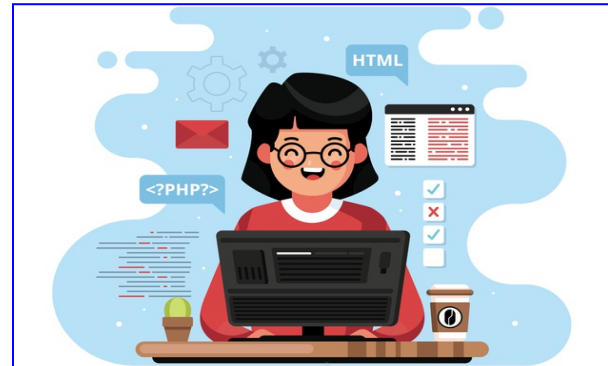


## Ramp Follower Robot - I



### 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?

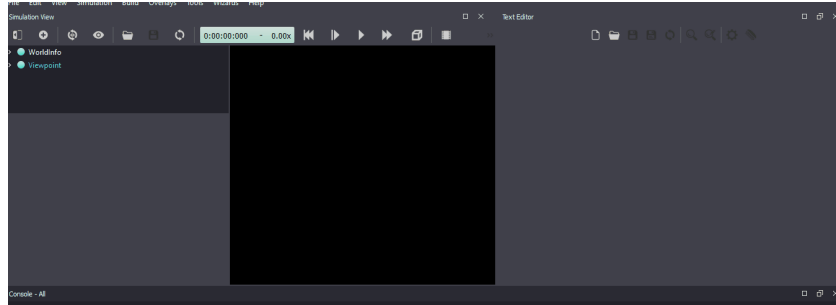
#### 1. A new Simulation:

- 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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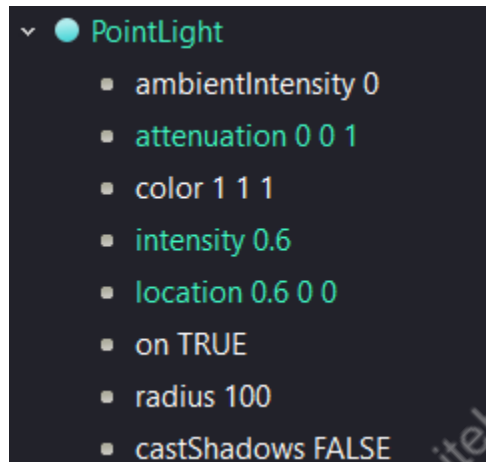
### 3. Teams related to Webots:

**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**


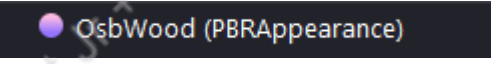
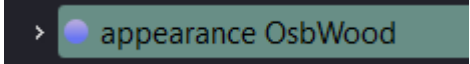
Note: (translation will define x,y,z coordinates)

- 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

▼ geometry DEF BOX0 Box

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**

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4. Click **Base nodes drop down** 

5. Select **Robot**

6. Click on **Add**

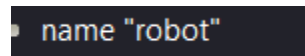
a. Write value for **translation** **0.286, 0, 0.286**

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

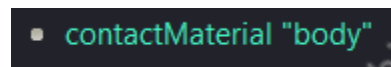
b. Write value for **rotation** **-0.199, 1, 0.98 . 3,14**

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**

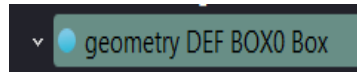
6. Set **metalness 0**

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



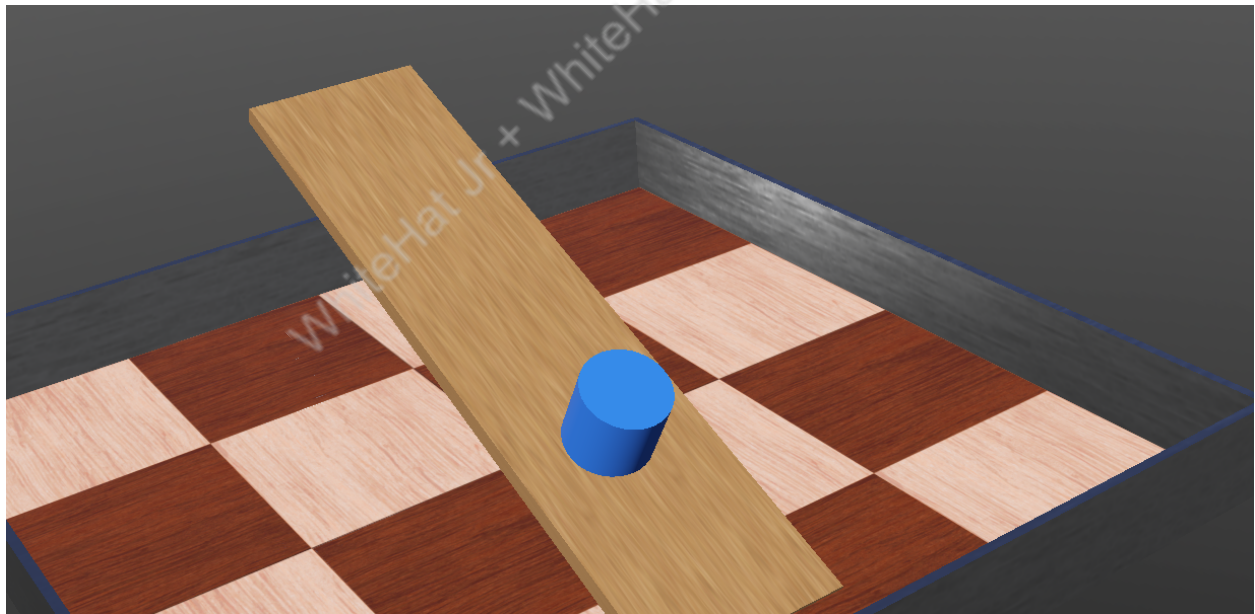
b. Set Height 0.08s

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](#).

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