

# Loops and Debugging

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# Overview

```
1  /*
2    - loops
3    - while loop
4    - for loop
5    - break, continue keywords
6
7    - debugging
8    - interpreting a stack trace/error message
9    - debugging a failing test
10   - using debugger
11  */
12
13
14
```



# while loop

```
1  /* a while loop requires three elements:
2     1. the while keyword
3     2. a conditional expression that evaluates to a boolean value
4     3. a block of code
5
6     while (conditional) {
7         // block of code
8     }
9
10    the block of code will run over and over as long as the conditional
11    expression evaluates to true
12 */
13
14
```



```
count is 3  
count is 2  
count is 1
```

# while loop

```
1  let count = 3;  
2  
3  while (count >= 1) {  
4    console.log('count is', count);  
5    count--;  
6  }  
7  
8  
9  
10  
11  
12  
13  
14
```



# while loop

```
1 while (false) {  
2   console.log('this line of code will never run');  
3 }  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14
```

# while loop

```
1 while (true) {
2     console.log('this line will run forever');
3     // (or until the machine running the code runs out of
4 }
```

[illegible]

[illegible]



# for loop

```
1  /* a for loop requires three elements:
2     1. the for keyword
3     2. three optional expressions
4     3. a block of code
5
6     for (initialization; condition; final-expression) {
7         // block of code
8     }
9
10    the block of code will run over and over until the condition
11    evaluates to false
12 */
13
14
```





```
i is: 1  
i is: 2  
i is: 3
```

# for loop

```
1  /* the initialization is run first, and only once. it's often used to  
2     define a counter variable */  
3  
4  /* then, before every iteration, the condition is checked to see if it's  
5     true - if it is, the for loop will run another iteration */  
6  
7  /* then, after each iteration, the final expression is run */  
8  
9  for (let i = 1; i <= 3; i++) {  
10     console.log('i is:', i);  
11 }  
12  
13  
14
```



# for loop

```
i is: 5  
i is: 4  
i is: 3  
i is: 2  
i is: 1
```

```
1  // loop in either direction  
2  for (let i = 5; i >= 1; i--) {  
3      console.log('i is:', i);  
4  }
```

5

6

7

8

9

10

11

12

13

14



```
i is: 100  
i is: 200  
i is: 300
```

# for loop

```
1  // can increment by any number  
2  for (let i = 100; i <= 300; i += 100) {  
3      console.log('i is:', i);  
4  }  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14
```



# for loop

a  
b  
c  
d  
e  
f  
g

```
1  // use for loops to iterate through a string
2  let letters = 'abcdefg';
3
4  for (let i = 0; i < letters.length; i++) {
5      let currentLetter = letters[i];
6      console.log(currentLetter);
7  }
8
9
10
11
12
13
14
```



```
i is: 1  
i is: 2  
i is: 4  
i is: 5
```

# continue keyword

```
1 // the continue keyword will cause the loop to skip to the next iteration  
2 for (let i = 1; i <= 5; i++) {  
3   if (i === 3) {  
4     continue;  
5   }  
6  
7   console.log('i is:', i);  
8 }  
9  
10  
11  
12  
13  
14
```



count is 5  
count is 3  
count is 1

# continue keyword

```
1 // the continue keyword also works in while loops
2 let count = 5;
3
4 while (count >= 1) {
5     if (count % 2 === 0) {
6         count--;
7         continue;
8     }
9
10    console.log('count is', count);
11    count--;
12 }
13
14
```



# break keyword

```
1 // the break keyword breaks out of the loop permanently
2 let myGrade = 'A';
3
4 while (true) {
5     myGrade += '+';
6
7     if (myGrade.length === 3) {
8         break;
9     }
10 }
11
12 console.log(myGrade);
13
14
```



```
i is 10  
i is 9  
i is 8  
i is 7
```

# break keyword

```
1 // the break keyword also works in for loops  
2 for (let i = 10; i >= 1; i--) {  
3   console.log('i is', i);  
4  
5   if (i === 7) {  
6     break;  
7   }  
8 }  
9  
10  
11  
12  
13  
14
```






# Debugging

```
1  /* Developers spend way more time debugging code than writing it! */
2
3  /* Let's review some good debugging techniques to help you write better
4     code more quickly throughout the remaining workshops */
5
6
7
8
9
10
11
12
13
14
```



# Debugging — error messages

```
1  /* Let's start by considering
2     bugs that come from writing
3     invalid JavaScript code. */
4
5  /* The testem page in your
6     browser passes helpful error
7     messages to you if it
8     couldn't run your code as
9     written */
10
11 /* This ReferenceError means the
12    the code tried to reference a
13    variable called sum that was
14    never defined */
```

 **Jasmine** 2.4.1 Options

● × × ×

4 specs, 3 failures finished in 0.013s

Spec List | Failures

only0dds returns a number


ReferenceError: sum is not defined

ReferenceError: sum is not defined  
at only0dds (http://localhost:7357/only-odds.js:11:7)  
at Object.it (http://localhost:7357/only-odds.spec.js:8:  
at attemptSync (https://cdnjs.cloudflare.com/ajax/libs/



# Debugging — error messages

```
1  /* Note the stack trace below the
2     error */
3
4  /* The first at... line gives the
5     location where the error
6     occurred in only-odds.js: it
7     looks like the error happened
8     on line 11. */
9
10 /* This line number may not
11    always be accurate, but its
12    often a good place to start */
13
14 /* Google unfamiliar errors */
```

 **Jasmine** 2.4.1 Options

● × × ×

4 specs, 3 failures finished in 0.013s

Spec List | Failures

only0dds returns a number

ReferenceError: sum is not defined

ReferenceError: sum is not defined

at only0dds (http://localhost:7357/only-odds.js:11:7)

at Object.it (http://localhost:7357/only-odds.spec.js:8:)

at attemptSync (https://cdnjs.cloudflare.com/ajax/libs/)



# Debugging — failing tests

```
1  /* When your test is failing, you'll get an output that compares the value
2     your function returned against the expected value. */
3
4
5
```



4 specs, 1 failure

finished in 0.007s

Spec List | Failures

onlyOdds returns the sum of all odd nums between the provided argument  
and 0

Expected 55 to equal 25.

Error: Expected 55 to equal 25.



# Debugging — failing tests

```
1  /* Note the plain-english explanation of what the test is looking for;  
2     that can help! */  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14
```



4 specs, 1 failure

finished in 0.007s

Spec List | Failures

onlyOdds returns the sum of all odd nums between the provided argument and 0

Expected 55 to equal 25.

Error: Expected 55 to equal 25.



# Debugging — failing tests

```
1  /* If your test is failing with "undefined" outputs, makes sure you
2     are returning values from your functions, not console.logging them! */
3
4
5
```

● × × ×

4 specs, 3 failures

Spec List | Failures

onlyOdds returns a number

Expected 'undefined' to equal 'number'.

stack@http://cdnjs.cloudflare.com/ajax/libs/jasmine/2.4.1/jasmine.js:1577:26





# Debugging — failing tests

1 `/* It can also help to look directly at the code that defines how the test`  
2 `is supposed to work. Look for a test in the *.spec.js file with the`  
3 `same plain-language explanation, and with the same expect value. */`  
4

```
12  it('returns the sum of all odd nums between the provided argument and 0', () => {  
13    let returnedValue = onlyOdds(10);  
14    expect(returnedValue).toEqual(25);  
15  });
```

8  
9 `/* Now you can see that the test is passing in the number 10 to your`  
10 `function. This can help you debug! */`  
11

12 `/* All of the code inside of the tests, besides the line that starts with`  
13 `expect, is plain-old JavaScript */`  
14




# Debugging — debugger

```
1  /* To use debugger:
2      1. add the debugger keyword in your function in VSCode
3      2. invoke the function yourself */
4  function onlyOdds(num) {
5      debugger; // debugger keyword here
6      let sum = 0;
7      for (let i = num; i >= 1; i--) {
8          if (i % 2 === 1) {
9              sum += i;
10         }
11     }
12     return sum;
13 }
14 onlyOdds(3); // invoking the function ourselves here
```



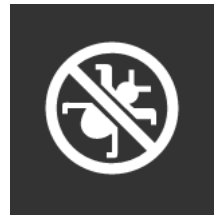
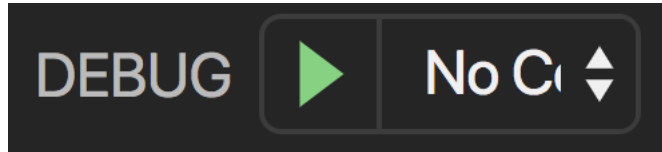
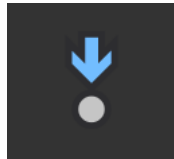



# debugger: Chrome Dev Tools

```
1  /* Open Chrome Dev Tools (right-click > Inspect > Console) */
2
3  /* Run your code in CodePen */
4
5  /* Your code will pause when it hits the debugger keyword */
6
7  /* Note the Scope panel on the right side of the screen. This
8     continuously updates the values assigned to every relevant variable. */
9
10 /* Select the  button to move your code forward one line */
11
12 /* It's sometimes easier to use debugger when you call the function
13    directly through the console instead of letting tests call your code */
14
```



# debugger: VSCode

```
1  /* Click the debugging option in VSCode: 
2
3  followed by the green debug arrow at the
4  top-left of the screen: 
5
6  Now, press  to see your code run line by line (press  to stop) */
7
8  /* Note the Variables panel on the left side of the screen. This
9  continuously updates the values assigned to every relevant variable. */
10
11 /* Especially helpful to debug control-flow bugs (like loops) */
12
13
14
```



# Recap

```
1  /*
2    - loops
3    - while loop
4    - for loop
5    - break, continue keywords
6
7    - debugging
8    - interpreting a stack trace/error message
9    - debugging a failing test
10   - using debugger
11  */
12
13
14
```