Conditionals:
Else-If

Goals

- In this tutorial you will:
  - Learn to use "Else-If" statements in programming
  - Use "Save As" to create a new project

```
else if (){
}
```

- "Else-If" statements give more flexibility in programming

- The code in the **else** slot will run when the **if** condition is **not** true
  - **Else** statements can contain:
    - Other **if** statements
    - Any other code

```
void loop(){
    //This funct
    if (){
    }
    else if (){
    }
```
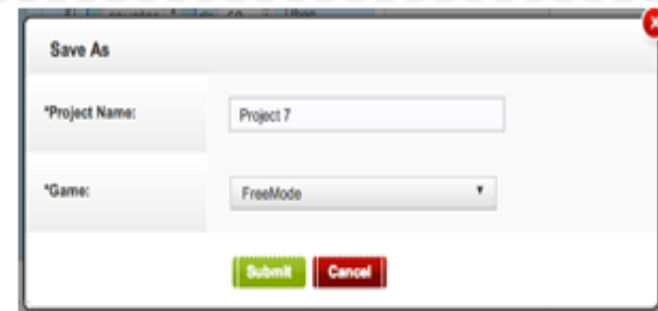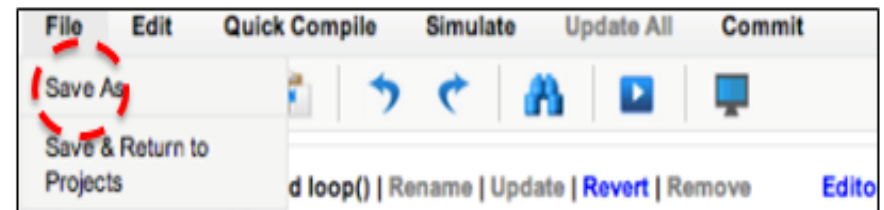
----->

```
void loop(){
    //This func
    if (){
    }
    else if(){
    }
    else{
    }
```

Use "Save As" to Create a New Project

- We will start with a simple example to show how "Else-If" statements work

- Since we will be using the variable **counter** and the arrays **positionA** and **positionB**, we will modify a program created previously.

- Open the ZR IDE

- Open **Project 4** that you created previously

- On the menu bar select "File" and then "Save As" from the drop down menu.

- Type in **Project 7** and select **FreeMode**

- Delete all the "if" statements. Leave the **counter++;** statement.

- You are ready to start your new project with
  - 1 variable and 2 arrays already created
  - The **counter++**; statement

- We will create a new project described by the flow diagram to the right

- Use what you have learned before to write an "If" statement containing the following (we'll add the "Else-If" statement later on):

  "If counter < 30, go to positionA"
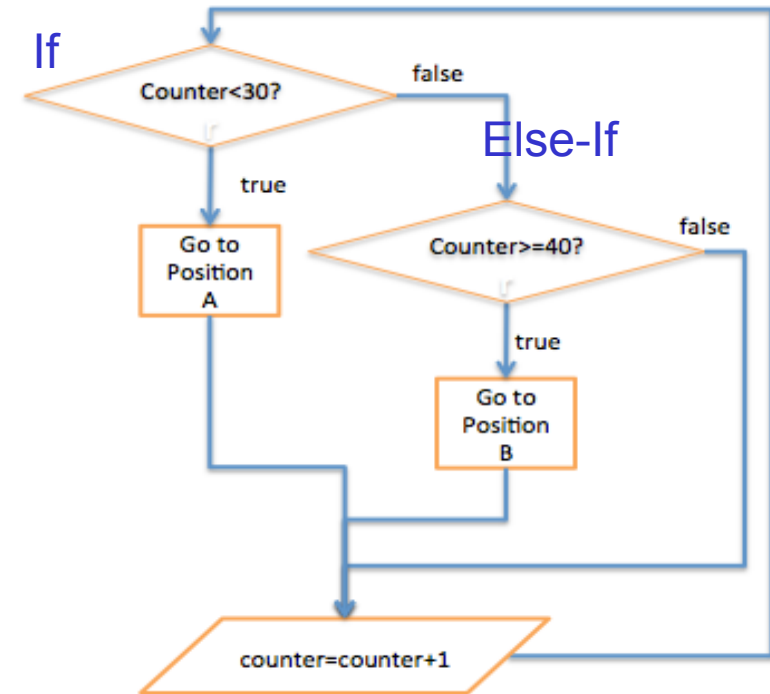

```
void loop(){
    //This function is call one per secon
    if (counter<30){
        api.setPositionTarget(positionA);
    }
    counter++;
}
```

- Add an **else if() { }** right below the if-then statement

- In that "Else-If" statement, add the following:

  - **Counter >= 40** (counter is greater than or equal to 40)

  - Go to positionB

The **counter++;** statement should be at the very bottom, after all the conditional statements.

```
void loop(){
    //This function is call one per second
    if (counter<30){
        api.setPositionTarget(positionA);
    }
    else if (counter>=40){
        api.setPositionTarget(positionB);
    }
    counter++;
}
```

- Compile
- Simulate
  - Select setting Tutorial_90
- View your simulation
- Watch the x,y,z position coordinates in the Scoring box and write down the x,y,z, coordinates for the Blue SPHERES when it pauses before moving to position B.
- Do the coordinates you wrote down match the coordinates entered for positionA? Close the simulation window and check.
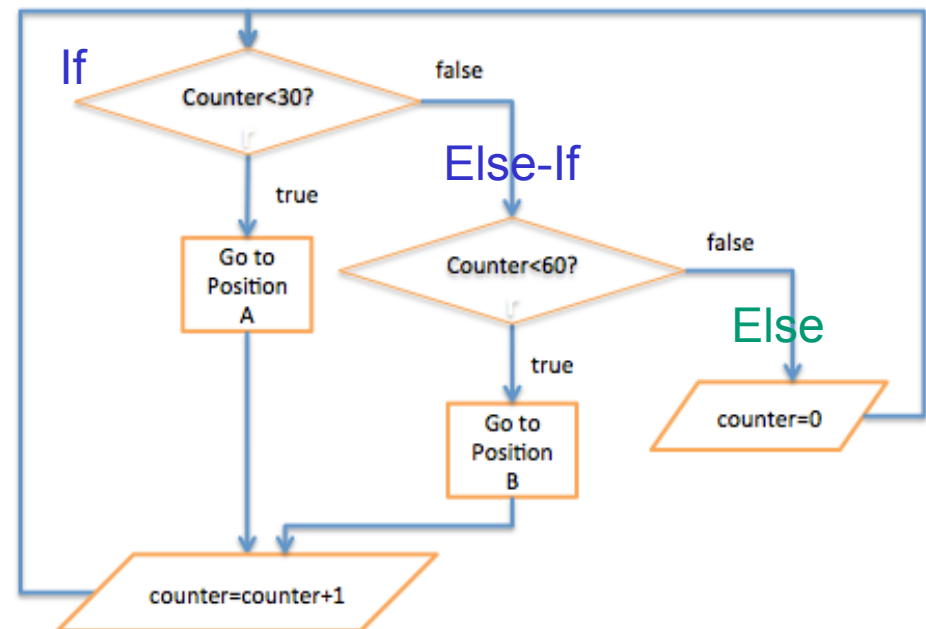
Blue satellite should move from:
initial position ➔ positionA ➔ pause ➔ positionB

project7A

X: 0.01	Y: 1.00	Z: -0.00
Vx: 0.001	Vy: 0.003	Vz: -0.001
Nx: 0.01	Ny: 1.00	Nz: 0.01
ωx: 0.56	ωy: -0.52	ωz: -0.28

Fuel Remaining: 100%

- Now let's modify your program to match the flow diagram on the right

- Your new program will have an "Else-If" statement that contains an "Else" statement
  - In this example, both use the same logic operator **<**

- The simulation for this program will be fun to watch since "Else" statement resets the counter to "0". Can you guess what happens?

If
Counter<30?   false

Else-If

true

Go to Position A   Counter<60?   false

Else

true

Go to Position B   counter=0

counter=counter+1

- Add an "Else" statement below our "Else-If" statement. Make the following changes:

  - Change **counter >= 40** to **counter < 60**

  - Add **else { counter=0; }**

  - Note: make sure you have enough brackets to start and end each statement or you will get an error when you compile the code.

```
void loop(){
    //This function is call one per sec
    if (counter<30){
        api.setPositionTarget(positionA);
    }
    else if(counter<60){
        api.setPositionTarget(positionB);
    }
    else{
        counter = 0;
    }
    counter++;
}
```

- Compile

- Simulate

  – **Create new setting** Tutorial_180

  – Set seconds to 180 (time needed for simulation)

- View your simulation

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

Repeat until time runs out

- An "if, else if, else" lineup can have as many "else if" statements as you need.

- The first condition in the lineup that is satisfied will be the one performed. For example, if the "if" condition is true, it will be performed even if all other "else if" statements are also true. If there are five "else if" statements and the second one is true, only the second one will be performed.

- In the example on the previous slide, the position target will be positionA as long as counter<30, even though counter<60 is also true. The counter<30 conditional comes first.

- Like an **if** statement, an **else if** does NOT need to be followed by **else** unless there is something that needs to be done in the **else** case

- Congratulations!
  - You have learned how to:
    - Use "Else-If" statements, which will be useful for programming your satellite for the game
    - Use "Save As" to create a new project

```
else if (){
}
```