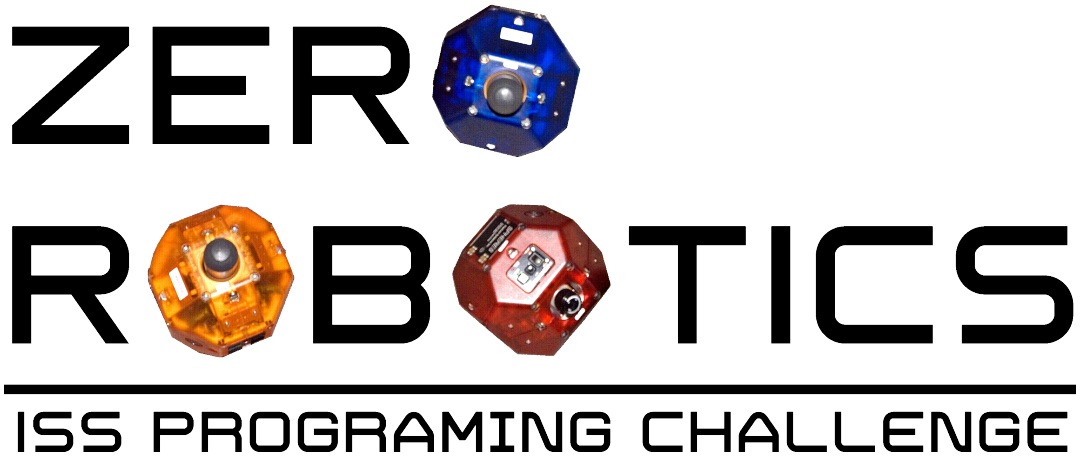


Getting to Know the ZR IDE

Goals

In this tutorial you will learn about various features of the ZR IDE (Integrated Development Environment) to:

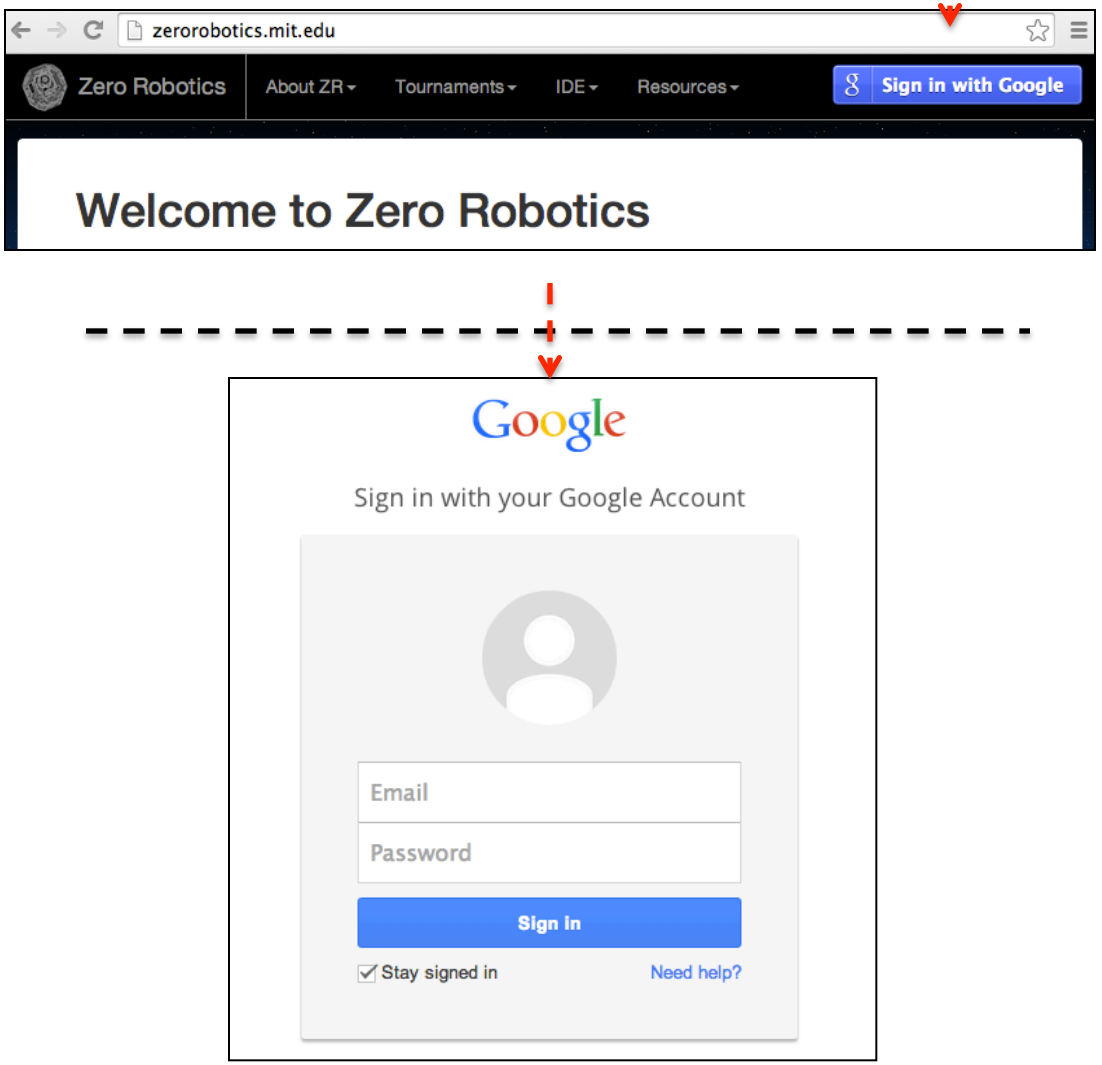
- Create a project
- Compile a code (check it for errors)
- Simulate (run the code in a simulation)

Log In

- Go to the Zero Robotics website:

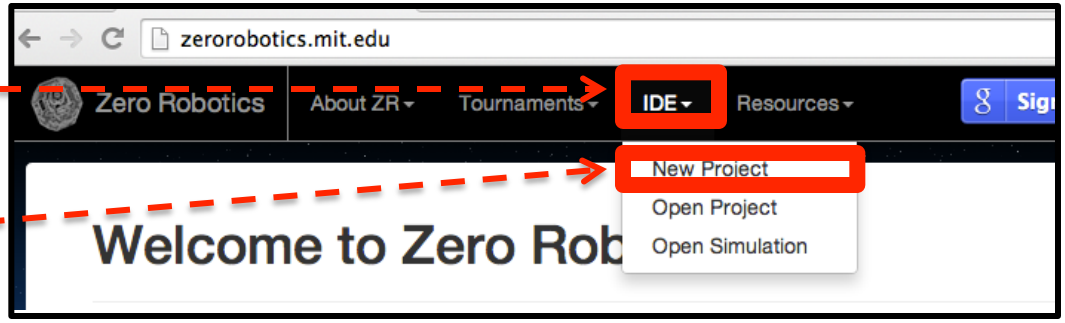
  www.zerorobotics.mit.edu

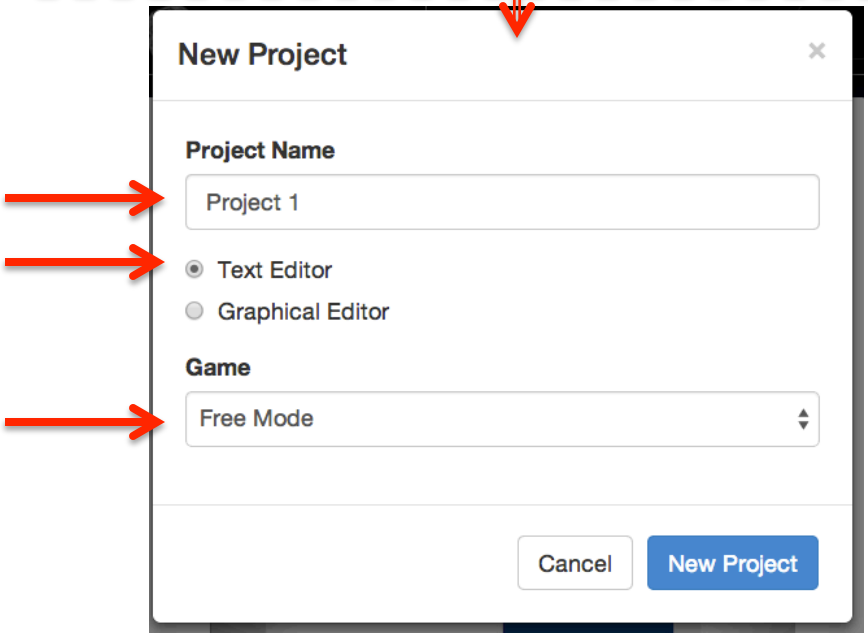
- Log into your account with your email and password



Create a New Project

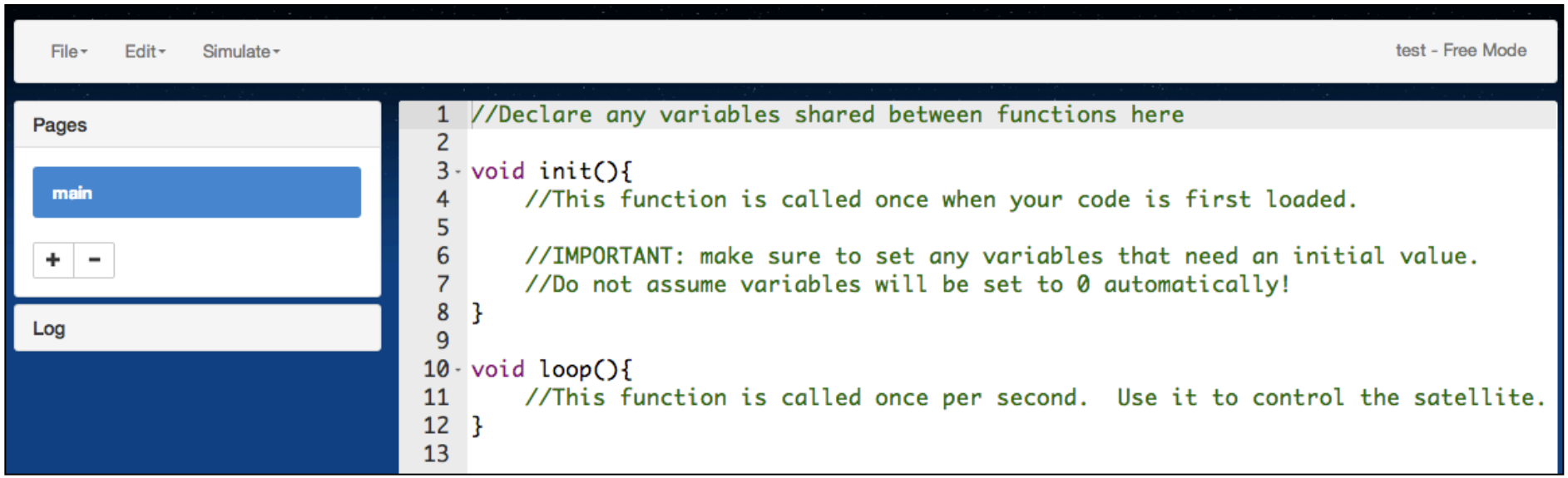
- Select light blue "ZR IDE" SPHERES icon on top ribbon
- Select " New Project"
- Enter
  - Project Name
    - Type: Project 1
  - Select "Text Editor"
  - Select "FreeMode"
- Click "New Project"





Text Editor IDE

- The Text Editor version of the ZR IDE is shown here
- On the next pages, you will:
  - Learn where to declare variables, compile and simulate without entering any code



Declaring a variable

–Variables are always declared right above "***void init***".

–Once a variable is declared you need to assign a value to the variable. This is done right below "***void init***", by typing the variable name followed by an equal sign and then the desired value.

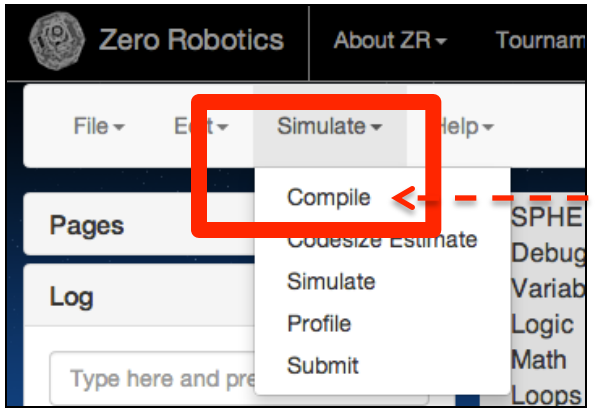
–Another way to assign a value to the variable is at the start of the "***void loop***" (we will get to this in a later tutorial).

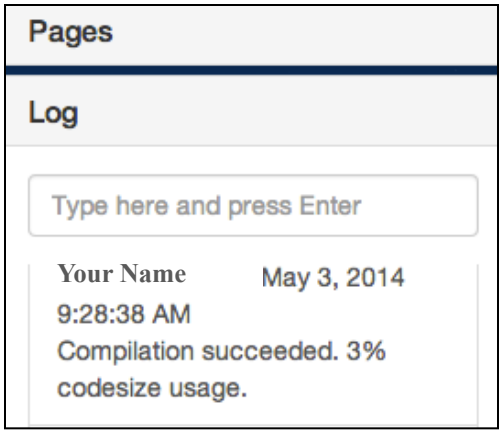
–Examples of declaring and assigning variables are provided in later tutorials

```
1  //Declare any variables shared
2
3  void init(){
4      //This function is called
5
6      //IMPORTANT: make sure to
7      //Do not assume variables
8  }
9
10 void loop(){
11     //This function is called
12 }
13
```

Quick Compile

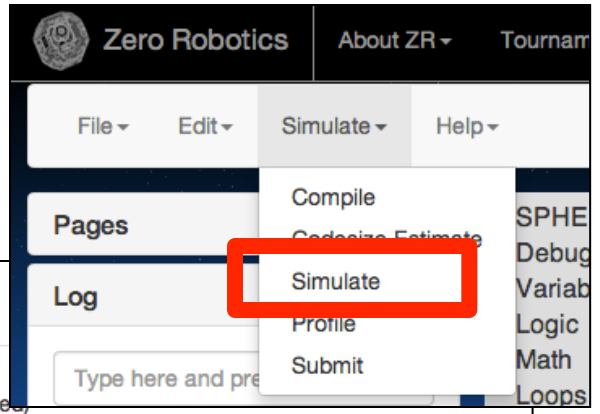
- Compile (Test this feature without entering code):
  - Click on “Simulate” (top menu, third from the left)
  - On the pull down menu, click on ”Compile”
- A “Running” window will pop up while the program is being compiled
- After compiling:
  - The log will open with a compilation succeeded or failed message.
  - If compilation failed check your code and try again

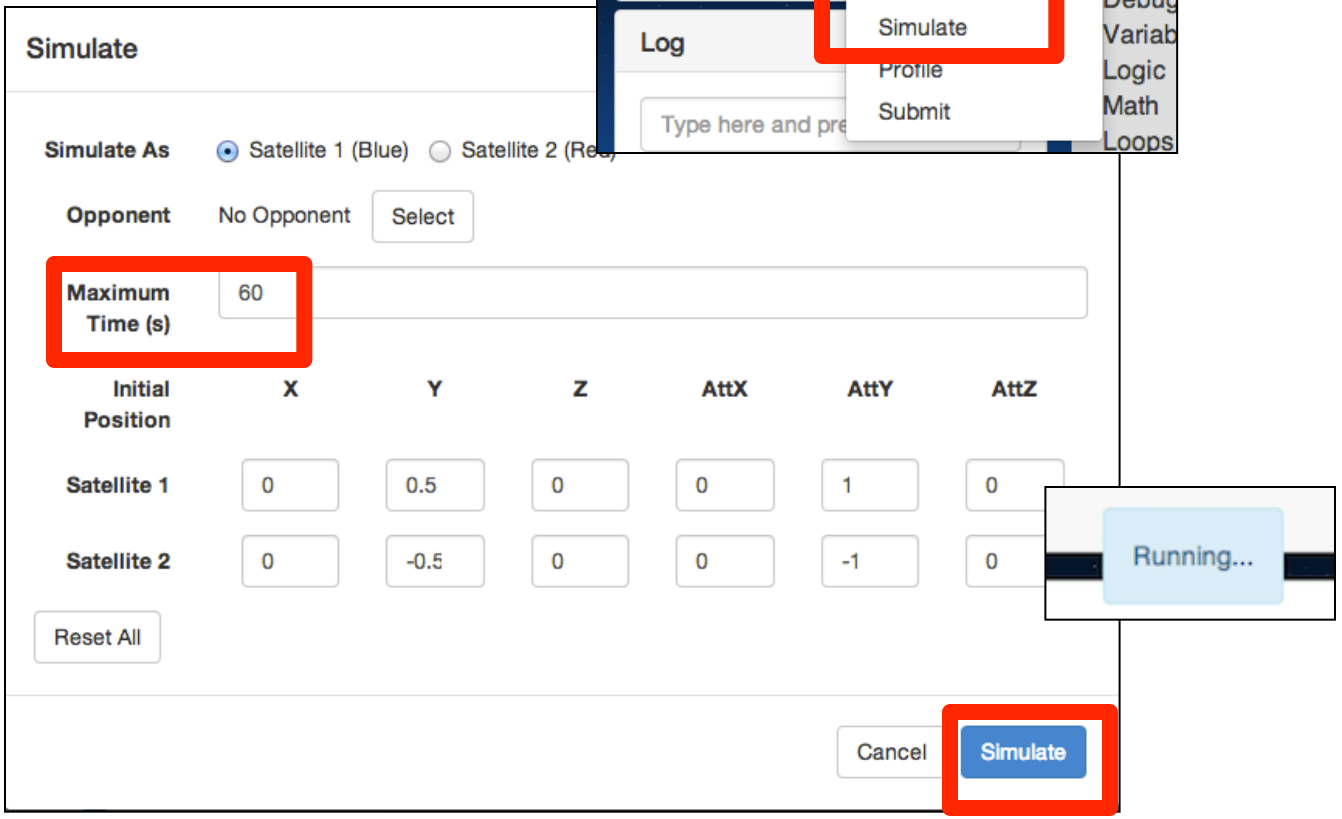




Simulate

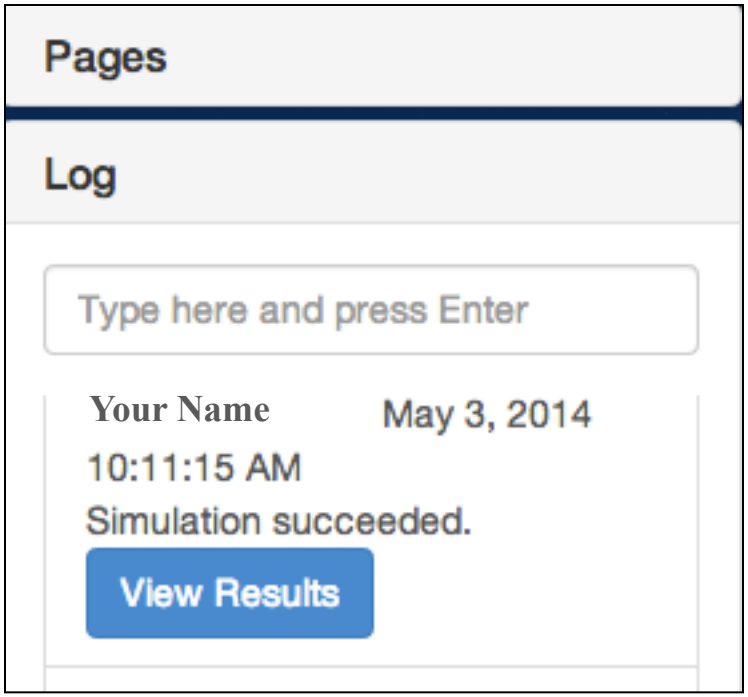
- Click on "Simulate" (top menu, 3rd item from left)
- The Simulation window will open
- Change "Maximum Time" setting to 60
- Click "Simulate"
- a "Running" window pop up while the simulation is being constructed





Simulate (cont.)

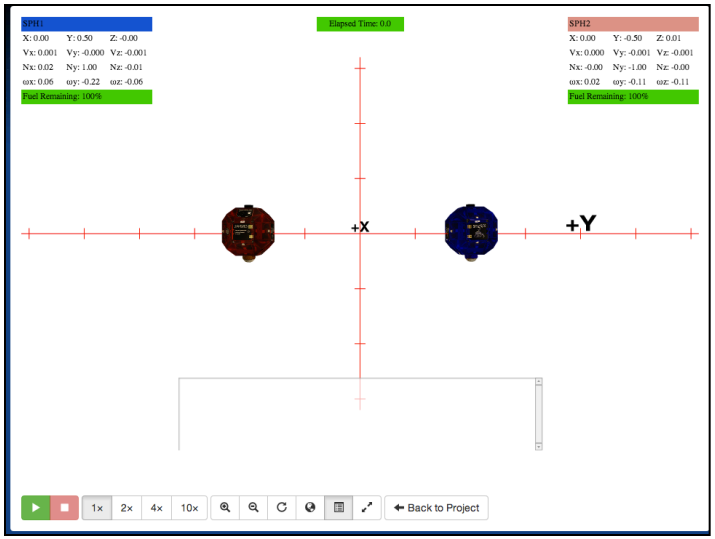
- When complete:
  - The log will open with a simulation succeeded or failed message.
  - Click on “View Results”
  - A new browser window should pop up with background picture.



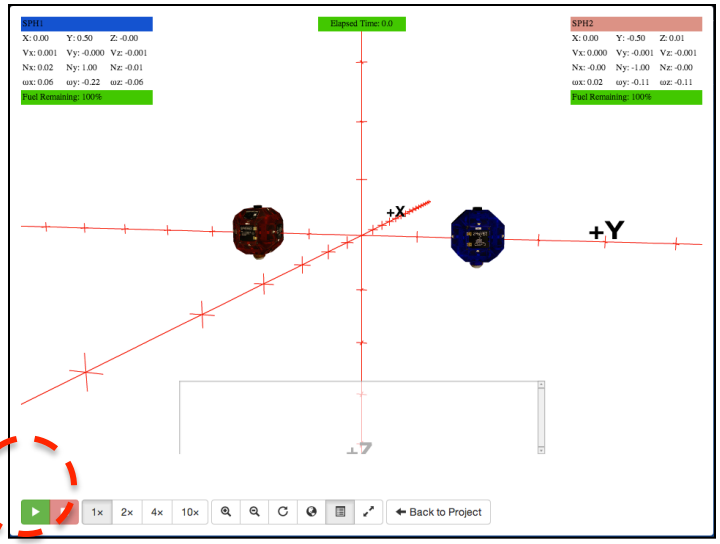
ZERO ROBOTICS
ISS PROGRAMING CHALLENGE

View Simulation

- The initial view shows y and z axis
  - horizontal line (the y-axis)
  - vertical line (the z-axis)
- To see the x axis:
  - Click and hold the left mouse button anywhere on the background and move the mouse until x, y and z axis are visible



- Click the “Play” arrow at the bottom left of the screen and wait a few seconds.
  - Two SPHERES satellites will appear
    - Satellites start from y=0.5 and y=-0.5
    - Hash marks are 0.25 units apart
  - The blue satellite will not move at this point unless you have entered a code.



View Simulation (cont.)

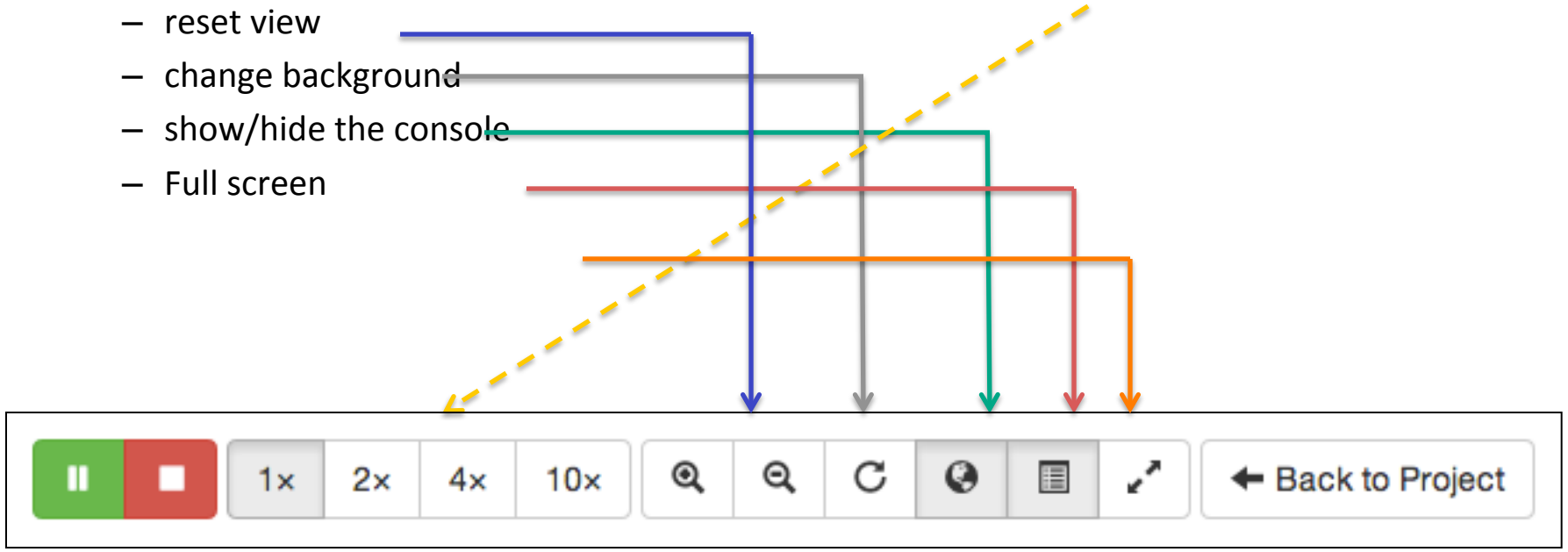
- Replay the simulation by clicking the red stop button and then the green play button.
- Experiment with your views by clicking on and moving the screen
- Watch the scoring box (top-left corner of the screen with blue label) which provides information about the blue SPHERES satellite:
  - where the satellite is (X, Y and Z)
  - how fast it's moving (Vx, Vy, Vz)
  - We'll explain the other labels later (they tell you which way the satellite is pointing and how fast it's rotating).

SPH1		
X: 0.00	Y: 1.51	Z: -0.00
Vx: 0.001	Vy: -0.001	Vz: -0.000
Nx: -0.00	Ny: 1.00	Nz: 0.01
ωx: 0.06	ωy: 0.14	ωz: 0.02
Fuel Remaining: 100%		

Modify Program, Compile & Simulate (cont.)

- Experiment with the simulation buttons and views at the bottom to:

– Experiment with the simulation buttons and views at the bottom to:
  – change simulation speeds (see the “1x, 2x, 3x, 4x, 10x” buttons)
  – Zoom buttons
  – reset view
  – change background
  – show/hide the console
  – Full screen



- On the bottom menu select “Back to Project” to return to the Graphical Editor page

Review

- Congratulations!
- You have learned about various features in the ZR IDE
- You learned how to compile code and check for errors
- You learned how to run the code in simulation