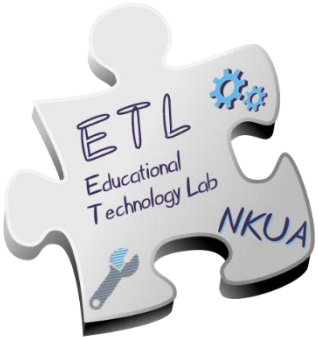
Educational Technology Lab

National and Kapodistrian University of Athens
School of Philosophy
Department of Educational Studies



Director: Prof. Chronis Kynigos

"SORBET"

Manual

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1. SORBET

1.1 What is SorBET

SorBET (Sorting Based on Educational Technology) aims to function as a "game generator", supporting teachers who are not familiar with the programming part of creating their own educational classification games. SorBET offers two different modes: the game mode ("Play Mode"), where each player has the possibility to play an already existing game, and the design mode ("Design Mode"), where everyone can design a new classification game or modify an existing one using the special assets available in this Digital Tool.

In SorBET games the player scores by "pushing" elements falling off the top of the screen to drop into the right category box at the bottom. "Pushing" elements can be done by mouse - clicking and dragging on a screen and will be extended to also include gesture interaction.

When the game is over the players are informed about their classification in the game log, which they can also download as a pdf file.

1.2 SorBET Games Rationale

The rationale behind this kind of games is similar to that of the classic game "TETRIS", where objects fall at a certain rate and the player tries to place them in the appropriate position. Objects, in the case of SorBET, may be text or images, and the "appropriate position", is about one or more available categories into which they can be classified. The gameplay builds on quick decision making, pattern recognition and abstraction of the characteristics of the falling objects.

SorBET adopts ETL's approach to learning, where learners put concepts into use and generate powerful ideas through the processes of tinkering, sharing and discussing personally meaningful artifacts through programmable digital media. Thus, SorBET apart from giving access to play games, enables non-technical users (e.g., teachers and students) to take the role of designer and create their own classification games with high-level interconnected computational affordances.

SorBET follows the classification model of "one to many", which means that one object could be classified to one or more categories. This design decision aims to raise discussions between players about the intersections or mutual exclusions of available categories based on the object properties. This feature also enables the design of games for more complex issues with unclear, doubtable and debatable classification rules, such as socio-scientific issues and wicked problems. The designer can also define the number of falling instances for each object, making an object falling more than one time in the same game.

2. Home Page

The first page (Homepage) you encounter when accessing the address http://etl.ppp.uoa.gr/sorbet/ is the one below (Figure 1).

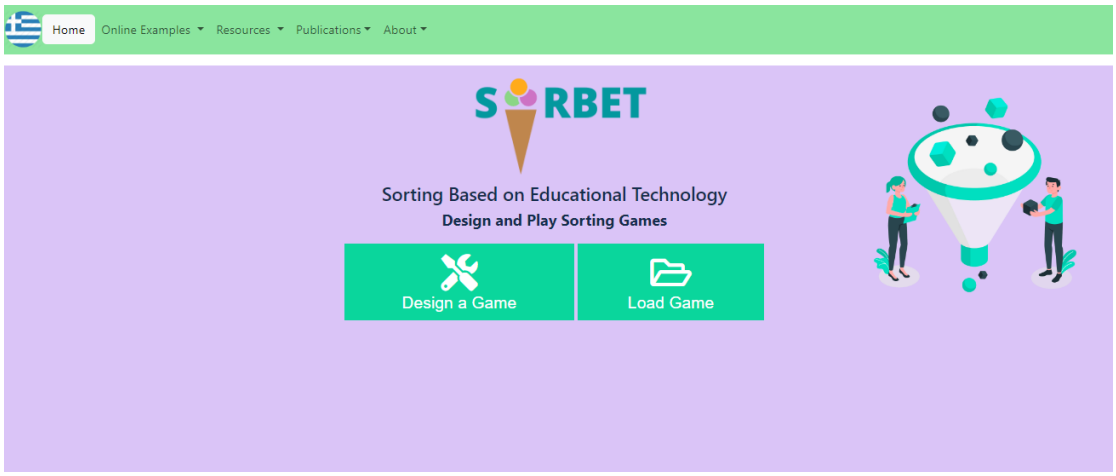


Figure 1: SorBET Homepage

On the top left, from the "Online Examples" option, you can open an existing game by selecting one of the titles that appear in the drop-down menu (Figure 2) (see Section 3.1).

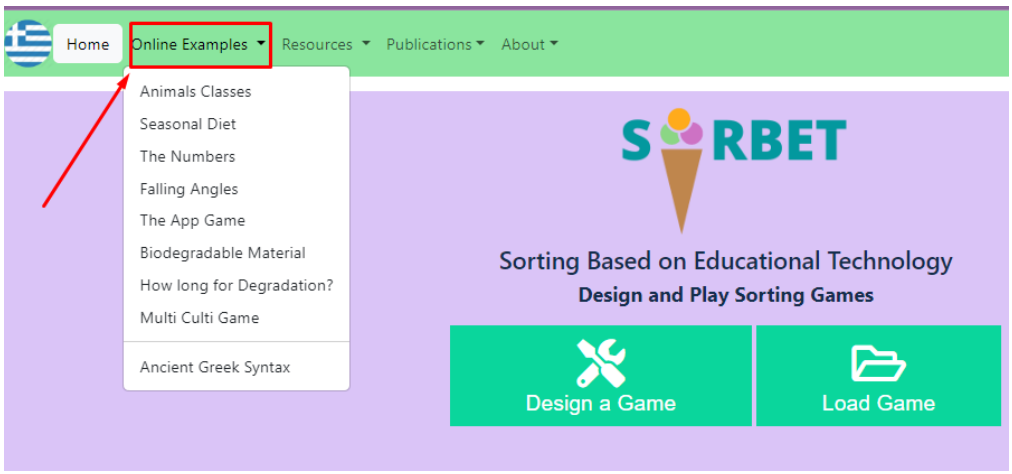


Figure 2: Existing Online Games

From the "Load Game" option (Figure 3), you can load a game from your local computer files, which is in ".json" format. Condition for that, is that a game has previously been created/saved (see Section 5.4).

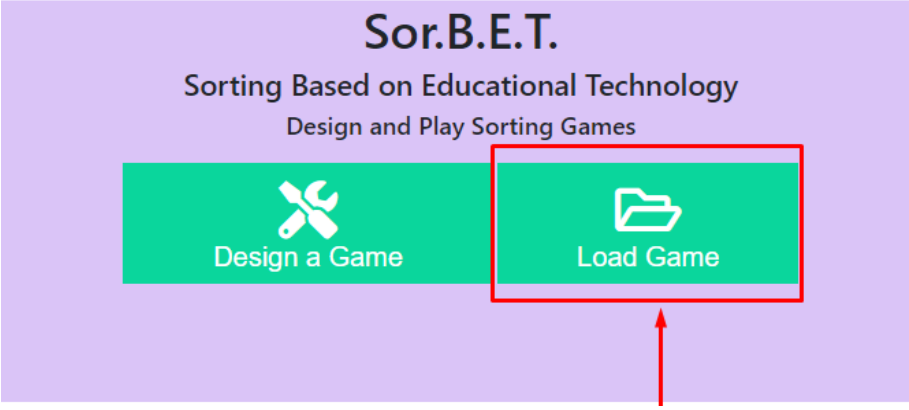


Figure 3: Load Game option

From the "Design a Game" option (Figure 4), the environment turns into design mode, from where you can start creating a new game (see Section 5).

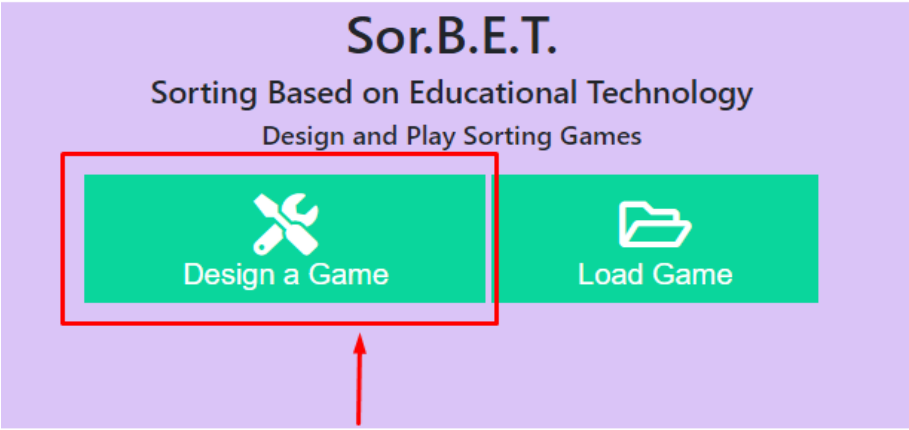


Figure 4: Design a Game Option

3. Play a Game

3.1 Selecting an online existing game

By selecting one of the online games (Figure 2), you enter "Play Mode" and you get the role of the player (Figure 5).

Figure 5: Play Mode

By pressing the "START" button, the game begins with objects (text or image) falling at a certain rate. In this example, the objects are images and names of seasonal fruits. At the bottom of the screen, carton boxes visualize the categories into which the objects should be classified. In our example, the categories represent the four seasons (summer, autumn, winter and spring).

The object needs to "touch" the category box to be considered as classified to this specific category. When an object is correctly classified in its category, the box turns green (Figure 6) and the score increases by 1. As you can see, the orange is correctly classified as winter fruit. In case the object is classified into the wrong category, the box turns red (Figure 7) and the score isn't affected. For example, apricot is not set as a summer fruit and as a result, classifying it to summer leads to an incorrect result.

Figure 6: Example of a correctly classified object

Figure 7: Example of a misclassified object

The score counter is at the top left of the screen (Figure 8) and has the form of x/y, where x is the number of objects correctly classified and y is the number of total objects to be classified.

Figure 8: Score Counter

3.2 Load your game

In Homepage (Figure 3), by selecting the "Load Game" button you have the chance to upload and play your own classification games. You should have previously designed and saved them in your device as described in Section 5.

3.3 End Game

Whether you have chosen to play one of the ready-made examples or have loaded a game from your file, the game ends when all the objects to be sorted are dropped. You can also end the game at any time by pressing the red button in the left-hand column of the screen (Figure 9).

Figure 9: Stop Button

When the game ends, the following notification box (Figure 10) appears, where you can choose to display the scores and statistics of the game in detail, by pressing the yellow label "Show Score and Statistics" (Figure 11). You can advise this board to reflect on how you classified the game objects and how you can improve the gameplay if you replay. The statistics show, apart from your score, how you have classified the falling objects into the game categories and which of them you didn't classify to any category ("unclassified"). The latter refers to objects that "fell into" the gap space between categories.

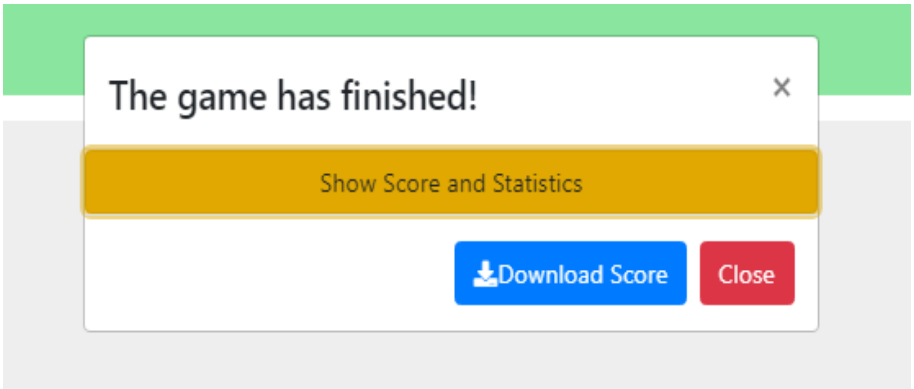


Figure 10: Game over notification box

As shown in the screenshot above (Figure 10), you can download your scores and statistics in tabular format to a .pdf file by clicking "Download Score" and close the window by clicking "Close".

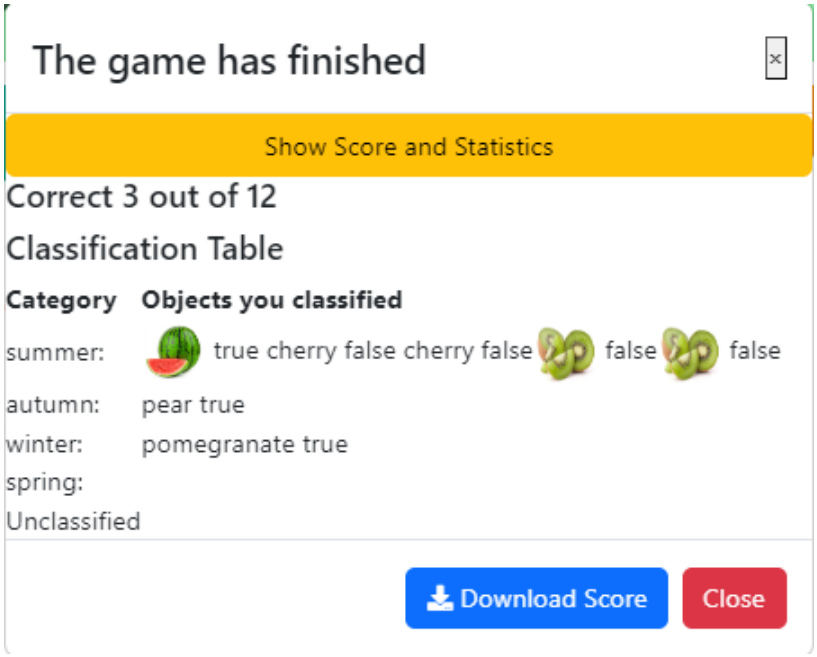


Figure 11: Showing detailed results and game statistics

4. Edit a Game

If you wish to edit the settings of a ready-made game that is online, or one from your device, because for example you may have found an error, you disagree with the assignments or you just want to make it more meaningful to you, you should enter the "Edit Mode". First, you need to select the specific game if it is from the online examples, or load it from your device (Load Game) and then select the "Edit" button on the top right (Figure 12).

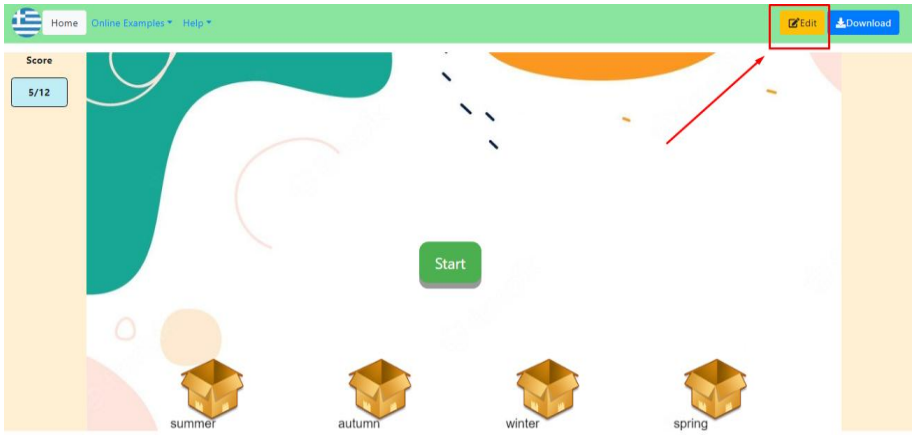


Figure 12: Edit Game Selection

Then, the game opens in "Design Mode" (Figure 13) where you will be able to modify the existing game elements, add or remove objects and columns, change the display number of the objects, and also the correspondence of classifying them into categories.

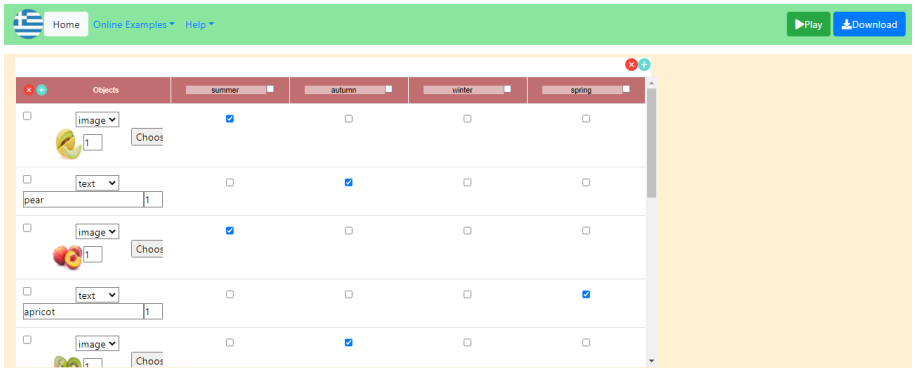


Figure 13: Selected game's table of contents – Edit Mode

For example, when editing the "Seasonal Fruits" game (Figure 13), we notice that the "apricot" object is assigned to the "spring season" category. If you believe that it should also belong to the summer fruits, you can select the corresponding checkbox and either uncheck the spring checkbox or leave both categories as correct, since SORBET allows one-to-many classification (Figure 14).

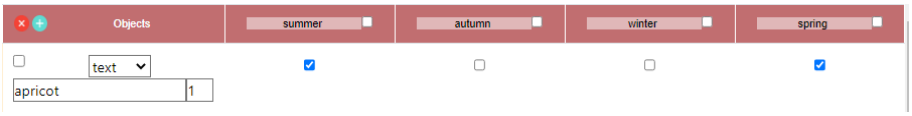


Figure 14: Editing the classification assignments

Moreover, you can add a new category e.g. named "All year", if some fruits thrive in all seasons, by selecting the "Add Category" button in the columns of the categories (Figure 15) or remove another by selecting one that you don't think as necessary category and delete it e.g. "Autumn" (Figure 16).

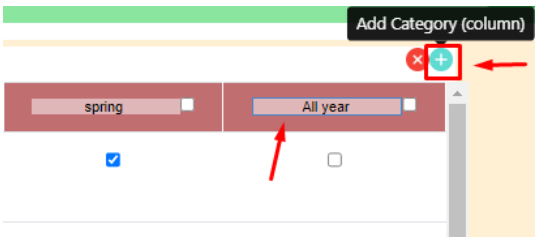


Figure 15: Adding a new category in an existing game

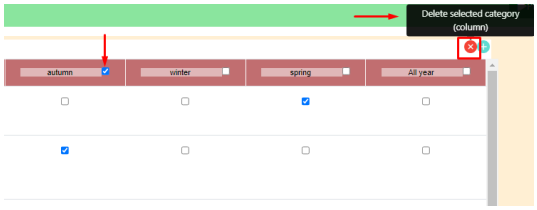


Figure 16: Delete an unwanted category from an existing game

You can also delete some of the existing objects by clicking the "Delete object" button on top of the table rows (Figure 17) or add more objects in the game, e.g. more of your favorite fruits, using the adjacent "Add object" button (Figure 18).

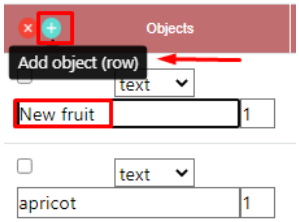


Figure 17: Add a new object in an existing game

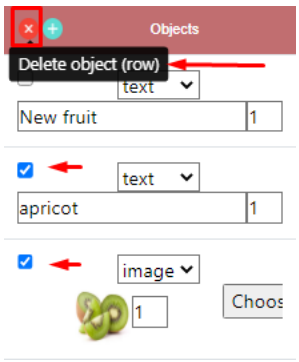


Figure 18: Delete an unwanted object in an existing game

Once you add or modify an object, you can select the object type, i.e. whether it is going to be text or image (Figure 19).

If you select the text type, you can type in the textbox the text to appear (it supports both Greek and English characters, numbers and special symbols).

If you select the image type, you can upload an image from your computer that will represent the falling object.

Note: The image should be already saved in your device.

Moreover, you can modify the number of instances of each object that will appear during the gameplay (Figure 19). This means that if e.g. you put the number 3 next to the apricot object, three instances of this object will fall during the same game at a random time and order.

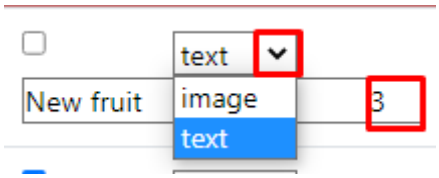


Figure 19: Modify an object's type and number of instances

After you finish editing the game you can play it online to see how it looks. To do so, click the "play" button at the upper right of the screen (Figure 20). You can also download it to your computer in order to edit it later, share it with others, or just save it in your archives.

To download the game, click the blue "download" button at the upper right of the screen (Figure 20).

Figure 20: Play or download a game after editing it

5. Design a new game

If you wish to create a classification game from scratch, you can select "Design a Game" from the Homepage (Figure 4). By selecting this option, you will enter SorBET's Design Mode, where you can find affordances for designing a classification game (Figure 21). The main tool is an interactive database for designing the game objects and categories, which is initially empty. The **columns** correspond to the **categories** of the game, and the **rows** correspond to the **objects** to be classified in the game.

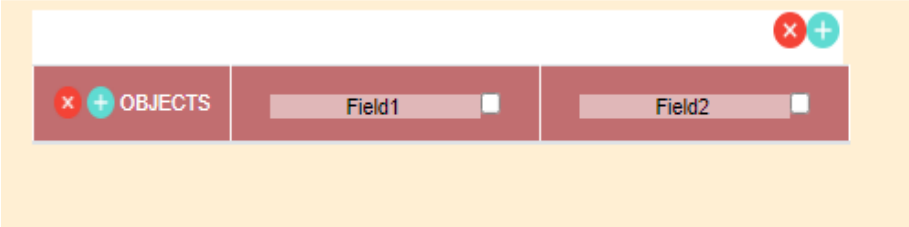


Figure 21: Interactive database in the Design Mode of SorBET

5.1 Adding, removing and renaming a category

The categories of the game are represented by the **columns** of the database (Figure 22).

Figure 22: The categories while designing a game

On the top right of Figure 22, the icon  means adding a new column to the table (new category).

Accordingly, the icon  means to remove the selected columns. To select one or more columns, click on the white checkbox next to their name (Figure 23).

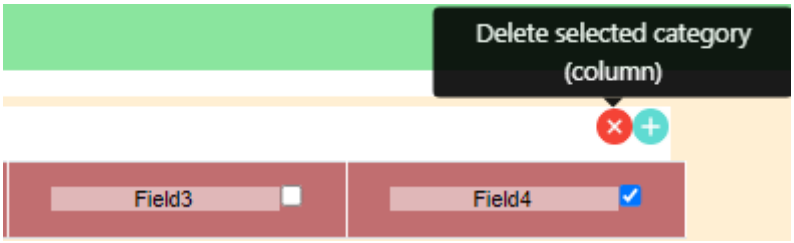


Figure 23: Removing selected category while designing a game

You can change the name of a category by clicking on the name field of the column (e.g. "Field3") and typing the name of the category you want (e.g. "summer").

5.2 Adding, removing and modifying an object

The game's objects are represented by the rows of the database (Figure 24).

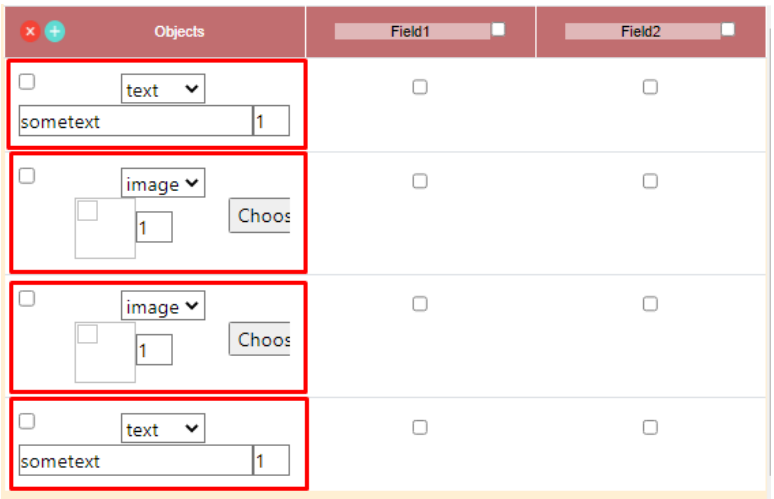


Figure 24: The objects while designing a game

On the top left of Figure 24, the icon  means adding a new row to the table (new object).

Accordingly, the icon  means to remove the selected rows. To select one or more rows, click on the white checkbox next to their name (Figure 25).

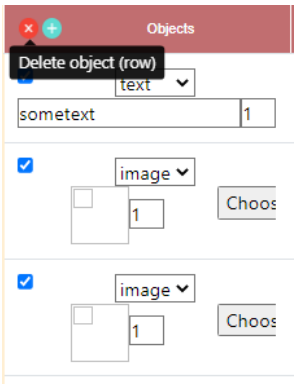


Figure 25: Removing selected objects while designing a game

For defining the objects, there is the option to be simple text or image (Figure 26).

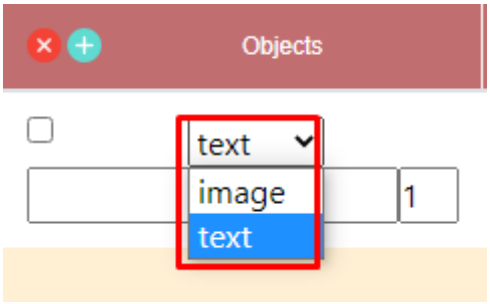


Figure 26: Available options for defining objects

By selecting the "text" option, you can fill in the textbox 

with the word or sentence you wish to add as an object.

By selecting the "image" option, and secondly pressing the "Choose" button (Figure 27), the program loads your computer's file management window, from which you can select a specific image file (.img, .ico, .png) that you wish to add as an object.

Note: The image must already be stored on your device as a prerequisite.

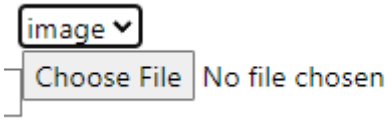


Figure 27: "Choose" button in the "Image" object category

Next to each object there is an integer number field. This integer refers to the number of instances of each object that will appear during the game at a random time and order (Figure 28).

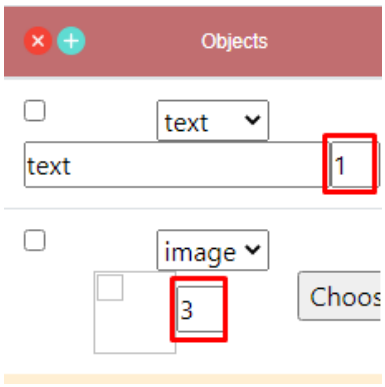


Figure 28: Modify an object's number of instances

5.3 Assigning objects to categories

Once you have added the objects and categories as rows and columns to the database, you have to choose which category each object corresponds to (Figure 29). You can choose from zero to all categories, depending on the type of game, by clicking on the corresponding checkbox that connects the column (category) to the row (object).

Note: The matching that is done at this stage of the game design is what will determine the correct classifications during gameplay.

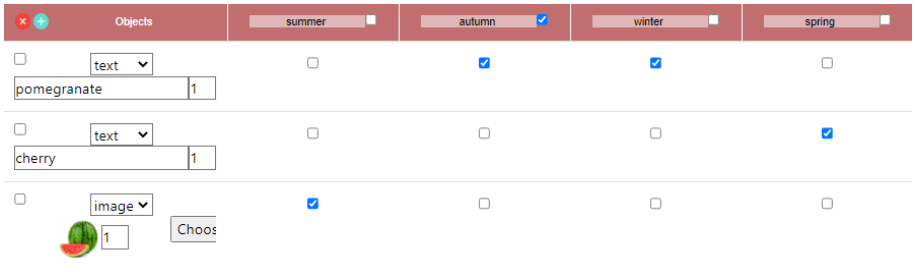
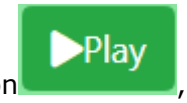
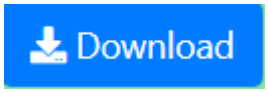


Figure 29: Example of assigning objects to categories

5.4 Test and save the game

Once you complete the design of the game, you can either play it directly by selecting the button 

, or save it to your device as a .json file by selecting the button 

(Figure 30).

Before downloading, the system asks you to provide a name to the game you just designed (Figure 31).

Figure 30: SORBET Edit environment showing "Play" & "Download" buttons

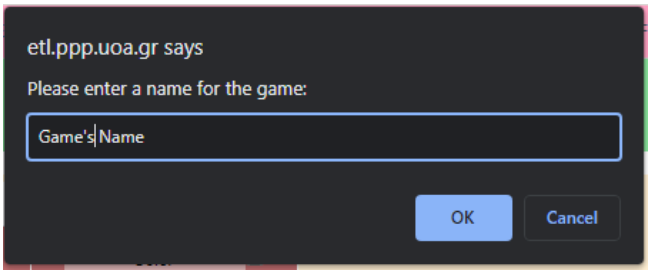


Figure 31: Name-giving box

This way, the game you just designed will be stored locally on your device. To play it later at SorBET, follow the "Load your game" procedure described in Section 3.2.

6. The Extended SorBET

SorBET was extended to enhance game play and game design experience, as part of the EU project Extending Design Thinking with Emerging Digital Technologies (Exten(DT)2).

You can find the extended version in the following link: https://extendt2.com/widgets/sorbetEXT/.

SorBET EXT evolved throughout game play in the form of bodily interaction with falling items. The extension allows students to interact with the game physically, in bigger or smaller visual settings, and it can encourage multiple players engaging with the same game at the same time, facilitating embodied collaborative learning experiences. In terms of game design experience, SorBET included simple programming instructions in block format, that allow creating and manipulating features such as the pace and density of objects rupture.

6.1 Homepage

When you access SorBET EXT, you first need to give access to the platform to use your camera & microphone settings. To do that, simply click on the checkbox as seen in Figure 32.

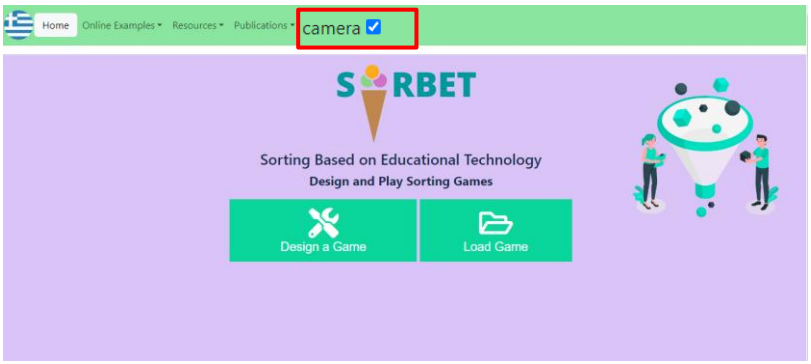


Figure 32: Activate Camera

When you try to open a game (see Section 3) e.g. from the Online Examples, a browser pop-up window will appear confirming the request to use the camera and microphone. Click on "Allow" (Figure 33).

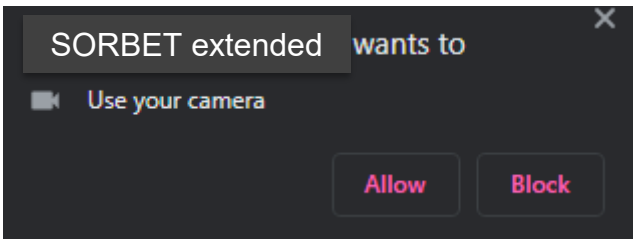


Figure 33: Website's request for camera & microphone access

If you do not wish to use this extension, simply open a game with the camera ☐ unchecked and the mouse manipulation will operate as usual.

6.2 Play an EXT game

background ☑ : Enables or disables the colorful backdrop during gameplay.

Once a game loads, click on START button and try moving your hand(s) in front of the camera and see its digital depiction on the game screen (Figure 34). The system recognizes up to 2 palms at a time.

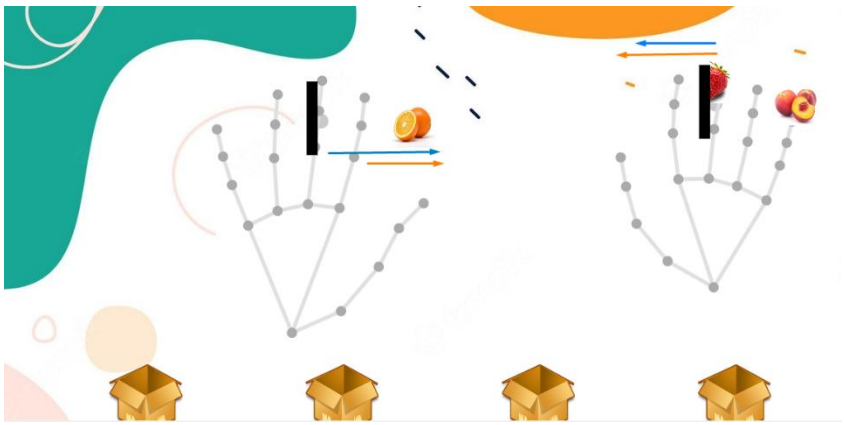
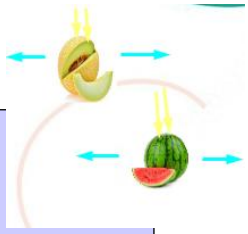


Figure 34: 2 digital palms manipulating the falling objects

To move a falling object, simply place your hand on its side and push it towards the direction you desire. You can only move it on the x axis.



Keep in mind:
In order to ensure that the hand recognition through your camera works as accurately as possible:

- there must be **sufficient lighting**
- your hands must be **close to the camera** and **pointed towards it**

(The scope of view of a typical laptop's webcam can vary depending on the specific make and model of the laptop.)

You can adjust the **speed** and **density** of the falling objects using **voice commands**.

- To change the **speed**, say:
  - **"Faster"** – objects will fall more quickly
  - **"Slower"** – objects will fall more slowly
- To change the **density** (i.e., how many objects fall at once), say:
  - **"More"** – increases the number of falling objects
  - **"Less"** – decreases the number of falling objects

Keep in mind:
- Speak clearly and **avoid background noise**
- You can **repeat** the command as many times as needed
- Make sure your **microphone is enabled** and working

6.3 Edit an EXT game

In the EXT version of SorBET, you have the ability to modify the speed and density of the falling objects using commands in block format.

When you access the Design Mode either from Play Mode (see Edit a Game) or when designing a game from the beginning (see Design a new Game), in addition to the classification database you can find the Blockly commands environment using i. Gamestart & ii. Gameplay tabs (Figure 35).

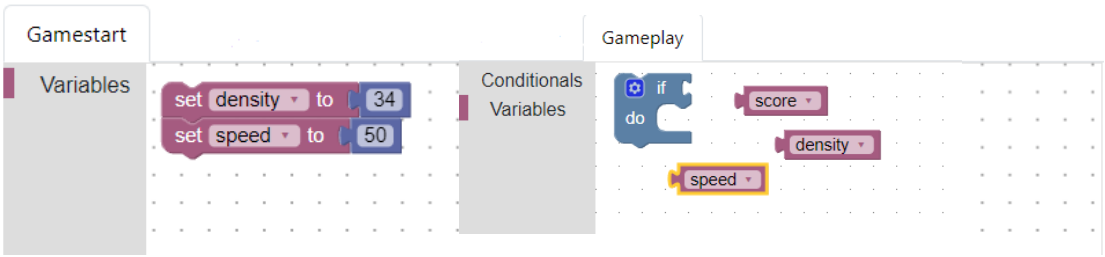


Figure 35: Blockly Commands Environment

i.GameStart Tab

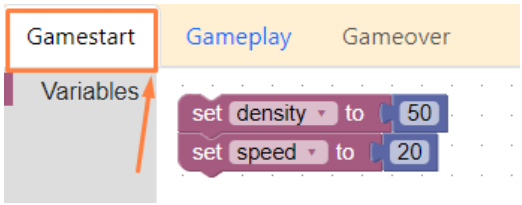


Figure 36: Gamestart Tab

In the first tab (Figure 36), you can set the **initial values** of speed & density. In other words, you set the values with which the objects start dropping at the beginning of the game.
Initialize the speed and density values by simply clicking on the number field and changing it.
The initial values already set by the game are **25** for speed and **30** for density. Thus, choosing **lower values decreases** the speed or density respectively, and choosing **higher values increases** them.

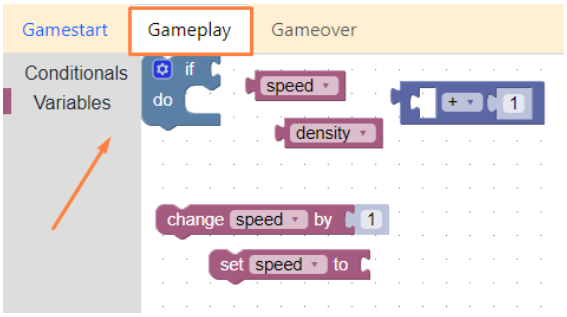
Keep in mind that these values are **not absolute** but **relative** to the previous value of the variables.
Density is a percentage number, which means that it refers to the **percentage of the number of remaining objects**.

If you set density level to 100 it will show all the objects together at once.

If you set density level to 20 it will show the 20**%** of the remaining objects each time. e.g. if the number of objects is 15 and the density is set to 20, 3 objects will appear each time (20% of 15 = 3)

*** avoid using zero (0) as a value, as it will not affect the sizes**
*** all numbers should be positive**

ii.GamePlay Tab



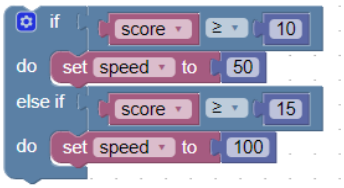
Keep in mind that:

- "**change … by**" will increase the current size by the amount you specify (e.g. change speed by 10, will add 10 to the previous value of speed)
- "**set …by**" sets a specific value (e.g. set speed to 100, will replace whatever value the speed had before with 100)

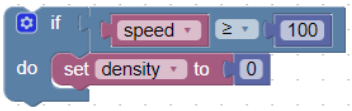
Figure 37: Gameplay Tab

In the second tab, you can set a **condition** (If..else) that has to be satisfied in order to **alter the value of a variable** (speed or density).

e.g. As the **score increases**, set a **higher speed** for the falling objects:



Or when the **speed is too high**, **decrease the density** of objects:



For tips to how to combine and use the blocks, you can check the Blockly Commands listed in the next page.

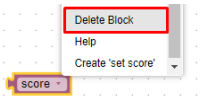
Programming Commands using Blockly:

Add a new block:

Click on the block you want from the blocks library and drop it in the position you want into the programming area.

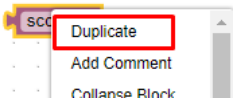
Delete a block:

To Delete a block or a set of connected blocks, you can either
-Right click on it and select "Delete block" OR
-Drag it and Drop it to the blocks library on the left of the screen



Copy a bock:

To copy a single block or a set of connected blocks right click on it/them and select "Duplicate".



For more info about dragging, dropping and connecting blocks click here

iii. Edit Game Instructions

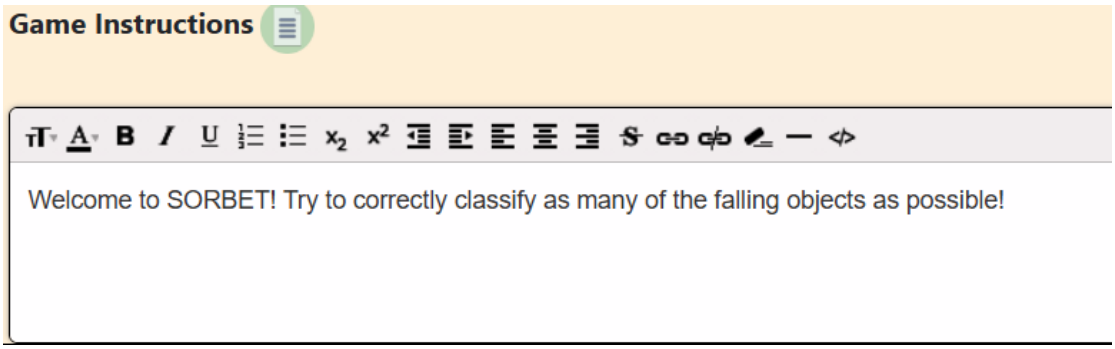


Figure 38: Game Instructions Text Editor

This is the text editor where you can write instructions, background context, or hints for the game you designed. You can use the formatting tools (bold, italics, lists, etc.) to structure your message clearly and make it engaging for players.