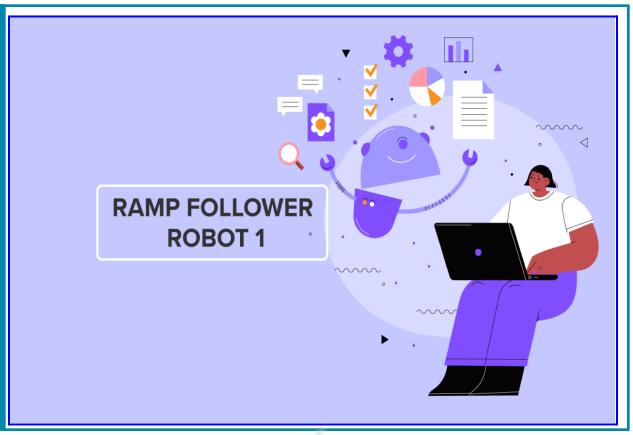
# Ramp Follower Robot - I




## What is our GOAL for this CLASS?

In this class, we designed a ramp follower. We designed a basic environment for Ramp Follower. We made a rectangle arena and then we designed a ramp follower and started designing a robot using a scene tree.

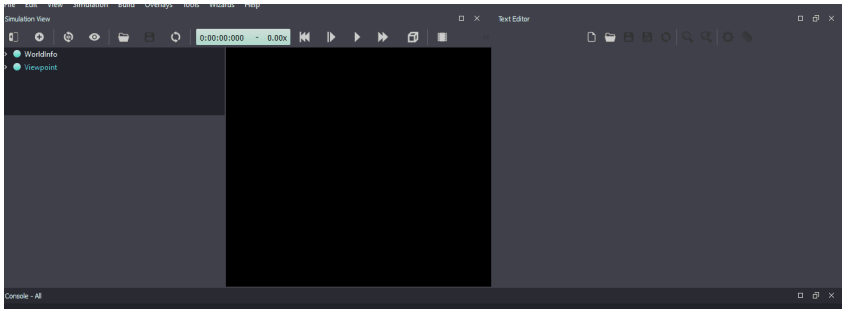
## What did we ACHIEVE in the class TODAY?

- We made a basic environment.
- We designed a ramp.
- We started designing the robot body.
- We learnt about PointLight and how to do it.

## How did we DO the activities?

1. **A new Simulation:**
    a. This simulation will contain a simple environment (a rectangle arena with floor and walls), one inbuilt Robot and a controller program that will make the robot move.
2. **Create a new world:**
    a. **World:** A World defines the initial state of a simulation. A world is stored in a file having the **".wbt" extension.**

Create a new project directory and world file with a rectangular arena.



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3. **Teams related to Webots:**

   **PointLight:**The PointLight node specifies a light source that emits light equally in all directions. The emitted light can be detected by a LightSensor node. Putting a PointLight onboard a robot allows the PointLight to move with the robot.

4. **Procedure to add a PointLight:**

   1. Click on **Rectangle Arena**
   2. Click on **+**
   3. Select **Base nodes**
   4. Click **Base nodes drop down** 
      a. Select **Point of Light**
      b. Click **ADD**.
      c. Now click on the drop down just before the **Point of Light.**
         i. Select **attenuation 0 , 0 , 1**
         ii. Select **Intensity 0.6**
         iii. Select **location 0.6, 0, 0**

Save the simulation. 


5. **Procedure to add Ramp/Slope**

    1. Click on **PointLight**
    2. Click on **+**
    3. Select **Base nodes**
    4. Click **Base nodes drop down** 
    5. Select **Solid**
    6. Click on **Add**
    7. Write the name of DEF function **SLOPE**
        a. Write value for **translation 0, 0, 0.15**

Note: (translation will define x,y,z coordinates)

        b. Write value for **rotation 0, 1, 0 . 0.4**

Note: (Rotation will define the axis as per x, y, z coordinates.)

        c. Double Click on **children**

*Note: This will be a child node*

a. Select **Base nodes**

b. Click **Base nodes drop down** 

**c.** Select **Shape**

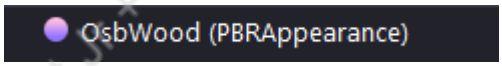
**d.** Click on **Add**

e. **Click on Drop Down of Shape**

**i. Double Click on Appearance Null**

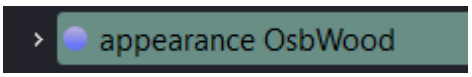
ii. Select **Proto Nodes (Webots Projects)**

iii. Click on **Appearance**

iv. Select OsbWood 


v. Select **location 0.6, 0, 0**

**vi. Click on Add**

**vii. Click on Drop down of** 


**1.** Double Click on **texture TransformNull**

**2.** Select **Texture Transform** under Base nodes

3. Now just below **Texture Transform** there is **Geometry Null.** Double Click on **Geometry Null**

**4.** Select **Box under Base nodes**

**5.** Click **Add**

**6.** Write the name of the DEF is **BOX0**

**a. Click on Drop Down**


**b.** Set Size **0.8, 0.2, 0.02**

Save the simulation. 

Next task is to make a Robot Body .

**Make a Robot as a parent class and all the components will act as a Child node.**

### 6. Procedure Robot Parent Class

1. Click on **DEF SLOPE SOLID**
2. Click on **+**
3. Select **Base nodes**

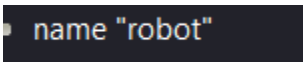
4. Click **Base nodes drop down** 
5. Select **Robot**
6. Click on **Add**
    a. Write value for **translation  0.286, 0, 0.286**

Note: (translation will define x,y,z coordinates)

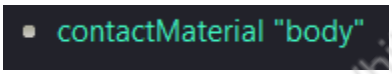
    b. Write value for **rotation  -0.199, 1, 0.98 . 3,14**

Note: (Rotation will define the axis as per x, y, z coordinates.)

    c. Name of the Robot **“MyBot”**




    d. ContactMaterial **“body”**




*Note: Robot Name.Write the same name and do the same settings, as this is the first class and we need to use the same name in the Program also.*

*When students will be familiar with settings and Programming they can change their settings and naming later on.*

Next we add all components of the robot. This should be done under children.

**We added an Altimeter using steps below:**

    a. Double Click on **children**
    b. Select  **Base nodes**
    c. Click **Base nodes drop down** 
    d. Select **Altimeter**

Next task is to make a Robot Body.This will come under the child node.

1. Double Click on **children again**

***Note: These children will be under Robot Parent class, Don't choose other children option***

2. Select **Base nodes**
3. Click **Base nodes drop down** 
4. Select **Transform**
5. Click on **Add**
    a. **Set Translation 0, 0, 0.0415**
    b. **Set Rotation 0 0 1 0**
    c. **Double click on children under Transform**
        i. Click **on Drop down of Base node**
        ii. Select **Shape**
        iii. Click **Add**
        iv. Double click on drop down of **Shape**
            1. Double Click on **Appearance**
            2. **Select PBR Appearance**
            3. **Click Add**
            4. **Set base color 0.0820075, 0.364, 0.8**

**Note : Color can be selected from ColourBox too.**

            5. **Set Roughness 1**
            6. **Set metalness 0**
            7. Under **Appearance** there is **Geometry Null.** Double Click on

**geometry Null**

8. Select **Cylinder under Base nodes**
9. Click **Add**
10. Write the name of the DEF is **BODY**

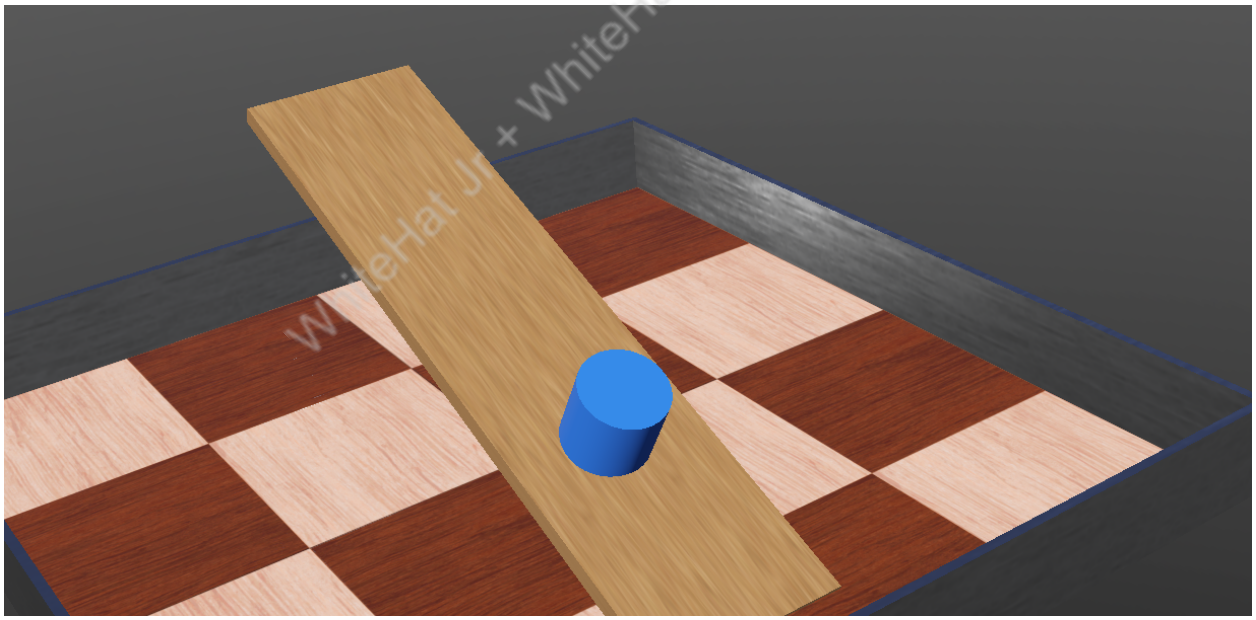
    a. **Click on Drop Down** 


    b. Set **Height 0.08s**

    c. Set **Radius 0.045**

Save the simulation. 

**Reference Output:**



## What's NEXT?

In the **next class**, we will learn to set wheels and sensors.

## Expand Your Knowledge

To know more about **Webots** click here.