example, attributes of "Number" type " accept only numeric values.

4.2 2nd tab – Initial Settings

After setting the fields and their properties in the first tab, you can then set the initial values of the numeric fields in the "Initial settings" tab, where you define how the game starts. There you'll find a Block-based programming area. On the left, there's a sidebar with the available blocks, which you can drag into the workspace on the right and start creating the game.

The available Blocks here are divided into 3 different categories (Figure 23) depending on their functionalities which are:

- Initialize
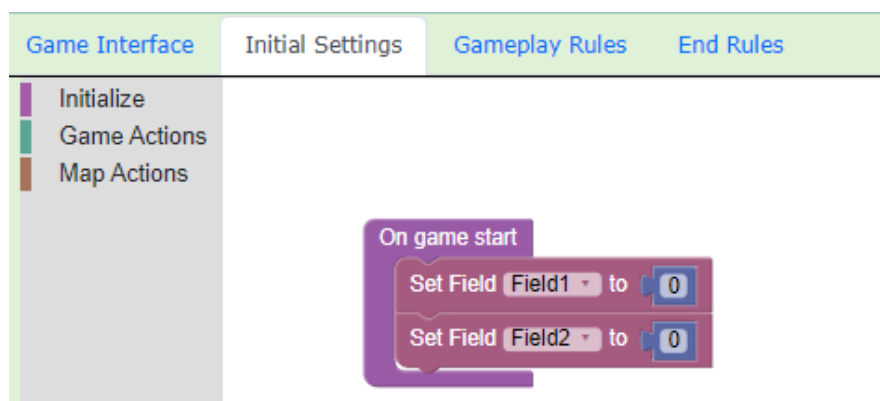- Game Actions
- Map Actions

Figure 25: Sidebar and workspace of the "Initial settings" tab.

When you access this tab for the first time, only two initialization property blocks that have been set as an example will be displayed. To add initial values, select the **"Set Field ... to ..."** block from the sidebar. and drag it into "On Game Start" (Figure 25).

Then by clicking on the property name, from the drop-down list you select the property you want to initialize. The value automatically given to all properties is 0. You can change this value by clicking inside the blue box containing the numeric value of the property.
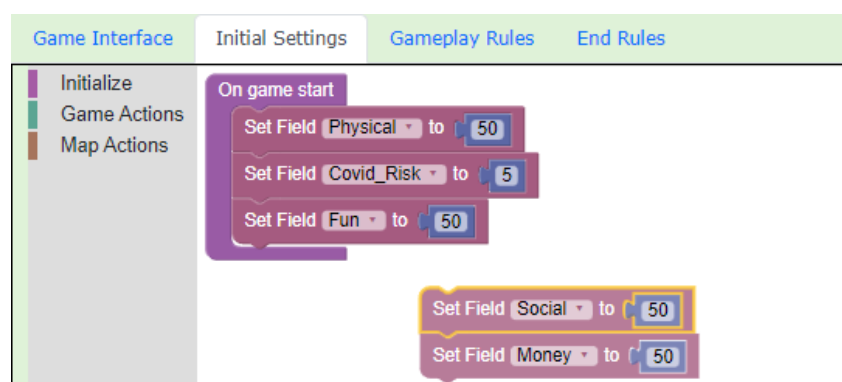

Figure 26: Example of initial setup code - Covid Survival game

All "Set Field" blocks must be within the "On Game Start" block.
You must set the initial value for each numeric field you have created in the game.

For a more detailed description of each:
Initialize block, see here.
Game Actions block, see here.
Map Actions block, see here.

4.3 3rd Tab - Gameplay Rules

In the 3rd tab you can program the rules for the game that will be triggered **every time the player selects a point**. The code programmed here will be executed every time the player selects a point and the result will be displayed automatically. Similar to the 2nd tab, this tab contains a workspace for Block programming and a sidebar with available blocks.

The available Blocks here are divided into four different categories depending on their functionality (Figure 27), which can be:

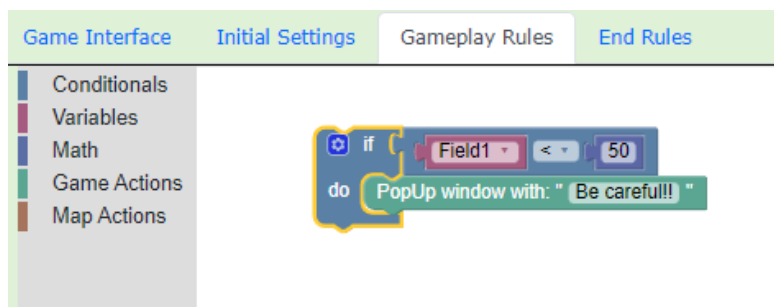- Conditionals
- Variables
- Math
- Game Actions
- Map Actions

Figure 27: Example of available commands on the Gameplay tab

Figure 28 shows an example of rules programmed in the "Gameplay" tab. In this example, after the player makes a selection, the game will check if the "Covid Risk" field is greater than or equal to 70 and, if it is, a pop-up window will appear with the message "You got close to a confirmed Covid case. Please be careful!!!!!". After that, it will check if the Money field is less than or equal to 15 and if it is, it will display the message "You're running out of money...".
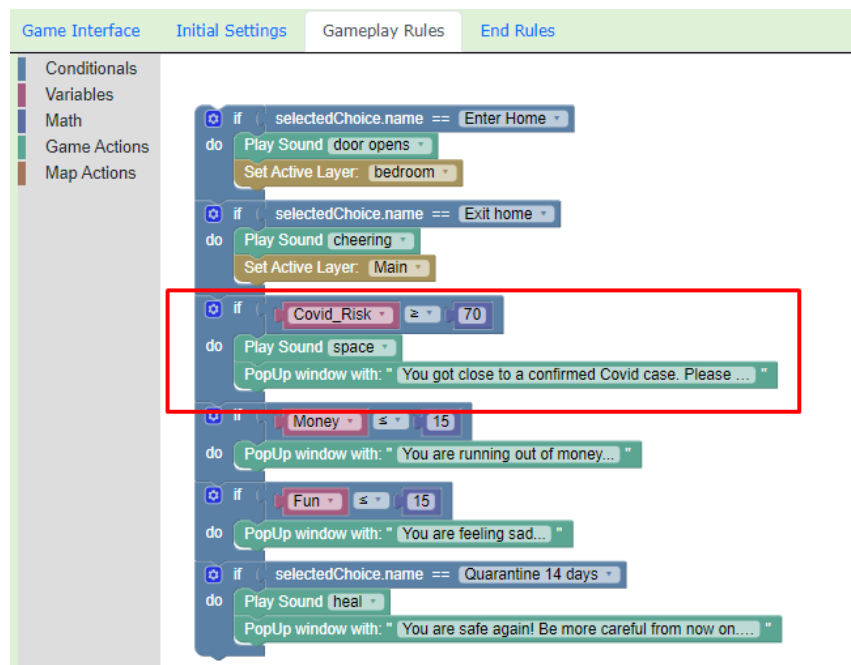
Figure 28: Example of gameplay rules code - Covid Survival Game

In the example in Figure 29, the code checks if the selected field is "Enter Home" (selectedChoice.name) and if it is, sets the active layer to the layer called "bedroom". In addition, the code checks if the clicked option is "Exit home" and if it is, the player is moved back to the main layer.

Figure 29: Example of gameplay rules code - Covid Survival Game

For a more detailed description of each:
Conditions block, see here.
Variables block, see here.
Math block, see here.

4.4 4th Tab - End rules

In the 4th tab you can program the rules for ending the game. The code programmed here will be executed every time the player selects a point, after the control conditions code, and the result will be displayed automatically. Similar to Tabs 2 and 3, this tab contains a workspace for Block programming and a sidebar with available Blocks.

The Blocks available here are divided into five different categories (Figure 30) depending on their functionality:

- Conditionals
- Variables
- Maths
- Game & Map Actions
- Game Flow

Figure 30: Available commands on the End Rules tab

Figure 31 shows an example of termination rules programmed in the 4th tab. Each time the player makes a choice, the code first checks if his physical state is lower than 5. If it is, a pop-up window appears with the message "Your physical state is really bad!..." and the game ends. Secondly, it checks if the Covid Risk field has a value above 90 and if so, a pop-up window appears with the message "You need to work out..."and the game ends. Second, it checks if the Covid Risk field has a value above 90 and if so, a pop-up window appears with the message "You've got Covid! Game is over" and the game ends.

Figure 31: Example of programming on the End Rules tab

> You must use the "GameOver" block to end the game.

➢ *More information about managing the available blocks can be found at* [*Section 6*](#)
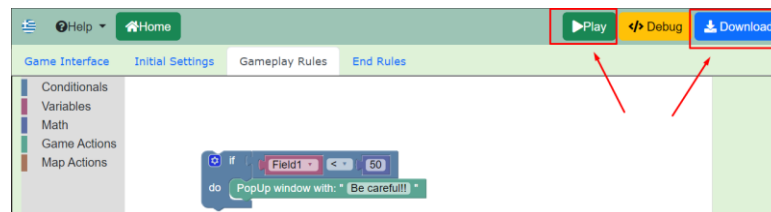
4.5 Test & Save the game

Figure 32: Test & Save Game

Once you have completed the game design, you can either:

i. play it directly, by selecting the "Play" button (Figure 32), without saving it, continuing if you wish to edit it afterwards.

ii. save it on your device as a file with a .choico format by pressing the "Save" button (Figure 32). Before downloading, through a pop-up window, you are asked to give a name to the game you just designed (Figure 33).
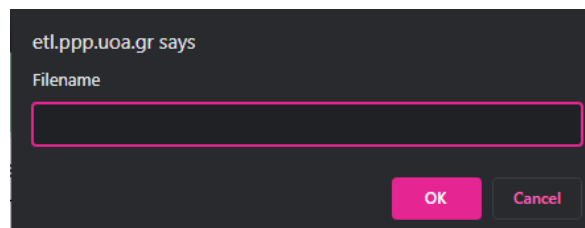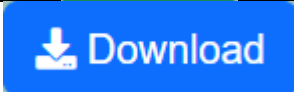

Figure 33: New or modified game naming pop-up window

4.6 Button actions in Design Mode

Button	Action
▶Play	Play the game, after modifications.
⬇ Download	Save a new or modified game.
</> Debug	Display a pop-up window with a report of programming errors that may have been made in the code.

5. Modify an existing game – Edit Mode

In case you choose to modify an existing ChoiCo game or a game stored locally on your computer, you can edit its functions and settings via the "Design Mode". After opening the desired game, select the "Design" button on the top right (Figure 34).
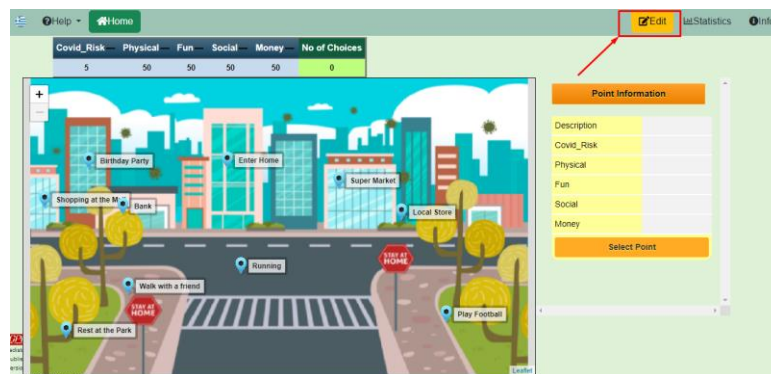

Figure 34: Selecting edit mode to modify an existing game

This opens the game in "Design Mode" (Figure 35), where it is possible to modify the game elements, such as:

- change in the values of the fields
- adding or removing fields
- change the type of variables in the fields
- adding or removing points or levels on the map
- change the map image
- changes to the game programming

The editing environment is the same as the Design Mode described in Section 4.

Figure 35: Covid Survival game in design mode

6. Programming with Blocks

This section describes the ChoiCo programming environment.

> Find a complete list of all ChoiCo commands with detailed descriptions and usage examples at this
> URL:http://etl.ppp.uoa.gr/choico/blocksEn.html
> or in the "Help" drop-down menu, by selecting the
> "Blocks Library" option.

The programming environment consists of two parts (Figure 36):
1. the left side-bar
2. the workspace on the right

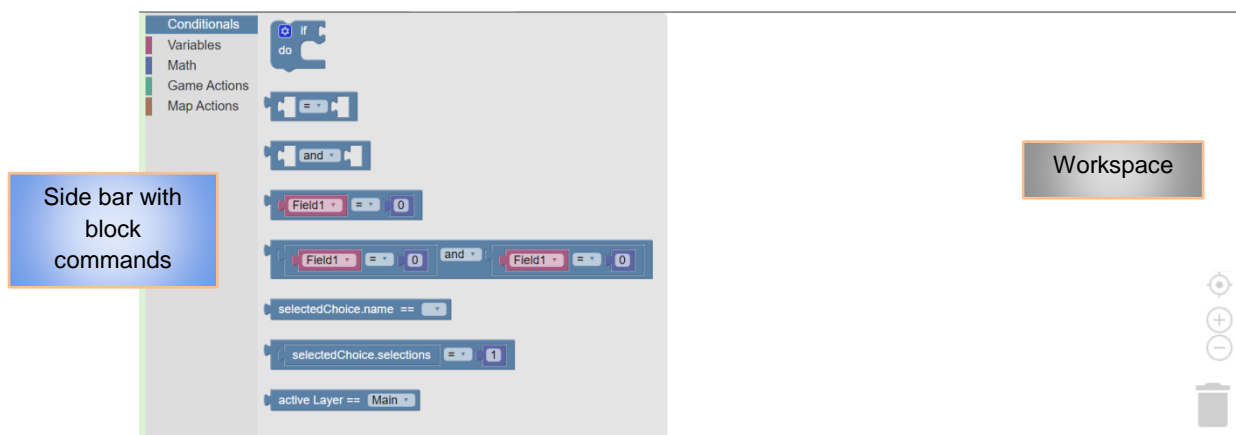The sidebar contains all the available blocks that can be used to design a game.

Figure 36: Example of a programming environment in ChoiCo

While ChoiCo has 3 different "programming" workspaces (initial settings, gameplay rules, end rules), there are some differences in the available blocks depending on the functionality of each workspace.

Insert a new block

To **insert** a new block into the workspace and make it part of the code, you can select it from the sidebar, drag it and then place it in the desired location on the workspace.

Different blocks can be linked together if they have **edges that fit**, like puzzle pieces. Figures 37 & 38 show examples of blocks that can be connected, while figure 39 shows blocks that cannot.
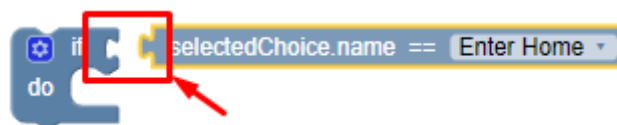

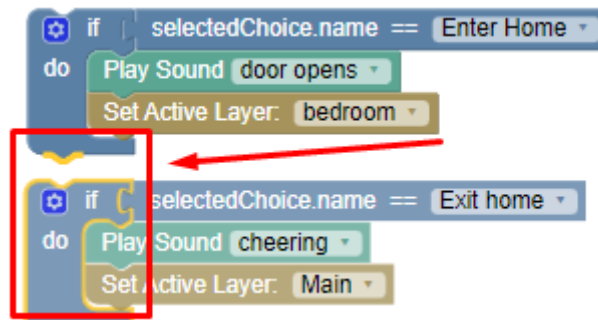*Figure 37: Example 1 of blocks that can be linked together*

Figure 38: Example 2 of blocks that can be linked together

Figure 39: Example of blocks that cannot be connected

Delete block(s)

To **delete** a block or a group of linked blocks, you can do one of the following:

α) Right-click on it and select "Delete block" (Figure 40).

Figure 40: Delete block(s) with right-click

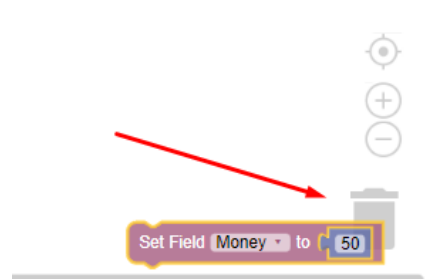b) Drag and drop it into the bin in the bottom right corner.

Figure 41: Delete block(s) using the bin

c) Drag and drop it to the sidebar.

Figure 42: Delete block(s) using the sidebar

Copy block(s)

To **copy** a block or a group of blocks, you should right-click on it and select "Duplicate" (Figure 43).
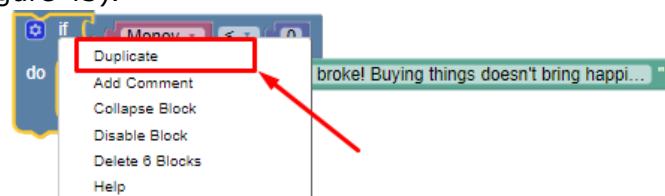

Figure 43: Copy block(s)

Disable block(s)

To **disable** a block or a group of connected blocks, you need to right-click on it and select "Disable Block". The blocks will appear as disabled in the workspace and will not be executed. You can **enable** it again by right-clicking and selecting "EnableBlock" (Figure 44).
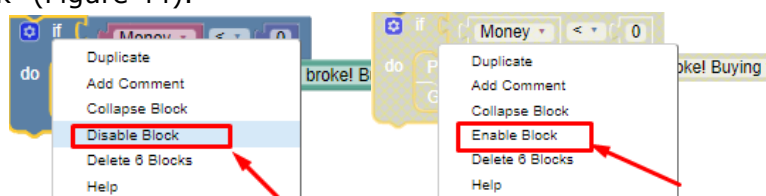

Figure 44: Disable/Enable block(s)

Collapse block(s)

To **collapse** a block or a group of connected blocks, you need to right-click on it and select "Collapse block". The blocks will be collapsed and represented by a single block. You can **expand** the block again by right clicking on the individual block and selecting "Expand block". This is a very useful function if you want to save space (Figure 45).
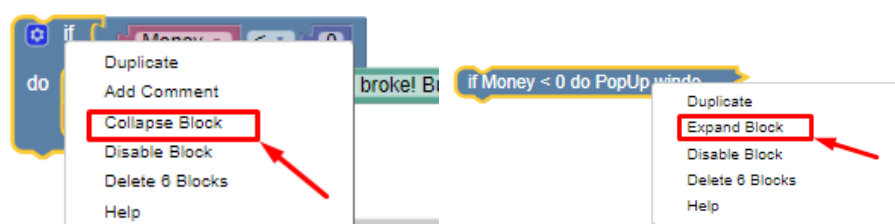

Figure 45: Collapse/Expand block(s)

Undo
You can undo the last action by pressing **ctrl+z** from your keyboard.