# Constructors

**Summary:** Objects in Java are instances of a class stored in memory. They are initialized using the keyword new, built using the class constructor, and can store data and have methods called on them. Constructors create new instances of classes and function similarly to other methods, having access to the internal `this` variable as well as any provided arguments.

**Why we should use it:** Constructors allow objects to be initialized with certain data to make their use easier.

**Key definitions:**
Object - A collection of related code and data in memory. It is an instance of a class.
Class - A group of fields representing all the information that a class holds and can access and code that operates on or with those fields. Classes are the blueprints for an object that is that class type.
new - The keyword that tells Java to create a new object. When new is called with a class constructor, new allocates enough memory to store all of the fields of that class in a new object, and then calls the class constructor on that object.
Class constructor - This is a special method that is called when an object is first created. After the space in memory for an object has been allocated, the constructor sets the fields to their appropriate initial values and performs whatever operations are needed to prepare an object for use.
Signature - A class can have multiple different constructors. The constructor called by new depends on its signature, the number, order, and types of parameters used in the constructor. All classes by default have an implicit no-argument constructor.

**A series of examples:**

```
public class Point{
	int x;
	int y;
	public Point(){ //this is a no-argument constructor
		this.x = 5;
		this.y = 5;
	}
	public Point(int xCoord, int yCoord){
		this.x = xCoord;
		this.y = yCoord;
	}
	public Point(int xyCoord){
		this.x = xyCoord;
		this.y = xyCoord;
	}
	public void printCoords(){
		System.out.println(this.x);
		System.out.println(this.y);
	}
}
```

**Some code using the class defined above:**

```
public class main {
	public static void main(String[] args) {
		Point p1 = new Point();
		Point p2 = new Point(1, 2);
		Point p3 = new Point(6);
		System.out.println("p1 coords:");
		p1.printCoords()
		System.out.println("p2 coords:");
		p2.printCoords();
		System.out.println("p3 coords:");
		p3.printCoords();
	}
}
```

**Explanation:** When this code is run, 3 `Point` objects are created in memory named `p1`, `p2`, and `p3`. Each of these objects uses a different constructor to create the `Point` object. The code will then print the following to the console:

p1 coords:
5
5
p2 coords:
1
2
p3 coords:
6
6