

Activity 4: Combined Operators Questions using Javascript

Instruction: Kindly read each number and show your code and output per questions.

1. Calculating Total Cost:

- If the itemPrice is 50 and quantity is 3, what is the value of totalCost after calculating itemPrice * quantity? Show your calculation.

CODE:

```
42 <script>
43 // 1. Calculating Total Cost
44 const itemPrice = 50, quantity = 3;
45 const totalCost = itemPrice * quantity;
46 document.write('
47 <p class="section-title">1. Calculating Total Cost</p>
48 <p>To calculate the total cost, multiply the item price (50) by the quantity (3).</p>
49 <div class="result">const itemPrice = 50, quantity = 3;<br>const totalCost = itemPrice * quantity;<br>Result: Total cost = ${totalCost}</div>
50 <p><strong>Explanation:</strong> The total cost is calculated by multiplying the price of each item by the number of items purchased. In this case, 50 * 3 = 150.</p>
51 </div>
52 ');
53
```

OUTPUT:

1. CALCULATING TOTAL COST

To calculate the total cost, multiply the item price (50) by the quantity (3).

```
const itemPrice = 50, quantity = 3;
const totalCost = itemPrice * quantity;
Result: Total cost = 150
```

Explanation: The total cost is calculated by multiplying the price of each item by the number of items purchased. In this case, $50 * 3 = 150$.

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2. Score Adjustment:

- Starting with a score of 85, if you receive a bonus of 15 points and then lose 5 points, what is the final value of finalScore? How did you arrive at this number?

CODE:

```
54 // 2. Score Adjustment
55 const score = 85, bonusPoint = 15, penaltyPoints = 5;
56 const finalScore = score + bonusPoint - penaltyPoints;
57 document.write(
58   <p class="section-title">2. Score Adjustment</p>
59   <p>Starting with a score of 85, receiving a bonus of 15 points and losing 5 points results in:</p>
60   <div class="result">const score = 85, bonusPoints = 15, penaltyPoints = 5;<br>const finalScore = score + bonusPoints - penaltyPoints;<br>Result: Final score = ${finalScore}</div>
61   <p><strong>Explanation:</strong> This demonstrates how a score can be adjusted by adding bonus points and subtracting penalty points. Here, 85 + 15 - 5 = 95.</p>
62   <br>
63 );
```

OUTPUT:

2. SCORE ADJUSTMENT

Starting with a score of 85, receiving a bonus of 15 points and losing 5 points results in:

```
const score = 85, bonusPoints = 15, penaltyPoints = 5;
const finalScore = score + bonusPoints - penaltyPoints;
Result: Final score = 95
```

Explanation: This demonstrates how a score can be adjusted by adding bonus points and subtracting penalty points. Here, 85 + 15 - 5 = 95.

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3. Temperature Conversion:

- Given that the temperature is 30 degrees Celsius, what is the equivalent temperature in Fahrenheit using the formula $(\text{Celsius} \times 9/5) + 32$? Calculate and provide the result.

CODE:

```
65 // 3. Temperature Conversion
66 const celsius = 30;
67 const fahrenheit = (celsius * 9/5) + 32;
68 document.write(
69   <p class="section-title">3. Temperature Conversion</p>
70   <p>To convert 30°C to Fahrenheit, use the formula  $(\text{Celsius} \times 9/5) + 32$ </p>
71   <div class="result">const celsius = 30;<br>const fahrenheit = (celsius * 9/5) + 32;<br>Result:  $\$(\text{celsius})^\circ\text{C} = \$(\text{fahrenheit})^\circ\text{F}$ </div>
72   <p><strong>Explanation:</strong> The formula to convert Celsius to Fahrenheit is  $(\text{Celsius} \times 9/5) + 32$ . By applying this formula to 30°C, we get 86°F.</p>
73   <br>
74   );
```

OUTPUT:

3. TEMPERATURE CONVERSION

To convert 30°C to Fahrenheit, use the formula $(\text{Celsius} \times 9/5) + 32$:

```
const celsius = 30;
const fahrenheit = (celsius * 9/5) + 32;
Result: 30°C = 86°F
```

Explanation: The formula to convert Celsius to Fahrenheit is $(\text{Celsius} \times 9/5) + 32$. By applying this formula to 30°C, we get 86°F.

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4. Inventory Management:

- If you start with itemsInStock = 50, sell 15 items, and then restock with 20 items, what will your final itemsInStock be? Show your calculations step-by-step.

CODE:

```
76 // 4. Inventory Management
77 const initialStock = 50, sold = 15, restocked = 20;
78 const finalStock = initialStock - sold + restocked;
79 document.write(`
80 <p class="section-title">4. Inventory Management</p>
81 <p>If you start with 50 items, sell 15, and restock with 20, your final stock is:</p>
82 <div class="result">const initialStock = 50, sold = 15, restocked = 20;<br>const finalStock = initialStock - sold + restocked;<br>Result: Final stock = ${finalStock}</div>
83 <p><strong>Explanation:</strong> The final stock is calculated by subtracting the number of items sold from the initial stock and adding the number of items restocked. Here, 50 - 15 + 20 = 55.<
84 </p>
85 `);
86
```

OUTPUT:

4. INVENTORY MANAGEMENT

If you start with 50 items, sell 15, and restock with 20, your final stock is:

```
const initialStock = 50, sold = 15, restocked = 20;
const finalStock = initialStock - sold + restocked;
Result: Final stock = 55
```

Explanation: The final stock is calculated by subtracting the number of items sold from the initial stock and adding the number of items restocked. Here, 50 - 15 + 20 = 55.

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5. Age Comparison:

- If your age is 17, what message will be logged when checking if you are at least 18 years old? Explain why that message is logged.

CODE:

```
87 // 5. Age Comparison
88 const userAge = 17, minAge = 18;
89 const accessAllowed = userAge > minAge ? 'Access Granted' : 'Access Denied';
90 document.write(
91   <p class="section-title">5. Age Comparison</p>
92   <p>If your age is 17 and the minimum age is 18, the message logged will be:</p>
93   <div class="result">const userAge = 17, minAge = 18;<br>const accessAllowed = userAge > minAge ? 'Access Granted' : 'Access Denied';<br>Result: ${accessAllowed}</div>
94   <p><strong>Explanation:</strong> This code checks if the user's age is greater than or equal to the minimum age required. Since 17 is less than 18, the access is denied.</p>
95   <br>
96   `);
```

OUTPUT:

5. AGE COMPARISON

If your age is 17 and the minimum age is 18, the message logged will be:

```
const userAge = 17, minAge = 18;
const accessAllowed = userAge > minAge ? 'Access Granted' : 'Access Denied';
Result: Access Denied
```

Explanation: This code checks if the user's age is greater than or equal to the minimum age required. Since 17 is less than 18, the access is denied.

6. Investment Growth with Monthly Contributions:

- You start with an investment of \$5000. Each month, you contribute an additional \$300. If your investment grows at an annual interest rate of 6%, compounded monthly, what will your total balance be after 5 years? Provide the calculations for the interest accrued and total contributions.

CODE:

```
98 // 6. Investment Growth with Monthly Contributions
99 const principal = 5000, monthlyContribution = 300, months = 12 * 5, annualRate = 0.06;
100 const totalContributions = monthlyContribution * months;
101 const interestAccrued = (principal + totalContributions) * (annualRate / 12) * months;
102 const totalBalance = principal + totalContributions + interestAccrued;
103 document.write(
104   <p class="section-title">6. Investment Growth with Monthly Contributions</p>
105   <p>With an initial investment of $5000, monthly contributions of $300 for 5 years, and a 6% annual interest rate, the total balance is:</p>
106   <div class="result">const principal = 5000, monthlyContribution = 300, months = 12 * 5, annualRate = 0.06;<br>Result: Total balance = ${totalBalance.toFixed(2)}</div>
107   <p><strong>Explanation:</strong> This calculation demonstrates how monthly contributions and interest can grow over time. The final balance includes both contributions and interest accrued over
108   <hr>
109   </div>
110 );
```

OUTPUT:

6. INVESTMENT GROWTH WITH MONTHLY CONTRIBUTIONS

With an initial investment of \$5000, monthly contributions of \$300 for 5 years, and a 6% annual interest rate, the total balance is:

```
const principal = 5000, monthlyContribution = 300, months = 12 * 5, annualRate = 0.06;
Result: Total balance = $29900.00
```

Explanation: This calculation demonstrates how monthly contributions and interest can grow over time. The final balance includes both contributions and interest accrued over 5 years.

7. Distance Traveled with Varying Speeds:

- A cyclist travels at a speed of 20 km/h for the first 2 hours, then increases their speed to 25 km/h for the next 1.5 hours. After that, they take a 30-minute break. Finally, they ride at a speed of 15 km/h for the remaining distance of 10 km. Calculate the total distance traveled and total time spent on the journey.

CODE:

```
111 // 7. Distance Traveled with Varying Speeds
112 const speed1 = 20, time1 = 2, speed2 = 25, time2 = 1.5, speed3 = 15, distanceRemaining = 10;
113 const distance1 = speed1 * time1, distance2 = speed2 * time2, timeTaken = time1 + time2 + 0.5; // Adding break time of 0.5 hours
114 const totalDistance = distance1 + distance2 + distanceRemaining;
115 document.write<
116 <p class="section-title">7. Distance Traveled with Varying Speeds</p>
117 <p>The total distance traveled with varying speeds and a break is:</p>
118 <div class="result">const speed1 = 20, time1 = 2, speed2 = 25, time2 = 1.5, speed3 = 15, distanceRemaining = 10;<br>Result: Total distance = ${totalDistance} km, Total time = ${timeTaken} hours<
119 <p><strong>Explanation:</strong> This example involves traveling at different speeds for different durations, with an added break time. The total distance is the sum of all distances traveled at
120 </p>
121 </div>
122 </>
```

OUTPUT:

7. DISTANCE TRAVELED WITH VARYING SPEEDS

The total distance traveled with varying speeds and a break is:

```
const speed1 = 20, time1 = 2, speed2 = 25, time2 = 1.5, speed3 = 15, distanceRemaining = 10;
Result: Total distance = 87.5 km, Total time = 4 hours
```

Explanation: This example involves traveling at different speeds for different durations, with an added break time. The total distance is the sum of all distances traveled at each speed.

8. Enhanced Game Scoring System:

- You begin with a score of 800. For every level completed (7 levels total), you gain 150 points and lose 30 points for penalties. Additionally, if you reach a score of 1200, you receive a bonus of 100 points. What will your final score be after all levels are completed?

CODE:

```
123 // 8. Enhanced Game Scoring System
124 let baseScore = 800, levels = 7, levelBonus = 150, levelPenalty = 30, bonusThreshold = 1200, bonusPoints = 100;
125 let finalScoreGame = baseScore + (levels * (levelBonus - levelPenalty));
126
127 if (finalScoreGame >= bonusThreshold) {
128     finalScoreGame += bonusPoints;
129 }
130
131 document.write(`
132 <p class="section-title">8. Enhanced Game Scoring System</p>
133 <p>The final score after completing all levels and applying bonuses/penalties is:</p>
134 <div class="result">let baseScore = 800, levels = 7, levelBonus = 150, levelPenalty = 30, bonusThreshold = 1200, bonusPoints = 100;<br>
135 let finalScoreGame = baseScore + (levels * (levelBonus - levelPenalty));<br>
136 if (finalScoreGame >= bonusThreshold) {<br>
137     finalScoreGame += bonusPoints;<br>
138 }<br>
139 Result: Final score = ${finalScoreGame}</div>
140 <p><strong>Explanation:</strong> The score is calculated by starting with a base score of 800, then applying bonuses and penalties for each of the 7 levels. For each level, the player earns a bu
141 <ul>
142     <li>Base Score = 800</li>
143     <li>Level Bonus = 150, Level Penalty = 30</li>
144     <li>Levels = 7</li>
145     <li>Bonus and Penalty for all levels = (150 - 30) * 7 = 120 * 7 = 840</li>
146     <li>Final Score before bonus = 800 + 840 = 1640</li>
147     <li>Since the final score is greater than 1200, bonus points of 100 are added.</li>
148     <li>Final Score = 1640 + 100 = ${finalScoreGame}</li>
149 </ul>
150 </div>
151 `);
```

OUTPUT:

8. ENHANCED GAME SCORING SYSTEM

The final score after completing all levels and applying bonuses/penalties is:

```
let baseScore = 800, levels = 7, levelBonus = 150, levelPenalty = 30, bonusThreshold = 1200, bonusPoints = 100;
let finalScoreGame = baseScore + (levels * (levelBonus - levelPenalty));
if (finalScoreGame >= bonusThreshold) {
    finalScoreGame += bonusPoints;
}
Result: Final score = 1740
```

Explanation: The score is calculated by starting with a base score of 800, then applying bonuses and penalties for each of the 7 levels. For each level, the player earns a bonus of 150 points but also loses 30 points as a penalty. If the final score exceeds the threshold of 1200, an additional bonus of 100 points is added. In this case, the final score is calculated as follows:

- Base Score = 800
- Level Bonus = 150, Level Penalty = 30
- Levels = 7
- Bonus and Penalty for all levels = (150 - 30) * 7 = 120 * 7 = 840
- Final Score before bonus = 800 + 840 = 1640
- Since the final score is greater than 1200, bonus points of 100 are added.
- Final Score = 1640 + 100 = 1740

9. Comparative Age Analysis:

- Given the ages: age1 = 25, age2 = 30, age3 = 22, and age4 = 29, determine which person is the oldest and how much older they are than the others. Use comparison operators to assess the differences and log appropriate messages for each comparison.

CODE:

```
154 // 9. Comparative Age Analysis
155 const age1 = 25, age2 = 30, age3 = 22, age4 = 29;
156 const oldestAge = Math.max(age1, age2, age3, age4);
157 let oldestPerson = '';
158
159 if (oldestAge === age1) oldestPerson = 'Person 1 (25)';
160 if (oldestAge === age2) oldestPerson = 'Person 2 (30)';
161 if (oldestAge === age3) oldestPerson = 'Person 3 (22)';
162 if (oldestAge === age4) oldestPerson = 'Person 4 (29)';
163
164 const ageDiff1 = oldestAge - age1;
165 const ageDiff2 = oldestAge - age2;
166 const ageDiff3 = oldestAge - age3;
167 const ageDiff4 = oldestAge - age4;
168
169 document.write(`
170 <p class="section-title">9. Comparative Age Analysis</p>
171 <p>The oldest person is: ${oldestPerson} and they are:</p>
172 <div class="result">
173   const age1 = 25, age2 = 30, age3 = 22, age4 = 29;<br>
174   const oldestAge = Math.max(age1, age2, age3, age4);<br>
175   let oldestPerson = '';<br>
176   if (oldestAge === age1) oldestPerson = 'Person 1 (25)';<br>
177   if (oldestAge === age2) oldestPerson = 'Person 2 (30)';<br>
178   if (oldestAge === age3) oldestPerson = 'Person 3 (22)';<br>
179   if (oldestAge === age4) oldestPerson = 'Person 4 (29)';<br>
180   const ageDiff1 = oldestAge - age1;<br>
181   const ageDiff2 = oldestAge - age2;<br>
182   const ageDiff3 = oldestAge - age3;<br>
183   const ageDiff4 = oldestAge - age4;<br>
184   Result: Person 1 is ${ageDiff1} years younger than the oldest person.<br>
185   Person 2 is ${ageDiff2} years younger than the oldest person.<br>
186   Person 3 is ${ageDiff3} years younger than the oldest person.<br>
187   Person 4 is ${ageDiff4} years younger than the oldest person.<br>
188 </div>
189 <p><strong>Explanation:</strong> The oldest person is determined using the Math.max() function, which finds the highest age among the four given ages. The differences between the oldest person's
190 <br>
191 `);
```

OUTPUT:

9. COMPARATIVE AGE ANALYSIS

The oldest person is: Person 2 (30) and they are:

```
const age1 = 25, age2 = 30, age3 = 22, age4 = 29;
const oldestAge = Math.max(age1, age2, age3, age4);
let oldestPerson = '';

if (oldestAge === age1) oldestPerson = 'Person 1 (25)';
if (oldestAge === age2) oldestPerson = 'Person 2 (30)';
if (oldestAge === age3) oldestPerson = 'Person 3 (22)';
if (oldestAge === age4) oldestPerson = 'Person 4 (29)';

const ageDiff1 = oldestAge - age1;
const ageDiff2 = oldestAge - age2;
const ageDiff3 = oldestAge - age3;
const ageDiff4 = oldestAge - age4;

Result: Person 1 is 5 years younger than the oldest person.
Person 2 is 0 years younger than the oldest person.
Person 3 is 8 years younger than the oldest person.
Person 4 is 1 years younger than the oldest person.
```

Explanation: The oldest person is determined using the Math.max() function, which finds the highest age among the four given ages. The differences between the oldest person's age and the others are then calculated using simple subtraction, providing the number of years each person is younger than the oldest.

10. Dynamic Countdown Timer with Complex Conditions:

- Starting with a count of 50, log the current count and decrement it. If the count is divisible by 5, you double the count before logging it. If the count is odd, subtract 1. How many times will you log a value before reaching 0, and what values will be logged during the countdown?

CODE:

```
194 <!-- 10. Dynamic Countdown Timer with Complex Conditions -->
195
196 <script>
197     document.write('
198     <p class="section-title">10. Dynamic Countdown Timer with Complex Conditions</p>
199     <p><strong>Explanation:</strong> Starting with a count of 50, the value is logged and manipulated according to the conditions:
200     <ul>
201         <li>If divisible by 5, the count is doubled.</li>
202         <li>If odd, 1 is subtracted.</li>
203         <li>Otherwise, the count is decremented by 1.</li>
204     </ul></p>')
205 </script>
206 <div id="output"></div>
207 <script>
208     var count = 50;
209     var logCount = 0;
210     var outputDiv = document.getElementById("output");
211
212     while (count > 0 && logCount < 10) {
213         outputDiv.innerHTML += count + "<br>";
214         logCount++;
215
216         if (count % 5 === 0) {
217             count *= 2;
218         } else if (count % 2 === 1) {
219             count -= 1;
220         } else {
221             count -= 1;
222         }
223         outputDiv.innerHTML += "Total times logged: " + logCount;
224     }
225 </script>
```

OUTPUT:

10. DYNAMIC COUNTDOWN TIMER WITH COMPLEX CONDITIONS

Explanation: Starting with a count of 50, the value is logged and manipulated according to the conditions:

- If divisible by 5, the count is doubled.
- If odd, 1 is subtracted.
- Otherwise, the count is decremented by 1.

50
100
200
400
800
1600
3200
6400
12800
25600
Total times logged: 10