

The background of the slide is a complex, abstract pattern. It features a dense network of thin, light blue lines that intersect and branch out, resembling a circuit board or a neural network. Overlaid on this are various geometric shapes, primarily triangles and polygons, in shades of light blue and white. Some of these shapes are solid, while others are outlined. The overall effect is a sense of dynamic, interconnected structure.

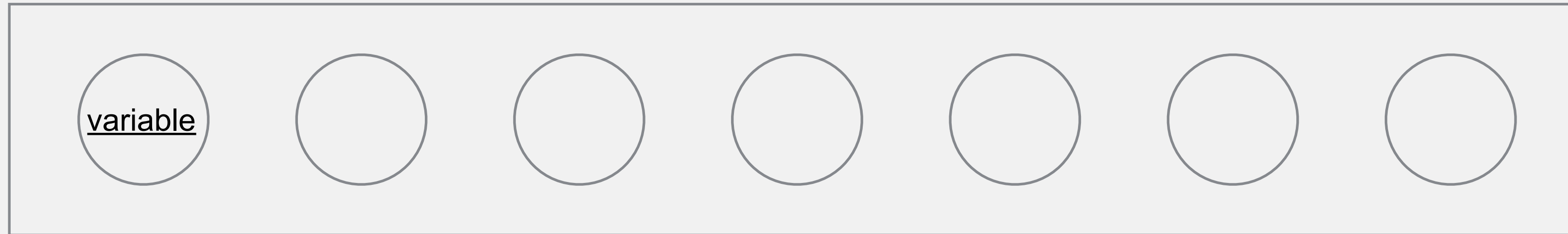
WEEK TEN - DATA STRUCTURES

Arrays, Objects, and dynamic data structures

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DATA STRUCTURES

structure



A **data structure** allows the program to use large amounts of information in order to manage itself.

All data structures are just **lists of variables**. But there are different types of structures, depending on use case and language.

ARRAYS

- **Arrays** are variables that contain other variables.
- An array is an **ordered list** of items.
- Each item has a **unique index** in the list

ARRAYS

```
var positions = [];
```

```
var positions = [ 0, 23, 45, 53, 67, 120 ];
```

Arrays can be initialized with or without members

ARRAYS

```
var positions = [ 0, 23, 45, 53, 67, 120 ];
```

```
console.log( positions[0] );
```

Members can be accessed with their unique index

ARRAYS

JS	Console
1 // create an array with 6 members	
2 var myList = [30, 20, 40, 50, 83, -12];	[30, 20, 40, 50, 83, -12]
3 console.log(myList);	[30, 20, 40, 50, 83, -12, 400]
4	
5 // add a member to the list	[20, 40, 50, 83, -12, 400]
6 myList.push(400);	
7 console.log(myList);	[20, 40, 50, 83, -12]
8	
9 // remove first member	[20, 40, -12]
10 myList.shift();	
11 console.log(myList);	
12	
13 // remove last member	
14 myList.pop();	
15 console.log(myList);	
16	
17 // remove two members, starting with index 1	
18 myList.splice(2, 2);	
19 console.log(myList);	
20	

Common Array actions

ARRAYS

```
var positions = [];
```

```
for(var i = 0; i < 100; i++){  
    positions.push( random(width) );  
}
```

Arrays and loops are best friends!

ARRAYS

```
for(var i = 0; i < positions.length; i++){  
    point(i , positions[i]) ;  
}
```

Arrays and loops are best friends!

OBJECTS

- **An Object** is a variable that can contain other variables.
- Each one is called a **property** (of the the object)
- Properties are **key-value pairs**

OBJECTS

```
var ball = {};
```

```
var ball = {  
    x: 45,  
    y: 202,  
    color: "red"  
};
```

Objects can be initialized with or without properties

OBJECTS

```
ball.radius = 20;
```

adding/setting properties

```
ellipse(ball.x, ball.y, ball.radius);
```

using properties

HOMEWORK #10

A homework assignment from a different course

Choose a homework assignment from one of the other courses from this term and create a solution of it using p5