

Javascript Assignment 4

Matchsticks House Problem - JavaScript Solution

Problem Statement

Create a function that calculates the number of matchsticks required to build a sequence of houses, where:

- The first house always requires 6 matchsticks
- Each subsequent house shares one side with the previous house
- The function takes the number of steps (houses) as an input

Solution:

```
function matchHouses(step) {  
  // Check for invalid input (0 or negative steps)  
  if (step <= 0) return 0;  
  
  // First house requires 6 matchsticks  
  // Each additional house requires 6 matchsticks minus 1 shared side  
  return 6 + (step - 1) * 5;  
}  
  
// Test cases  
console.log(matchHouses(1)); // 6  
console.log(matchHouses(4)); // 21  
console.log(matchHouses(87)); // 436
```

Solution Breakdown

Mathematical Logic

- 1st house: Always requires 6 matchsticks
- Additional houses: Require 5 matchsticks (one side is shared)

Calculation Formula

- Total Matchsticks = $6 + (\text{step} - 1) * 5$

Step-by-Step Examples

1. First House (step = 1)
 - Matchsticks = 6
 - Calculation: 6
2. Four Houses (step = 4)
 - 1st house: 6 matchsticks
 - 2nd house: +5 matchsticks
 - 3rd house: +5 matchsticks
 - 4th house: +5 matchsticks
 - Total: $6 + (4-1) * 5 = 21$ matchsticks