

# Ar r a y s & F o r L o o p s

[ ]

# Agenda

Variabl es v. s. arrays

I ntroducti on of arrays

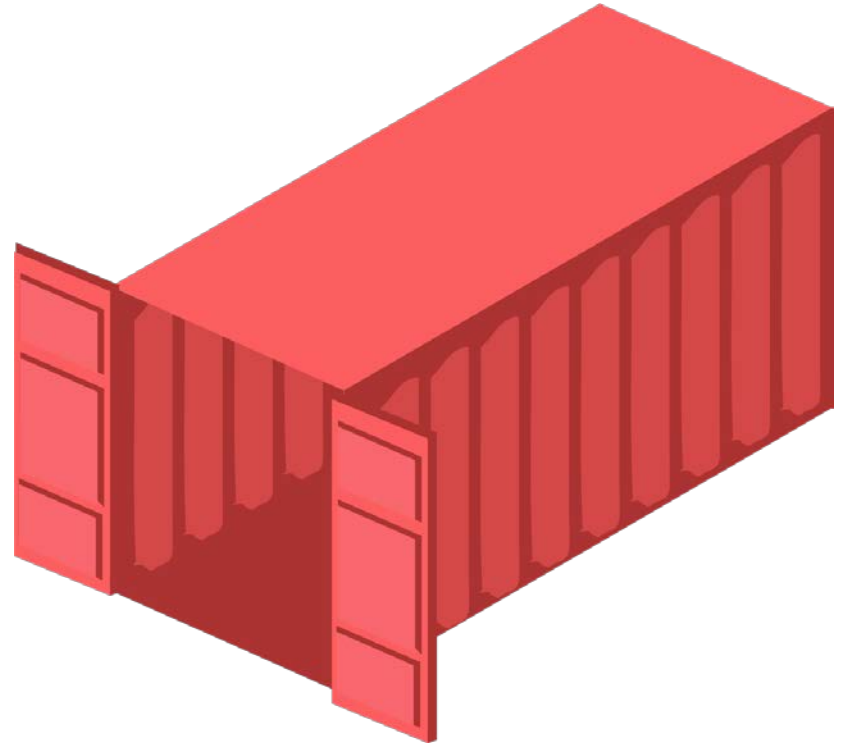
I ntroducti on of for loops

Text Advent ure Presentati on

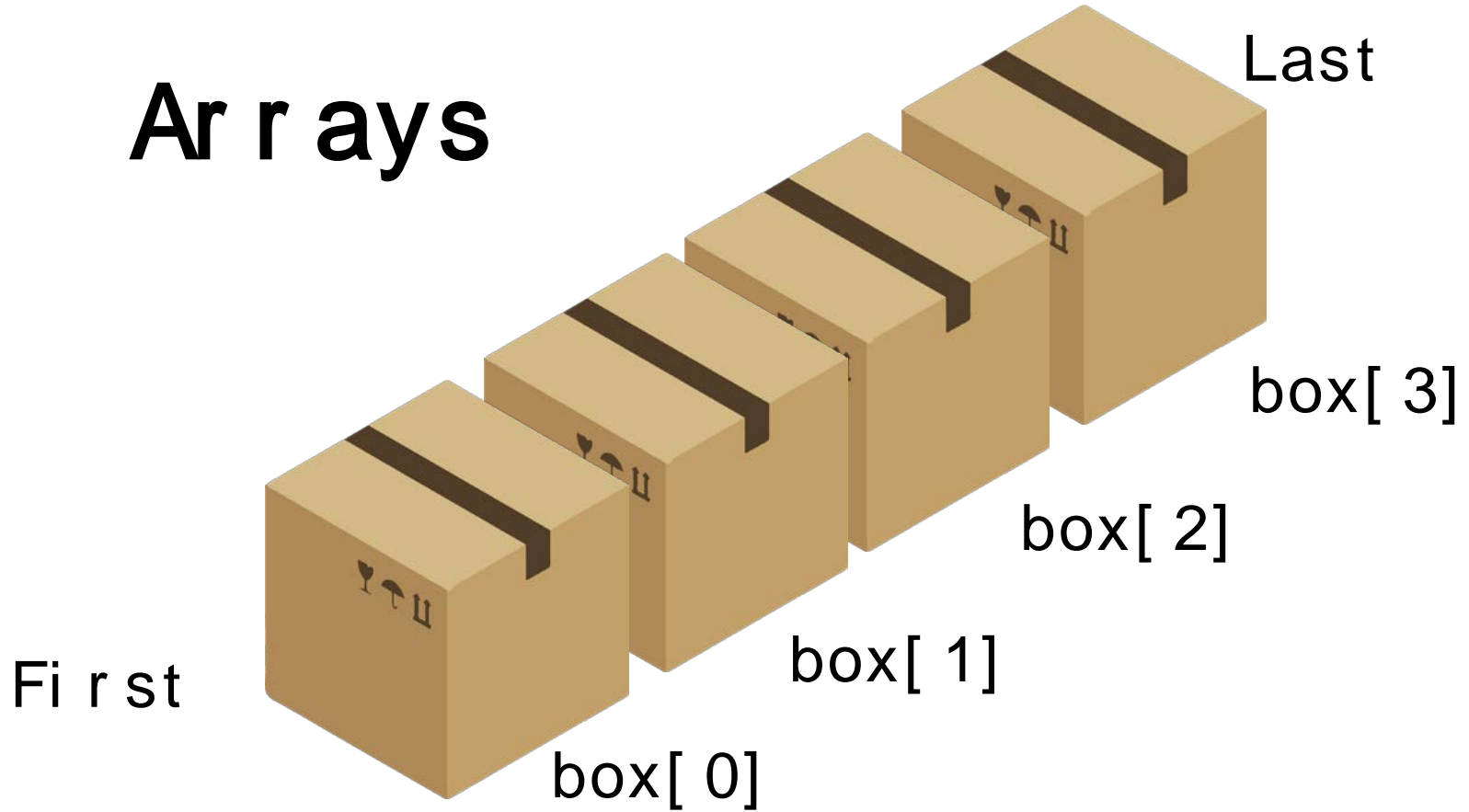
# Var i ables



# Ar r a y s



# Ar r a y s



**WHY USE ARRAYS?**

```
// Arrays are extremely efficient in utilizing computer memory  
// because they use adjacent memory storage  
// making it easy to access variables
```

Variable

1
---

Array

1	6	4	5	3	2
---	---	---	---	---	---

// What do they look like in code? [ ]

```
int[] numbers = { 90, 150, 30 } ;
```

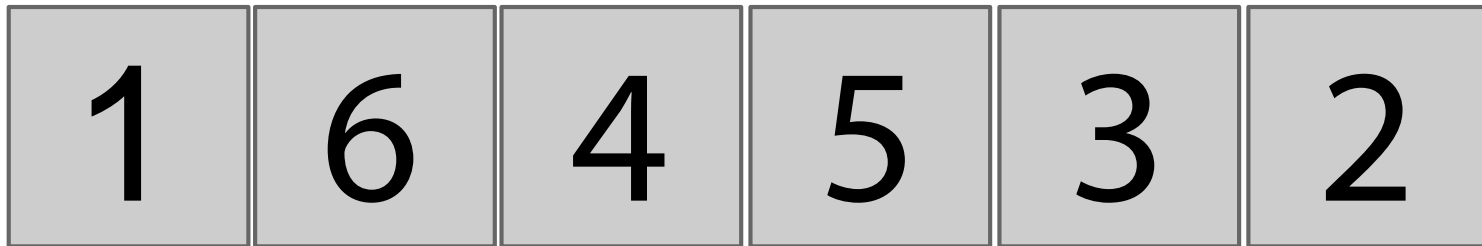
```
string[] names = { "Leah", "Nathan", "Ray",  
                  "Youchun", "Phillip", "Jakie",  
                  "Archit" } ;
```



```
int[] num = new int[6];
```



num[0] = 1   num[1] = 6   num[2] = 4   num[3] = 5   num[4] = 3   num[5] = 2



# I NDEXES

i nt [ ] num = { 1, 2, 3, 4 }

0 1 2 3

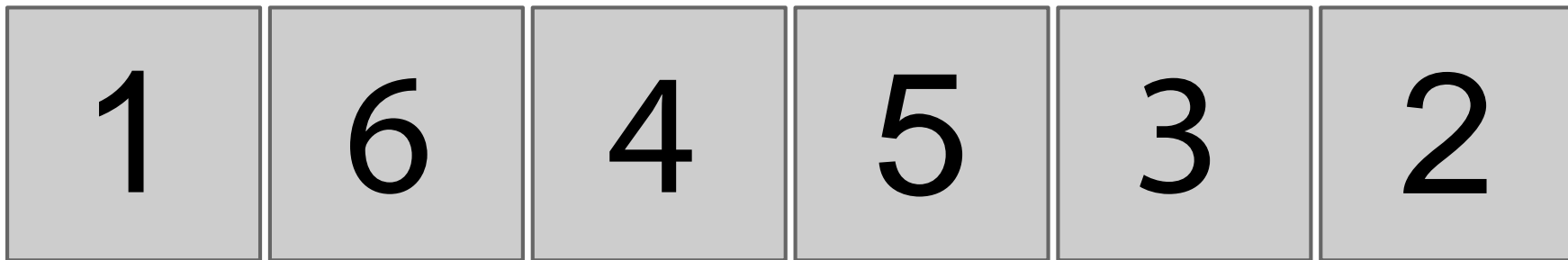
The diagram illustrates an array of integers. The array is labeled 'i nt [ ] num = { 1, 2, 3, 4 }'. Below the elements, four vertical arrows point upwards to each element. The arrows are labeled with the indices 0, 1, 2, and 3 from left to right, indicating that index 0 points to the value 1, index 1 points to 2, index 2 points to 3, and index 3 points to 4.

num[ 0] = 1 ;

num[ 1] = 2 ;

num[ 3] = ? ;

value



[ 0 ]

[ 1 ]

[ 2 ]

[ 3 ]

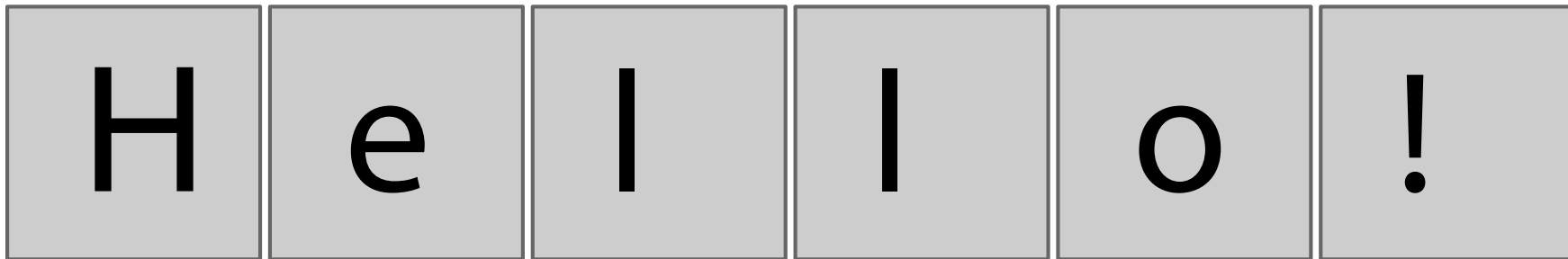
[ 4 ]

[ 5 ]



position (index)

value



[ 0 ]

[ 1 ]

[ 2 ]

[ 3 ]

[ 4 ]

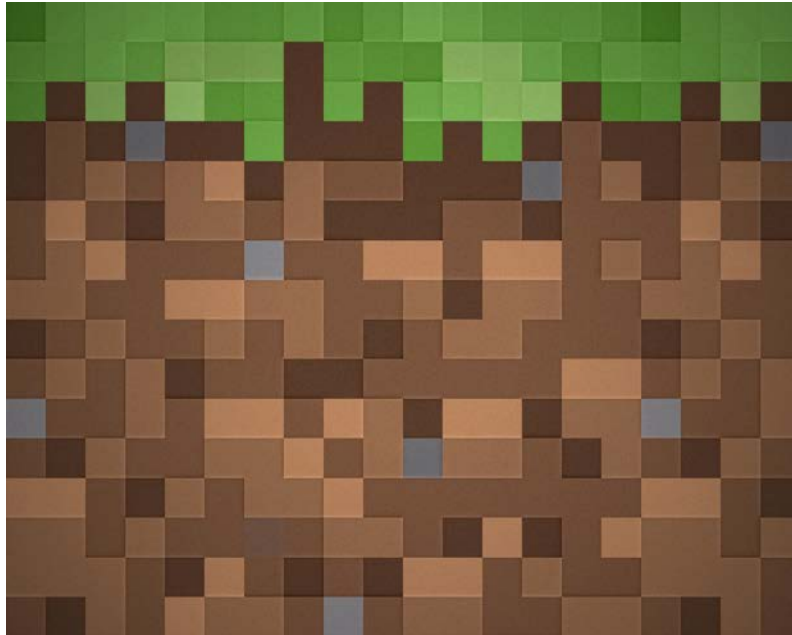
[ 5 ]



position (index)

# Example of arrays

- Images are arrays of colors



- Animations (GIFs)



# FOR LOOPS

What is a for loop?

# Book analogy

- Find a book with numbered pages.
- Pick a starting page number and an ending page number.
- Ask student suggestion for an increment value.
- Turn the pages of the book as the increment value and perform a task on landing on a page. Eg. Draw a circle on that page.



```
// A loop that executes a particular line or lines  
// of code a set number of times.  
// Extremely useful to iterate
```

# Structure of a for loop

```
for ( int i = 0; i < 5; i ++ ) {  
    // code block to be executed  
    print(i) ;  
}
```

**Statement 1** Declare a variable to keep track of how many times the loop executes.

**Statement 2** Defines the number of times the loop executes.

**Statement 3** Iterate the variable so the loop does not execute infinitely.

# EXAMPLE

```
void setup(){  
    for (int i = 0; i < 5; i++){  
        println(i + " is the current value");  
    }  
}
```

See how easy that was. Now you never have to type out 0-4 ever again!

# Do something!

```
int num[] = {1, 2, 3, 4};
```

```
void setup() {
```

```
    for (int i = 0; i < num.length; i++) {
```

```
        println(num[i] + " is the current value");
```

```
    }
```

```
}
```

This prints out each number in the array to the console, fun!

# **Array Functions and Operations**

# Appending Arrays

How do you add to an existing array programmatically?

```
int num[] = {1, 2, 3, 4};
```

```
int num2[] = append(num, 5);
```

```
void setup() {
```

```
    for (int i = 0; i < num2.length; i++) {
```

```
        println(num2[i] + " is the current value");
```

```
    }
```

```
}
```

# COOL PROJECTS

<https://gist.github.com/whoisbma/8fd99f3679d8246e74a22b20bfa606ee>

//Raycasting in p5.js using 2D Arrays by Bryan Ma

<https://gist.github.com/whoisbma/fa995387326813931eab>

//Processing Pac-Man by Bryan Ma

# HOMEWORK

Create patterns using arrays and for loops

- Try incorporate a 2D array into your homework



# Resource

[What is an array? - Daniel Shiffman](#)

[Declare, Initialize, and Use Array in Processing - Daniel Shiffman](#)

Prepare for tomorrow - vectors and physics:

[Intro to vectors & scalars](#)

[What are velocity components?](#)

[Intro to the trigonometric ratios](#)