

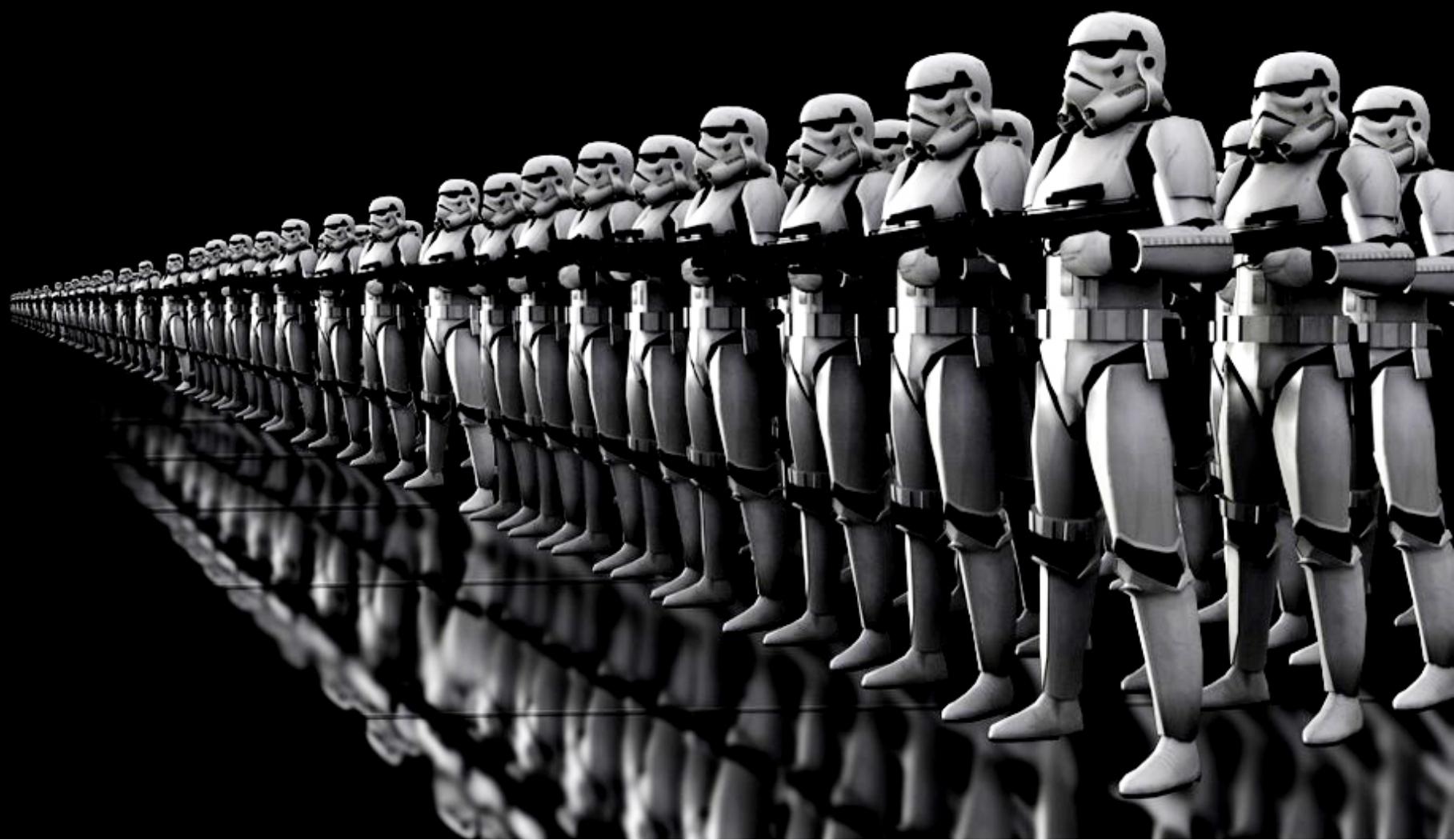
# Arrays

Tuesday, August 5

# Memory is great.

|                             |                                      |                                      |                                      |                                      |
|-----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 38 06 71 21                 | 38 09 31 38                          | 38 09 57 32                          | 38 09 57 32                          | 38 09 57 32                          |
| 38 09 49 64                 | 38 09 57 C p 4626                    |
| 38 10 07 90                 | 38 09 57 C p 4626                    |
| 38 04 42 36                 | 38 09 57 C p 4626                    |
| 38 16 72 74                 | 38 09 57 C p 4626                    |
| 38 04 74 63                 | 38 09 57 C p 4626                    |
| 38 02 74 59                 | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         |
| 38 04 69 96                 | Arild, Kartheia 57 C p 4626          |
| 38 13 72                    | Arild, Lerkev. 60 p 4700             |
| 5 61 43                     | Arnhild, p 4636                      | Arnhild, p 4636                      | Arnhild, p 4636                      | Arnhild, p 4636                      |
| 41 56                       | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         |
| 37 43                       | Arnhild Bue, Røsev. 40 p 4640        |
| 997                         | Arvid, Løvsangerv. 9 p 4626          |
| 91                          | Arvid, disp. Tverrv. 19 p 4620       |
|                             | Arvid, Gunhilds v 149 p 4633         |
|                             | Asbjørn, Haumyrv. 40 p 4637          |
|                             | Astrid Berge, Løvsangerv. 9 p 4626   |
|                             | Aud, Agder Allé 4 p 4631             |
|                             | Bergliot, Joh Øydegards v 69 p 4632  |
|                             | Birtha, Høivold Brygge 8 p 4631      |
|                             | Bård Gunnar, Løkkev. 2 p 4616        |
|                             | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         | Mobiltelefon                         |
|                             | Chris Alexander, Paradisv. 11 p 4617 |
| Dag Ingvar, Enrum 12 p 4616 | Dag Ingvar, Enrum 12 p 4616          | Dag Ingvar, Enrum 12 p 4616          | Dag Ingvar, Enrum 12 p 4616          | Dag Ingvar, Enrum 12 p 4616          |
| Dag Magne,                  | Dag Magne,                           | Dag Magne,                           | Dag Magne,                           | Dag Magne,                           |
| Lagnus Barfots v 32 p 4622  | Lagnus Barfots v 32 p 4622           | Lagnus Barfots v 32 p 4622           | Lagnus Barfots v 32 p 4622           | Lagnus Barfots v 32 p 4622           |
| Grun Vagle                  | Grun Vagle                           | Grun Vagle                           | Grun Vagle                           | Grun Vagle                           |

An array is a list of variables.



# Why are arrays useful?

# Variable

1

# Array

1

6

4

5

3

2

int number;

1

int[ ] number;

1

6

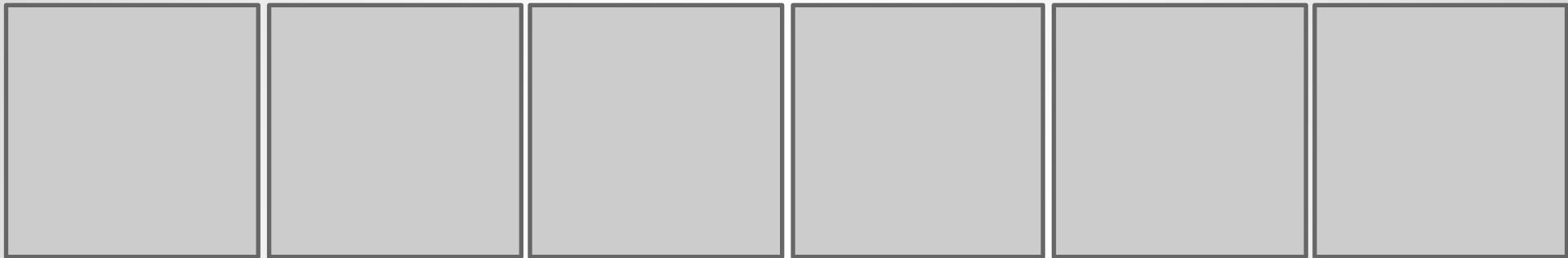
4

5

3

2

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



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



MAN, YOU'RE BEING INCONSISTENT  
WITH YOUR ARRAY INDICES. SOME  
ARE FROM ONE, SOME FROM ZERO.

DIFFERENT TASKS CALL FOR  
DIFFERENT CONVENTIONS. TO  
QUOTE STANFORD ALGORITHMS  
EXPERT DONALD KNUTH,  
“WHO ARE YOU? HOW DID  
YOU GET IN MY HOUSE?”

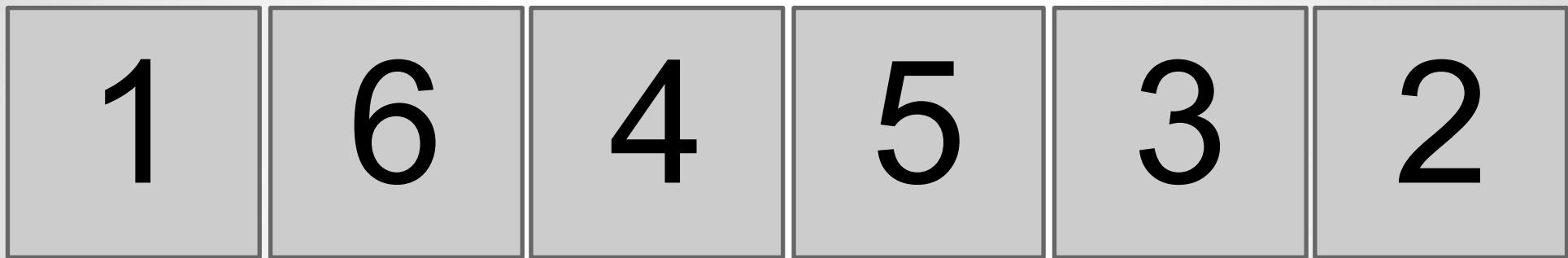


WAIT, WHAT?

WELL, THAT'S WHAT HE  
SAID WHEN I ASKED  
HIM ABOUT IT.



value



[0]

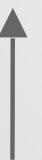
[1]

[2]

[3]

[4]

[5]



position (index)

**Using a for loop to initialize all elements of an array**

**arrayName dot length**

# **Why do we use arrays?**

# Numbers



```
int[ ] floors = {1,2,3,4,5,6,7}
```



# Names

```
String [ ] beatles = {"George", "Paul", "Ringo", "John"}
```

# Strings and Numbers

```
String[ ] firstname = {"Bryan", "Regina", "Udit", "Doug",  
"Lucy", "Miri", "Jaskirat"}
```

```
String [ ] lastname = {"Quick", "Brown", "Fox", "Jumped",  
"Over", "A", "Lazy"}
```

```
int[ ] phonenumbers = {1929141, 1290841, 3813829,  
4839184, 0382849, 2839482, 8492019}
```

```
println(firstname[0] + lastname[0] + phonenumbers[0]) =  
"Bryan Quick 1929141"
```

# Positions (x, y)

```
int [ ] posX = new int[50];  
  
for (int i=0; i<50; i++) {  
    posX[i] = random(width);  
}
```

```
int [ ] posY = new int[50]  
  
for (int i=0; i<50; i++) {  
    posY[i] = random(height);  
}
```

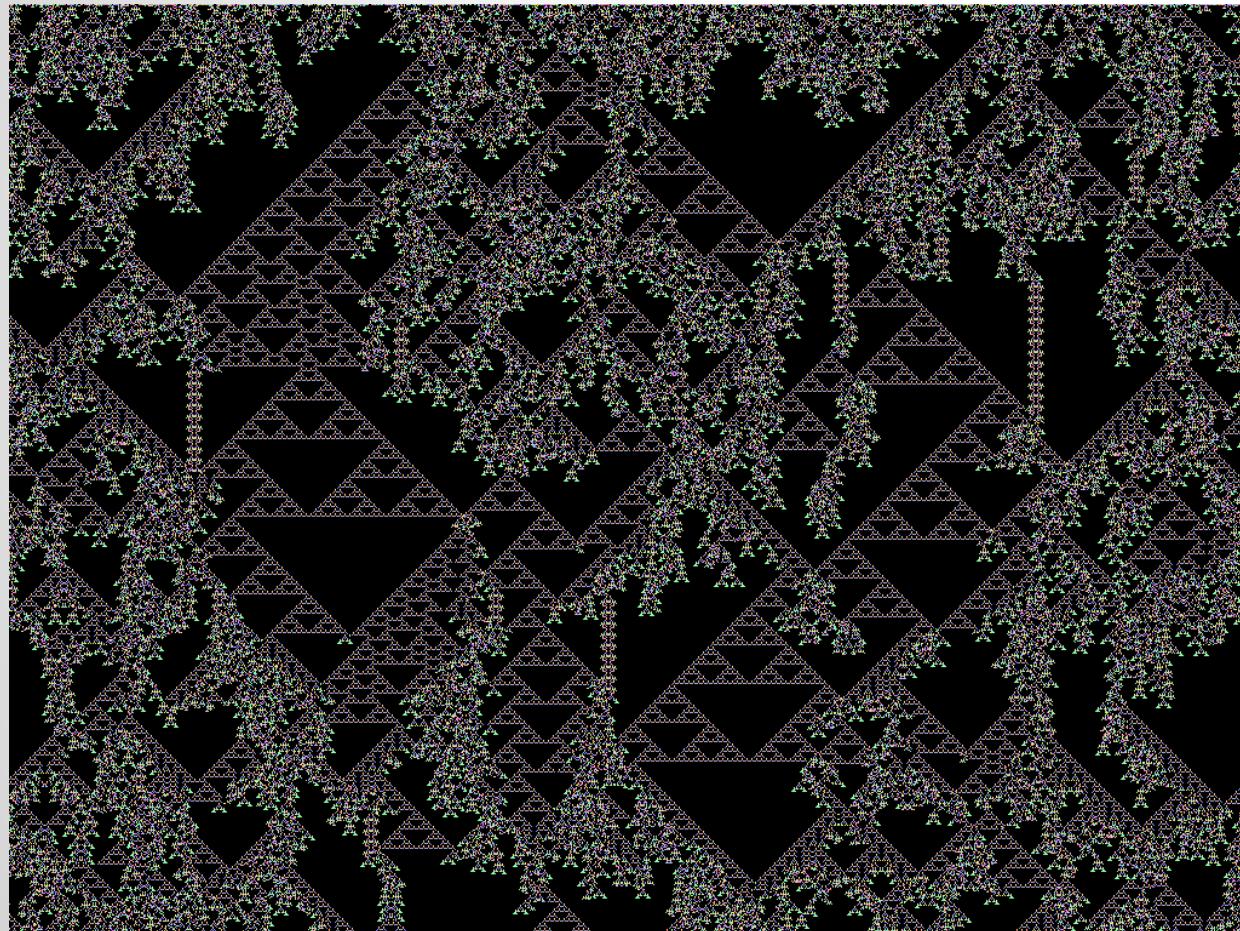
```
// assume we have a size[] array already defined  
for (int i = 0; i < 50; i++) {  
    ellipse(posX[i], posY[i], size[i], size[i]);  
}
```

# **Examples**

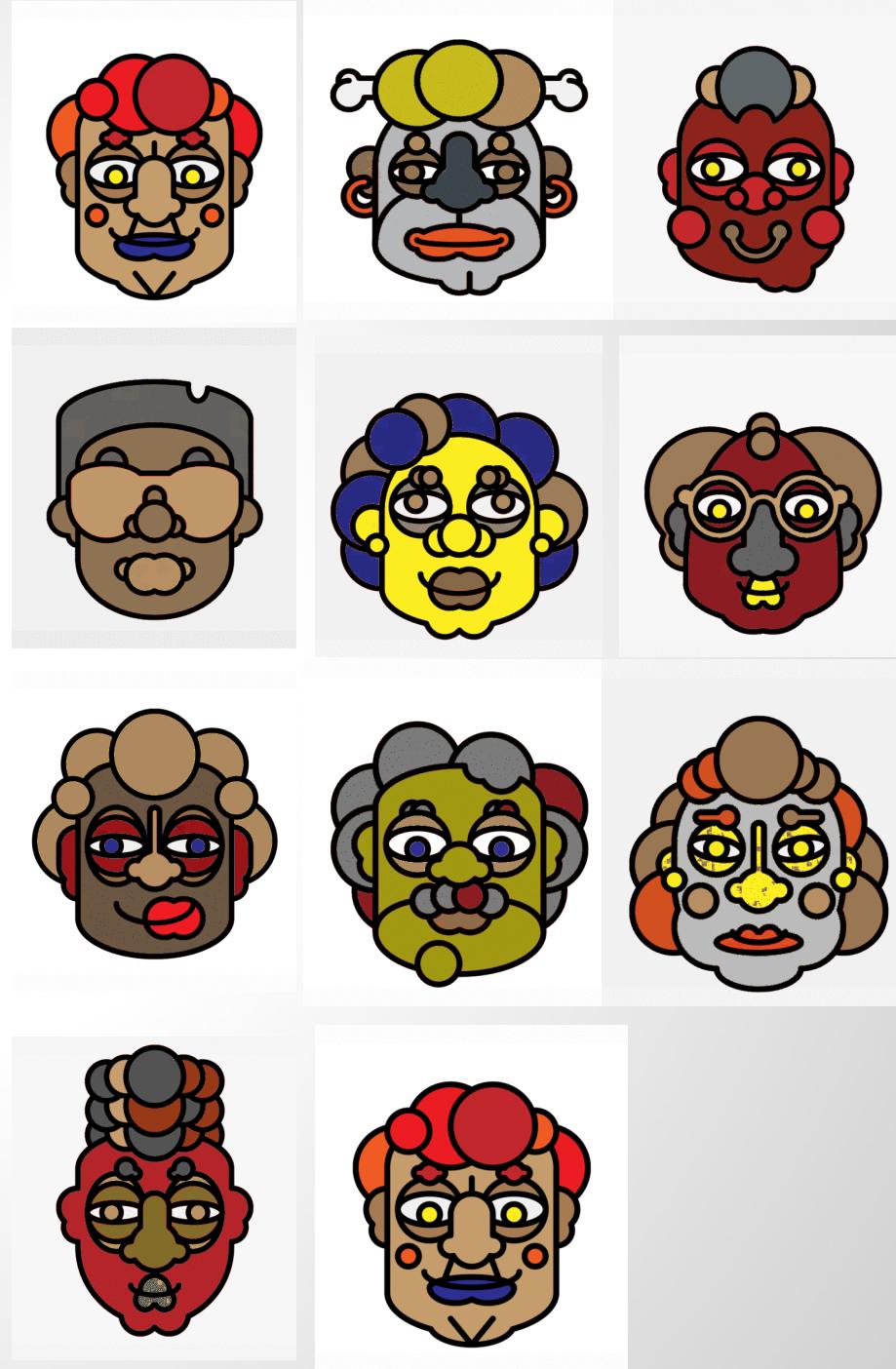


An image is an array of colors.

# Cellular Automata



# Animations (GIFs)



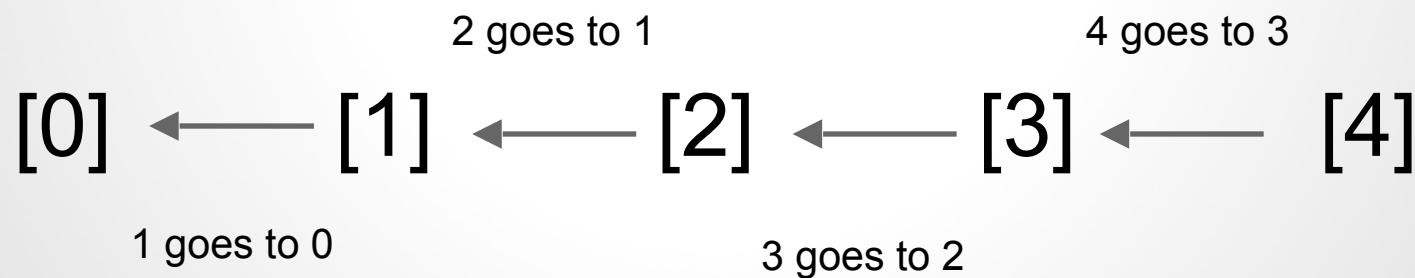
# **Array Functions & Operations**

# Array Shift

spot 0 is overwritten



new value goes into  
spot 4



# sort()

```
//create a list of names
string names [] = { "eric", "ken", "raeling"};

//sort my list of names
names = sort(names);

//sort the first 2 elements of my list
names = sort(names, 2);
```

# reverse()

```
//create a list of names  
string names [] = { "eric", "ken", "raeling"};  
  
//reverse the order of my list  
names = reverse(names);
```

Returns:

```
names[] = {"raeling", "ken", "eric"};
```

# **loadTable() - declaring & initializing**

```
//declare table object
Table table;

void setup(){

    //initialize a list of names
    table = loadTable("bootcampTeachers.csv", "header");

}
```

# **loadTable() - loading rows**

```
void draw(){

for (int i=0; i<table.getRowCount(); i++){

    int id = table.getInt(i, "id");
    String firstName = table.getString(i, "firstName");
    String lastName = table.getString(i, "lastName");

}
```



# HW

## HW- Day 07 Arrays

Create a 2D array with dynamic values and visualize them in a sketch which will  
ineffect change with time.