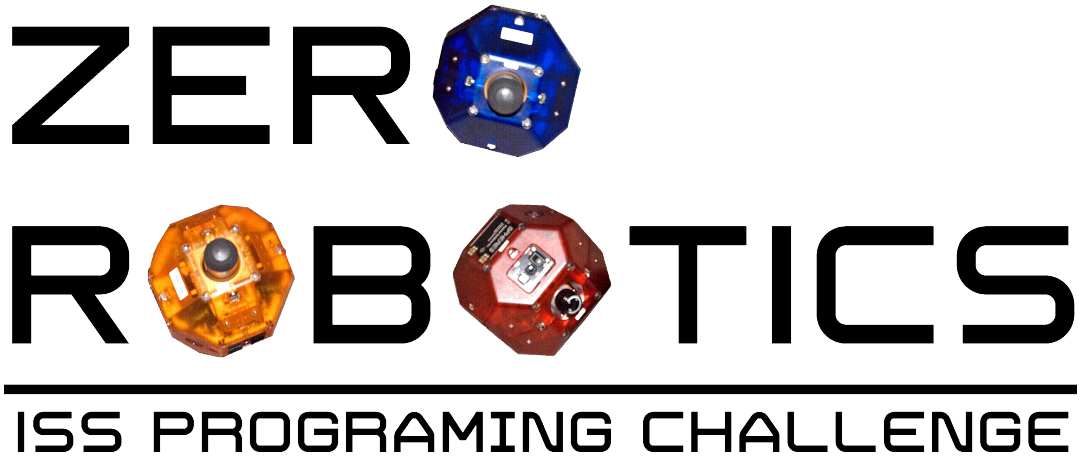


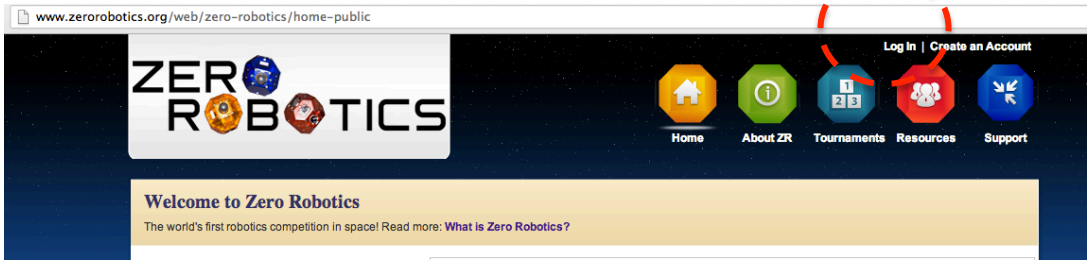
Getting to Know the ZR IDE (Text Editor)

Goals

In this tutorial you will use the ZR IDE (Integrated Development Environment) to:

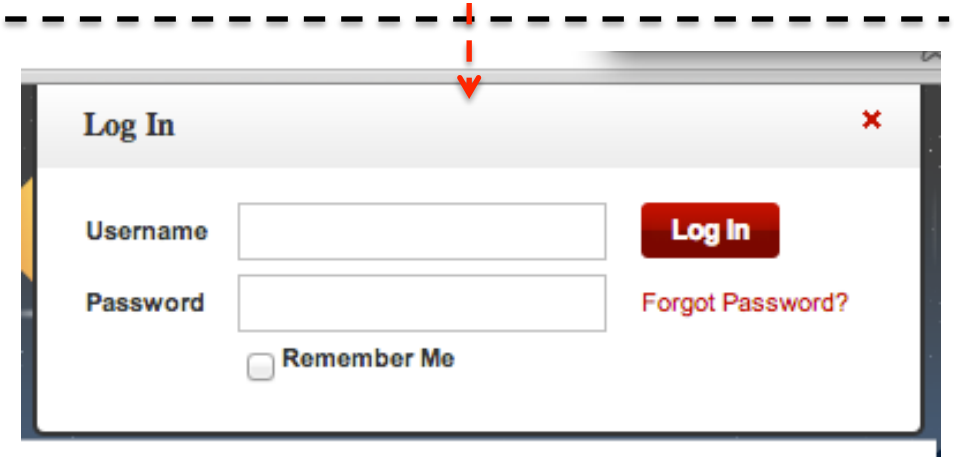
- Create a project in the C++ programming language
- Compile code (check it for errors and translate it from C++ to binary code a SPHERES can understand)
- Simulate (run the code in a simulation of the real SPHERES hardware on the ISS)

Log In



- Go to the Zero Robotics website:

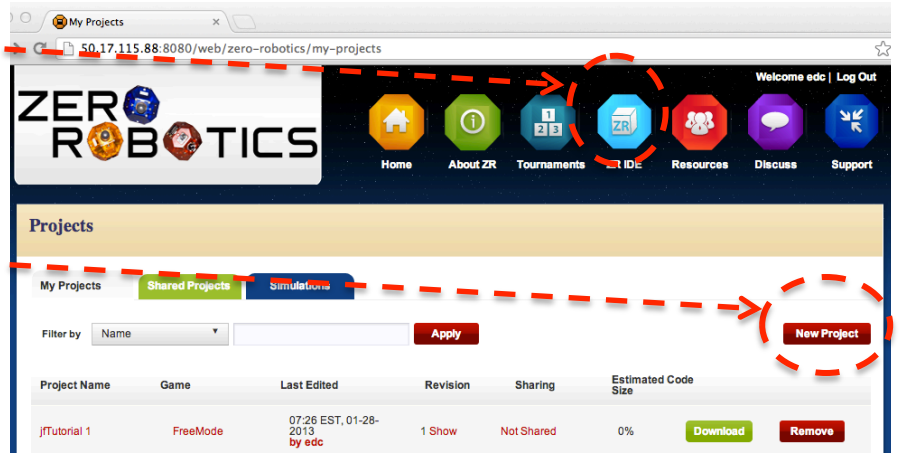
http://www.zerorobotics.mit.edu

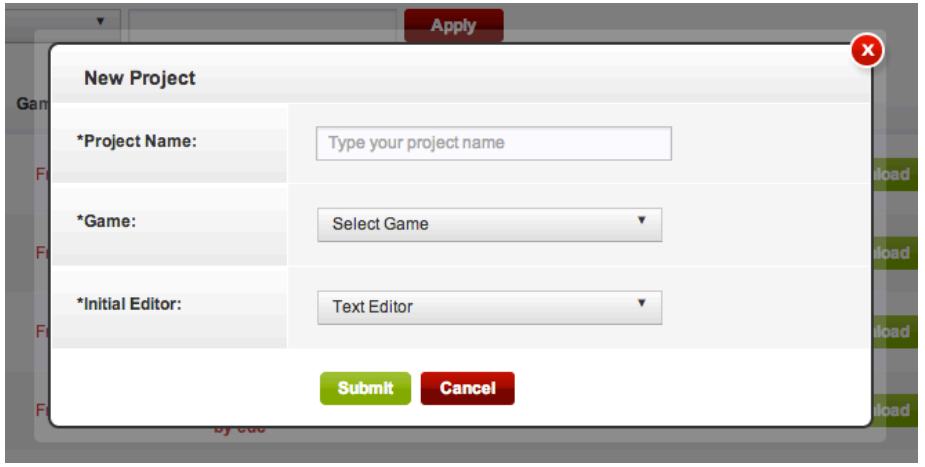


- Log in with your username and password

Create a New Project

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





Text Editor IDE

- The Text Editor version of the ZR IDE is shown here with the basic template code for a ZR project

ZR IDE

File Edit Quick Compile Simulate Update All Commit

Save As

Save & Return to Projects

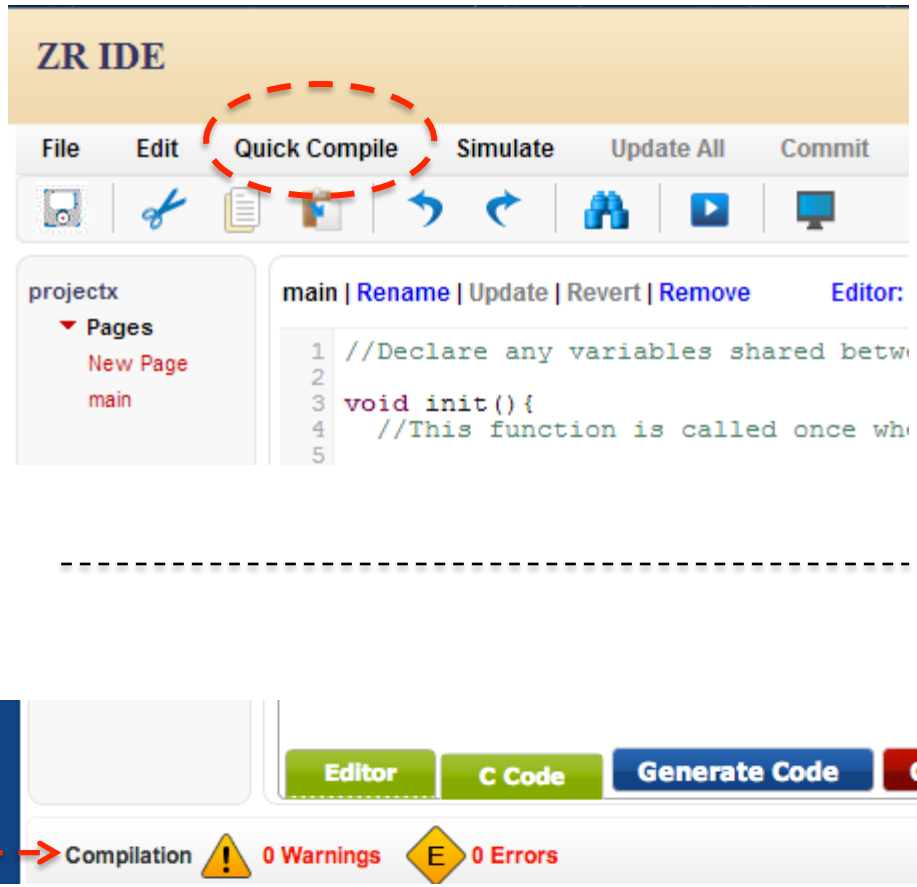
in | Rename | Update | Revert | Remove Editor: m10610 Mine : Latest [0:0]

Pages
New Page
main

```
1  //Declare any variables shared between functions here
2
3  void init(){
4    //This function is called once when your code is first loaded.
5
6    //IMPORTANT: make sure to set any variables that need an initial value.
7    //Do not assume variables will be set to 0 automatically!
8  }
9
10 void loop(){
11   //This function is called once per second.  Use it to control the satellite.
12 }
13
14
15
16
17
```

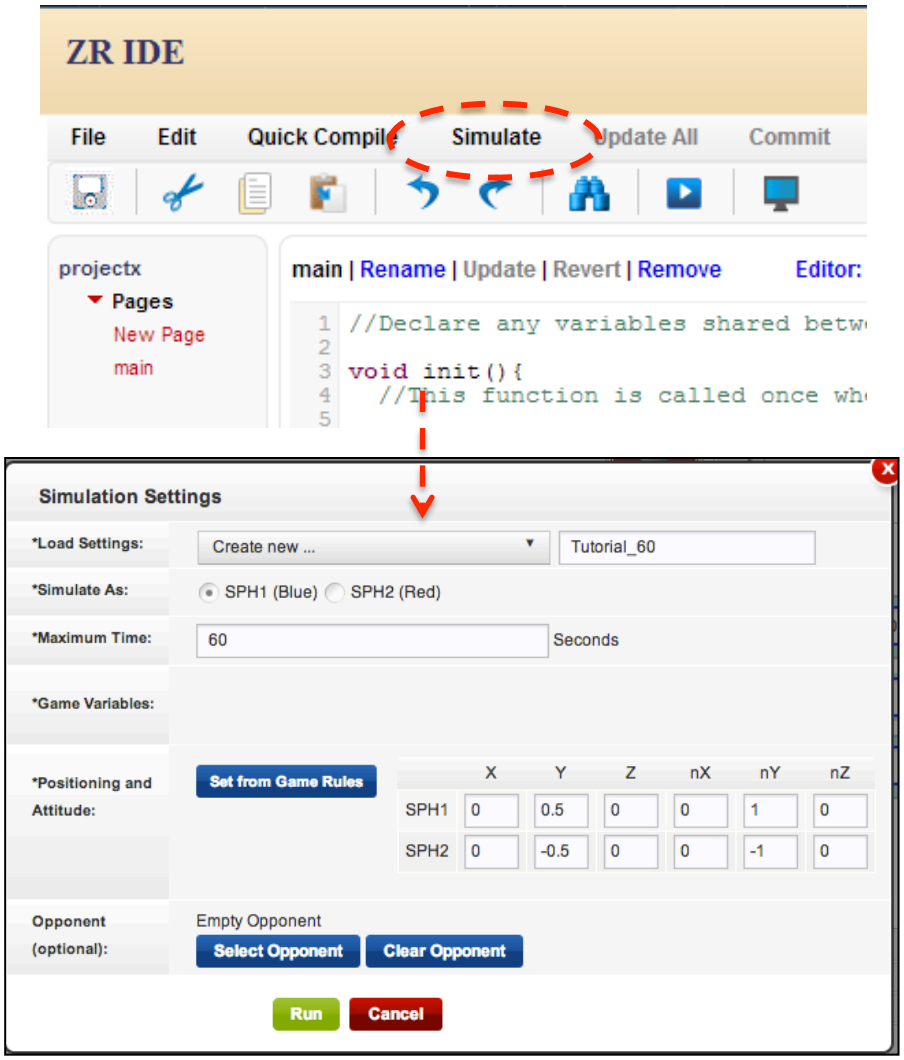
Quick Compile

- Now let's see a program in action!
- Click on "Quick Compile" (top menu, third from the left) and wait a moment.
  - At the bottom of the screen, you should see "0 Warnings" and "0 Errors"



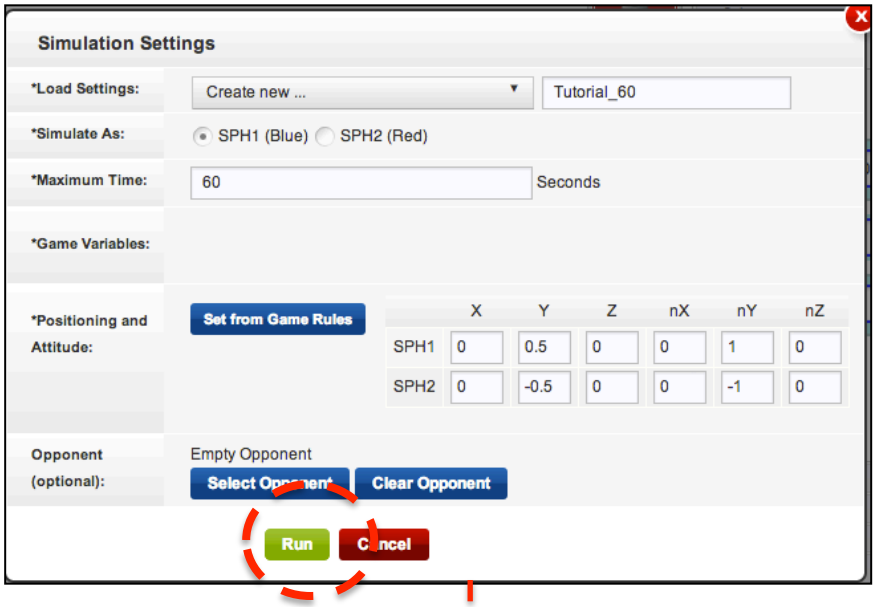
Simulate

- Click on “Simulate” (top menu, 4th item from left)
- In the Simulation Settings pop-up box:
  - Select “Create new…”
  - Type a settings name: “Tutorials_90”
  - This simulation will run for 90 seconds
- Leave everything else as is

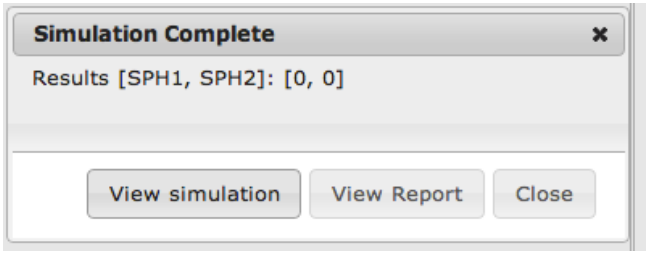


Simulate (cont.)

- Click on green “Run” button at the bottom
  - This will take a minute
  - You will see messages while you wait

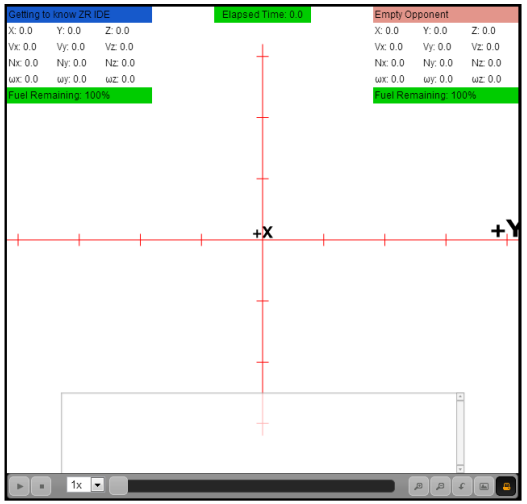


- Click on “View simulation”
- A new browser window or tab should pop up.

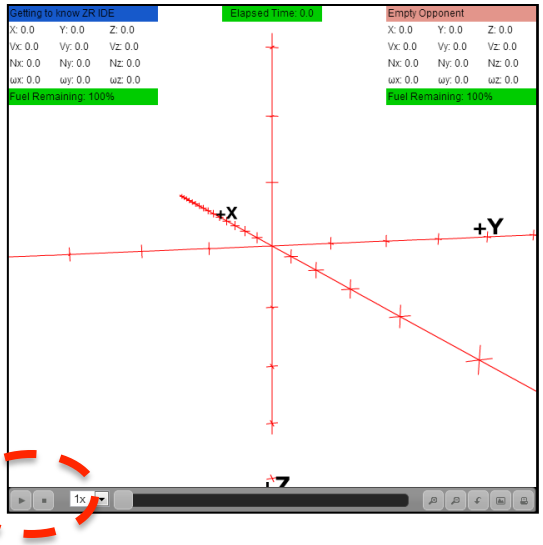


View Simulation

- 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

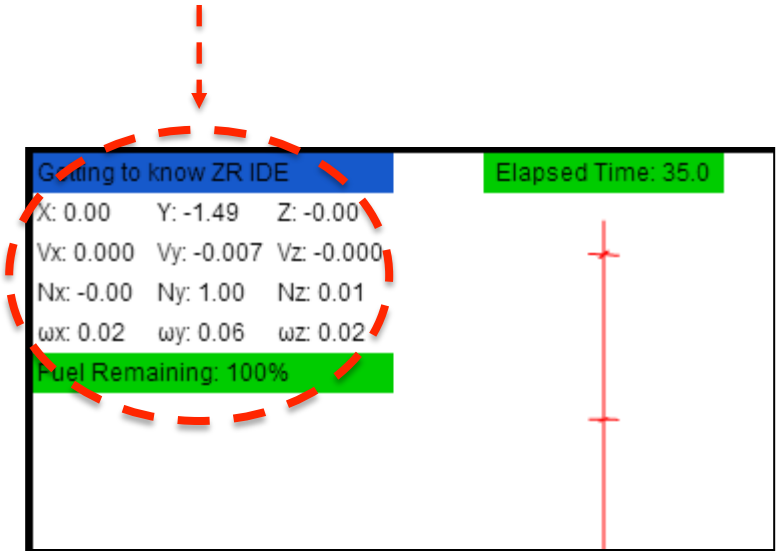


- Click the "Play" arrow at the bottom left of the screen and wait a few seconds.
  - Two SPHERES satellites will appear
    - Satellites start from y=0.5 and y=-0.5
    - Hash marks are 0.25 units apart
  - The satellites will not do much because you have not programmed them to do anything yet!



View Simulation (cont.)

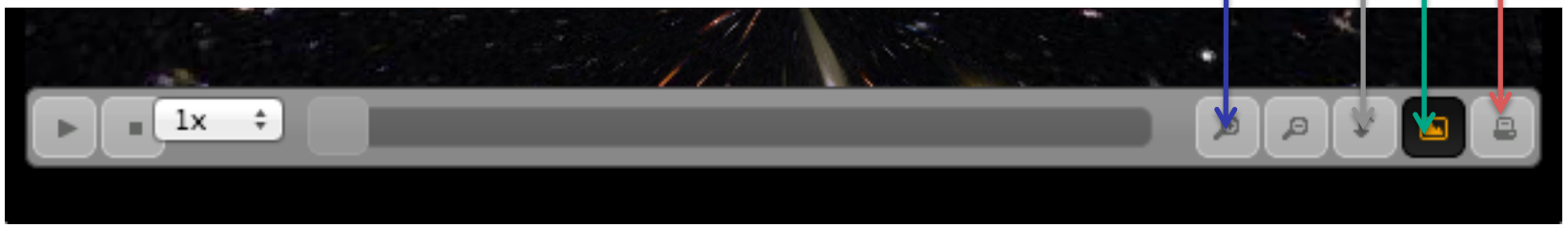
- Replay the simulation by clicking the play arrow again
- Experiment with your views by clicking on and moving the screen
- Watch the scoring box (top-left corner of the screen with blue label) which provides information about the blue SPHERES satellite:
  - where the satellite is (X, Y, Z)
  - how 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).



- Notice that the satellites "jiggle" a little even when they are not programmed to do anything. There is noise (random movement) built into the simulation to represent the imperfections in the actual SPHERES.

View Simulation (cont.)

- Experiment with the simulation buttons and views at the bottom to:
  - change simulation speeds (dropdown menu on the left)
  - zoom in/out
  - reset view
  - change background
  - show/hide the console



Review

- Congratulations!
- You learned how to use the ZR IDE
- You compiled code
- You ran the code in a simulation