

JavaScript: Collision Detection & Key/Mouse Input



Target Audience: Beginner to Intermediate Students

Learning Objectives

By the end of this session, students will be able to:

- Understand how to detect when two objects are touching or overlapping.
 - Use keyboard and mouse inputs to control elements.
 - Build a mini interactive game with collision detection.
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Session 1: Collision Detection

What is collision detection?

Collision detection means checking if two objects (e.g., divs, canvas elements) are overlapping.

Logic for Collision Between Two Rectangles

```
if (
  rect1.x < rect2.x + rect2.width &&
  rect1.x + rect1.width > rect2.x &&
  rect1.y < rect2.y + rect2.height &&
  rect1.y + rect1.height > rect2.y
) {
  // Collision happened!
}
```

Example in Browser

```
const player = document.getElementById("player");
const treasure = document.getElementById("treasure");
```

```
const playerBox = player.getBoundingClientRect();
const treasureBox = treasure.getBoundingClientRect();

if (
  playerBox.x < treasureBox.x + treasureBox.width &&
  playerBox.x + playerBox.width > treasureBox.x &&
  playerBox.y < treasureBox.y + treasureBox.height &&
  playerBox.y + playerBox.height > treasureBox.y
) {
  alert("Collision detected!");
}
```

Session 2: Keyboard and Mouse Inputs

Keyboard Events

- **keydown**: triggered when a key is pressed down
- **keyup**: triggered when a key is released

```
document.addEventListener("keydown", function (event) {
  if (event.key === "ArrowRight") {
    console.log("Move Right");
  } else if (event.key === "ArrowLeft") {
    console.log("Move Left");
  }
});
```

Mouse Events

- **click**: when you click
- **mousemove**: when mouse is moved
- **mousedown, mouseup**: mouse press and release

```
document.getElementById("colorBtn").addEventListener("click", function()
() {
    document.body.style.backgroundColor = "lightgreen";
});
```

Mini Project: Move & Collide Game

HTML

```
<div id="player"
style="width:50px;height:50px;position:absolute;background:red;"></div>
<div id="treasure"
style="width:50px;height:50px;left:300px;top:100px;position:absolute;background:gold;"></div>
```

JavaScript

```
let posX = 0;
let posY = 0;
const player = document.getElementById("player");
const treasure = document.getElementById("treasure");

document.addEventListener("keydown", function (e) {
    if (e.key === "ArrowRight") posX += 10;
    if (e.key === "ArrowLeft") posX -= 10;
    if (e.key === "ArrowUp") posY -= 10;
    if (e.key === "ArrowDown") posY += 10;

    player.style.transform = `translate(${posX}px, ${posY}px)`;

    const p = player.getBoundingClientRect();
    const t = treasure.getBoundingClientRect();

    if (
        p.x < t.x + t.width &&
        p.x + p.width > t.x &&
        p.y < t.y + t.height &&
        p.y + p.height > t.y
    )
```

```
) {  
    treasure.innerText = "🎁 You found it!";  
}  
});
```

✓ Wrap-Up Questions

1. What is collision detection used for?
2. How do you detect arrow key movement in JavaScript?
3. What method do you use to get an element's position on screen?
4. What happens when two objects collide in your example?