

Notes on Rounding Numbers in JavaScript

Overview

This document explains how to round numbers in JavaScript for an online music service where customer ratings are averaged and converted to a 0–5 star scale. It covers the `Math.round`, `Math.ceil`, and `Math.floor` methods for handling decimal numbers.

Key Points

1. Objective:

- Round a fractional average (e.g., `scoreAvg`) to the nearest integer to assign a star rating (0–5).
- Use JavaScript's `Math` object methods to control rounding behavior.

2. The `Math.round` Method:

- Rounds a number to the nearest integer.
- Example:

```
var numberOfStars = Math.round(scoreAvg);
```

- **How it works:**

- Rounds up if the decimal is ≥ 0.5 (e.g., $1.5 \rightarrow 2$, $2.5 \rightarrow 3$).
- Rounds down if the decimal is < 0.5 (e.g., $1.4 \rightarrow 1$).
- For negative numbers: $-1.5 \rightarrow -1$, $-2.5 \rightarrow -2$.

- **Assignment:**

- Assign to a new variable (`numberOfStars`) to preserve the original `scoreAvg`.
- Overwrite the original variable to replace it:

```
scoreAvg = Math.round(scoreAvg);
```

- **With literals:**

```
var scoreAvg = Math.round(0.0678437); // Returns 0
```

3. The `Math.ceil` Method:

- Rounds up to the nearest integer, regardless of the decimal value.
- Example:

```
var scoreAvg = Math.ceil(0.000001); // Returns 1
```

- **How it works:**

- “Ceiling” rounds any positive fraction up (e.g., $0.000001 \rightarrow 1$, $1.00001 \rightarrow 2$).
- For negative numbers: $-0.000001 \rightarrow 0$, $-1.9999 \rightarrow -1$.

4. The **Math.floor** Method:

- Rounds down to the nearest integer, regardless of the decimal value.
- Example:

```
var scoreAvg = Math.floor(0.999999); // Returns 0
```

- **How it works:**

- “Floor” rounds any positive fraction down (e.g., $0.999999 \rightarrow 0$, $1.9999 \rightarrow 1$).
- For negative numbers: $-0.000001 \rightarrow -1$, $-1.9999 \rightarrow -2$.

5. Additional Notes:

- All **Math** methods begin with **Math.** (capital M required).
- These methods do not modify the original number unless assigned back to the variable.
- Applicable to both variables and literal numbers.
- Numbers are not constrained to the 0–5 range in these examples; additional logic would be needed to enforce this for star ratings.

Observations

- **Errors in Original Code:**

- `Math.roundathe scoreAvg` contains a typo; it should be `Math.round(scoreAvg)`.
- The rounding behavior for negative numbers is incorrectly described for `Math.round`: it rounds -1.5 to -1 (not -2 as implied).

- **Improvements:**

- For star ratings, ensure the rounded result is clamped to 0–5 using `Math.max(0, Math.min(5, Math.round(scoreAvg)))`.
- The document could clarify that `Math.round(-1.5)` rounds to -1 due to JavaScript’s “round half away from zero” behavior.

- **Edge Cases:**

- The code does not handle non-numeric inputs or NaN, which would return NaN with `Math.round`, `Math.ceil`, or `Math.floor`.
- Ensure `scoreAvg` is a valid number before rounding to avoid errors in a production environment.