For Loops & Lists

CSCI 185: Repeating Code

Announcements: Schedule

Week 14 (this Week)

- We, 4/12: HW6 due
- Fr, 4/14 Class Cancelled, no tutorial

Week 15

- Mo, 4/17: Mid-point project deliverable due
- We, 4/19: Mid-point project presentations during class

Week 16

- Mo, 4/24: Quiz 3
- We, 4/26: HW7 due
- Fri, 4/28: Final exam Section 2

Week 17

- Mo, 5/1: Final exam Section 1
- Tu, 5/2: Final Project due

Announcements: Your Grade

- 15% Participation (attendance)
- 15% Tutorials (drop your lowest grade)
- 50% Homework & Projects
- 10% Quizzes (final exam score can replace one quiz score)
- 10% Final Exam

The final exam is optional:

- If you don't take it, your final exam score will become an average of your 3 quiz scores.
- If you do take it:
  - Your final exam score can replace your lowest quiz score
  - Your final exam score will be whichever is higher: your quiz score or your final exam score

Outline

1. Homework 6
2. Review
3. For loops
4. Looping algorithms

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1. **Homework 6**
2. Review
3. For loops
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Homework 6: Tips

- Let's download it and look at it briefly.
- For the showImage() function, use a template literal to create the image tag with the next element in the list (corresponding to the **idx** variable).
- Come to office hours today if you have any questions.

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1. Homework 6
2. **Review**
3. For loops
4. Looping algorithms

Consider the following:

```
let nums = [7, 4.5, 2, 1, 2.5];
let result =  nums[0] + nums[2] + nums[4];
```

1. What is the **VALUE** stored in ***result***?
2. What is the **DATA TYPE** of the value stored in ***result***?

Consider the following code block:

```
let flowers = ['daisy', 'orchid', 'lily', 'tulip'];
let flower = flowers.pop();
flowers.push('rose');
flowers.push(flower);
console.log(flowers);
```

What prints to the screen?

Using any kind of loop that you want, write a program that prints out all of the items in the “fruit” array to the JavaScript console:

```
let fruit = ['apple', 'orange', 'banana', 'grapefruit', 'lemon'];
```

Consider the following snippet of code....

```
const colors = [
    'red', 'orange', 'yellow', 'green',
    'blue', 'purple', 'indigo', 'violet'
];

const numbers = [1, 3, 5];

console.log(colors[5]);
console.log(numbers[1]);
console.log(colors[numbers[1]]);
```

What will happen when this code is executed? If information prints to the screen, write what the output would be below.

Consider the following:

```
const colors = [
    'red', 'orange', 'yellow', 'green',
   'blue', 'purple', 'indigo', 'violet'
]

let i = 0;
while (i < colors.length) {
    console.log(i, colors[i]);
    i += 2;
}
```

What will happen when this code is executed? If information prints to the screen, write what the output would be below.

Given the following code block, what prints to the console?

```
let course = {
    id: 250,
    title: 'Intro to Music Composition',
    department: 'Music',
    semesters_offered: ['sp2021', 'sp2022', 'sp2023']
};
console.log(course.id, course.semesters_offered[2]);
```

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Recall: List Review

```
const names = [
     'Larry', 'Curly', 'Moe', 'Seamus'
];
const length = names.length;     // length of names list

console.log(names[0]);           // prints first element
console.log(names[1]);           // prints second element
console.log(names[2]);           // prints third element
...
console.log(names[length - 1]); // prints last element
```

How do I use a while loop to print all of the names?

```
const names = [
     'Larry', 'Curly', 'Moe', 'Seamus'
];
```

- What to I want to repeat?
  - I want to print a word
- How long to repeat?
  - Until we get to the end of the name
- What do I want to change each time?
  - The specific word that’s being printed

Sample While Loop Quiz Question

- Open up the Code Visualizer: https://pythontutor.com/javascript.html#mode=edit

- Write a program to print out all of the items in this list using a while loop...

```
const names = [
     'Larry', 'Curly', 'Moe', 'Seamus'
];
```

Answer

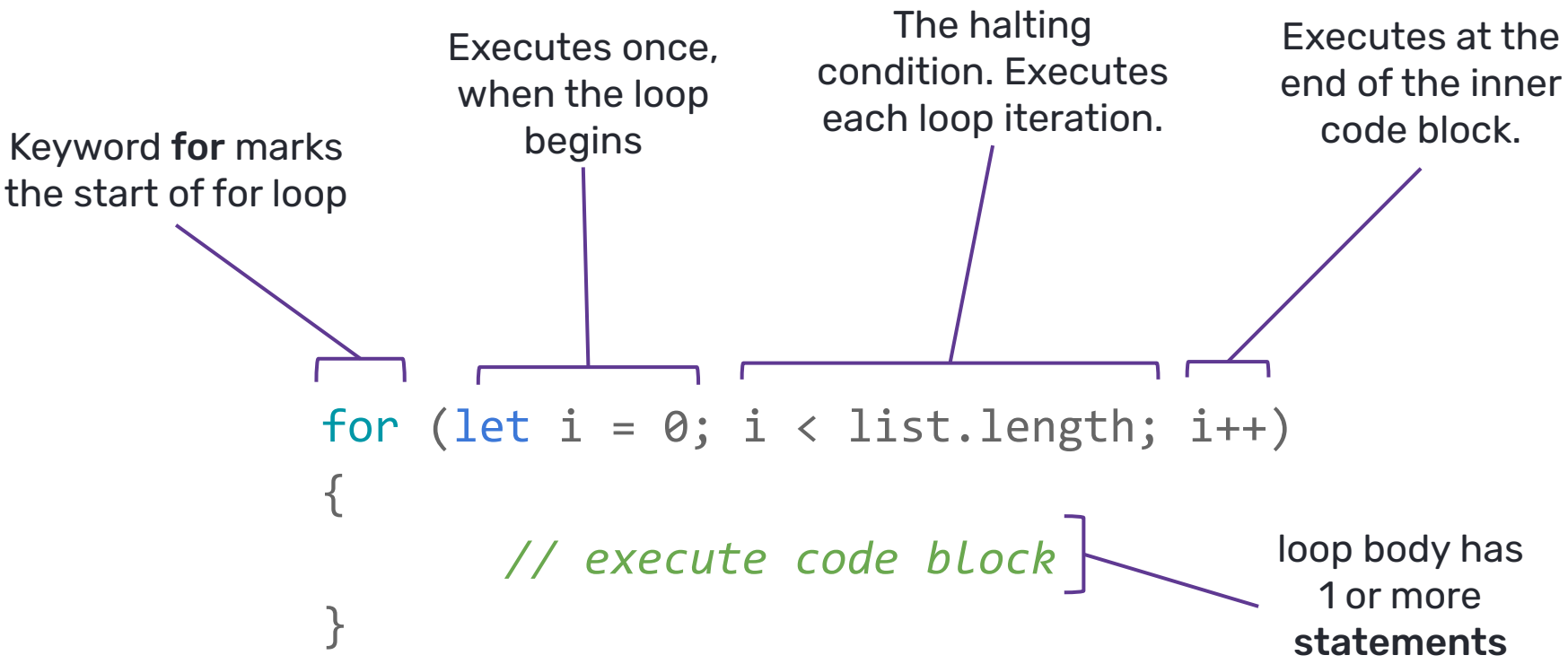
```
const names = [
     'Larry', 'Curly', 'Moe', 'Seamus'
];

let i = 0;
while (i < names.length) {
    console.log(names[i]);
    ++i;
}
```

For Loops

Pseudocode

```
for (let i = 0; i < sequence.length; i++)
{
        // execute code block
}
```



Logically identical to a while loop, but more condensed syntax.

Different Loop Syntaxes

```
// while loop:
let i = 0;
while (i < items.length) {
    // do something
    i++;
}
```

```
// for loop:
for (let i = 0; i < items.length; i++) {
    // do something
}
```

Sample For Loop Quiz Question

- Open up the Code Visualizer: https://pythontutor.com/javascript.html#mode=edit

- Write a program to print out all of the items in this list using a **for loop...**

```
const names = [
     'Larry', 'Curly', 'Moe', 'Seamus'
];
```

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PRACTICE TIME

SOLVING PROBLEMS WITH LOOPS

09-find-largest-number

CHALLENGE 1

WHAT'S THE LARGEST NUMBER?

For Loops: Challenge

Which number is biggest?

```
[65, 1800, 12, 20, 1963,
5000, 260, 0, 40, 953,
775, 67, 33, 1688, 119]
```


Credit: activity designed by Chuck Severance

BEGIN

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

65

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

```
1800
```

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

12

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

1963

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

```
5000
```

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

260

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

END

BEGIN

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

65

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

```
1800
```

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

12

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

1963

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

```
5000
```

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

260

Loop: Challenge

How can a computer scan a list of numbers and figure out the biggest number?

END

How did you figure it out?

Three Questions

1. What do you want to repeat?
   comparison

2. How long to you want to repeat it?
   Until the end of the list

3. What do you want to change each time?
   Only if the new number is bigger do we swap out the currentLargestNumber

09-find-largest-number

Loop Challenge: Find the Largest Number

```
const numbers = [65, 1800, 12, 20, 1963, 5000, 260, 0, 40, 953, 775, 67,
33];
let biggestNumberYet = 0
for (let i = 0; i < numbers.length; i++) {
    const num = numbers[i];
    if (biggestNumberYet < num) {
        biggestNumberYet = num;
    }
}
console.log('The biggest number in the list is: ', biggestNumberYet)
```

09-find-largest-number

Will work with millions of

More Number Challenges: practice on your own!

```
const numbers = [65, 1800, 12, 20, 1963, 5000, 260, 0, 40, 953, 775];
```

Given the list above, do the following:

- ~~Find the largest number~~
- Find the smallest number
- Find the sum of the numbers
- Find the average of the numbers
- Print every number in the list that is a multiple of 2 or 5
- Print each number in the list in the reverse order