ZERO ROBOTICS

ISS PROGRAMING CHALLENGE

Let the Games Begin

- Start planning your code for the game
  - This slideshow gives steps for how to get started using a simple example

  - You will follow the example steps to start developing a plan for your game, based on the game manual and your strategy ideas

Describe your plan using sentences

- Remember the importance of giving specific directions (as demonstrated by the logic activities you have done)

- Example (for the diagram shown at the right)

  - <u>In Phase 1:</u> Move the SPHERES from the starting position around the left side of a green planet (the green circle) to an outpost. Stop the SPHERES when it reaches the outpost and rotate the SPHERES 90 degrees

  - <u>In Phase 2:</u> Move the SPHERES from the outpost around the other side of the planet to the starting position. Stop the SPHERES when it reaches the starting position and rotate the SPHERES 90 degrees

Phase 1

Starting Position

Planet

Outpost

Phase 2

Planet

Outpost

Finish at Starting Position
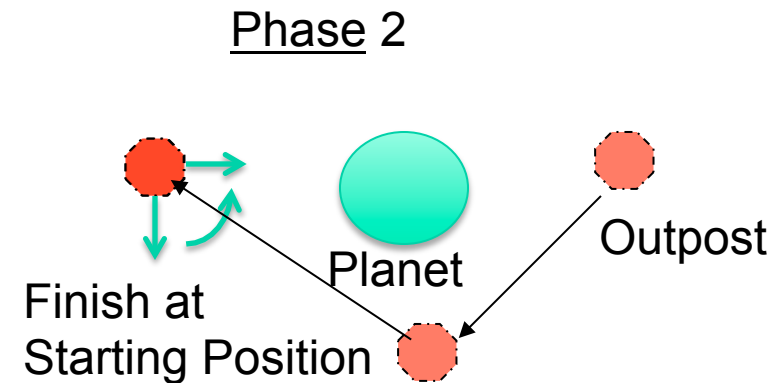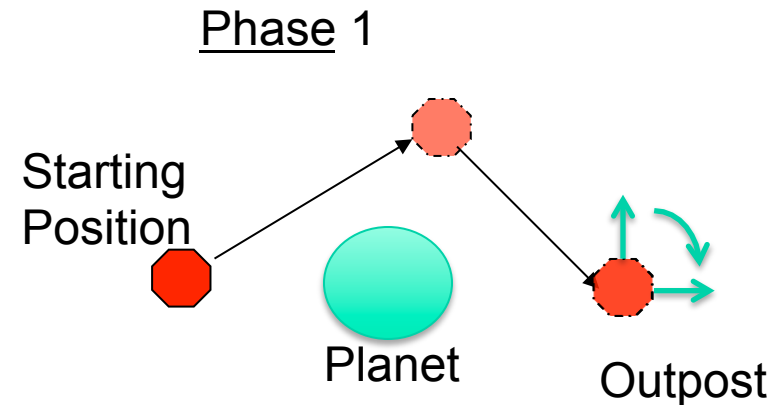
Now it's your turn to write sentences to describe one or more parts of your game.

(You may want to start with the sentences you wrote for the Field Day activities.)

- When you convert your sentences into list form try to:
  - Add more detail
  - Replace the words "move" and "rotate" with the words setPositionTarget and setAttitudeTarget
- Example for Phase 1 shown at the right
  - Convert the following sentence:
    - In Phase 1: Move the SPHERES from the starting position around the left side of the green planet to the outpost. Stop the SPHERES when it reaches the outpost and rotate the SPHERES 90 degrees
  - To list form:
    - setPositionTarget to "Other" position
    - When SPHERES reaches "Other" position, setPositionTarget to Outpost
    - When SPHERES reaches Outpost stop SPHERES at the Outpost (setPositionTarget to Outpost)
    - Use setAttitudeTarget to rotate the SPHERES 90 degrees

Phase 1

"Other" position

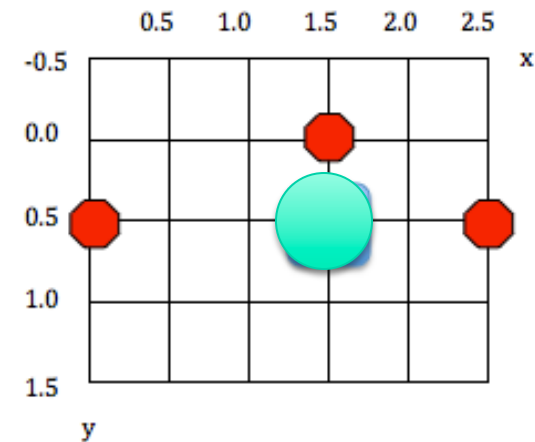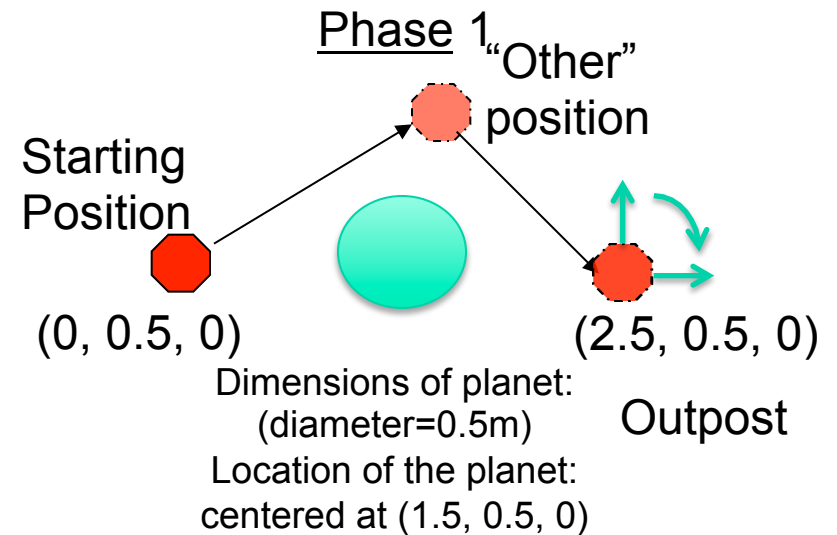Starting Position

Planet

Outpost
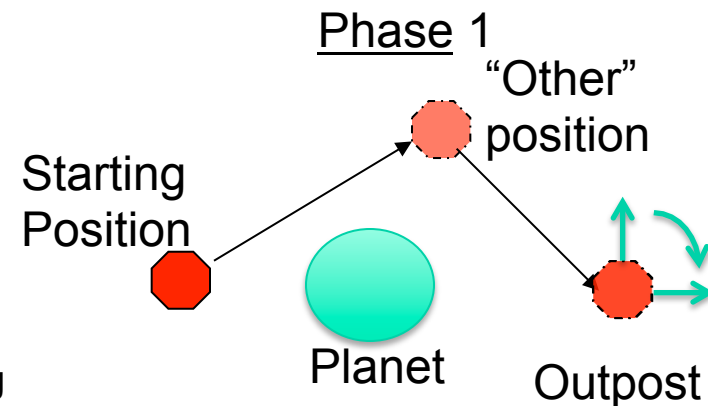
Now it's your turn to convert your sentences into list form.

Remember to replace the words "move" and "rotate" with the words setPositionTarget and setAttitudeTarget.

- Add details about coordinate information based on information from the game manual

- It may be helpful to draw a graph

  - Original list form:

    - setPositionTarget to "Other" position
    - When SPHERES reaches "Other" position, setPositionTarget to Outpost
    - When SPHERES reaches the Outpost stop SPHERES at the Outpost (setPositionTarget to Outpost)
    - Use setAttitudeTarget to rotate the SPHERES 90 degrees

  - List form with coordinates:

    - setPositionTarget to "Other" position (we will try "Other" position =(1.5,0,0)
    - When SPHERES reaches "Other" position, setPositionTarget to Outpost(2.5,0.5,0)
    - When SPHERES reaches the Outpost setPositionTarget to Outpost(2.5,0.5,0)
    - Use setAttitudeTarget to rotate the SPHERES 90 degrees

Phase 1 "Other" position

Starting Position

(0, 0.5, 0)

(2.5, 0.5, 0)

Outpost

Dimensions of planet:
(diameter=0.5m)
Location of the planet:
centered at (1.5, 0.5, 0)

Now it's your turn to add coordinate information to your list

- Try to create a flow diagram based on your list of steps.
  - For this exercise, **use time counters to determine when each step occurs** and guess how much time is needed for each step.

- The example flow diagram on the right is based on the example below
  - <u>List form with time counters added:</u>
    - If Counter<30
      - Then setPositionTarget to "Other" position (we will try "Other" position =(1.5,0,0)
    - Else If Counter<60
      - Then, setPositionTarget to Outpost (2.5,0.5,0)
      - setAttitudeTarget to pointposx (specifies a pointing direction before 90 degree rotation)
    - Else
      - When SPHERES reaches Outpost setPositionTarget to Outpost (2.5,0.5,0)
      - setAttitudeTarget to pointposy (to rotate 90 degrees)
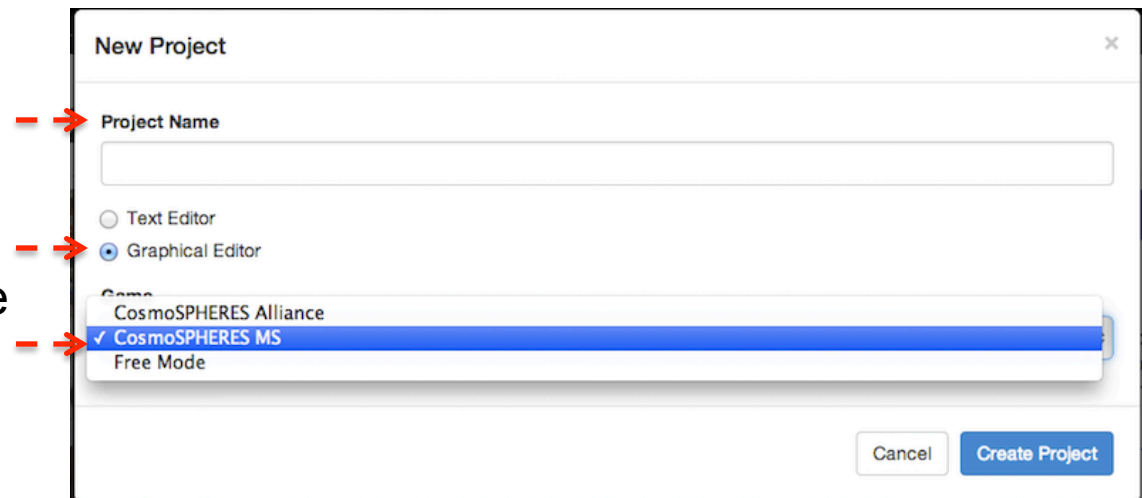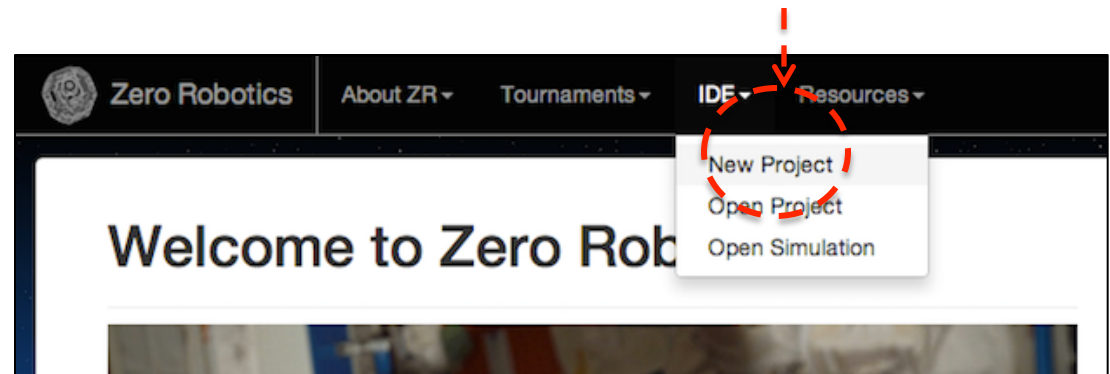   - Counter=Counter+1
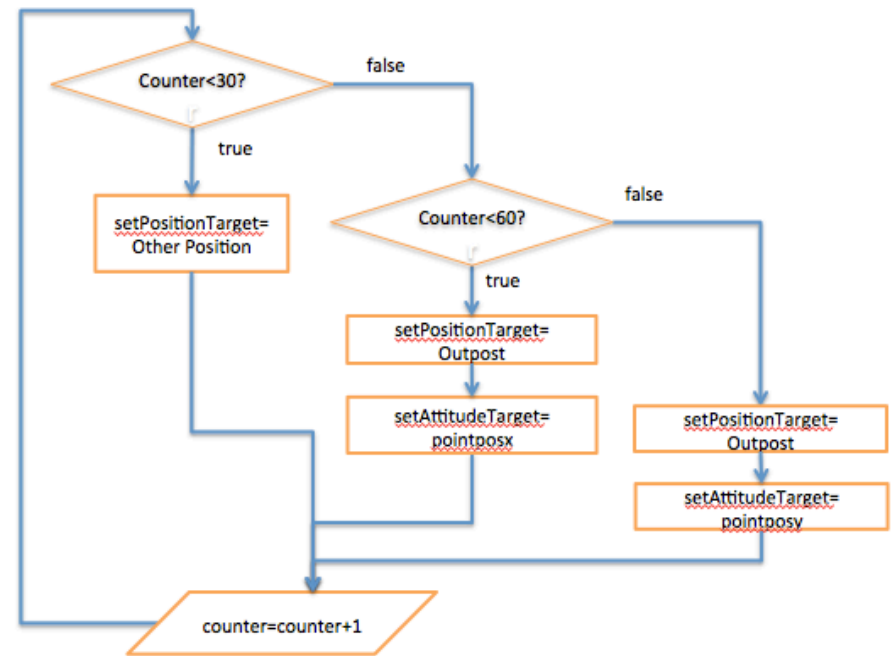
Now it's your turn to create a flow diagram and/or a list based on time counters.

Add details about how you will use setAttitudeTarget to rotate the SPHERE (see example).

- You are ready to start creating a program in the ZR IDE using **Game Mode**
    - The main difference from what what you have done before is that you will **not** select Free Mode this time

- Click on the IDE menu

- Click on "New Project"

- Give your program a name

- **For Game**:
    - Select the name of this year's Zero Robotics Middle School game (check with your teacher)

- Editor: Graphical Editor

- Don't forget to start by declaring and initializing your variables!
  - In our example we would have the following variables:
    - "Counter" (int)
    - "Otherposition" (float, [3])
    - "Outpost" (float, [3])
    - "Pointposx" (float, [3])
    - "Pointposy" (float, [3])
- Refer to your tutorials for help
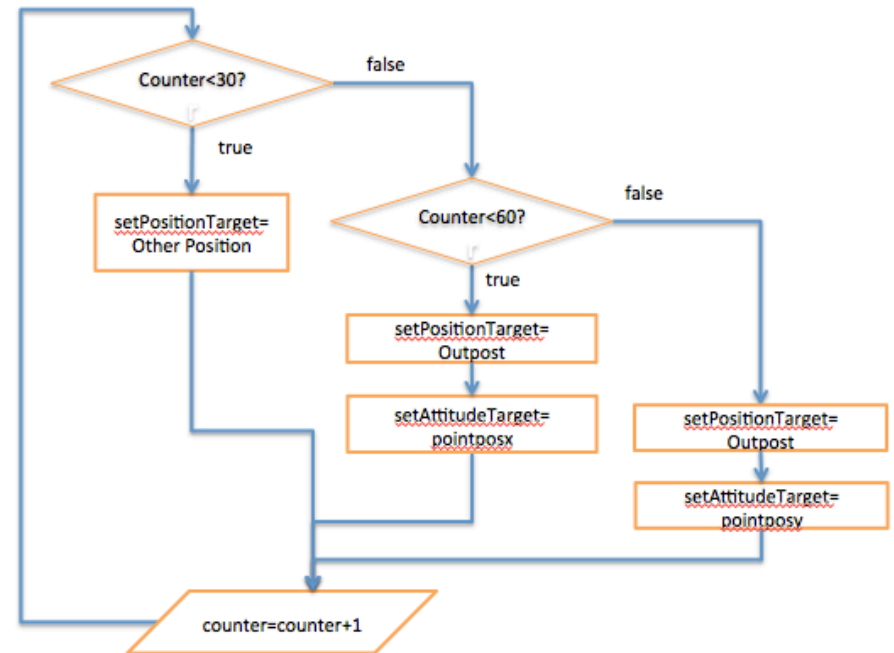
Congratulations! You are on your way to creating a program for the Zero Robotics Middle School game!