

Creative Coding 2023

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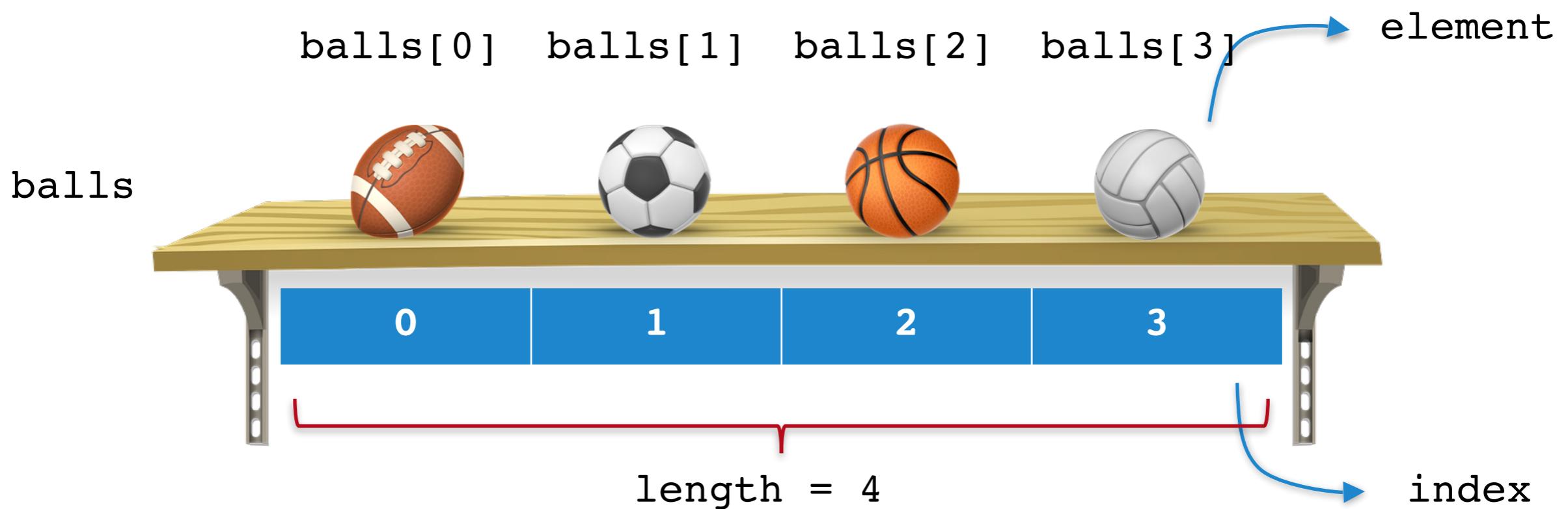
Course website: <https://openprocessing.org/class/83620>

```
String ball1 = "football";
String ball2 = "soccer";
String ball3 = "basketball";
String ball4 = "volleyball";
```



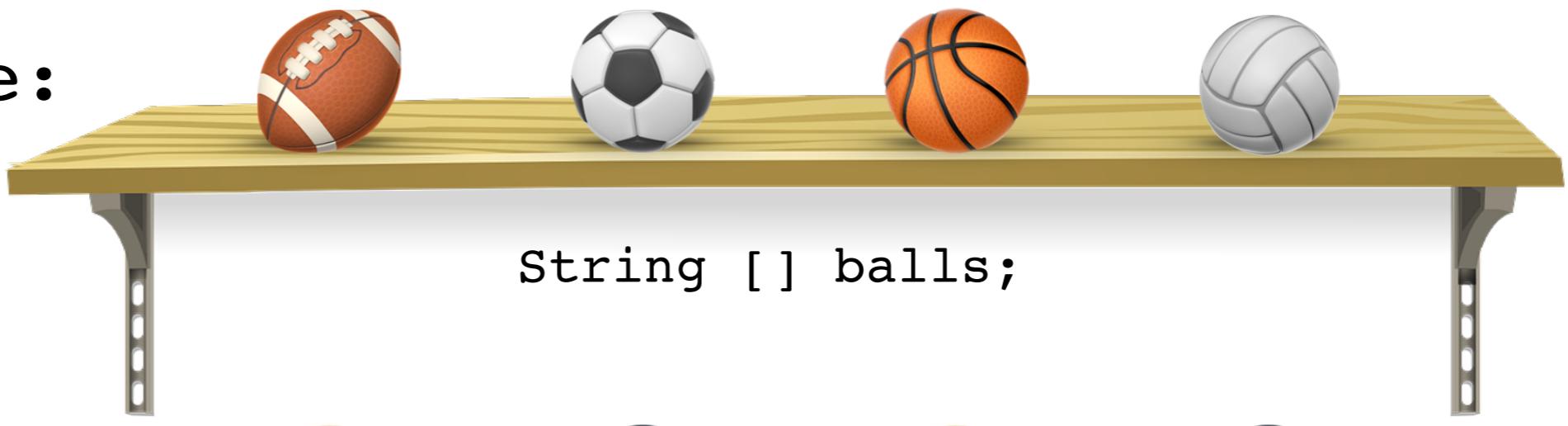
What is an Array?

- ❑ Arrays are like a numbered list of items.
- ❑ Each item, or element, in an array has a location, or index.



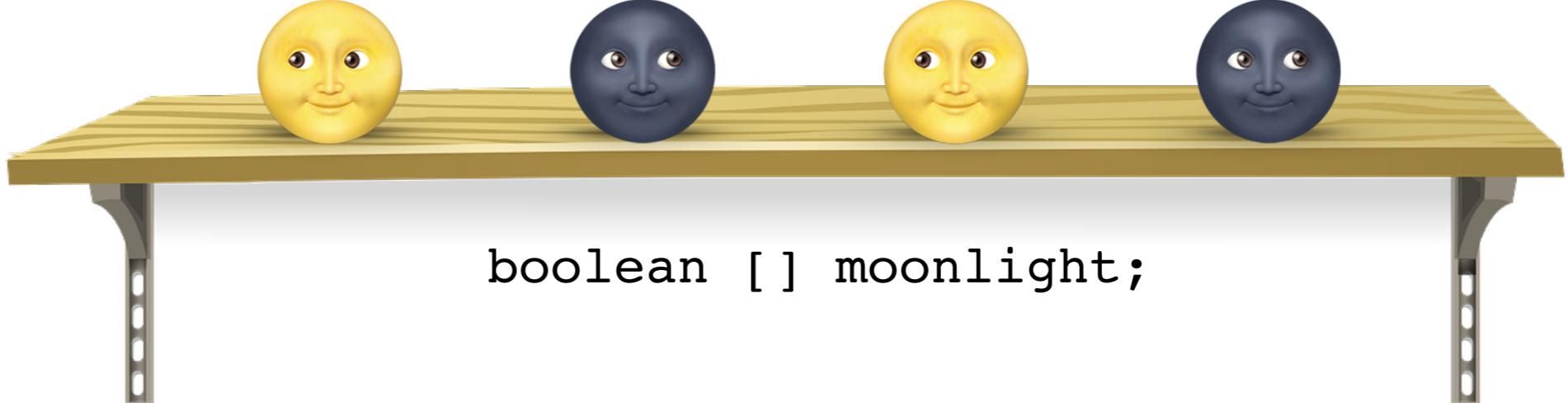
Array type:

String



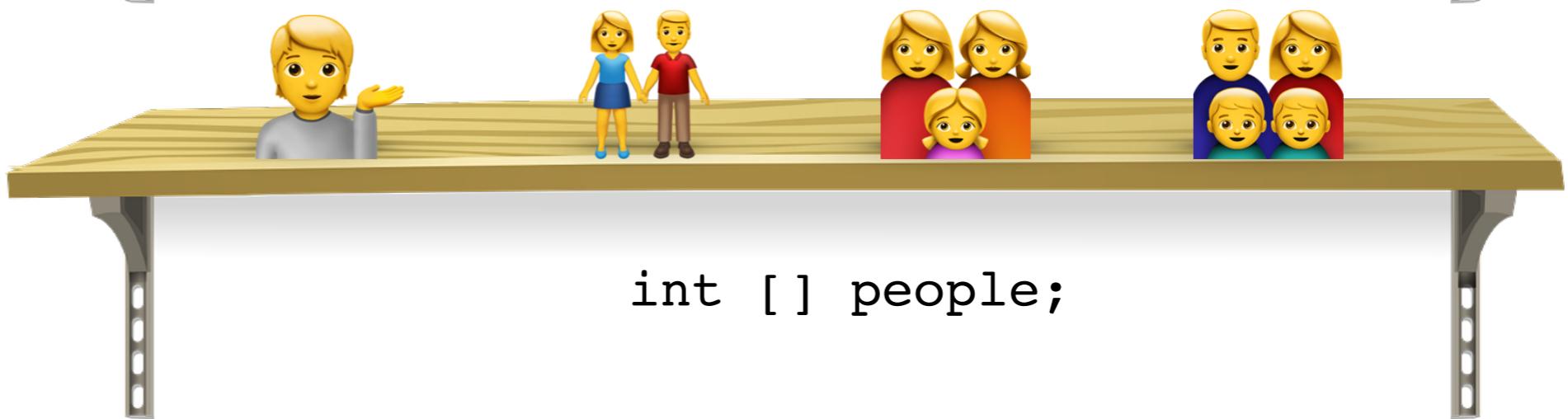
String [] balls;

boolean



boolean [] moonlight;

int



int [] people;

When to use an Array

- Any time a program requires multiple instances of similar data, it might be time to use an array. 😊😊😇😍😴\$\$\$\$😎
- For example, an array can be used to store:
 - The scores of players in a game 
 - A selection of colors in a drawing app 
 - A list of fish objects in an aquarium simulation 
 - A set of alarms in a scheduling program 

How to declare an array

```
// declare: datatype [ ] name  
int [ ] arrayOfInts;
```

```
// create a memory space for an array
```

```
arrayOfInts = new int[4];
```

```
// or do it in a single line
```

```
int [ ] arrayOfInts = new int[4];
```

0	1	2	3

you can't change the size
of an array once created

Initializing an Array

```
// the long way
int [] stuff = new int[3];
stuff[0] = 8;
stuff[1] = 3;
stuff[2] = 1;
```


index# element

size (length)

```
// another way
int [] stuff = { 8, 3, 1 };
```

Initializing with Iteration

```
int[] dice = new int[5];
dice[0] = (int)random(6);
dice[1] = (int)random(6);
dice[2] = (int)random(6);
dice[3] = (int)random(6);
dice[4] = (int)random(6);
```

```
for (int n = 0; n < 5; n++) {
    dice[n] = (int)random(6);
}
```

Initializing with Iteration

```
int[] dice = new int[5];
dice[0] = (int)random(6);
dice[1] = (int)random(6);
dice[2] = (int)random(6);
dice[3] = (int)random(6);
dice[4] = (int)random(6);

for (int n = 0; n < 6; n++ ) {
    dice[n] = (int)random(6);
}
```



Looping over arrays

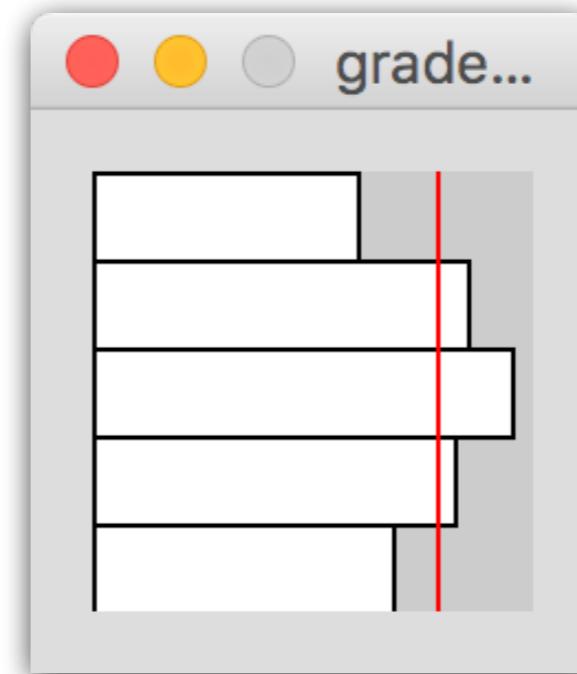
0	1	2	3	4	5	6
1	2	5	3	1	3	4

 dice.length = 6

```
for (int i = 0; i < dice.length; i++) {  
    println( dice[i] );  
}
```

Example

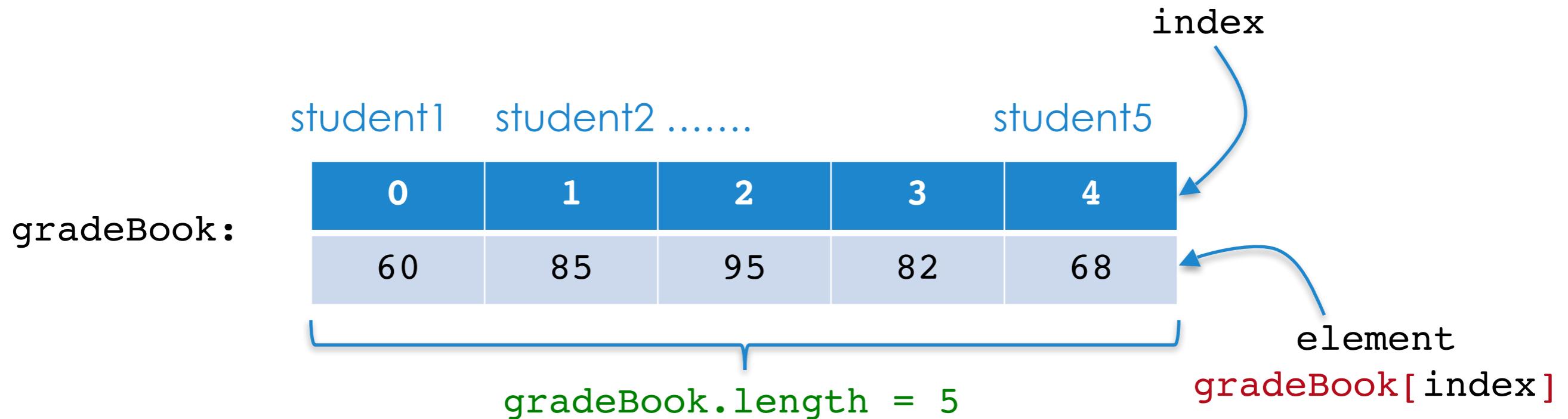
- student 1: 60
 - student 2: 85
 - student 3: 95
 - student 4: 82
 - student 5: 68
-
- Show the bar chart
 - Calculate the average
 - Find the top score



gradebook.pde

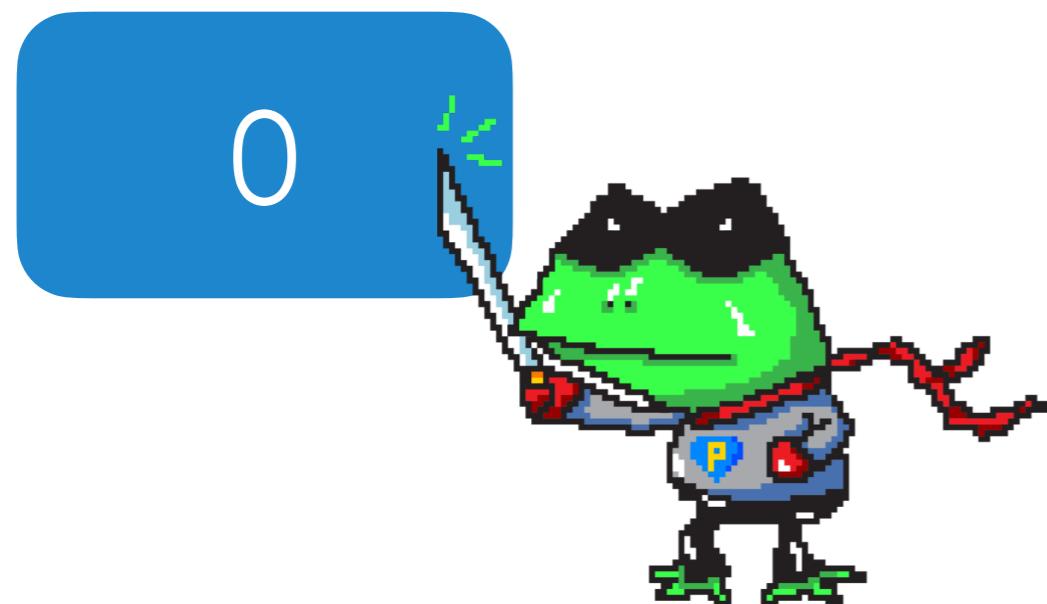
Looping over arrays

```
for (int i=0; i<gradeBook.length; i++){  
    println("student "+ (i+1) + ":" + gradeBook[i]);  
}
```



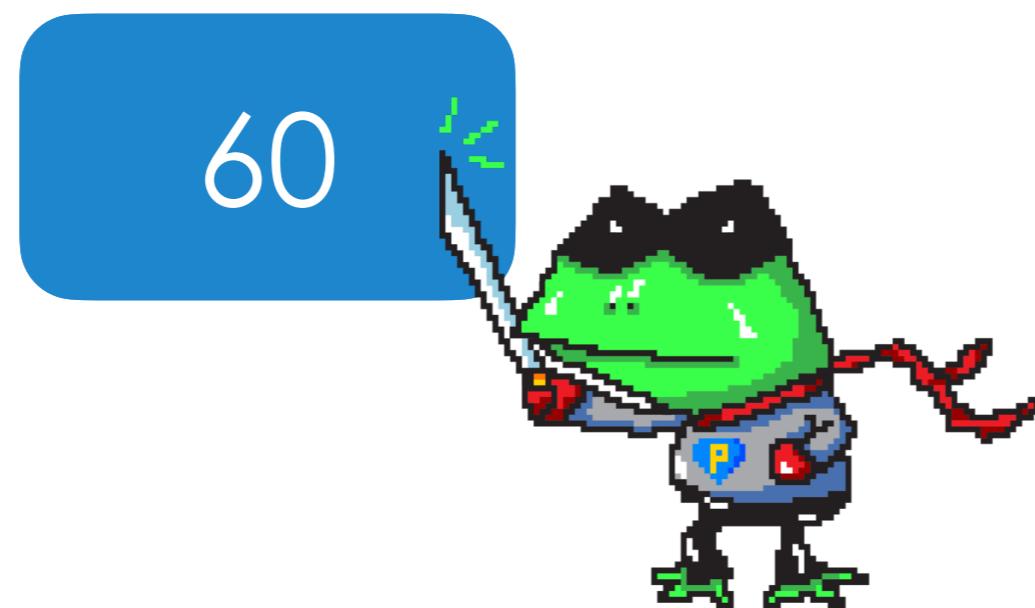
Find the Max value in an array

0	1	2	3	4
60	85	95	82	68



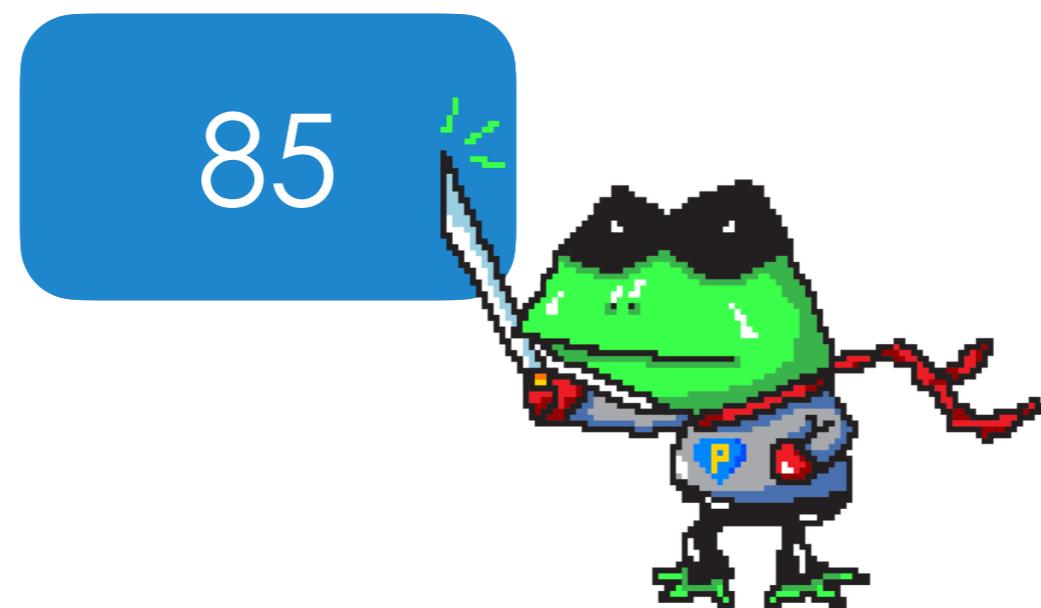
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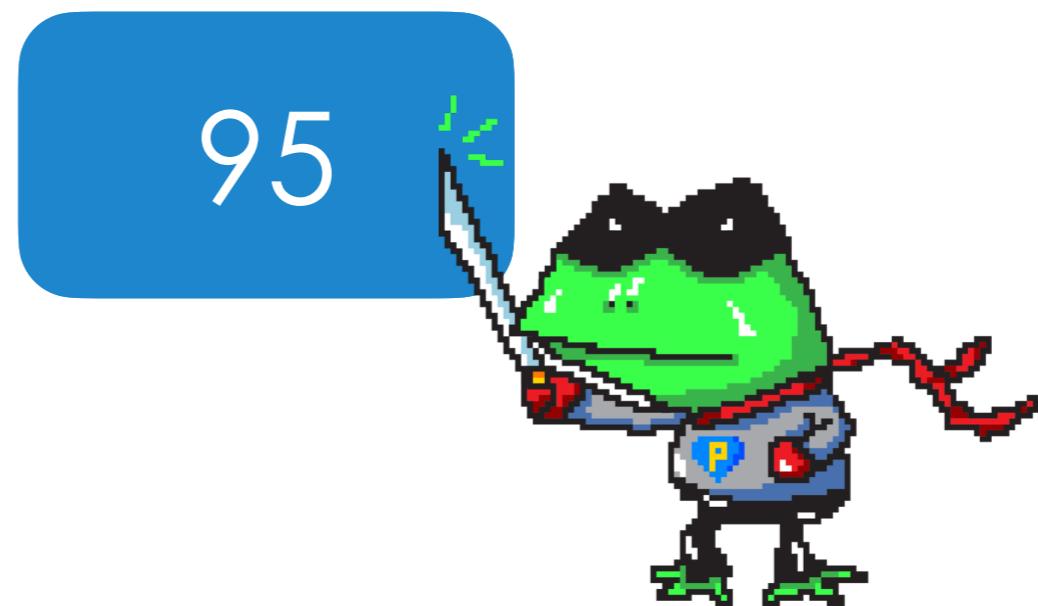
Find the Max value in an array

0	1	2	3	4
60	85	95	82	68



Find the Max value in an array

0	1	2	3	4
60	85	95	82	68



Find the Max value in an array

0	1	2	3	4
60	85	95	82	68

95



Find the Max value in an array

0	1	2	3	4
60	85	95	82	68

95



Find the Max value in an array

0	1	2	3	4
60	85	95	82	68

95



String

- ❑ a string of characters

```
String someText = "chars here";  
Capital S  
variable name  
"double quote"  
  
// similar to  
// char [ ] someText = {'c', 'h',.....,'e'}  
println (someText);
```

0	1	2	3	4	5	6	7	8	9
c	h	a	r	s		h	e	r	e

Special characters

- ❑ Using escape sequences to represent special characters
 - ❑ `\n` for a new line
 - ❑ `\t` for a tab
 - ❑ `\"` for a double quotation mark
 - ❑ `\\"` for a single backslash

```
// control characters
String linesOfText = "line1\nline2\nline3\tInsert a tab";
println(linesOfText);
// result
line1
line2
line3    Insert a tab
```

0	1	2	3	4	5	6	7	8	9
c	h	a	r	s		h	e	r	e

❑ String length

- ❑ `string.length() // 10`

❑ Common String functions

- ❑ `string.toUpperCase(); string.toLowerCase();`
- ❑ `string.charAt(3)`
// return the character at the specified index
- ❑ `string.equal("chars here"); // compare two strings`
 - ❑ Return true if two Strings contain the exact same sequence of characters
- ❑ `string.indexOf("ar")`
// search a substring and return its position
 - ❑ return -1 if not found

❑ Extract a substring

- ❑ `string.substring(beginIndex, endIndex)`
 - ❑ `string.substring(3,7) // "rs h"`
 - ❑ `string.substring(3, string.length()); // "rs here"`

Exercise

0



13



String word = "Where is the banana line?";

String mistake = "banana";

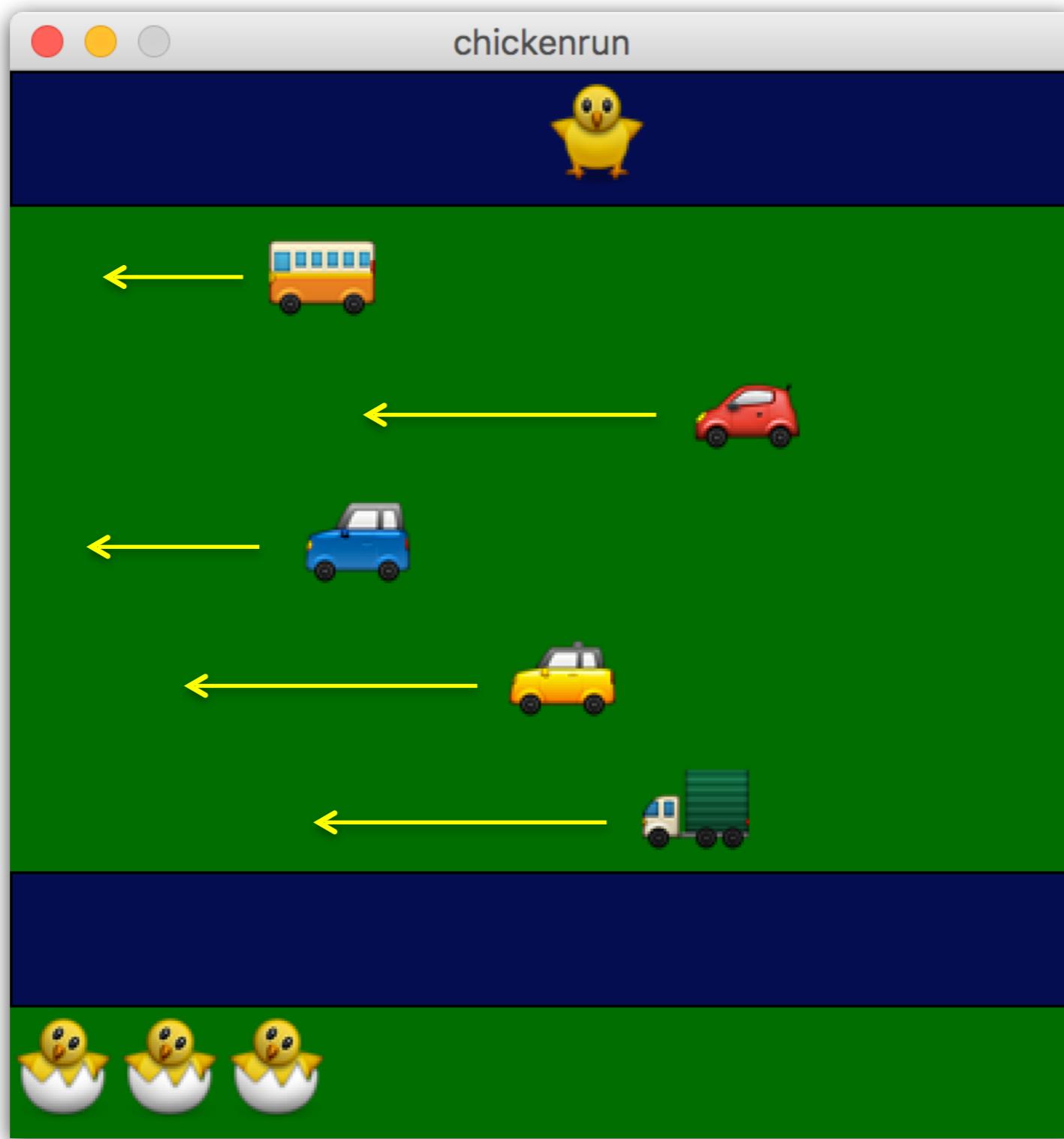
// replace "banana" by "Bannan"



display text on the canvas

```
PFont f; // STEP 1 Declare PFont variable  
void setup() {  
    size(200,200);  
    f = createFont("Arial",24); // STEP 2 Create Font  
}  
void draw() {  
    background(255);  
    textAlign(CENTER); // STEP 4 Sets the alignment  
    fill(0); // STEP 5 Specify font color  
    text("Hello World!",10,100); // STEP 6 Display Text  
}
```

Chicken Run



REQUIREMENTS

1. Use arrow keys to control the movement of the chick, and it cannot move outside the screen °



2. Five cars move at different speeds within the lane.



3. When the car collides with the chicken, one life is lost and a ghost icon 😬 is displayed. Pressing "Enter" will return to the starting point and restart the game. °

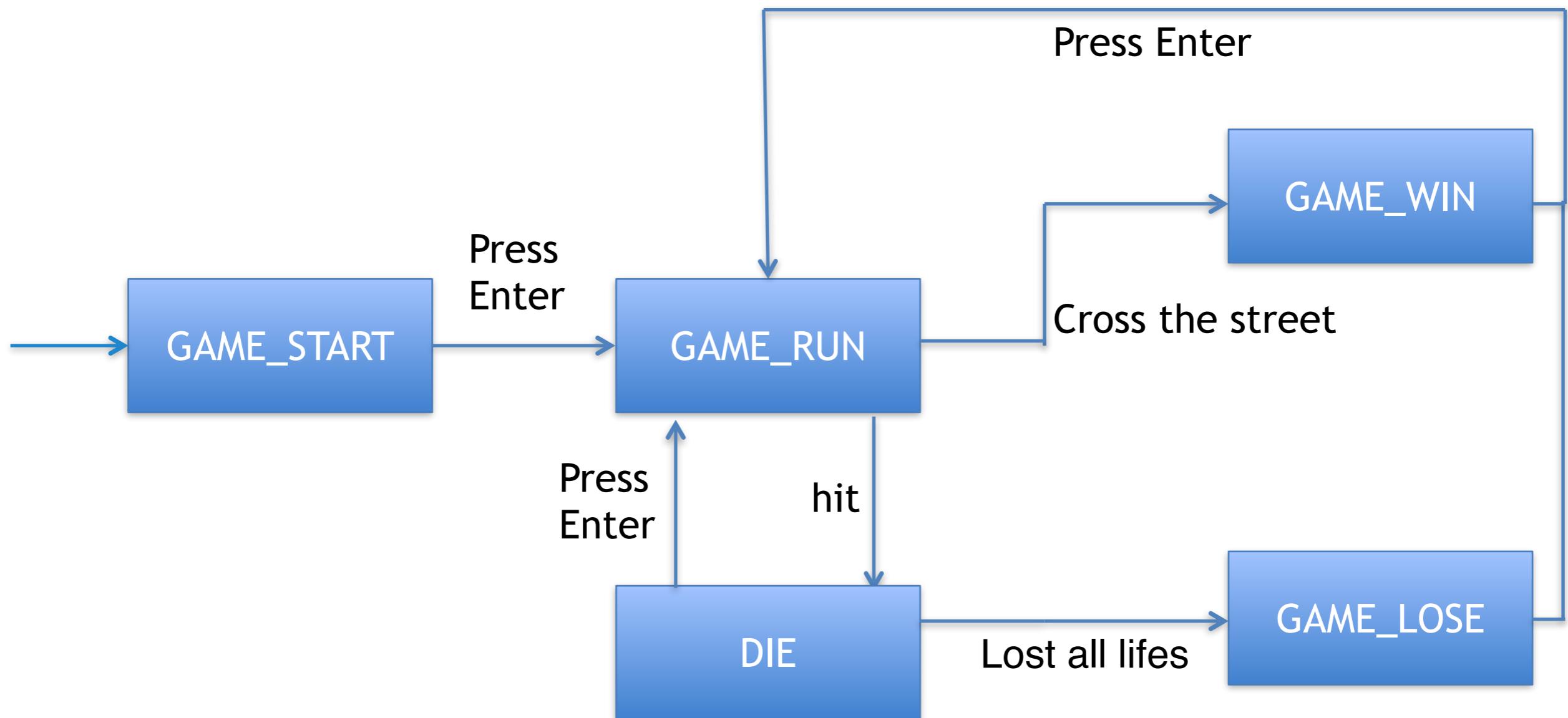
4. When the chick reaches the finish line, the player wins; press Enter to restart, and increase the car speed to increase the difficulty. °



5. The chicken has three lives, and the game will end when all three lives are lost.



GAME FLOW



Recap

- ❑ Use arrays to manage a list of data with the same datatype.
 - ❑ Each element in an array can be accessed by its index
 - ❑ Combine loops to iterate through the elements of the array
- ❑ A string is a sequence of characters
 - ❑ Strings can be manipulated using various string functions, such as substring, indexOf, and equal
- ❑ Use PFont to display text on the canvas