PROFESSIONAL

C20: GCSO

WhiteHat Jr
Live Online Coding for Kids

INSTRUCTIONS:

Goal of the Project:

In Class 20, you learned how to evaluate if two sprites have collided.

In this project, you have to make a simulator that can test car reliability.

Story:

The Global Car Safety Organisation tests cars for safety and reliability in the event of a crash.

Based upon the weight and speed of the car, the deformation of the car is calculated using the formula below.

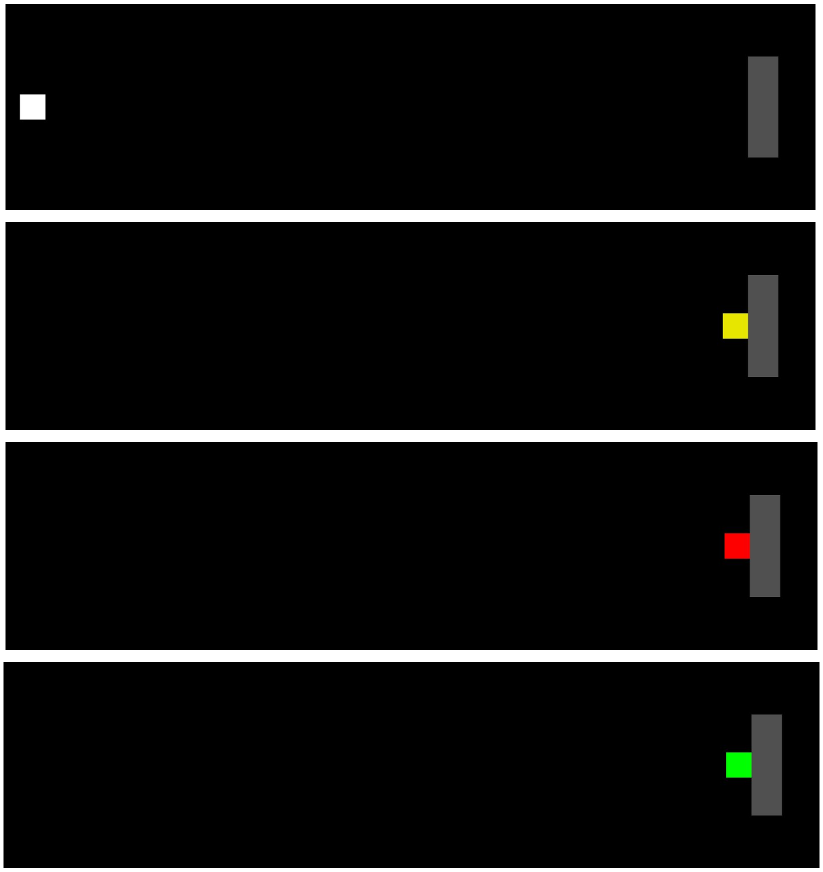
$$\text{Deformation} = \frac{0.5 \text{ X weight X speed X speed}}{22500}$$

Examples:

Car Name	Weight	Speed	Deformation	Rating
Zenia	2260	60	180	D-
Tourus	1522	50	84	A-
Cyclap	3000	45	134	B+

- Any deformation **greater than 180** is considered **lethal** for the passengers.
- Any deformation **between 80 and 180** is considered **average**.
- Deformation **below 80** is considered **good**.

You have to help the CGSO by creating a simulator to collide a car sprite with a wall and calculate the damage.



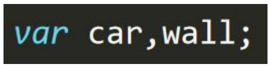
*This is just for your reference. We expect you to apply your own creativity in the project.

Getting Started:

1. Use the template on github, available for download on the following link: https://github.com/whitehatjr/p5.play-boilerplate/archive/master.zip
2. **Unzip** this folder.
3. Rename the unzipped folder as **Project 20.**
4. **Import** this folder **into VS Code**.
5. Start editing your code in **sketch.js**.

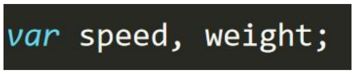
Specific Tasks to complete the Project:

1. The canvas is 1600 pixels wide and 400 pixels tall.
2. Create two variables - **car** and **wall** - outside the setup function.



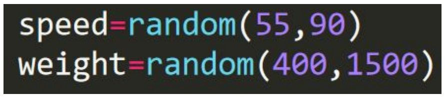
```
var car,wall;
```

3. Create two variables - **speed** and **weight** - outside the setup functions.



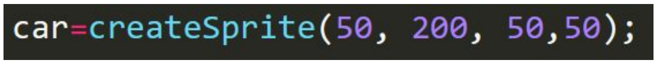
```
var speed, weight;
```

4. Set these to random values as shown, inside setup().



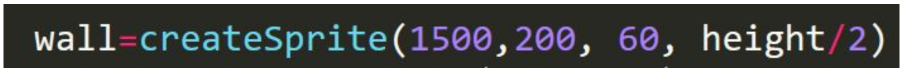
```
speed=random(55,90)
weight=random(400,1500)
```

5. Create a rectangle sprite which represents a **car**.
   - Add this to the canvas.
   - Set its position somewhere on the left edge of the canvas.



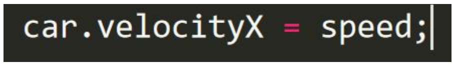
```
car=createSprite(50, 200, 50,50);
```

6. Create a **Wall** which is half the height of the canvas and whose width is 60 pixels.
   - Keep this Wall at 1500 pixels distance from the left edge of the canvas.
   - Set the color of the Wall to **color (80,80,80)**.



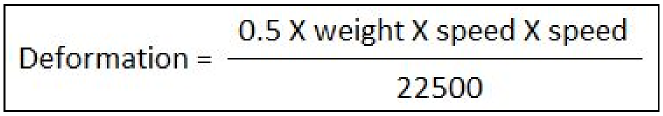
```
 wall=createSprite(1500,200, 60, height/2)
```

7. Assign the **velocityX** property of the car sprite to the speed variable.
    - This should make the car sprite move towards the wall.



```
car.velocityX = speed;
```

8. Detect the collision of the car with the wall.
9. Calculate the deformation for the car when it collides with the wall using the formula given below.



$$\text{Deformation} = \frac{0.5 \text{ X weight X speed X speed}}{22500}$$

10. When collision happens, based on deformation calculations determine the color of the car as red, yellow or green.

Deformation	**Car Color**	**Color Code**
Less than 100	Green	(0, 255, 0)
Between 100 and 180	Yellow	(230, 230, 0)
Greater than 180	Red	(255, 0, 0)

11. Make sure the project works before you submit it.

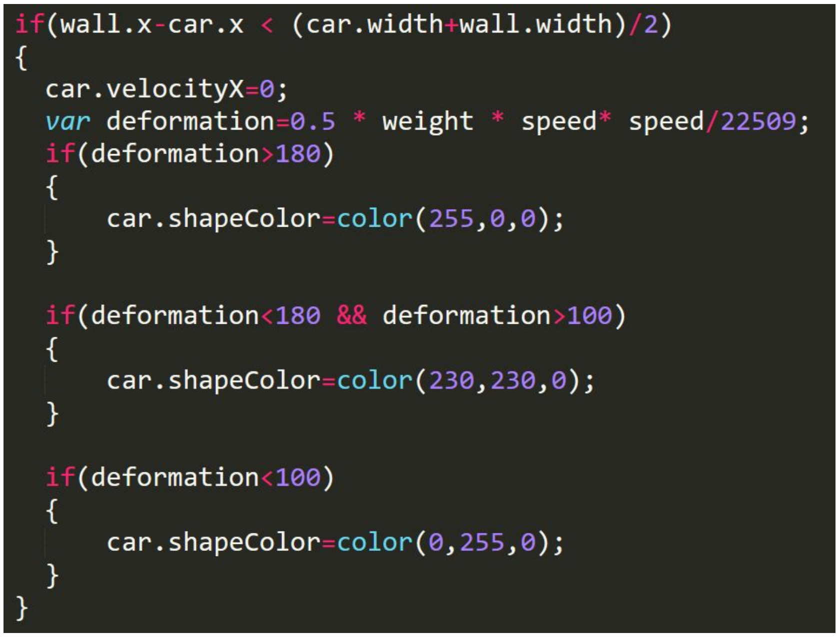
*Refer to the images given above for reference.

Submitting the Project:

1. **Upload** your completed project to your own github account.
2. Enable **Github** pages for the repository.
3. Copy and paste the link to the github pages in the Student Dashboard against the correct class number.

Hints:

1. Use the **<sprite>.shapeColor=color(r,g,b)** to assign a color to the car when it collides.
2. When the collision happens, set the velocityX of the car to 0.



```
if(wall.x-car.x < (car.width+wall.width)/2)
{
  car.velocityX=0;
  var deformation=0.5 * weight * speed* speed/22509;
  if(deformation>180)
  {
      car.shapeColor=color(255,0,0);
  }

  if(deformation<180 && deformation>100)
  {
      car.shapeColor=color(230,230,0);
  }

  if(deformation<100)
  {
      car.shapeColor=color(0,255,0);
  }
}
```

REMEMBER... Try your best, that's more important than being correct.
After submitting your project your teacher will send you feedback on your work.

——————— **xxx** ——————— **xxx** ——————— **xxx** ——————— **xxx** ——————— **xxx** ———————