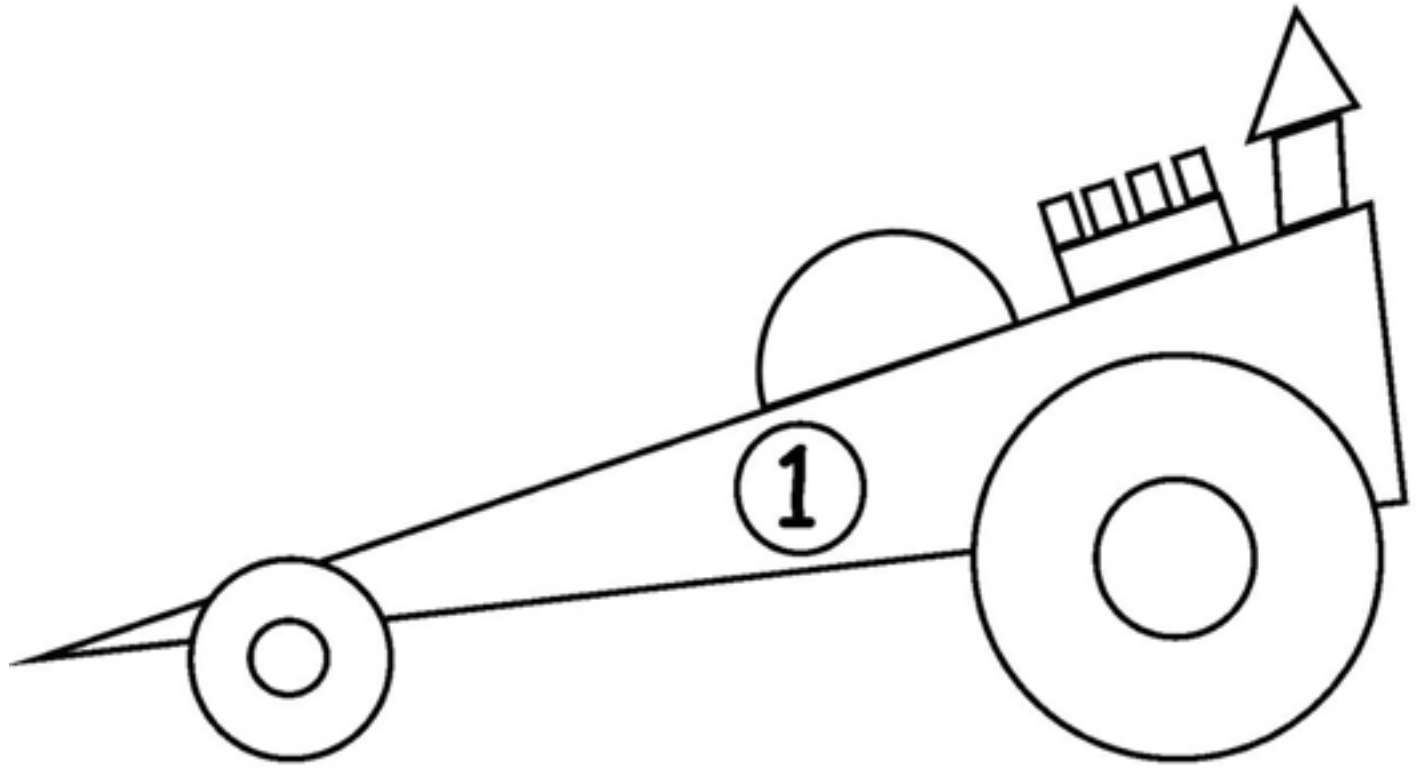
Object Oriented Programming (OOP)

UC Berkeley Graduate School of Journalism

Why we call them "objects"



Why we call them "objects"

Properties (adjectives)

Methods (verbs)

Events (triggers)

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```
car.color = "blue"
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car.start()
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```
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```

Properties (adjectives)

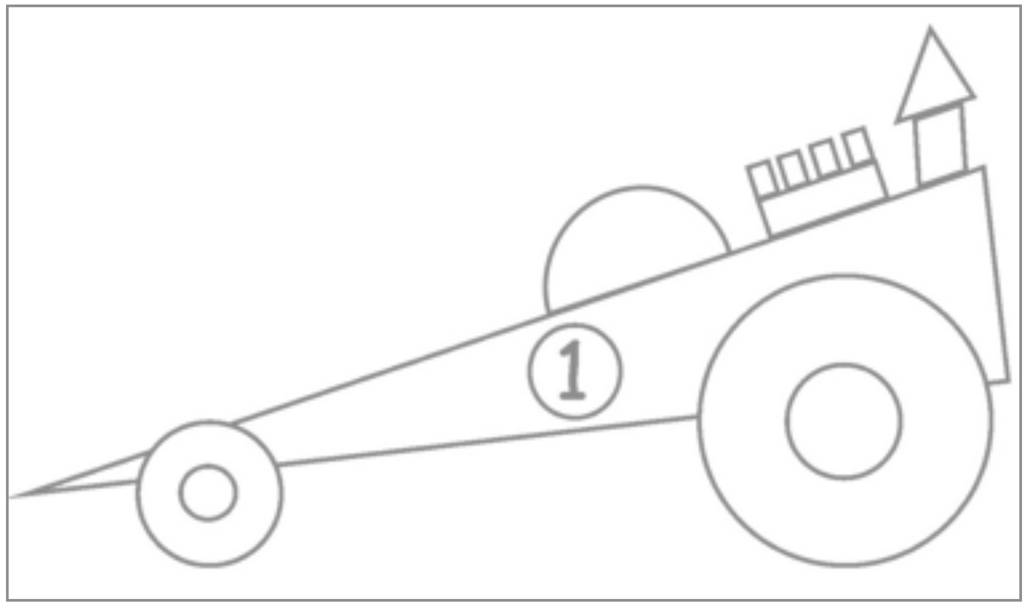
```
car.start()
```

Methods (verbs)

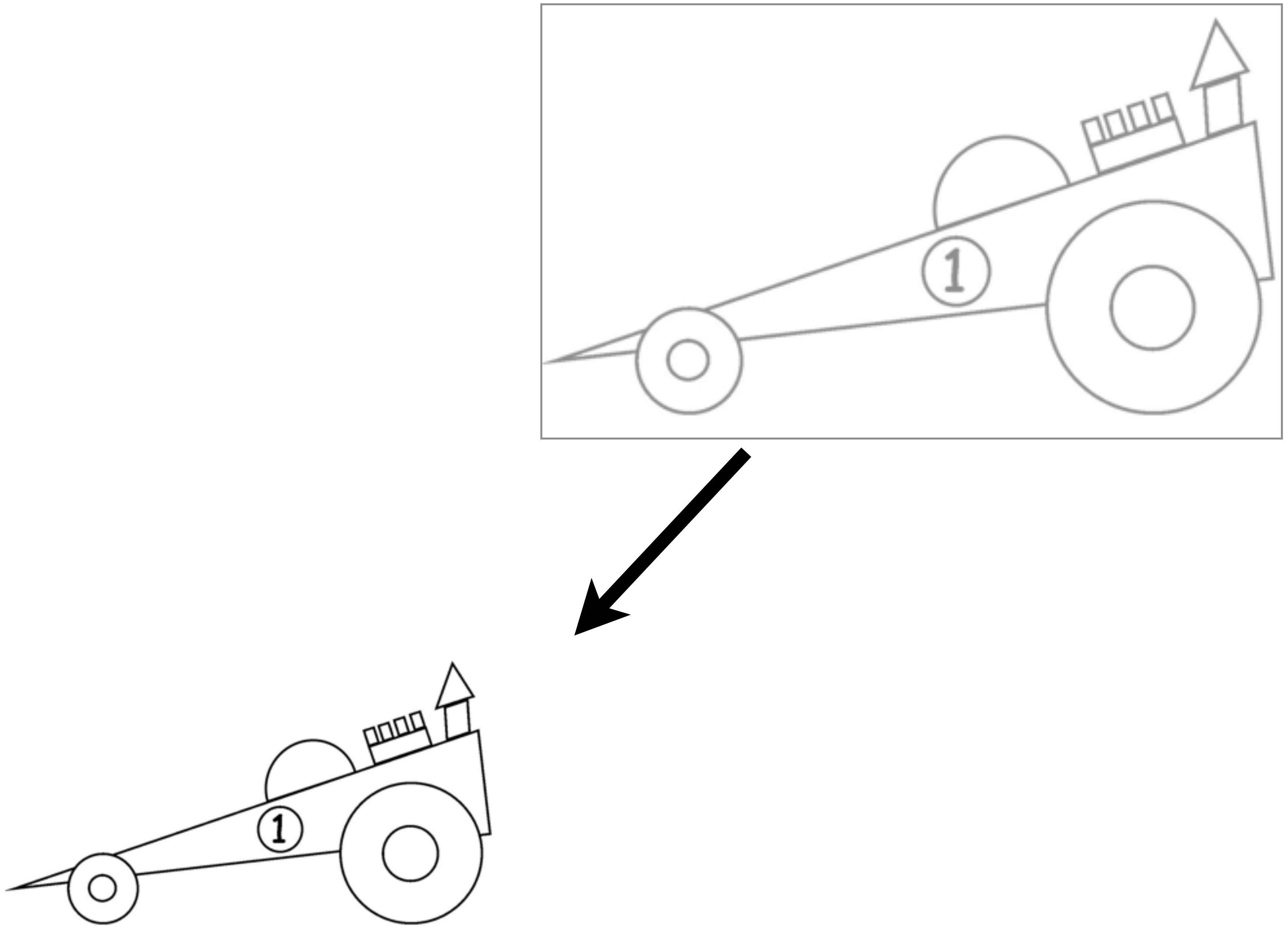
```
car.addEventListener("move", doSomething())
```

Events (triggers)

Classes (like a blueprint)



Classes (like a blueprint)



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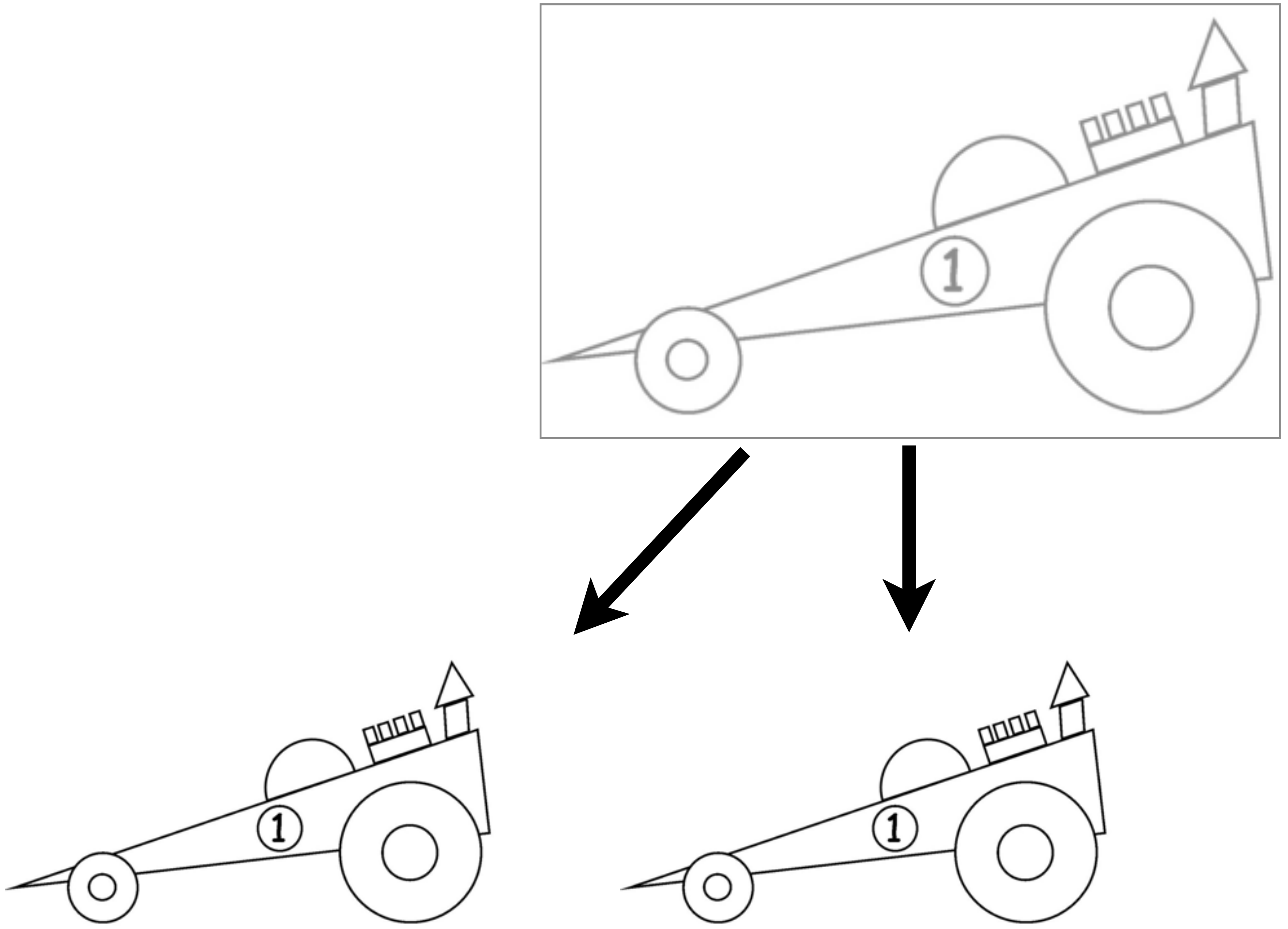

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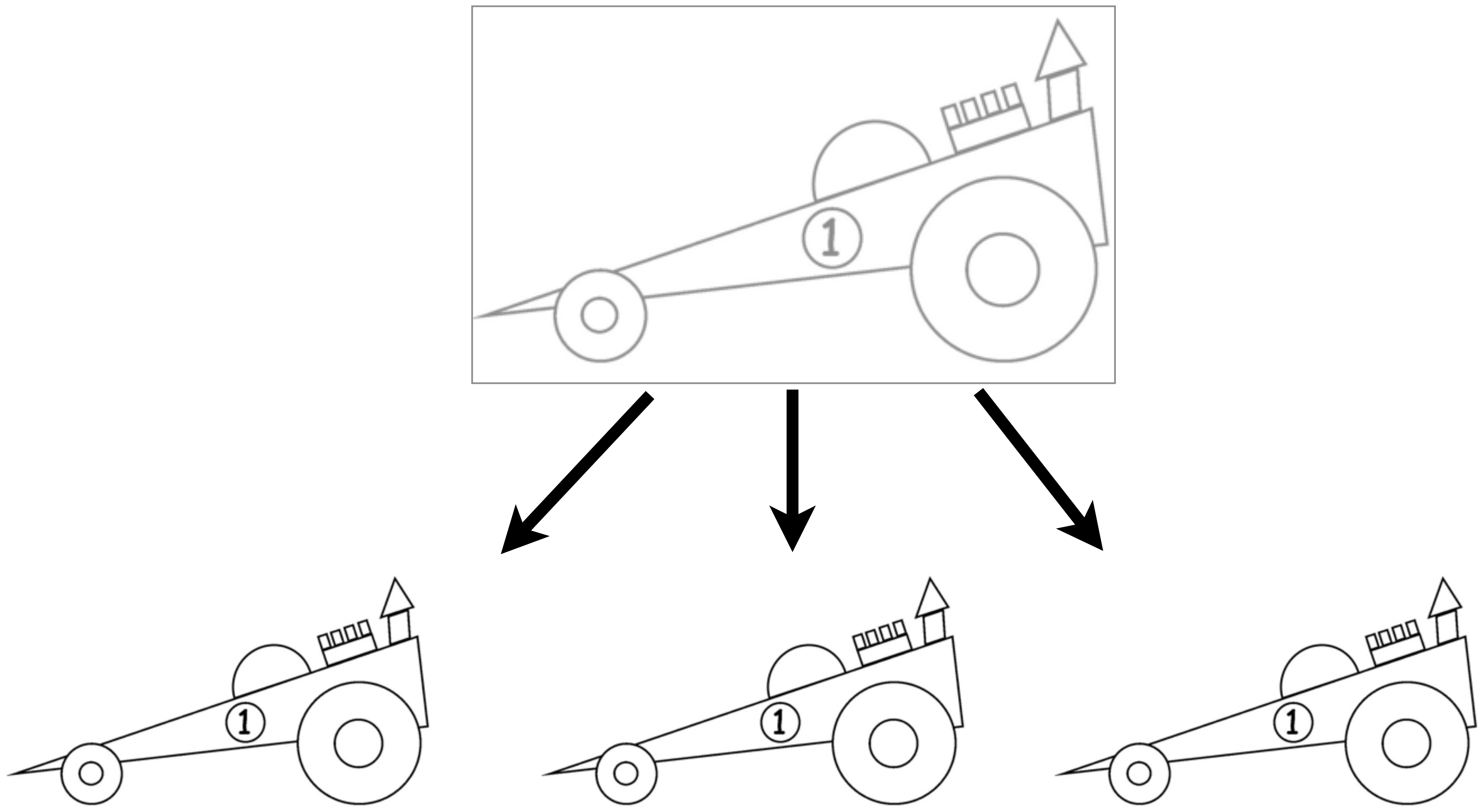

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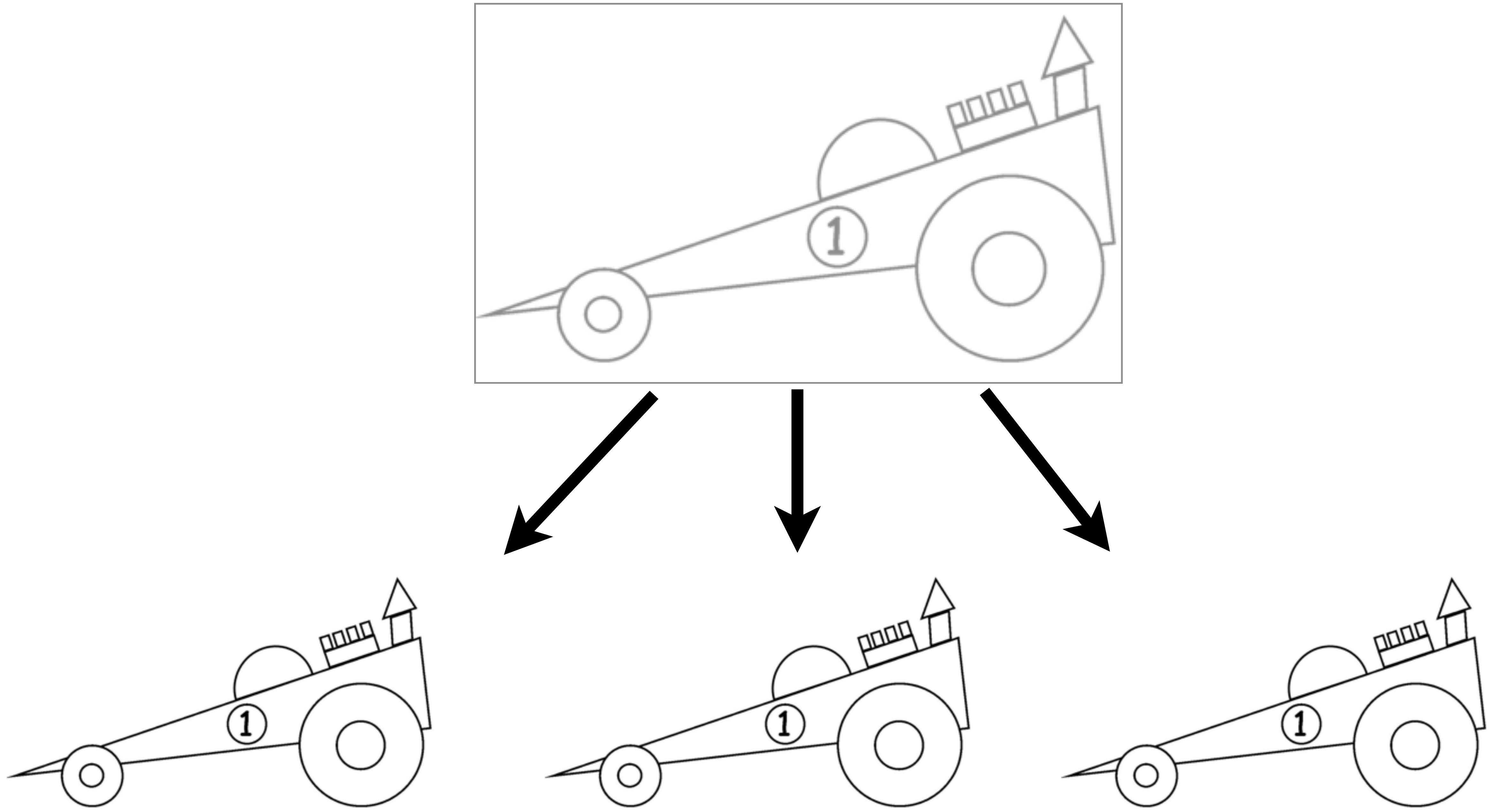
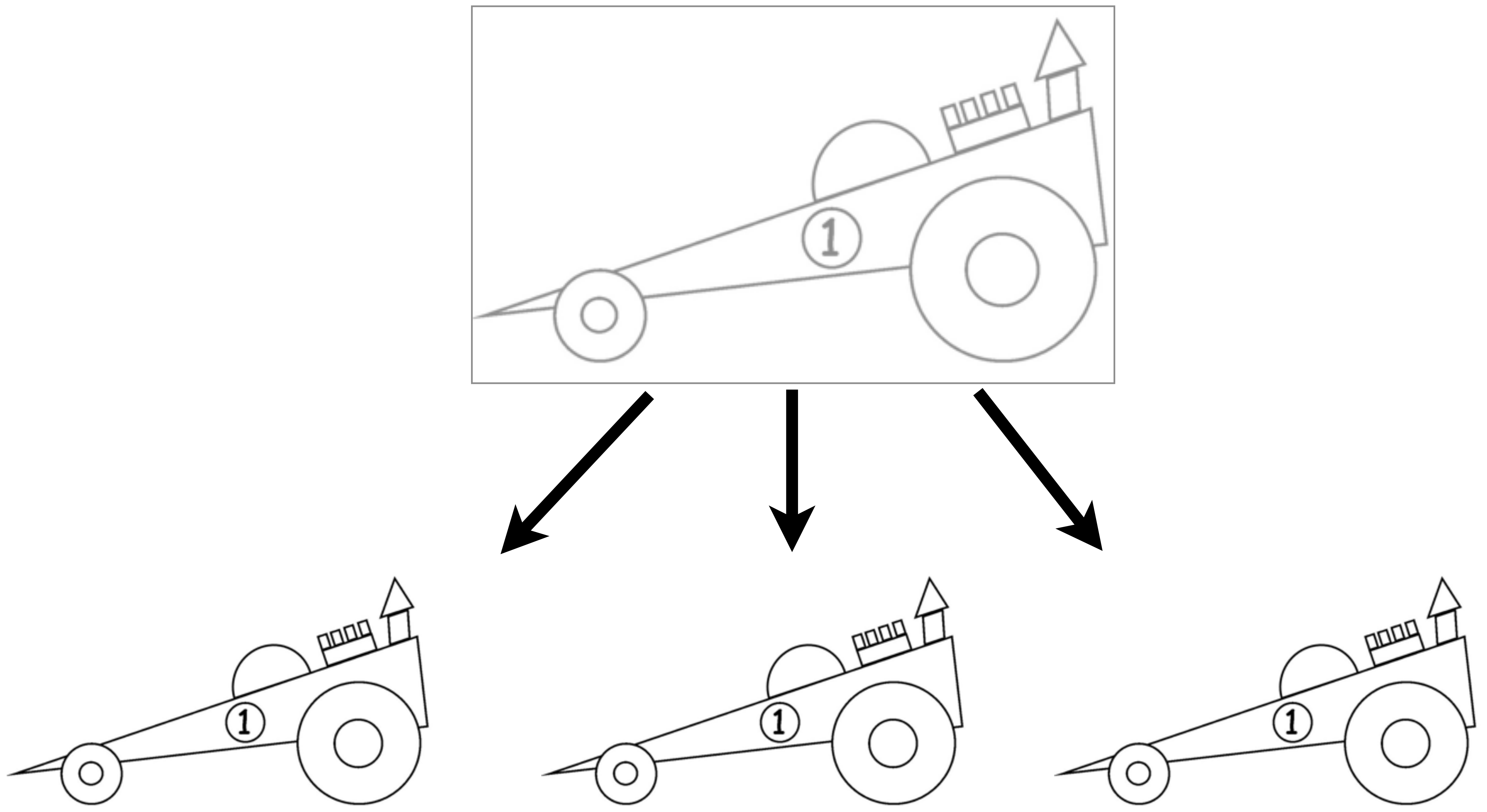


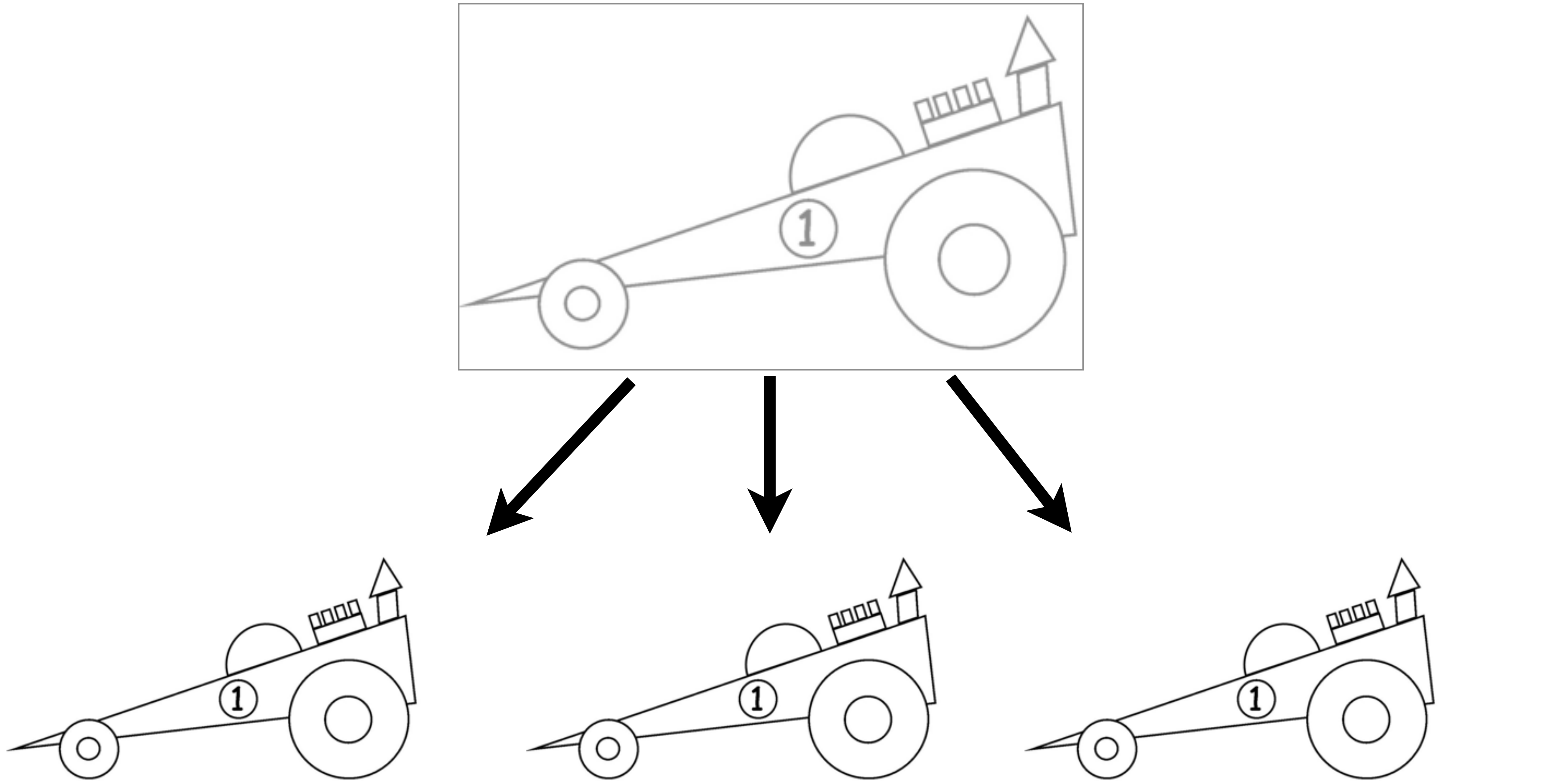
```
jrueCar.color = blue;
```

Classes (like a blueprint)



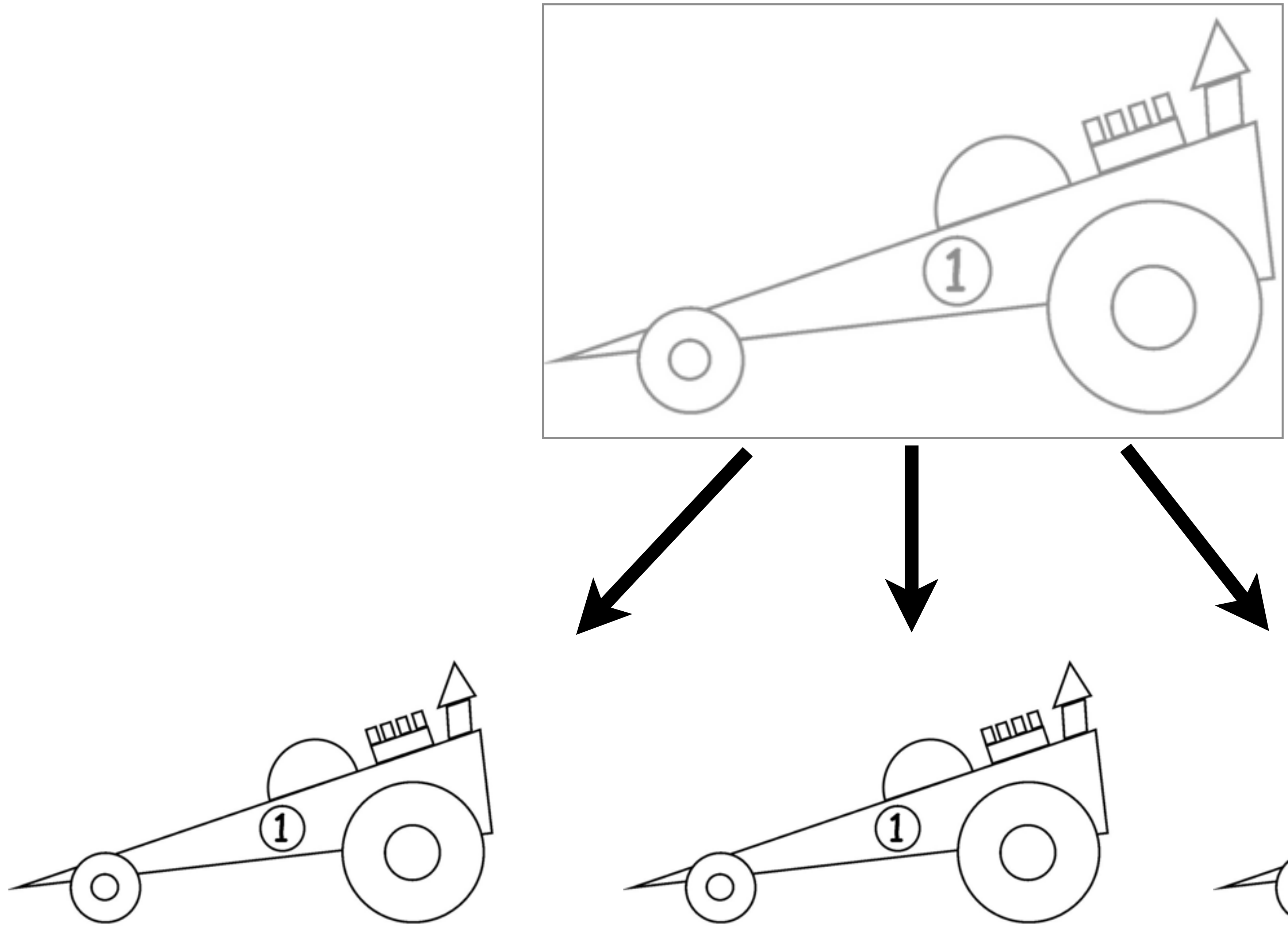
```
jrueCar.color = blue;     kociCar.color = red;
```

Classes (like a blueprint)



```
jrueCar.color = blue;      kociCar.color = red;      grabsCar.color = black;
```

Classes (like a blueprint)

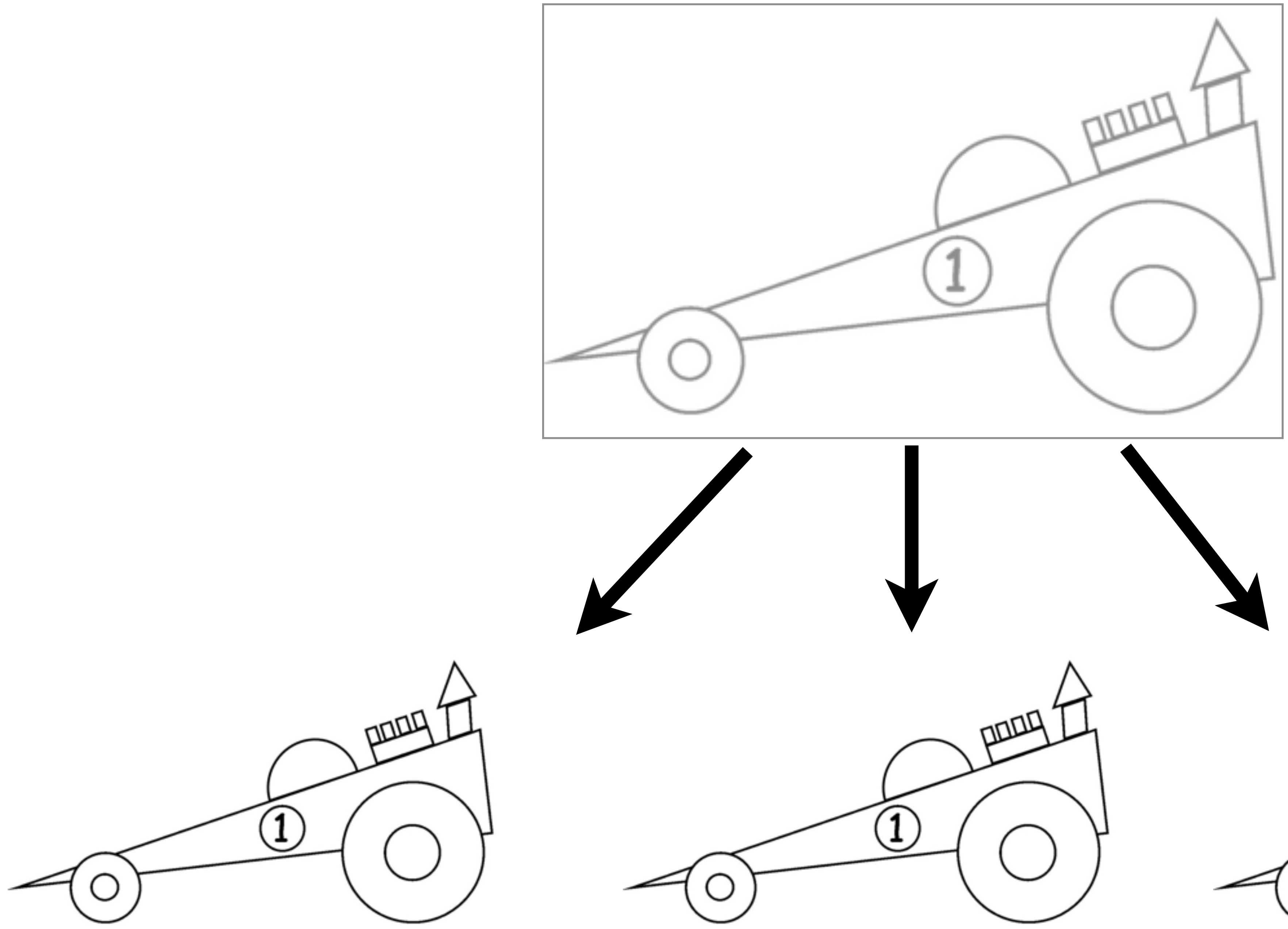


```
jrueCar.color = blue;
jrueCar.start();
```

```
kociCar.color = red;
```

```
grabsCar.color = black;
```

Classes (like a blueprint)



```
jrueCar.color = blue;
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kociCar.stop();
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grabsCar.color = black;
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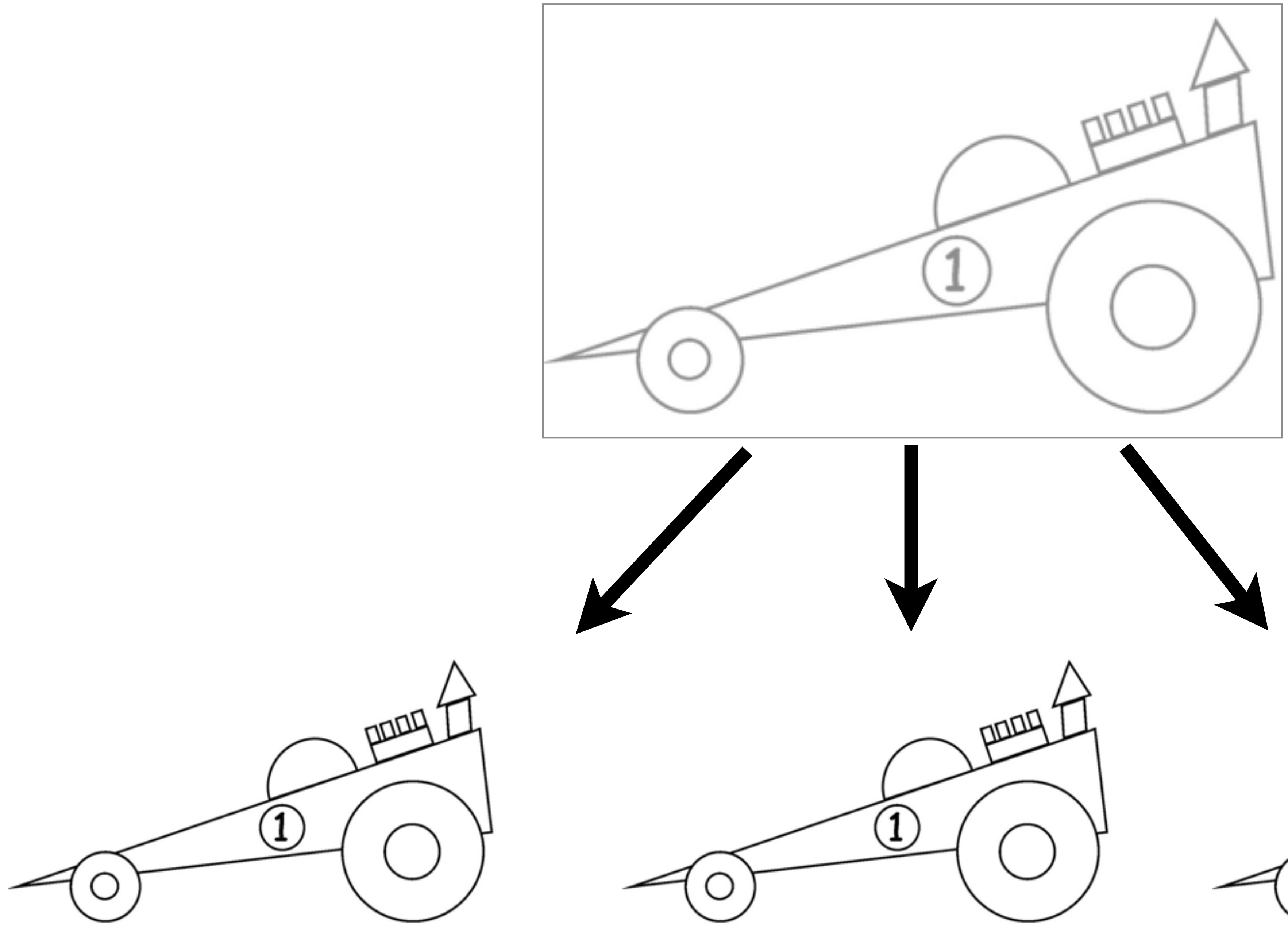

```
jrueCar.color = blue;
jrueCar.start();
```

```
kociCar.color = red;
kociCar.stop();
```

```
grabsCar.color = black;
grabsCar.breakDown();
```

How does it look in code?

```
Car();
```

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```
Car();
```

*Step 1: **Instantiate** your object from the class.*

```
var jrueCar = new Car();
```

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```
Car();
```

*Step 1: **Instantiate** your object from the class.*

```
var jrueCar = new Car();
```

*Step 2: Set **properties** or run **methods***

```
jrueCar.color = "blue";
jrueCar.type = "sedan";
jrueCar.go(65);
```

Instances of the class

```
var jruesCar = new Car();
var kocisCar = new Car();
var grabsCar = new Car();


grabsCar.color = "black";
kocisCar.go(100);
jruesCar.playMusic();
```

Instances of the class

```
var jruesCar = new Car();
var kocisCar = new Car();
var grabsCar = new Car();
```

```
grabsCar.color = "black";
kocisCar.go(100);
jruesCar.playMusic();
```

Audio Player Code

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```
var introSound = new AudioPlayer();
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```
var introSound = new AudioPlayer();

introSound.song = "let_it_be.mp3";
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var introSound = new AudioPlayer();

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var introSound = new AudioPlayer();

introSound.song = "let_it_be.mp3";

introSound.play();

var bgSound = new AudioPlayer();
```

Audio Player Code

```
var introSound = new AudioPlayer();

introSound.song = "let_it_be.mp3";

introSound.play();

var bgSound = new AudioPlayer();

bgSound.song = "hey_jude.mp3";
```

Audio Player Code

```
var introSound = new AudioPlayer();

introSound.song = "let_it_be.mp3";

introSound.play();

var bgSound = new AudioPlayer();

bgSound.song = "hey_jude.mp3";

introSound.stop();
```

Audio Player Code

```
var introSound = new AudioPlayer();

introSound.song = "let_it_be.mp3";

introSound.play();

var bgSound = new AudioPlayer();

bgSound.song = "hey_jude.mp3";

introSound.stop();

bgSound.play();
```

Prototyping (extending object)

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```
var intro = new AudioPlayer();
```

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```
var intro = new AudioPlayer();

intro.song = "help.mp3";
```

Prototyping (extending object)

```
var intro = new AudioPlayer();

intro.song = "help.mp3";

intro.play();
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Prototyping (extending object)

```
var intro = new AudioPlayer();

intro.song = "help.mp3";

intro.play();

AudioPlayer.prototype.pause = function()
{
    //pause code
}
```

Prototyping (extending object)

```
var intro = new AudioPlayer();

intro.song = "help.mp3";

intro.play();

AudioPlayer.prototype.pause = function()
{
   //pause code
}

intro.pause();
```

Polymorphism (inheritance)

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```
var AudioPlayer = new Audio();

AudioPlayer.prototype.play = function()
{


}
```

Polymorphism (inheritance)

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```
var myname = "Jeremy";


console.log( myname.length );
```

Polymorphism (inheritance)

```
var myname = "Jeremy";


console.log( myname.length );
```

Polymorphism (inheritance)

$$\begin{tikzcd}
\text{Superclasses (built into language)} \arrow[d] \\
\text{subclasses} \arrow[d] \\
\text{extended classes} \arrow[d] \\
\text{your code}
\end{tikzcd}$$

Every variable in JavaScript is an Object

```
var fruit = new Array("Pear", "Apple");
```

```
fruit.push("Banana");
```

fruit is now three items, Pear, Apple, Banana

```
fruit.pop();
```

fruit is now two items, Pear, Apple.

Every variable in JavaScript is an Object

```
var myname = new String("Jeremy");
```

```
myname.toUpperCase();
```

myname variable is now JEREMY

```
myname.trim();
```

myname has trimmed the whitespace from beginning and end of the string

If someone asks you:

JavaScript is a *prototypical* language

While JavaScript is technically object oriented, it's a prototypical language which means objects (instances) can be extended through a built-in prototype method every object has.

Polymorphism

JavaScript has the ability to create objects which inherit characteristics from superclasses.

Duck Typing

"When I see a bird that walks like a duck and swims like a duck and quacks like a duck, I call that bird a duck."

- James Whitcomb Riley

Objects can inherit all of the properties and methods from another class without explicitly instantiating it from that class.