

JavaScript Random Library Reference

Written by Ben Yan, from materials by Jerry Cain and Eric Roberts.

In CS106AX, we provide a **RandomLib.js** library. To summon the random library for use in your own JavaScript programs, add the following line to the **<head>** section of the corresponding HTML file.

```
<script type='text/javascript'
  src='https://cs106ax.stanford.edu/jslib/RandomLib.js'></script>
```

This library supports the following quartet of operations, to enable your program to behave randomly ☺.

- **Selecting a random integer in a specific range**, e.g., rolling a six-sided dice.
- **Choosing a random real number in a specified range**, e.g., choosing the **x** and **y** coordinates of a random point in space.
- **Simulating a random event with a specific probability**, e.g., a coin flip being heads.
- **Picking a random color**, e.g., in graphical applications, it's useful to repeatedly chose and rainbow random colors to create interesting and unexpected patterns.



RandomLib: Methods	
randomInteger(low, high)	
Returns a random integer between low and high , inclusive on both ends , e.g., each call to randomInteger(1, 6) returns a random value among 1, 2, 3, 4, 5 , and 6 , like a dice roll.	
randomReal(low, high)	
Returns a random real number in the half-open interval [low, high) , e.g., low ≤ x < high . For instance, randomReal(0, 1) returns a random decimal, e.g., 0.1415, 0.99, 0.01 , etc.	
randomChance(p = 0.5)	
Returns true with probability p , and false with probability 1 - p . A missing input p defaults to = 0.5 , i.e. a perfectly fair coin with a 1/2 chance of true , a 1/2 chance of false .	
randomColor()	
Returns a random RGB color string. The return value is a hexadecimal string of form "#RRGGBB" , e.g., "#7FFFD4" (aquamarine), where RR , GG , and BB are 2-digit hex numbers of the amount of red, green, and blue, respectively. Note there are 256 ^ 3 = 16777216 possible RGB colors.	



In case you're curious how all of them work underneath, we've provided sample implementations on the next page. Note we rely on a pair of methods from the built-in JavaScript **Math** library, which are:

- **Math.random()**, which *returns* a random decimal **x** in the half-open interval **0 ≤ x < 1**.
- **Math.floor(x)**, which *returns* the largest integer not exceeding **x**.

Also note the **randomColor()** method uses the **randomInteger()** method as a helper function ☺.

```

/* File: RandomLib.js
 * -----
 * This file contains a simple library to generate randomness and chaos.
 */

```

```

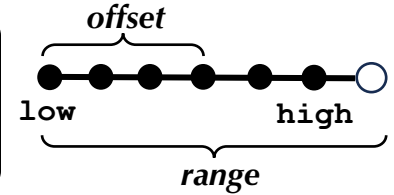
/* Returns a random integer in the range low to high, inclusive.
 */

```

```

function randomInteger(low, high) {
  let range = high - low + 1;
  let offset = Math.floor(range * Math.random());
  return low + offset;
}

```



```

// note Math.floor() rounds down to next smallest integer

```

```

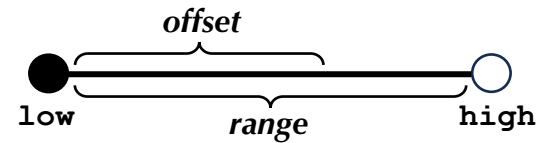
/* Returns a random real number in the half-open interval [low, high).
 */

```

```

function randomReal(low, high) {
  let range = high - low;
  let offset = range * Math.random();
  return low + offset;
}

```



```

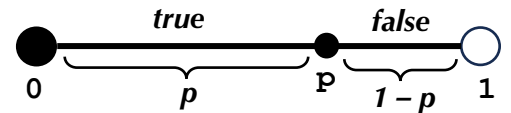
/* Returns true with probability p. A missing argument defaults to 0.5 */

```

```

function randomChance(p = 0.5) {
  return Math.random() < p;
}

```



```

/* Returns a random opaque color as a hex RGB string of form "#RRGGBB".
 */

```

```

function randomColor() {
  let str = "#";
  for (let i = 0; i < 6; i++) {
    // six random hex digits (base 16)
    let digit = randomInteger(0, 15);
    if (digit <= 9) {
      str += digit;
    } else if (digit === 10) {
      str += "A";
    } else if (digit === 11) {
      str += "B";
    } else if (digit === 12) {
      str += "C";
    } else if (digit === 13) {
      str += "D";
    } else if (digit === 14) {
      str += "E";
    } else { // digit is 15
      str += "F";
    }
  }
  return str;
}

```

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
A	A	A	A	A	A
B	B	B	B	B	B
C	C	C	C	C	C
D	D	D	D	D	D
E	E	E	E	E	E
F	F	F	F	F	F

↑ #C9A0DC, or the color wisteria ↑
 First digit Last digit