

# Using the Gamepad API for a better gaming experience on the web

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JavaScript and Friends 2020



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# The Web Platform

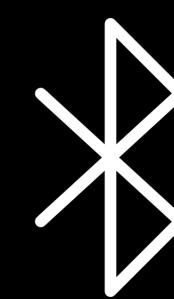
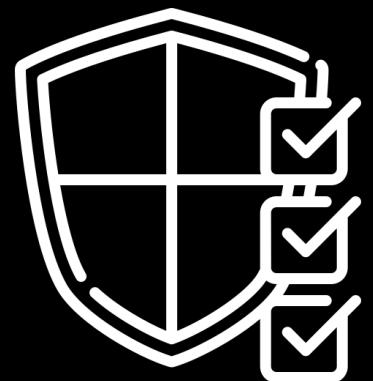
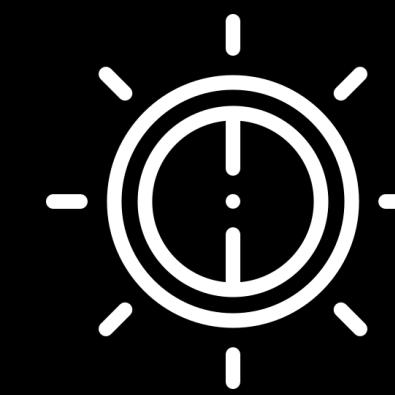
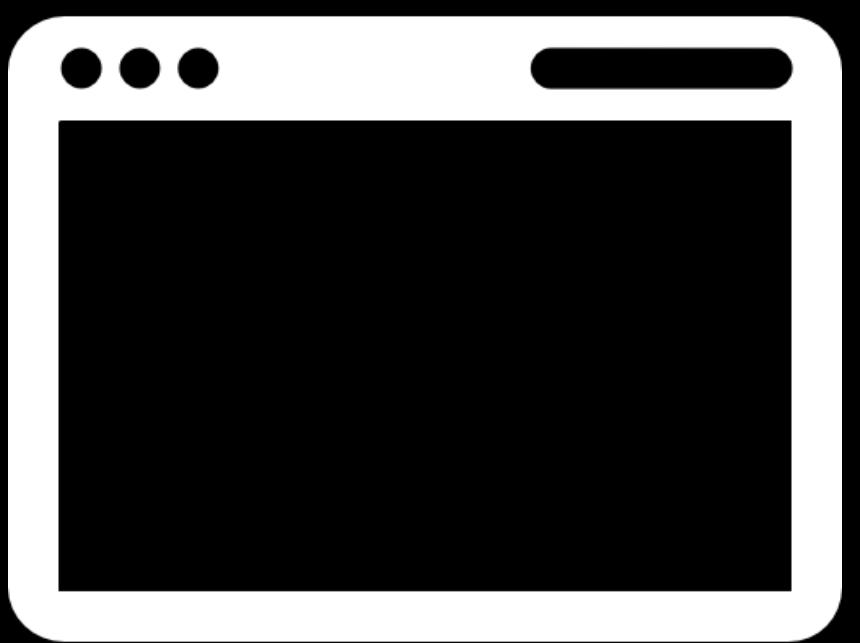
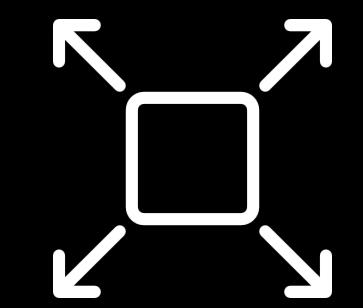
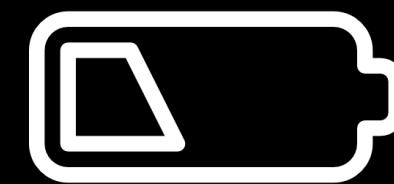
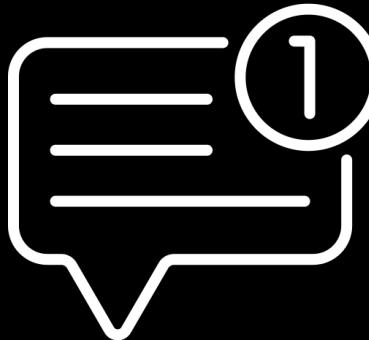
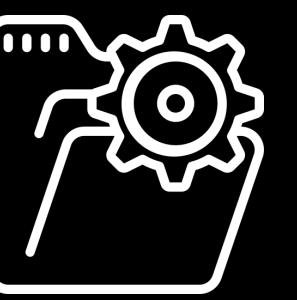


Image source: freepik.com

**MIGHTY PARTY**  
The Grave Keeper

PLAY NOW

FEATURED GAMES (see all)

- Raid Heroes: Total ... ★ 3.7
- PINCREMENTAL
- LORDS OF THE ARENA
- KUMU's ADVENTURE
- CLICKER
- INCREMENTAL EPIC H...

**Menu**

- Main Page
- Game Consoles
- Online Emulators
- Offline Emulators
- Games Control
- Random Game

**Games**

- Adventure (79)
- Action (933)
- Fighting (88)
- Puzzle (139)
- Platform (387)
- Adult (47)
- RPG (68)
- Simulation (48)
- Sport (115)
- Strategy (40)
- Shooter (294)
- Racing (84)
- Others (25)
- All games (1388)

**Others**

- TOP 100
- Videos
- Glossary
- Help/FAQ

## Contra - Nintendo NES system

**KONAMI**

**PLAY SELECT**

**1 PLAYER**

**2 PLAYERS**

TM AND © 1988  
KONAMI INDUSTRY CO., LTD  
LICENSED BY  
NINTENDO OF AMERICA INC

**Rate this game:**

Average game rating: 72%      Voted: 7180x      Played: 972426x

**NES gamepad:**

	Player 1:	Player 2:
↑	↑	-
↓	↓	-
←	←	-
→	→	-
A	X	-
B	Z	-
SELECT	Shift	-
START	Enter	-

**Emulator selection:**

The following emulators are available for this game: NeptunJS (JavaScript), Nesbox (Flash), Retro-Games (JS) and vNES (Java).

**Other platforms:**

Unfortunately, this game is cur-

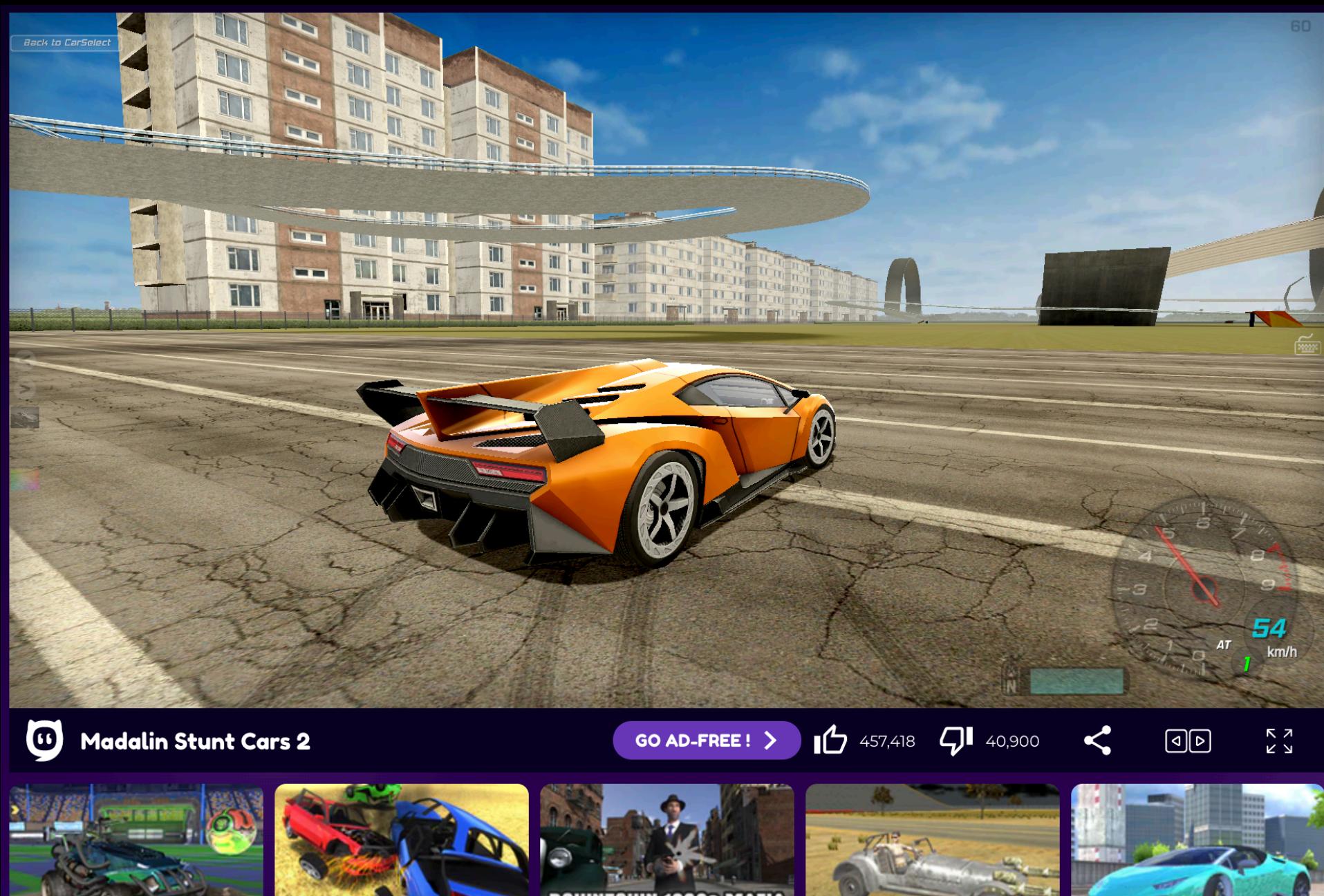




Image source: nocookie.net



Image source: [mobilefreetoplay.com](http://mobilefreetoplay.com), [windowscentral.com](http://windowscentral.com)

# Gamepad API

[bit.ly/gamepad\\_api](http://bit.ly/gamepad_api)

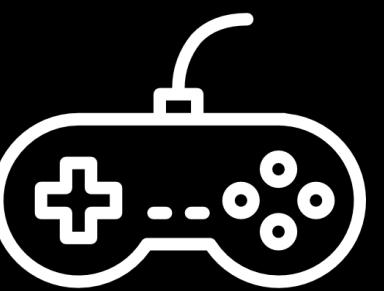
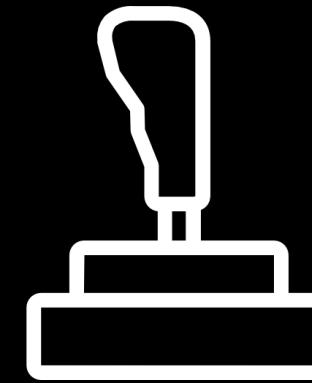
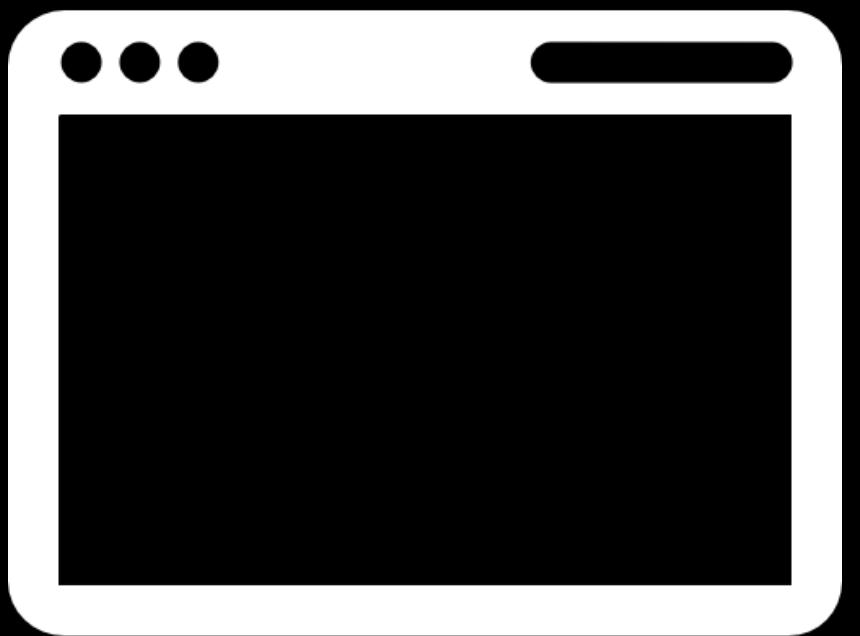
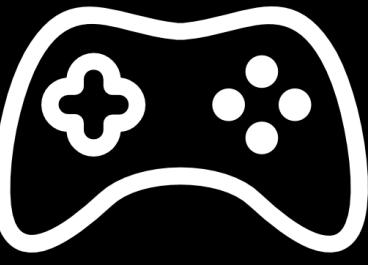
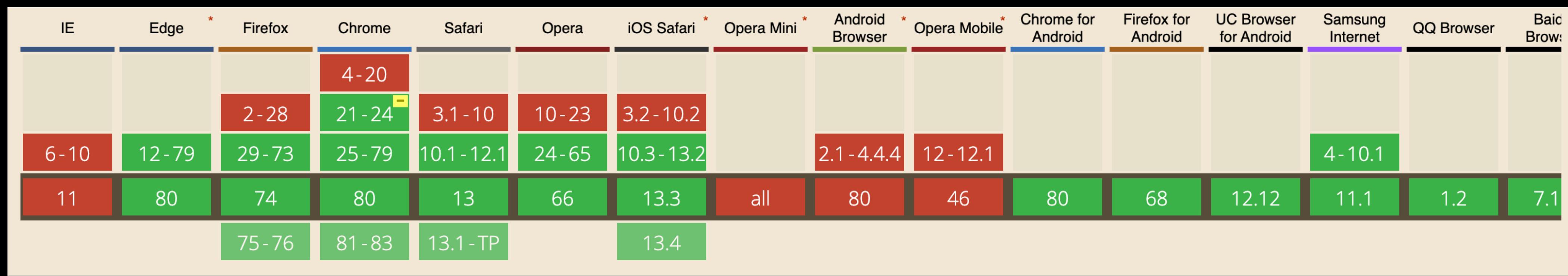


Image source: freepik.com



```
window.navigator.getGamepads()
```

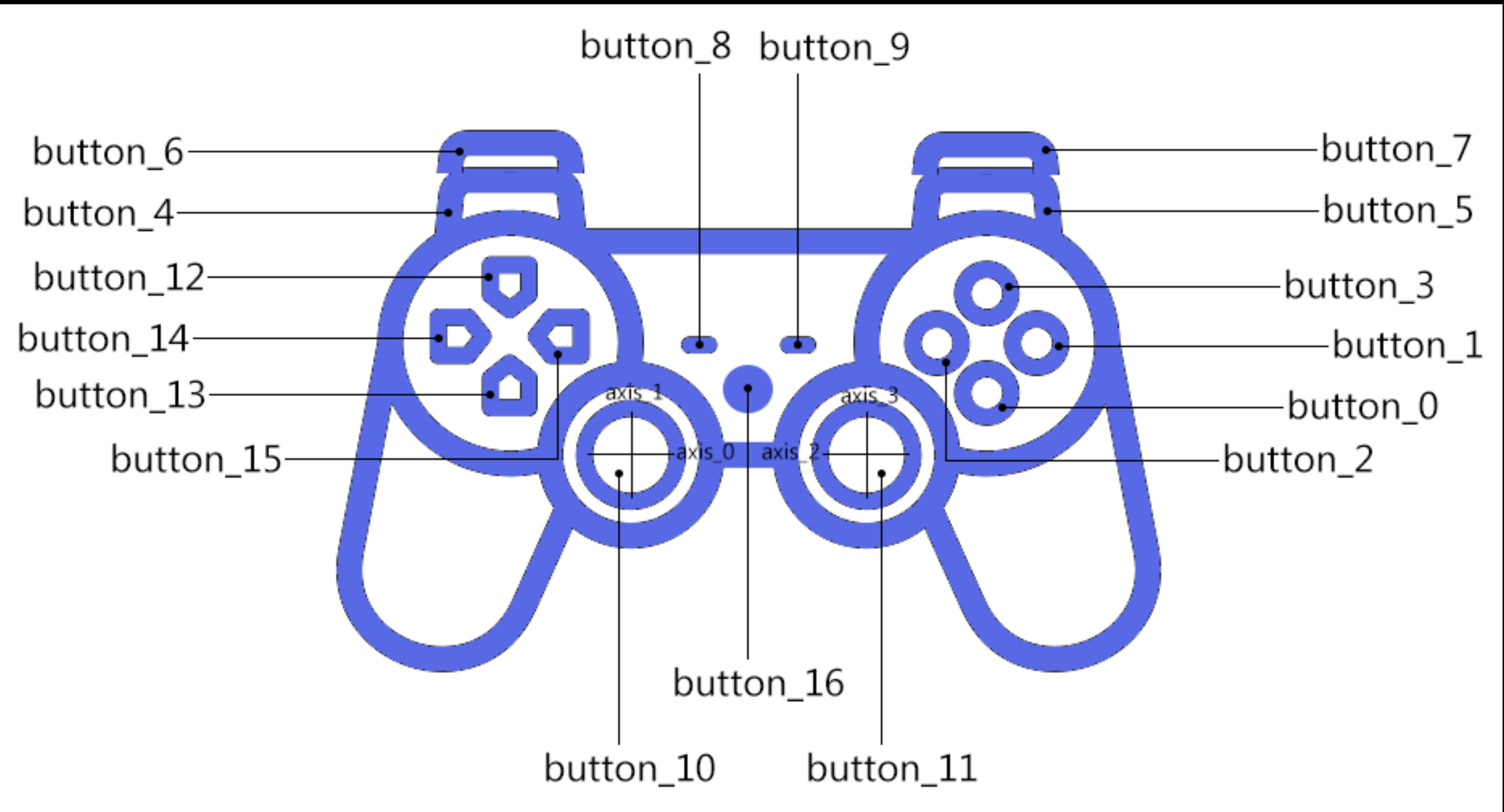
# Gamepad Interface

[bit.ly/gamepad\\_interface](http://bit.ly/gamepad_interface)

```
▼ Gamepad {id: "Wireless Controller (STANDARD GAMEPAD Vendor: 054c Product: 05c4)", index: 0, connected: true, 96396, mapping: "standard", ...} ⓘ
▶ axes: (4) [0, 0, 0, 0]
▶ buttons: (18) [GamepadButton, GamepadButton, GamepadButton, GamepadButton, GamepadButton, GamepadButton, Ga
connected: true
id: "Wireless Controller (STANDARD GAMEPAD Vendor: 054c Product: 05c4)"
index: 0
mapping: "standard"
timestamp: 19567.754999996396
▶ vibrationActuator: GamepadHapticActuator {type: "dual-rumble"}
▶ __proto__: Gamepad
```

```
true, timestamp: 19567.754999996396, mapping: "standard"
▶ axes: (4) [0, 0, 0, 0]
▼ buttons: Array(18)
  ▼ 0: GamepadButton
    pressed: false
    touched: false
    value: 0
```

# Standard Gamepad Layout



# Events?

```
window.addEventListener("gamepadconnected", function(e) {  
    // Info of connected gamepad  
    console.log(e.gamepad);  
});
```

[bit.ly/gamepad\\_connected\\_event](http://bit.ly/gamepad_connected_event)

```
window.addEventListener("gamepaddisconnected", function(e) {  
    // Info of disconnected gamepad  
    console.log(e.gamepad);  
});
```

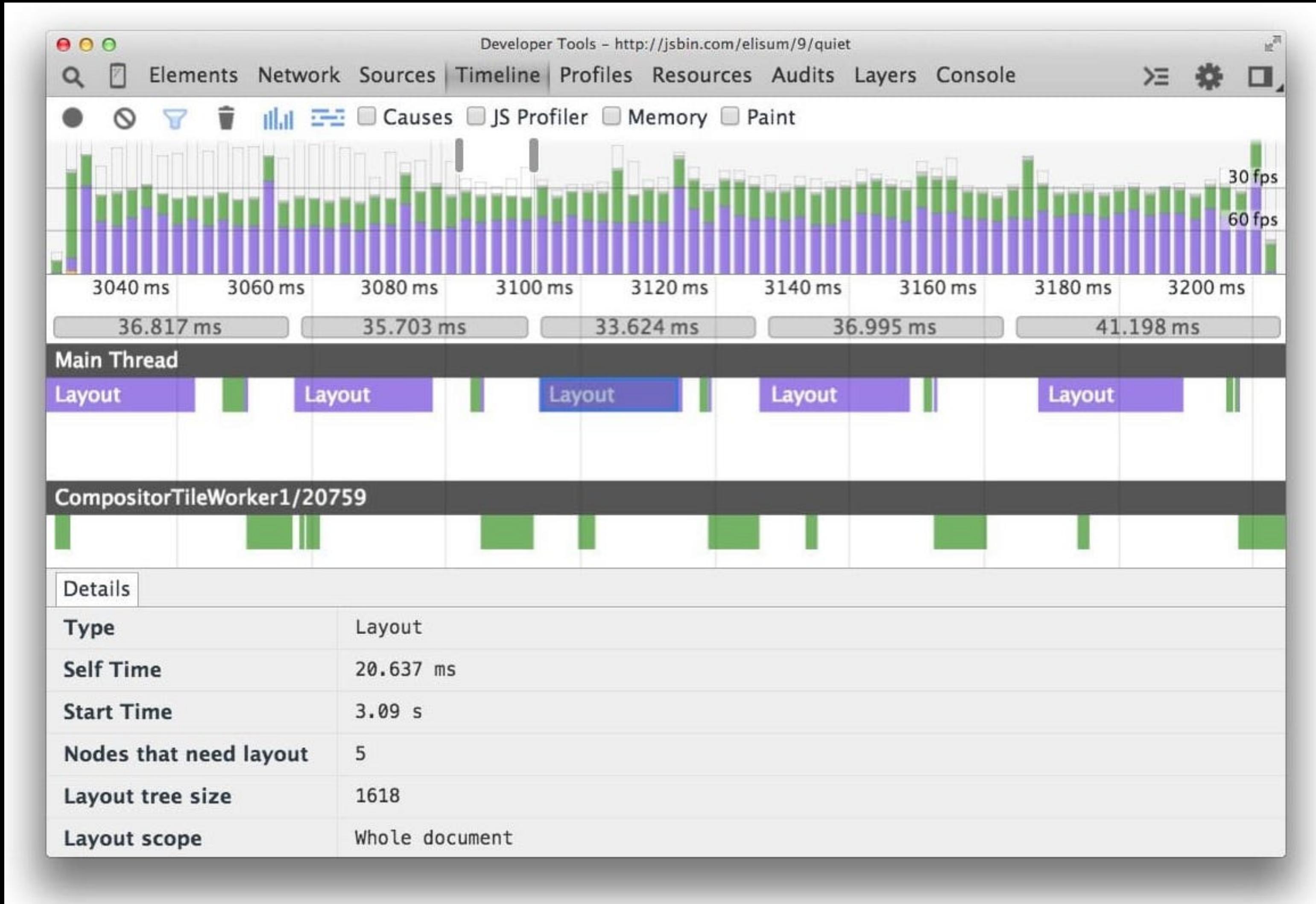
[bit.ly/gamepad\\_disconnected\\_event](http://bit.ly/gamepad_disconnected_event)



```
window.addEventListener("gamepadbuttonpressed", function(e) {  
    // Cannot detect button press  
});
```

```
setInterval(() => console.log(window.navigator.getGamepads()[0].buttons[0]), 10);
```

```
▶ GamepadButton {pressed: true, touched: true, value: 1}
▶ GamepadButton {pressed: false, touched: false, value: 0}
```



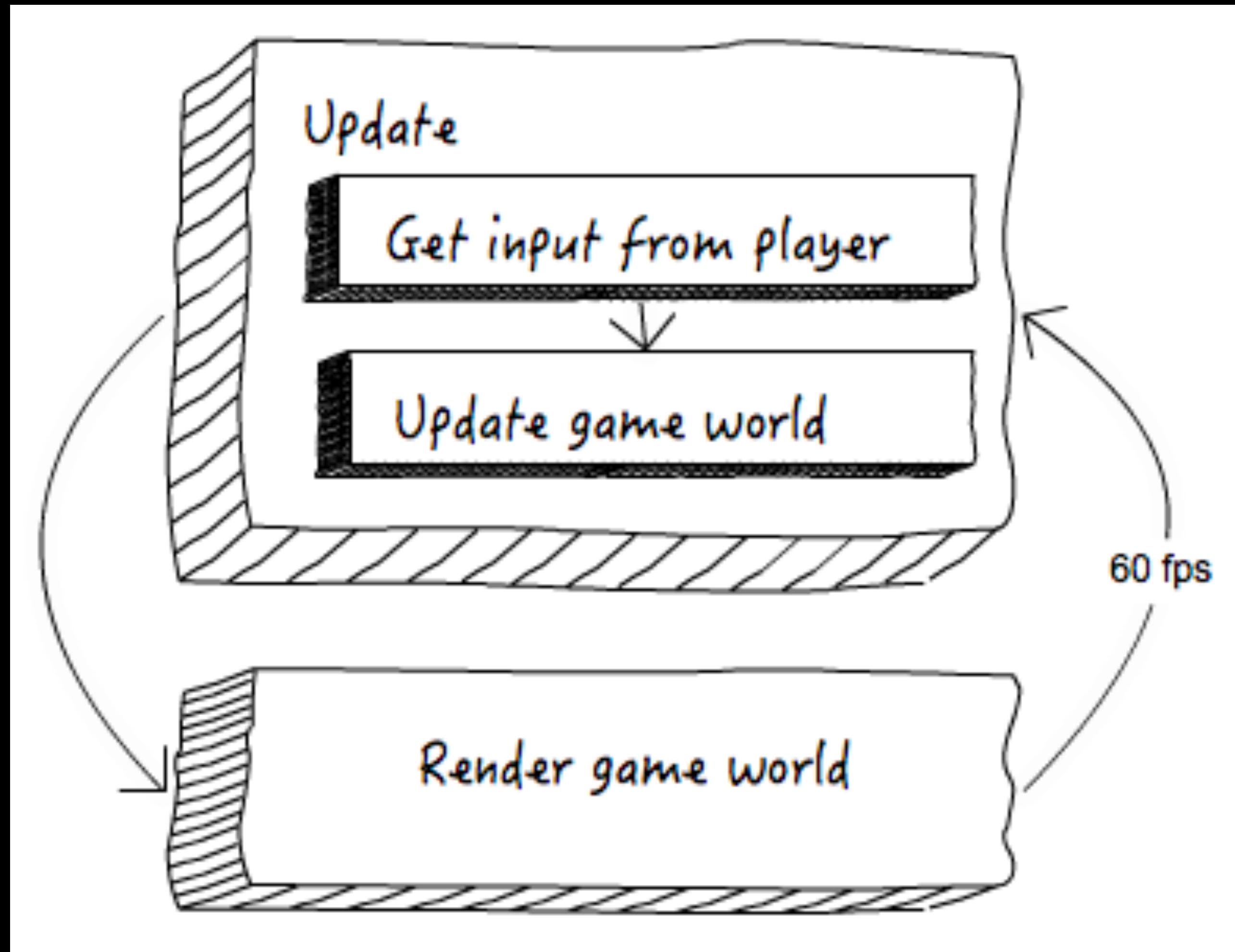
[bit.ly/javascript\\_layout\\_thrashing](http://bit.ly/javascript_layout_thrashing)

*requestAnimationFrame()*

```
const loop = () => {
    console.log(navigator.getGamepads()[0].buttons[0]);
    requestAnimationFrame(loop);
}

loop();
```

# The Game Loop



[bit.ly/anatomy\\_of\\_a\\_videogame](http://bit.ly/anatomy_of_a_videogame)

Image Source: [mozdevs.github.io](https://mozdevs.github.io)

```
const loop = {
  id: null,
  start: function () {
    // Get all the gamepads
    let gamepads = window.navigator.getGamepads();
    gamepads = Array.prototype.slice.call(gamepads);
    // Loop through the gamepads
    gamepads.forEach(gamepad => {
      if (gamepad) {
        // Listen to button press events
        listenToButtonEvents(gamepad);
        // Listen to axis movement events
        listenToAxisMovements(gamepad);
      }
    });
    // Call the start function on each frame
    this.id = window.requestAnimationFrame(this.start.bind(this));
  },
  stop: function (id) {
    return window.cancelAnimationFrame(id);
  }
};
```

```
const listenToButtonEvents = gamepad => {
    // Loop through the gamepad buttons
    gamepad.buttons.forEach(button => {
        // Check if button is pressed and dispatch event
        if (button.pressed) {
            window.dispatchEvent(buttonPressEvent(button));
        } else {
            // Handle button release
        }
    });
};
```

```
const buttonPressEvent = eventData => {
  return new CustomEvent("gamepadbuttonpressed", {
    detail: eventData
  });
};
```

```
const listenToAxisMovements = gamepad => {
  const { axes } = gamepad;
  const totalAxisIndexes = axes.length;
  const totalSticks = totalAxisIndexes / 2;
  // Loop through all axes
  axes.forEach((axis, index) => {
    let stickMoved = null;
    let directionOfMovement = null;
    // Find which stick has been moved
    if (index < totalSticks) {
      stickMoved = 'left_stick';
    } else {
      stickMoved = 'right_stick';
    }
    // Find the direction of movement
    if (index === 0 || index === 2) {
      directionOfMovement = axis < 0 ? 'left' : 'right';
    }
    if (index === 1 || index === 3) {
      directionOfMovement = axis < 0 ? 'top' : 'bottom';
    }
    const eventData = { stickMoved, directionOfMovement };
    // Dispatch axis movement event
    return window.dispatchEvent(axisMovementEvent(eventData));
  });
};
```

```
const axisMovementEvent = eventData => {
  return new CustomEvent("gamepadaxismoved", {
    detail: eventData
  });
};
```

```
window.addEventListener("gamepadbuttonpressed", function(e) {  
    // Info of pressed button  
    console.log(e.detail);  
});
```

```
window.addEventListener("gamepadaxismoved", function(e) {  
    // Info of moved axis  
    console.log(e.detail);  
});
```

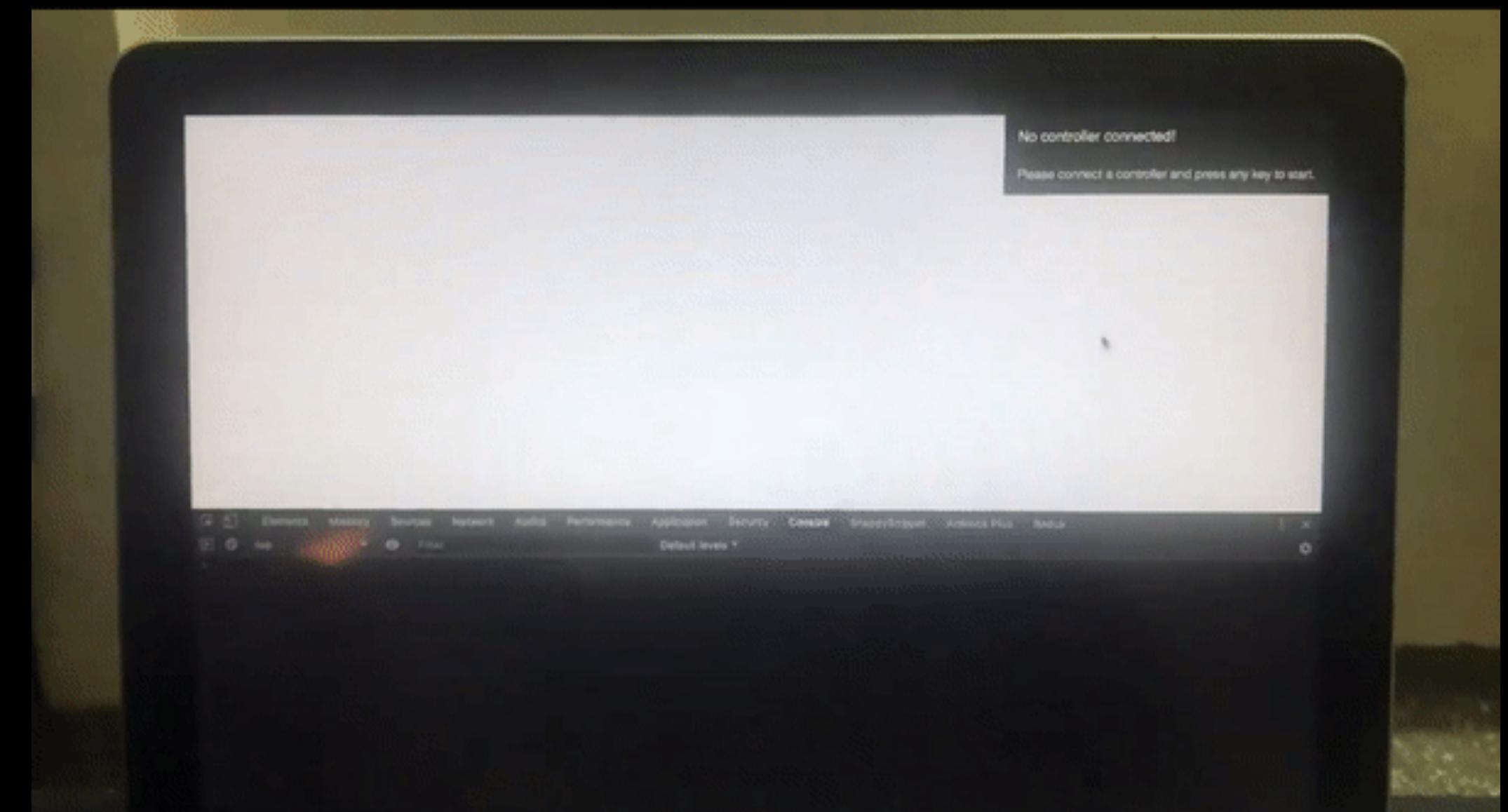


[bit.ly/joypad\\_js](http://bit.ly/joypad_js)

# Connect/Disconnect

```
joypad.on('connect', e => {
  const { id } = e.gamepad;
  console.log(`#${id} connected!`);
});

joypad.on('disconnect', e => {
  const { id } = e.gamepad;
  console.log(`#${id} disconnected!`);
});
```

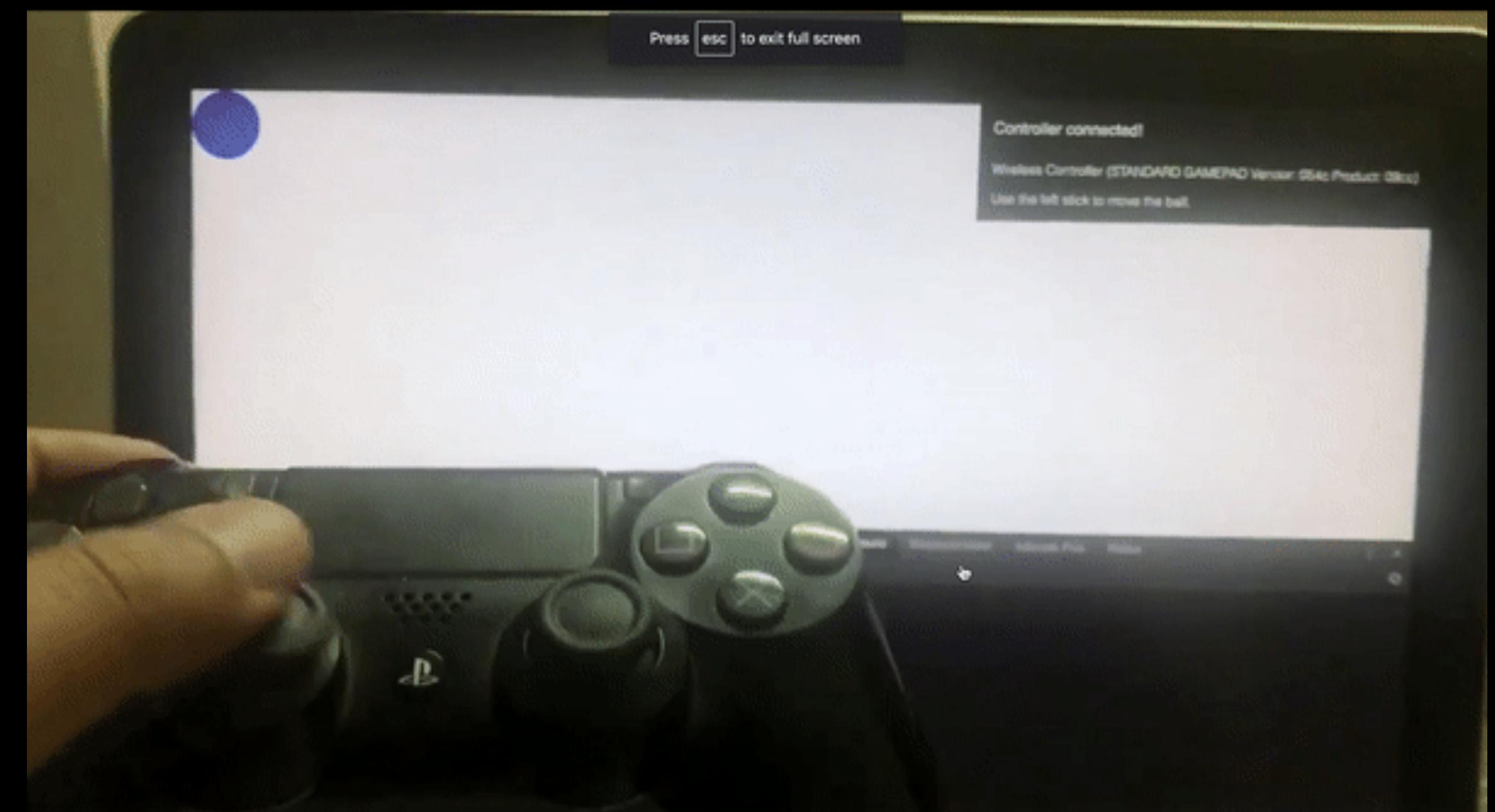
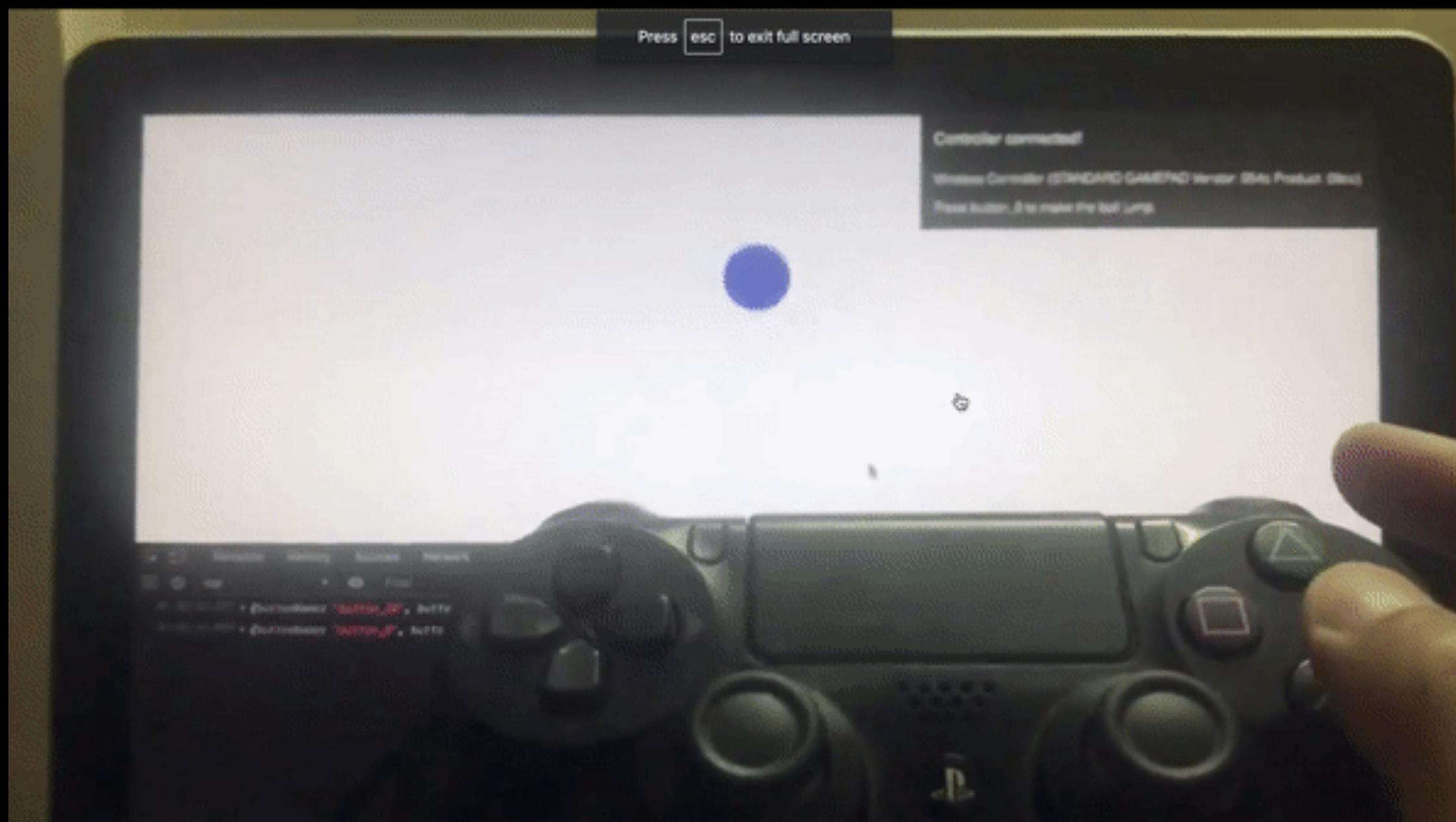


# Button Press/Axis Movement

```
joypad.on('button_press', e => {
  const { buttonName } = e.detail;
  console.log(`#${buttonName} was pressed!`);
});

joypad.on('axis_move', e => {
  const { stickMoved } = e.detail;
  console.log(`#${stickMoved} was moved!`);
});
```

# Button Press/Axis Movement



# Vibration Effect

```
joypad.on('connect', e => {
    const { gamepad } = e;
    const options = {
        startDelay: 500,
        duration: 2000,
        weakMagnitude: 1,
        strongMagnitude: 1
    };

    joypad.vibrate(gamepad, options);
});
```

# Settings

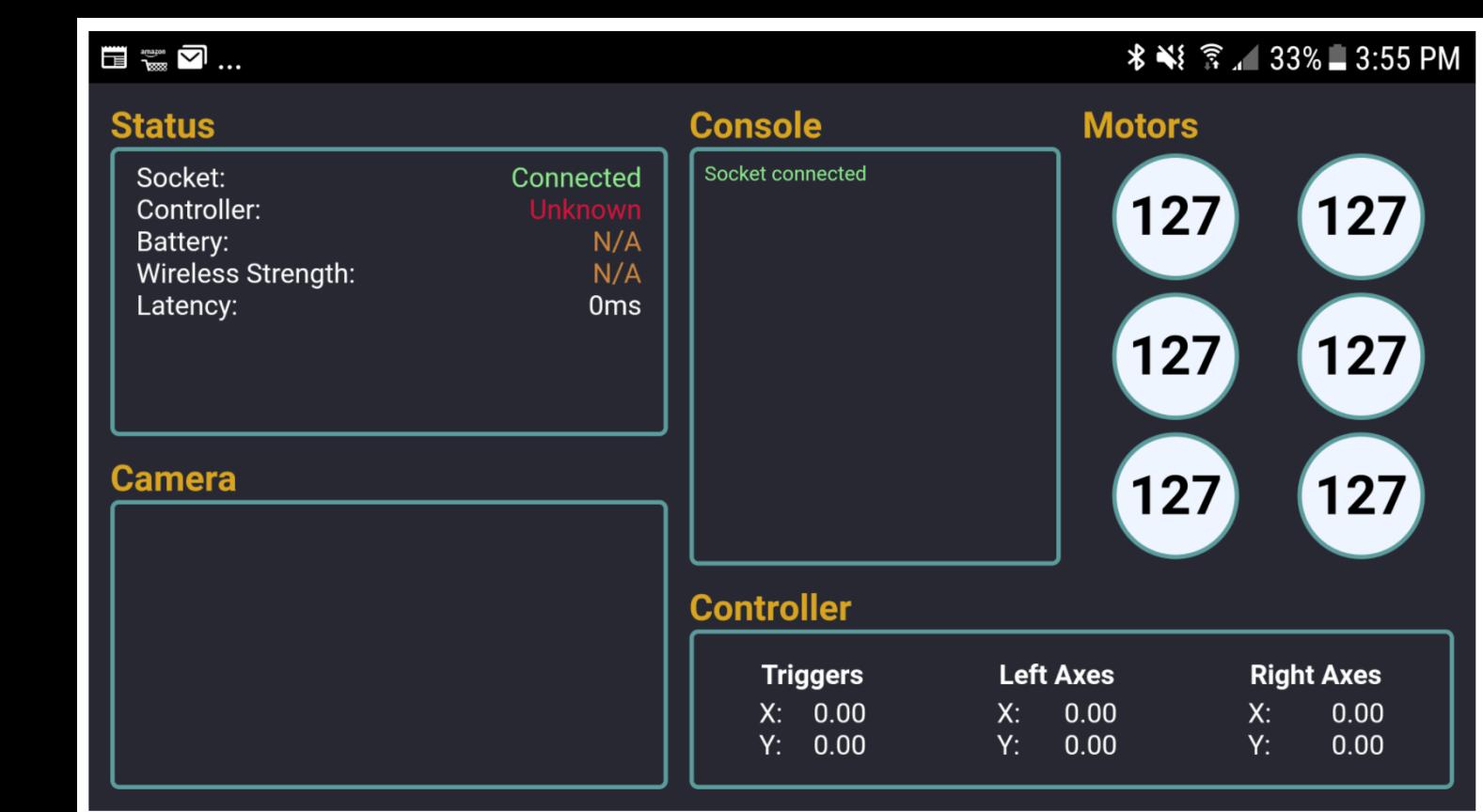
```
joypad.set({  
    vibration: {  
        startDelay: 500,  
        duration: 3000,  
        weakMagnitude: 1,  
        strongMagnitude: 1  
    }  
});
```

```
joypad.set({  
    axisMovementThreshold: 0.3  
});
```

```
function setCustomButtonMapping() {  
    if (browserIs('Firefox')) {  
        return {  
            button_0: 1,  
            button_7: 11,  
            button_8: 12  
        }  
    } else {  
        return null;  
    }  
};  
  
joypad.set({  
    customButtonMapping: setCustomButtonMapping()  
});
```

# Browsers Support

				
Edge	Firefox	Chrome	Safari	Opera
12+	29+	25+	10.1+	24+





[bit.ly/joypad\\_js](http://bit.ly/joypad_js)

# Further Reading

[arunmichaeldsouza.com/blog/using-joypad.js-for-a-better-gaming-experience-on-the-web](http://arunmichaeldsouza.com/blog/using-joypad.js-for-a-better-gaming-experience-on-the-web)

[arunmichaeldsouza.com/blog/web-platform's-hidden-gems-\(series\)](http://arunmichaeldsouza.com/blog/web-platform's-hidden-gems-(series))

[arunmichaeldsouza.com/blog/web-platform's-hidden-gems---gamepad-api](http://arunmichaeldsouza.com/blog/web-platform's-hidden-gems---gamepad-api)

# Thank you

**Arun Michael Dsouza**

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