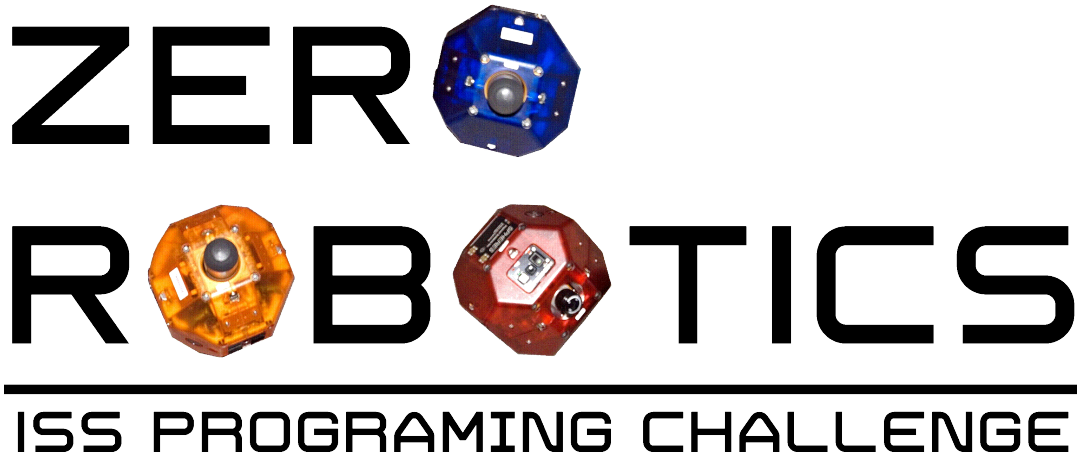
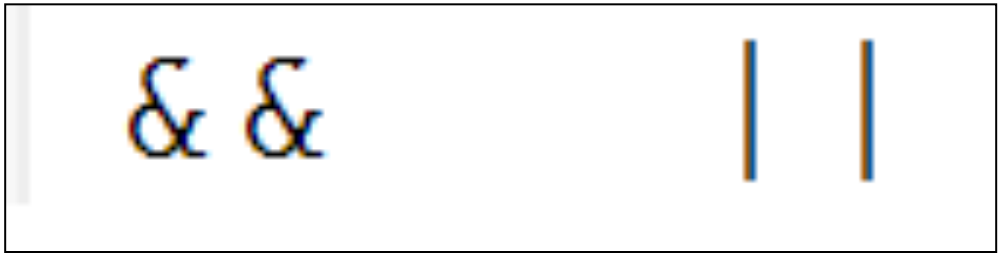



# Conditionals: Advanced Logic Operators

# Goals


- In this tutorial you will:
  - Use the logic operators “and ” and “or” in conditionals
  - Control the satellite’s translation and rotation simultaneously



# Create a New Project


- Open the ZR IDE
- Select “New Project”
  - Project name: **Project 6**
  - Game: FreeMode
  - Text Editor

```
18 void loop(){
19   //This function is called once per second.  Use it to control the satellite.
20   api.setPositionTarget(positionA);
21 }
```

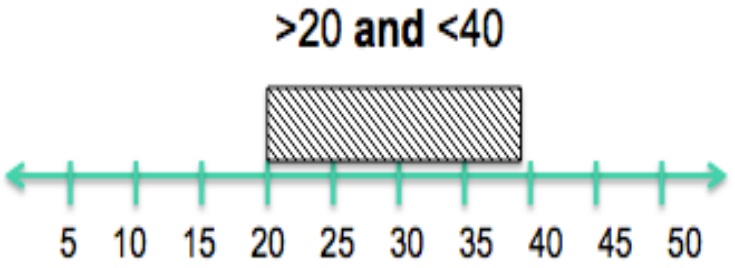
- Declare Variables/Arrays

  (Go back and look at Project 4 if you need help with how to declare variables)
  - **int counter** (initialized to **0**)
  - **float positionA[3]** (initialized to **1.0f,0.0f,0.0f**)
  - **float positionB[3]** (initialized to **0.0f,1.0f,0.0f**)
- Add a statement to set the position target to **`positionA`**
- Next we will add a conditional statement to tell the satellite when to go to **`positionB`**, as follows.

# The Logic Operator &&


- **&&** is a logic operator that means "and"
- Create the following conditional statement in your loop using **&&**:

  "If counter > 20 and counter < 40
  then…go to positionB"




```
22 void loop(){
23   //This function is called once per second.  Use it to control the satellite.
24 api.setPositionTarget(positionA);
25   if (counter>20 && counter<40){
26   }
27 }
```

# The Logic Operator "and" (cont.)


- Remember the "If-Then" statement is:
  "If counter > 20 and counter < 40 then… go to positionB."
- To make it go to positionB, we need to add the following:
  **api.setPostionTarget(positionB);**
- The last step is to increment the counter (outside the if statement.)
  **`counter++;`**

```
22 void loop(){
23   //This function is called once per s
24 api.setPositionTarget(positionA);
25   if (counter>20 && counter<40){
26     api.setPoitisonTarget(positionB);
27   }
28   counter++;
29             }
```

# The Logic Operator "and" (cont.)


- What do you expect to happen?
  - Compile, Simulate
    - Load settings: Tutorial _90
  - View simulation

Blue satellite should move from:
initial position➔ positionA ➔ positionB ➔ positionA

# Modify program


- Modify the program to change both the attitude and position of the satellite
- Create the following arrays for setting other attitudes:
  - To point in the positive x direction: **float pointposx[3]** initialized to {**1.0f,0.0f,0.0f**}
  - To point in the negative x direction: **float pointnegx[3]** initialized to {**-1.0f,0.0f,0.0f**}

```
1  //Declare any variables shared between functions here
2  int counter;
3  float positionA[3];
4  float positionB[3];
5  float pointposx[3];
6  float pointnegx[3];
7
8  void init(){
9    //This function is called once when your code is first loaded.
10
11   //IMPORTANT: make sure to set any variables that need an initial value.
12   //Do not assume variables will be set to 0 automatically!
13 counter = 0;
14 positionA[0] = 1;
15 positionA[1] = 0;
16 positionA[2] = 0;
17 positionB[0] = 0;
18 positionB[1] = 1;
19 positionB[2] = 0;
20 pointposx[0] = 1;
21 pointposx[1] = 0;
22 pointposx[2] = 0;
23 pointnegx[0] = -1;
24 pointnegx[1] = 0;
25 pointnegx[2] = 0;
26 }
```

# Modify program (cont.)


- Add the following into the If-then statement:
"**api.setAttitudeTarget(pointposx)**"

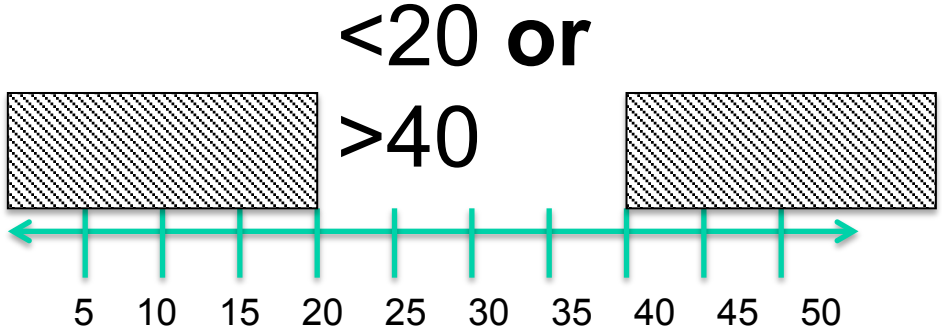
```
22 void loop(){
23   //This function is called once per
24 api.setPositionTarget(positionA);
25   if (counter>20 && counter<40){
26     api.setPositionTarget(positionB);
27     api.setAttitudeTarget(pointposx);
28   }
29   counter++;
30             }
```

# The Logic Operator ||


- || is a logic operator that means "or"
- Add another "If-Then" statement that states the following:

"If counter < 20 or counter > 40 then… point in the negative x direction"

(Note: Make sure this goes before the counter statement.)




```
22 void loop(){
23   //This function is called once per s
24 api.setPositionTarget(positionA);
25   if (counter>20 && counter<40){
26     api.setPoitisonTarget(positionB);
27     api.setAttitudeTarget(pointposx);
28   }
29   if (counter<20 || counter>40){
30   }
31   counter++;
32             }
```

# The Logic Operator || (cont.)


- Add the following into the second conditional statement:
  **api.setAttitudeTarget(pointnegx);**
- What do you expect to happen?
  - Compile, Simulate
    - Load settings: Tutorial _90
  - View simulation

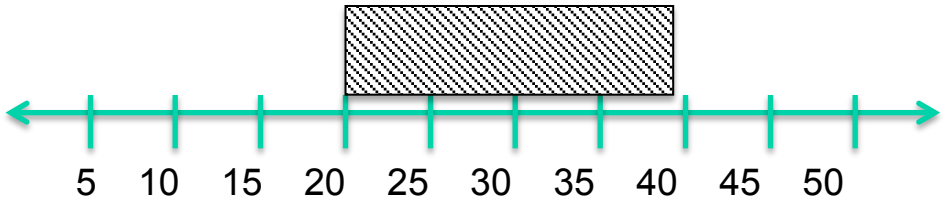
```
22 void loop(){
23   //This function is called once per s
24 api.setPositionTarget(positionA);
25   if (counter>20 && counter<40){
26     api.setPoitisonTarget(positionB);
27     api.setAttitudeTarget(pointposx);
28   }
29   if (counter<20 || counter>40){
30     api.aetAttitudeTarget(pointnegx);
31   }
32   counter++;
33             }
```

# Review


- Congratulations!
- You have learned two more logic operators:

  **&&** and **||**
- You wrote a program that controls the satellite's position and attitude simultaneously

>20 **and** <40




<20 **or** >40