Sail Boat Simulation Game

Simulate a basic sailboat with 2 sails floating on water around various obstacles, with a view from above on a 2D scene.

Table of Contents

↑ Description

There are 2 sails, a keel, and a rudder. The water shows via waves the direction and power of the wind. Controls allow to change the tension by which sails are pulled, and the rudder position. Physics simulation uses Unity to handle how wind force over the sails is induced over the boat and affects its movement speed and direction.

Obstacles include fixed buoys and rock wave breakers.

The boat can also throw a small lifesaver to demonstrate an exercise of pulling a "man in the water" situation.

Buttons on the left allow restricted sail tension control to operate only on one of the sails for doing various types of maneuvers.

↑ Features

1. 2 sails, individually controlled,
2. keel with 3 positions,
3. rudder with 8 positions on each side.
4. The boat has a lifesaver buoy to create "man in the water" alerts and maneuvers.
5. Wind power on sails computes both blowing wind and airflow effect over the sails as wings at tight angles.
6. Sails' shape reflects the wind blow force applied to them.
7. When wind blows on loose sails, they flicker from side to side to show that.
8. When the wind changes sides from the back, sails perform a full side change (revolution) that should be done with care.
9. Rudder is also affecting the boat drag according to its position, so if set to 90 degrees, it will not cause turn, but slow the boat.
10. The colors of sails reflect the direction of the wind blow side (green when positive, red when negative).
11. Rudder color reflects the boat's speed forward or backward. When boat velocity is negative, the rudder affects the boat turning in a reverse manner.
12. Extensive help info including an animated tutorial.

↑ Installation

1. Developer: Get the project from GIT and use the Unity Editor to run the game.
2. User on Windows 64-bits: Unzip the installation file from Google Drive here: Sailing-PC.zip. Then run the **Sailing.exe** executable for a full-screen experience.
   - See this U-tube Overview (in Hebrew).
3. Future: APK file for the Android devices.

↑ Usage

The game has GUI controls as well as short-hand keyboard keys to manage the different boat parts when sailing as in the following table:

Part	GUI	Keyboard (for the PC version)
Rudder	Move horizontal slider left and right to steer the boat	Use **left arrow** and **right arrow** keys.
Sail Tension	Move left slider up or down	Use **up arrow** and **down arrow** keys.
Keel position: up, middle or full	Move the 3 position vertical slider on right	Use the **PgUp** and **PgDown** keys.
Sail selection	Two buttons [FS] [MS] on the bottom left screen allows to select the front sail (FS) or main sail (MS) to be affected by the sail tension slider and keys. If both are **not** selected, the slider and keys control both sails together.	Use the **W** key to select the front sail, and **S** key for the main sail.
Kick rudder	A blue left ← and right → arrows, perform a sudden **"kick"** of the rudder to the left or the right respectfully, when clicked. This can help get the boat out of stalling when facing wind for instance.	Use the **Left shift** and **Right Shift** keys respectfully.
Anchor	clicking the toggle button ☑ ANCHOR will stop applying sail power on the boat so it stops	Click the **A** on the keyboard to toggle this button's effect.
Man in the water drill	Click the little buoy ⊙ icon to "throw" a small lifesaver to mark a man in the water situation. Click on the thrown buoy to grab it back to the boat.	Click the **space** bar to toggle man in the water throw/grab action.

Part	GUI	Keyboard (for the PC version)
Pause/Play the game	Click the ⏸ icon to **pause** the game, and then the ▶ icon to **resume** it.	Click the **P** key to toggle pause/play modes.
Reset, and restart the game	Click the ⏪ icon to move the boat and screen back to the initial state.	Click the **R** key to reset the game.
Help info	Click the ❓ icon, to see several help information options: First is the keyboard shortcut commands layout image (see KEYBOARD). Second is a summary of all GUI widgets on the screen (as also detailed in this table) image (see GUI). The third option is a series of tutorial animated lessons (see TUTORIAL). To close, click the **Close** button on the bottom, or click the icon again.	Click the **?** (usually ? and slash) key for that. Click again to close or hit the **close** button.
Track option	Click the Follow-Boat button 🧍 to track the boat from onboard, which will then turn into the Follow-World button ⊕ which will maintain a fixed view from above.	Use the **X** key to toggle whether the camera follows the boat's direction, or stays fixed to the north (screen upwards).
Zoom in/out.	Clicking the small green arrows out icon ⤢ button to zoom out and see more of the scene around the boat. Clicking the small red arrows in icon ⤢ button to zoom in (and see less of the scene).	Use the + keyboard key (i.e., the + and = key, without using shift!) for zoom out, and the **-** (minus and underline key) to zoom in.
Quit the program	Click the ⏹ icon, then confirm or cancel	**-C** - hold the control key and click **C**. This too will invoke a confirm dialog.
Toggle full screen on and off	Click the F11 button on the screen to toggle full sceen option.	**F11** - click the function key F11.
Toggle GUI on and off	No GUI	Click **K** on the keyboard to turn graphics GUI off, leaving the scene details only. Click again to turn them on.

↑ Tracking info

Display on the top left showing the values of four parameters dynamically:
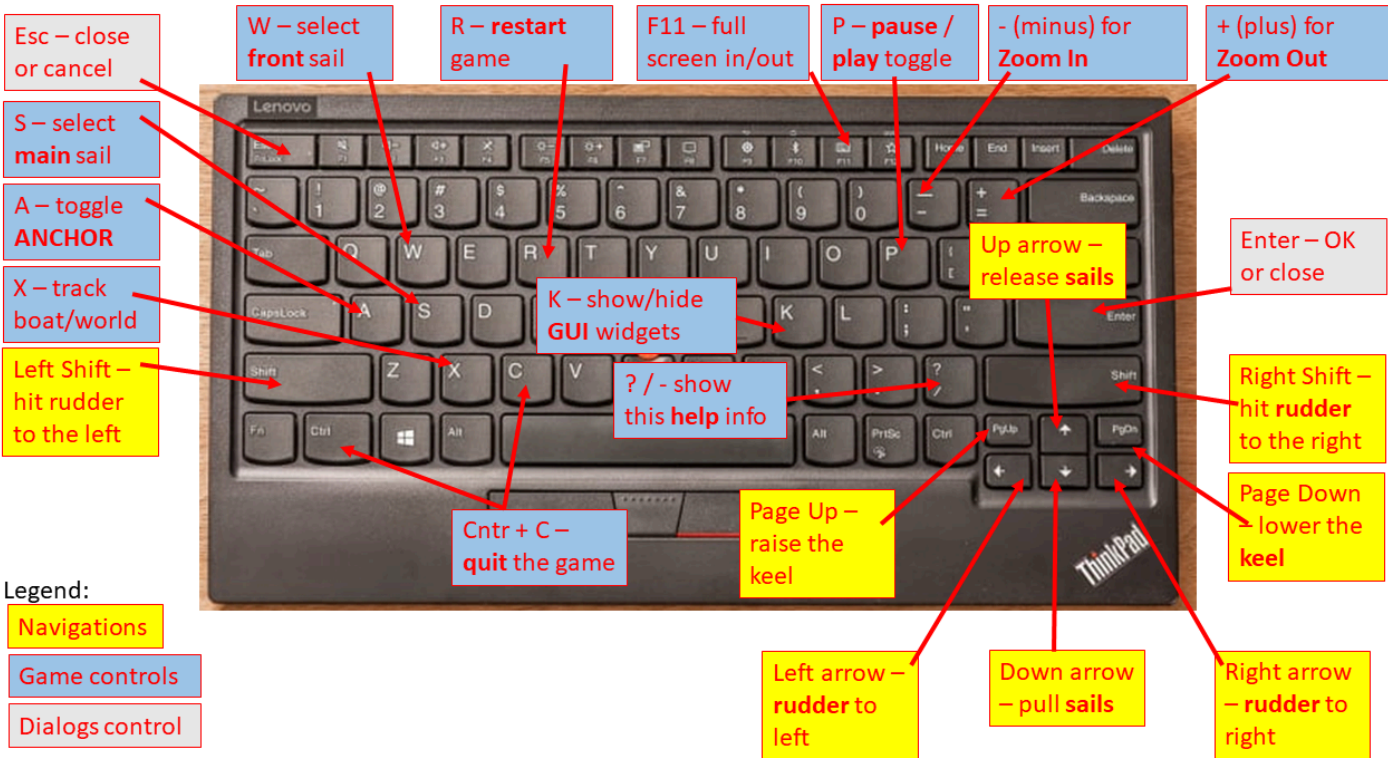
1. ANG D. is the Angular Drag that slows boat turning.
2. LIN D. is the linear Drag that slows the boat's velocity in all directions.
3. FWD F. is the wind force that is applied in the boat's forward direction.
4. LAT F. is the wind force that is applied in the lateral direction.

Like this on top left:

ANG. D: 0.5   FWD F: 1.96
LIN. D: 0.17   LAT F: 0.35

↑ Keyboard Shortcuts

As part of the game help information is the keyboard layout:

Esc – close or cancel
W – select **front** sail
R – **restart** game
F11 – full screen in/out
P – **pause / play** toggle
- (minus) for **Zoom In**
+ (plus) for **Zoom Out**
S – select **main** sail
A – toggle **ANCHOR**
X – track boat/world
Left Shift – hit rudder to the left
K – show/hide **GUI** widgets
Up arrow – release **sails**
Enter – OK or close
? / - show this **help** info
Right Shift – hit **rudder** to the right
Cntr + C – **quit** the game
Page Up – raise the keel
Page Down – lower the keel
Left arrow – **rudder** to left
Down arrow – pull **sails**
Right arrow – **rudder** to right

Legend:
Navigations
Game controls
Dialogs control

⇧ GUI widgets

A second part of the game help information - a summary of all the GUI controls on the screen:
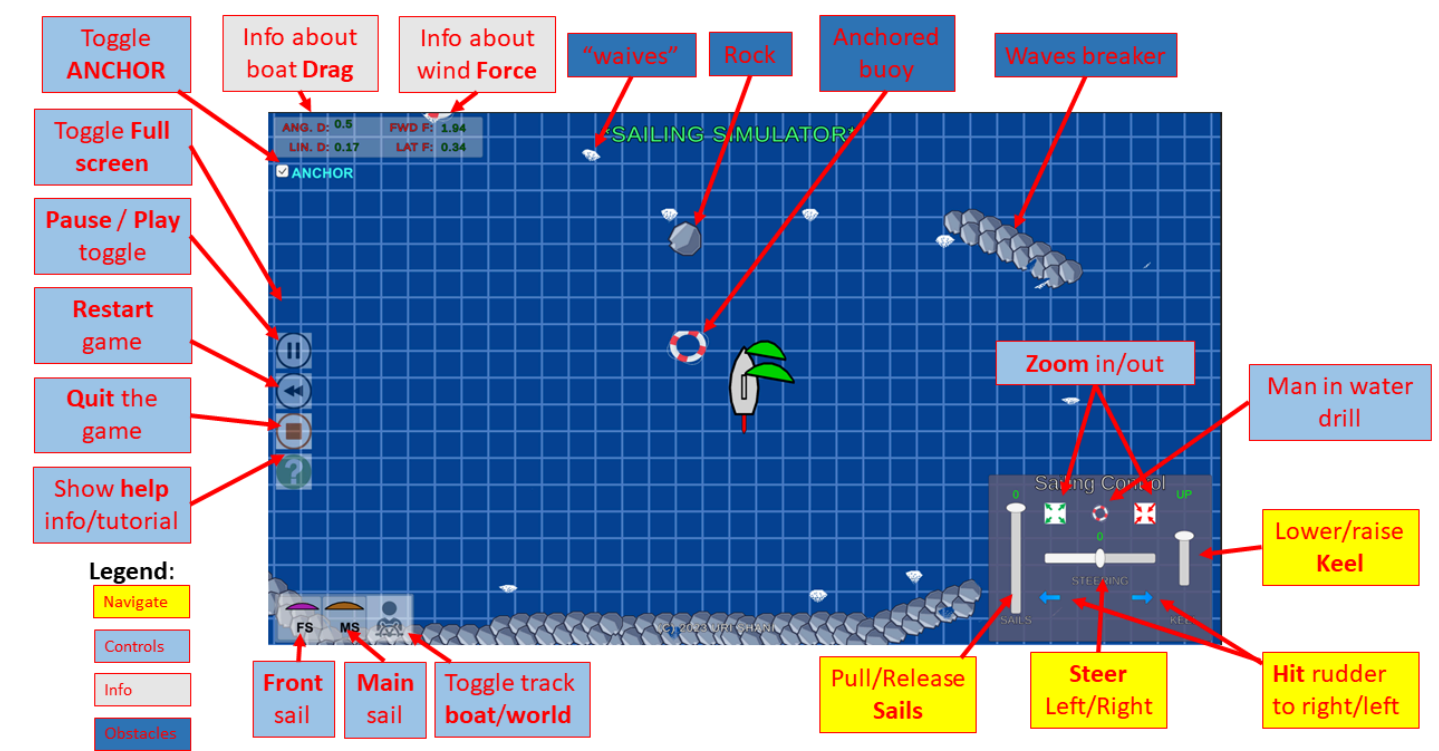
⇧ Tutorial

The third part of the game help information is a series of lessons with animated demonstrations and hands-on steps. For instance, this is the lesson explaining how to work with the sails, the opening explanation, and pointers to the relevant graphics on the screen:
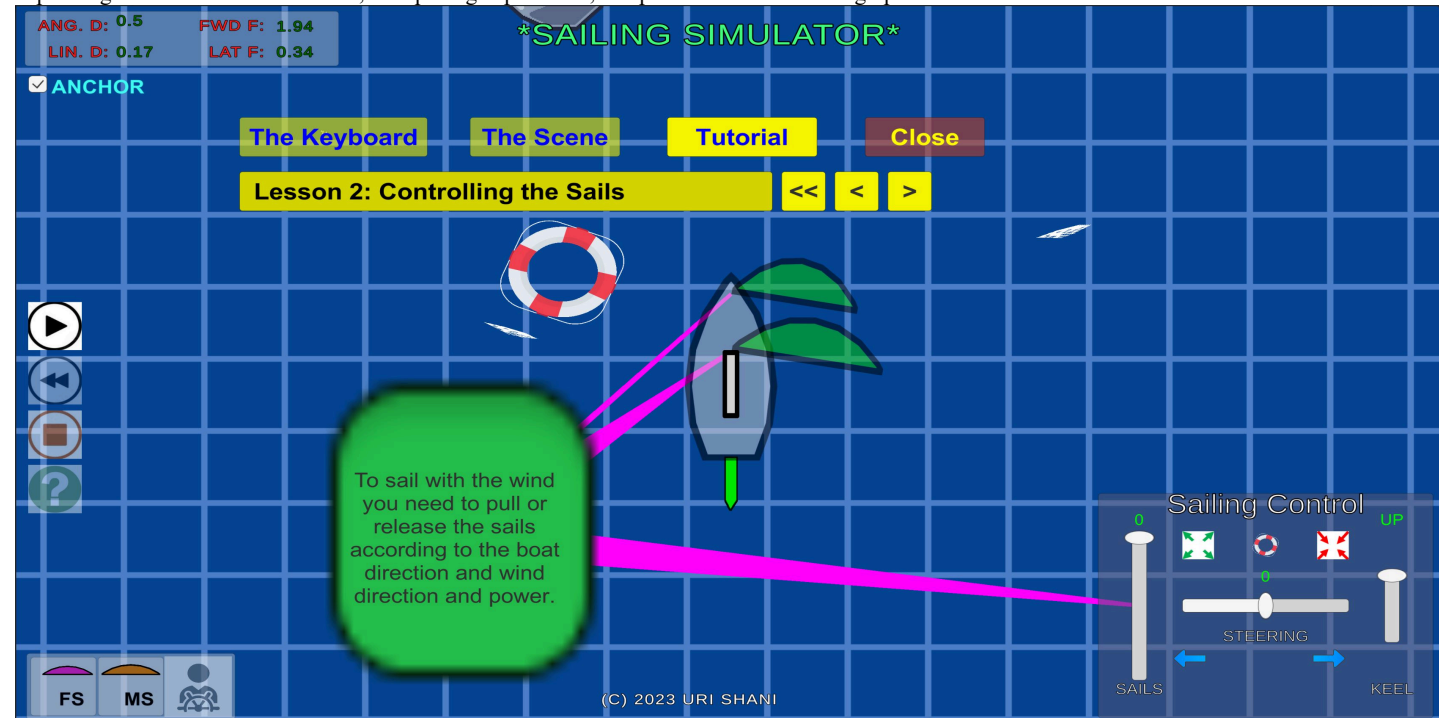
⇧ Versions and changes

The current version 1.1 includes some changes in the GUI and keyboard:

- The GUI size is kept relative to the resolution of the game screen and cannot be changed manually.
- The zoom-in and zoom-out now has many levels that are applied with the keys used previously to change GUI widgets' size: the + and - keys, and also by the small buttons in the "Sailiung Control" box.
- The "Zoom" button **Z** is not active anymore and the respective GUI button on the left side has been removed.
- It is possible to remove the GUI altogether (via the toggle key **K** on the keyboard) and use only keyboard shortcuts.

⇧ Contributing

The project is presently private so contributions are limited.

↑ License

This project is licensed under the [Uri](#) and [Ofek](#) Copyrights. Refer to the [LICENSE](#) file for more information.