

Programming Fundamentals **with JavaScript**

Conditional Execution

Last Piece: Making Decisions

- ① Start with the foreground image you want (fgImage)
- ② And with the background image you want (bgImage)
- ③ Make a blank image of the same size (output)
- ④ For each pixel (currentPixel) fgImage
 1. Look at currentPixel and if it is green,
 - Look at same position in bgImage
 - And set output's corresponding pixel to bgImage's pixel
 2. Otherwise: set output's corresponding pixel

Last Piece: Making Decisions

Make a decision, pick what to do next

- ① Start with the foreground image you want (fgImage)
- ② And with the background image you want (bgImage)
- ③ Make a blank image of the same size (output)
- ④ For each pixel (currentPixel) fgImage
 1. Look at currentPixel and if it is green,
 - Look at same position in bgImage
 - And set output's corresponding pixel to bgImage's pixel
 2. Otherwise: set output's corresponding pixel

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

- Decisions: if/else statements
 - Example: assume x, y, z, a declared previously

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

The keyword *if*

- Break down syntax

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

The condition (in parentheses)

- Break down syntax

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

The “then clause” (in curly braces)

- Break down syntax

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}
```

```
else {  
    a = y + 1;  
    y = x - 3;  
}
```

The keyword *else*

- Break down syntax

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}
```

```
else {
```

```
    a = y + 1;
```

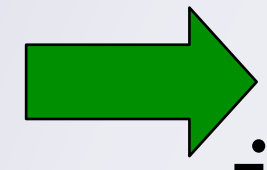
```
    y = x - 3;
```

```
}
```

The “else clause” (in curly braces)

- Break down syntax

Making Decisions: if/else



```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
---	---

y	7
---	---

z	0
---	---

a	4
---	---

- Semantics

Making Decisions: if/else

→ $2 < 7$

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
---	---

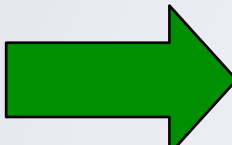
y	7
---	---

z	0
---	---

a	4
---	---

- Semantics

Making Decisions: if/else

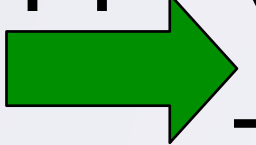
 **true**

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
y	7
z	0
a	4

- Semantics

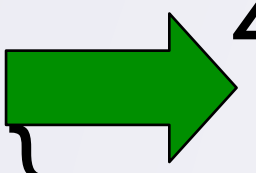
Making Decisions: if/else

```
if (x < y) {  
     z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
y	7
z	0
a	4

- Semantics

Making Decisions: if/else

```
if (x < y) {  
     z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
y	7
z	2
a	4

- Semantics

Making Decisions: if/else

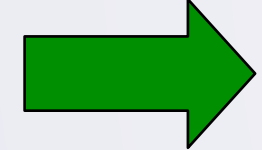
```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	2
---	---

y	7
---	---

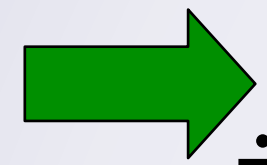
z	2
---	---

a	4
---	---



- Semantics

Making Decisions: if/else



```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	42
---	----

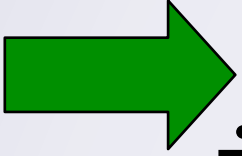
y	7
---	---

z	0
---	---

a	4
---	---

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

 $42 < 7$
if $(x < y)$ {
 $z = 2;$
}
else {
 $a = y + 1;$
 $y = x - 3;$
}

x	42
---	----

y	7
---	---

z	0
---	---

a	4
---	---

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

→ **false**
if (x < y) {
 z = 2;
}
else {
 a = y + 1;
 y = x - 3;
}

x	42
---	----


y	7
---	---

z	0
---	---

a	4
---	---

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
     a = y + 1;  
    y = x - 3;  
}
```

x	42
y	7
z	0
a	4

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	42
y	7
z	0
a	8

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

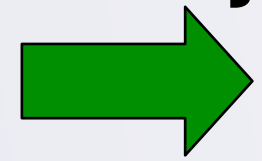
x	42
y	39
z	0
a	8

- Semantics: Another example
 - Suppose x were instead 42

Making Decisions: if/else

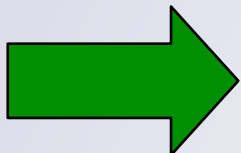
```
if (x < y) {  
    z = 2;  
}  
else {  
    a = y + 1;  
    y = x - 3;  
}
```

x	42
y	39
z	0
a	8



- Semantics: Another example
 - Suppose x were instead 42

Putting Pieces Together



```
var img = new SimpleImage("small.png");

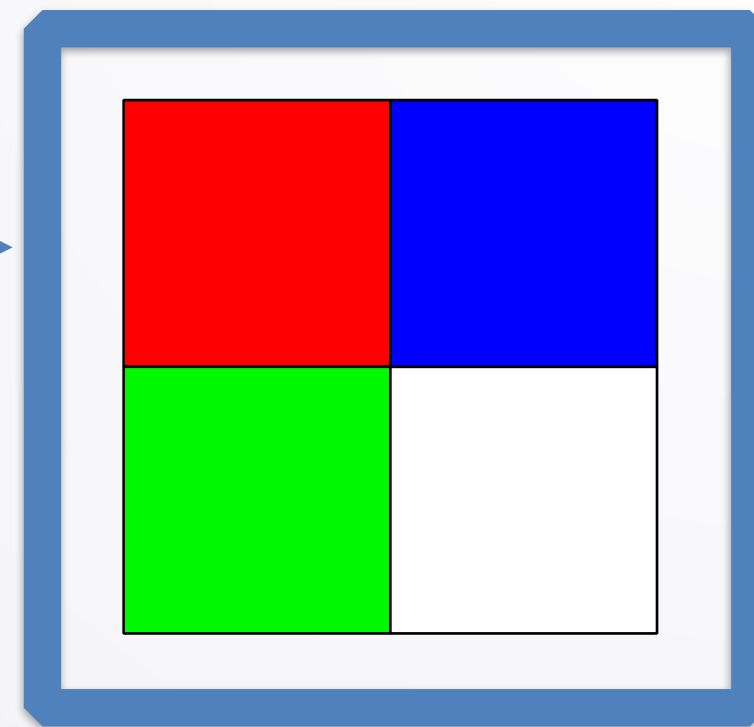
for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2) {
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```

Putting Pieces Together

→ `var img = new SimpleImage("small.png");`

```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img



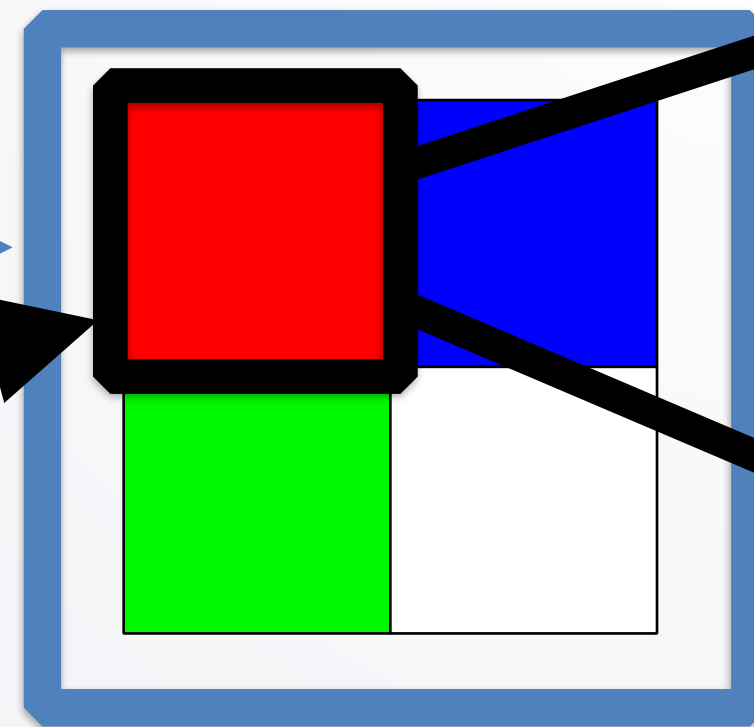
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel



x	0
y	0
R	255
G	0
B	0

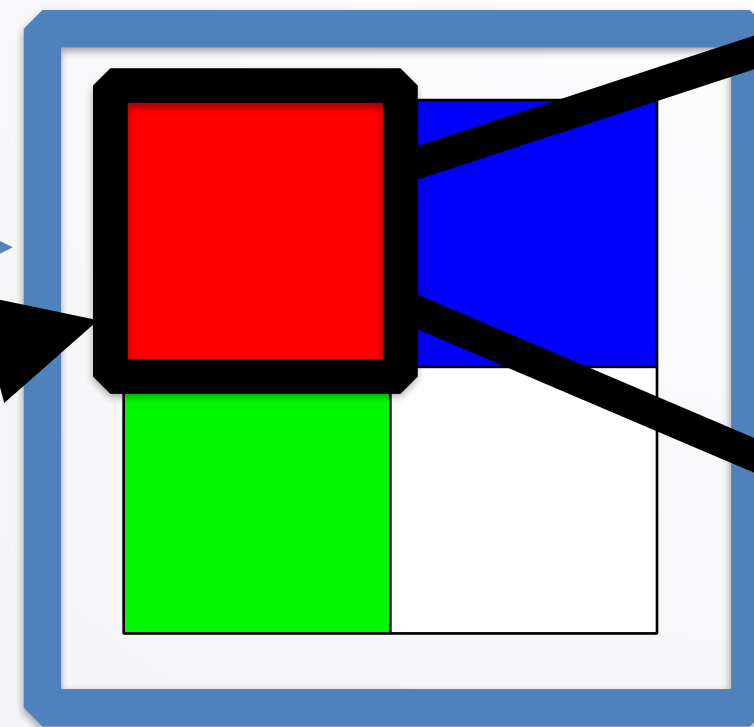
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) { is 0 >= 2/2 ?  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel



x	0
y	0
R	255
G	0
B	0

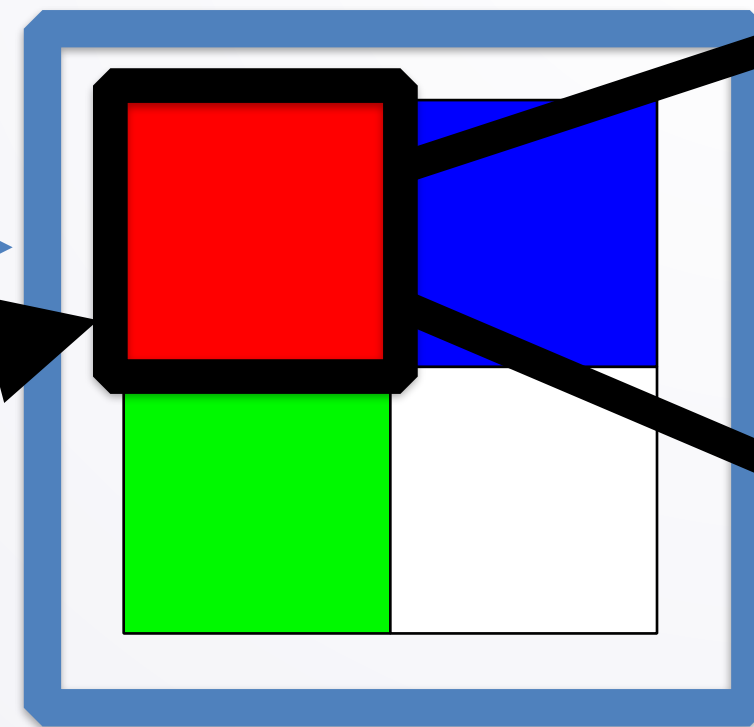
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) { false  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel



x	0
y	0
R	255
G	0
B	0

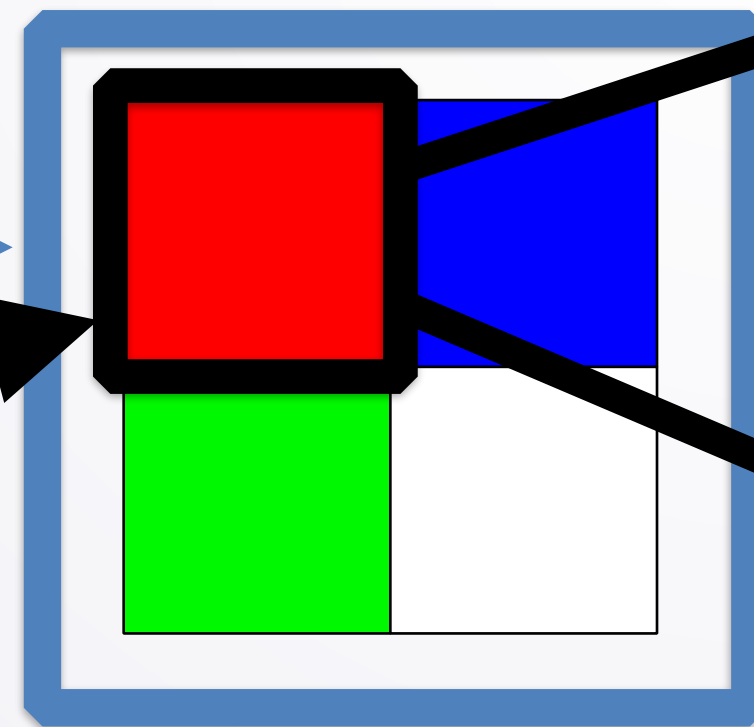
Putting Pieces Together

```
var img = new SimpleImage("small.png");

for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        → pixel.setBlue(pixel.getRed());
    }
}
```

img

pixel

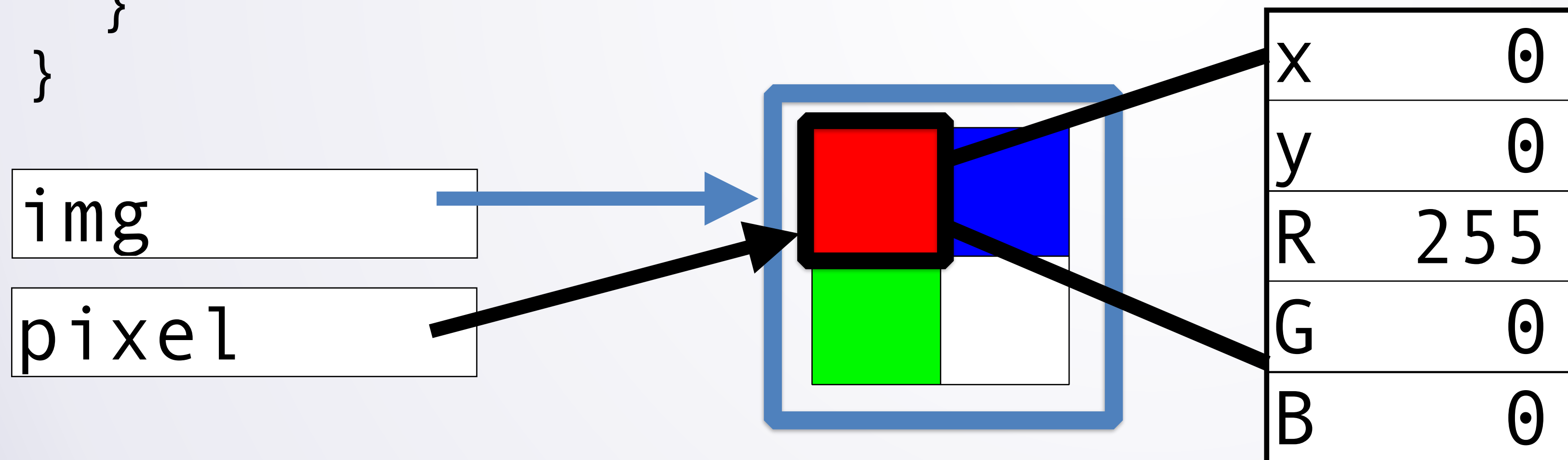


x	0
y	0
R	255
G	0
B	0

Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

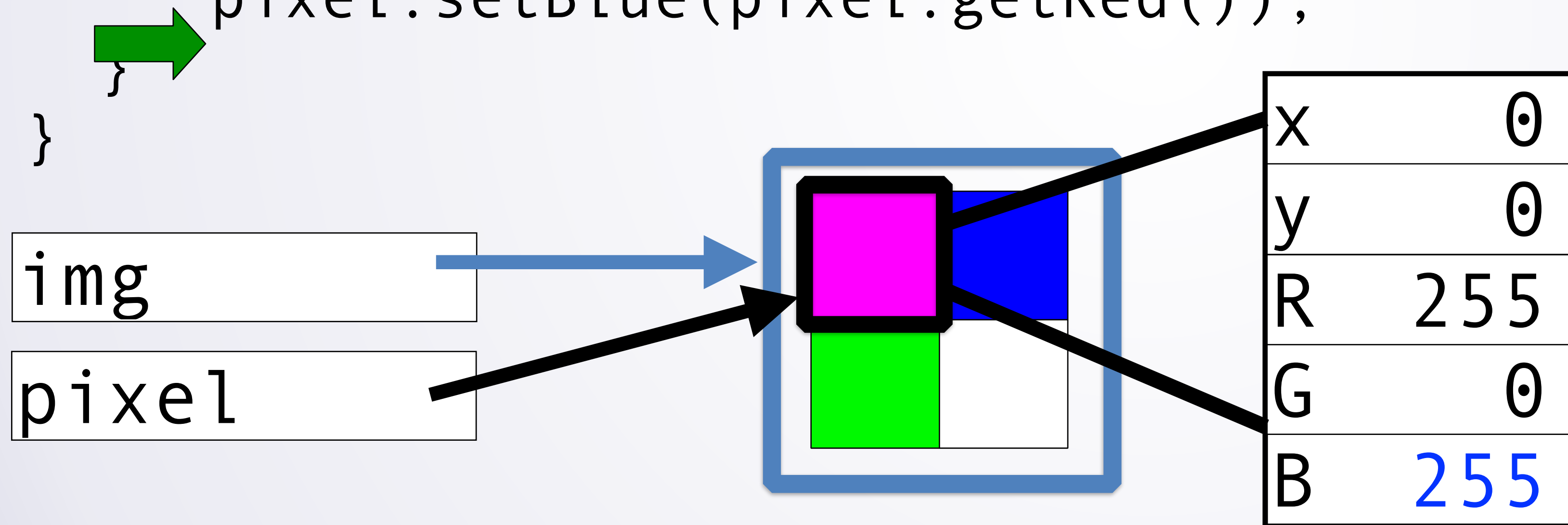
```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

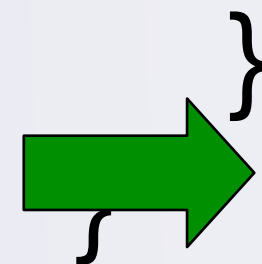
```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



Putting Pieces Together

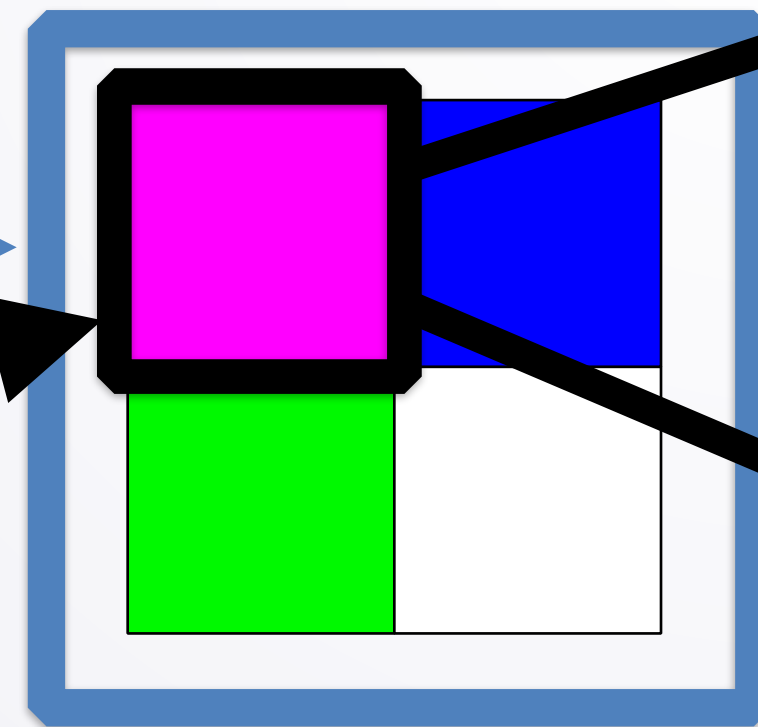
```
var img = new SimpleImage("small.png");
```

```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



img

pixel



x	0
y	0
R	255
G	0
B	255

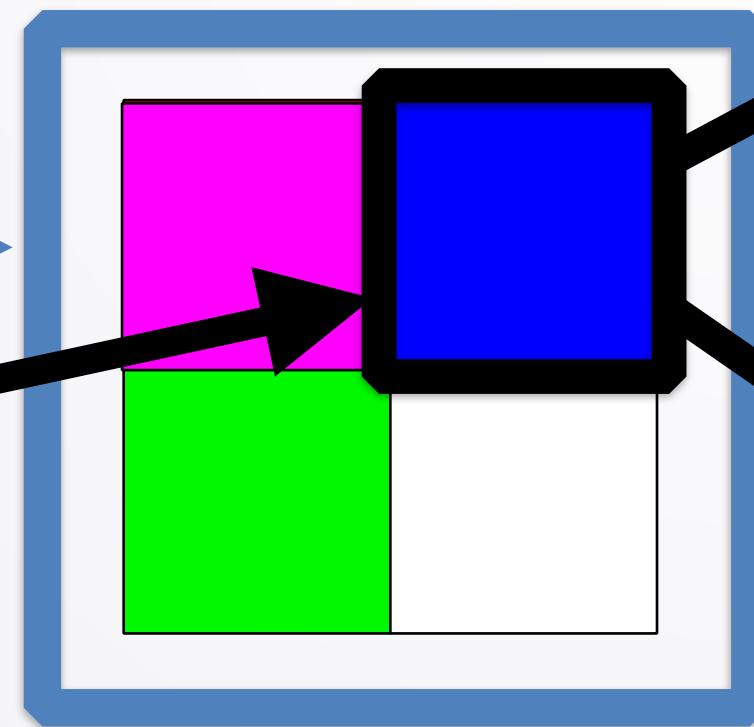
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

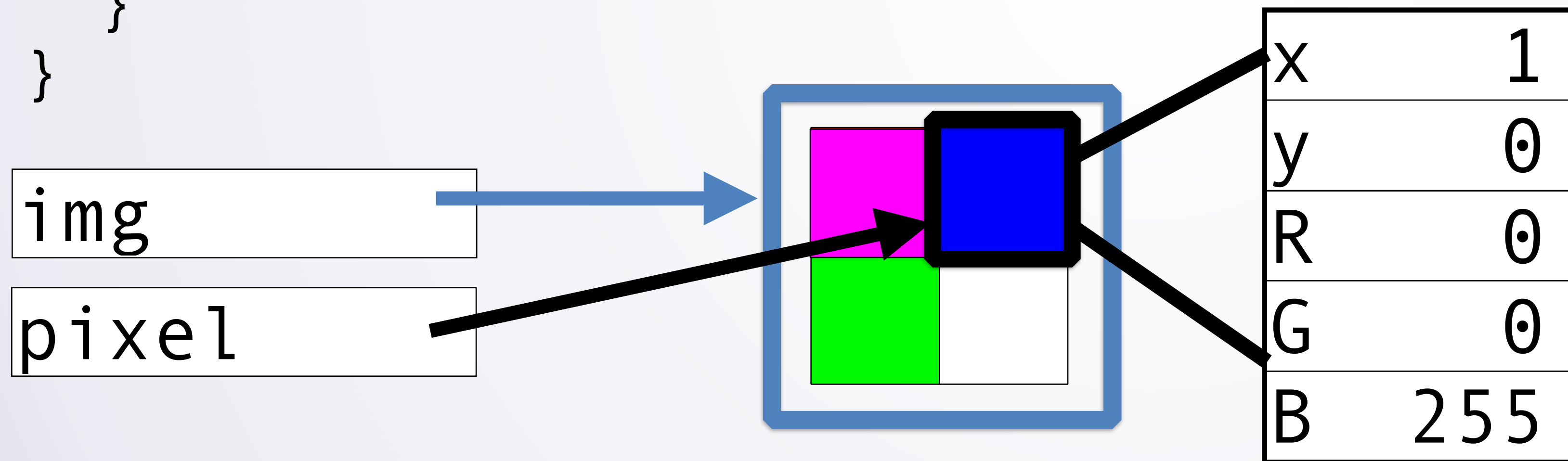
pixel



x	1
y	0
R	0
G	0
B	255

Putting Pieces Together

```
var img = new SimpleImage("small.png");  
  
for (var pixel of img.values()) { is 1 >= 2/2 ?  
    → if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



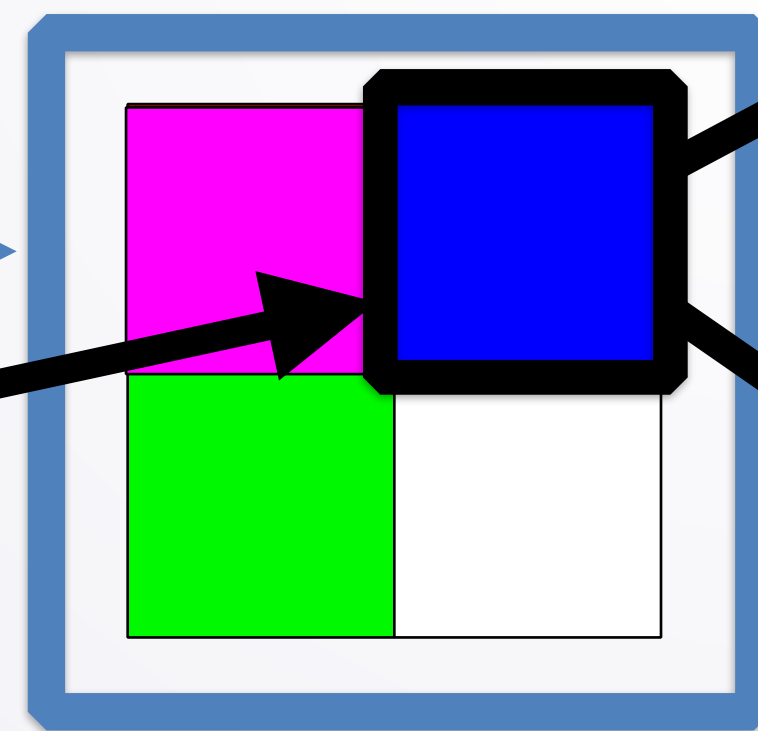
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
for (var pixel of img.values()) { true  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel

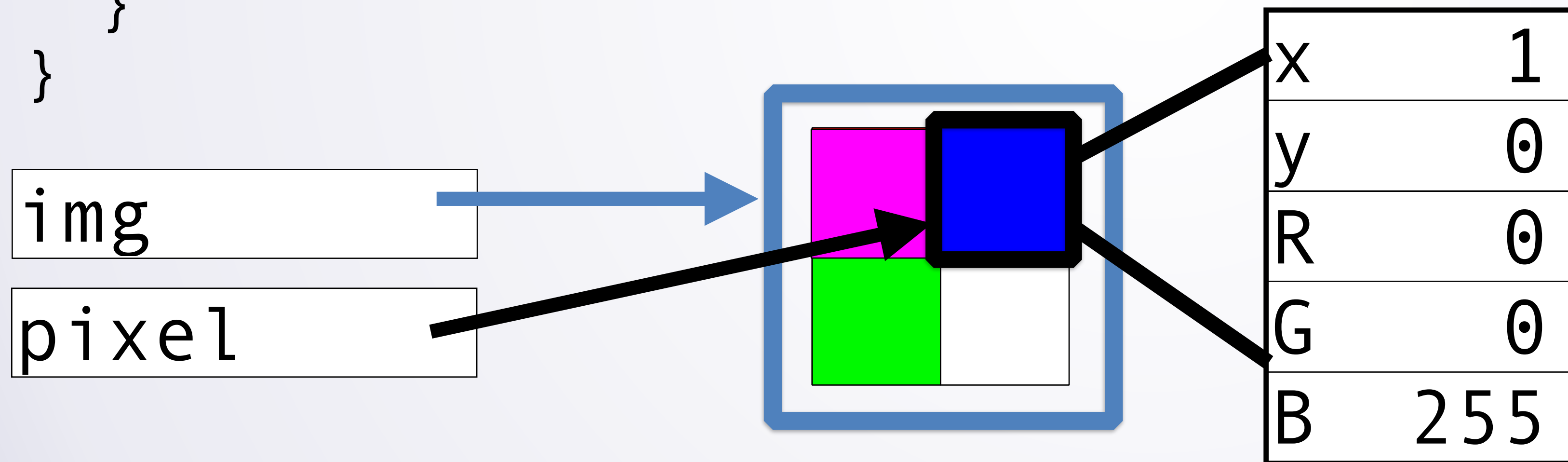


x	1
y	0
R	0
G	0
B	255

Putting Pieces Together

```
var img = new SimpleImage("small.png");

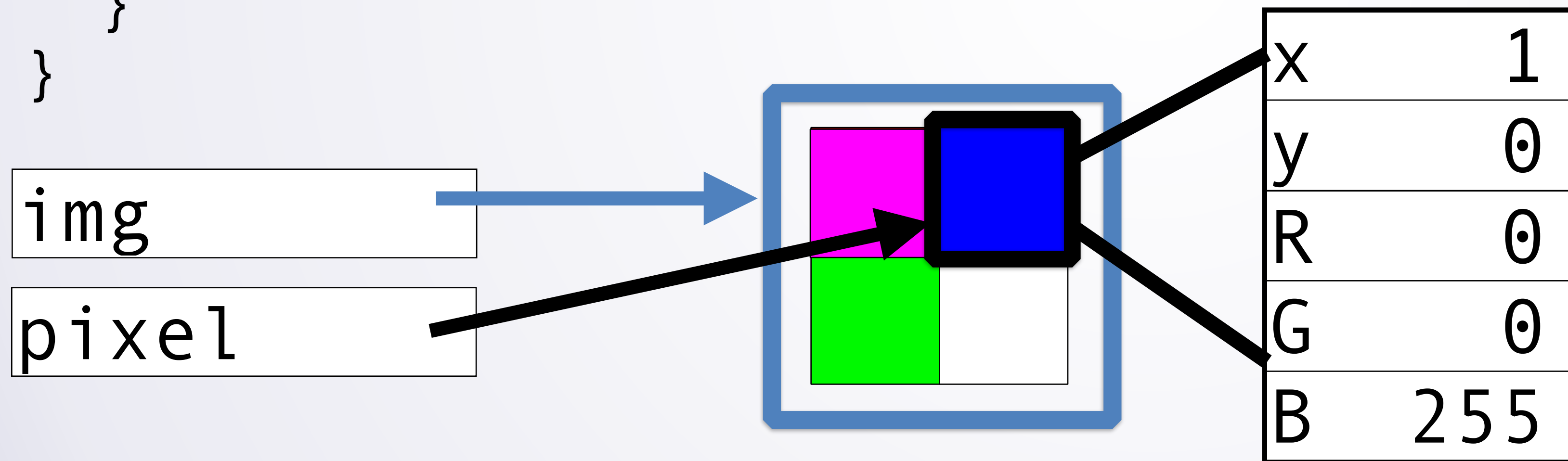
for (var pixel of img.values()) {
  if (pixel.getX() >= img.getWidth()/2) {
    → pixel.setRed(pixel.getRed()/2);
  }
  else {
    pixel.setBlue(pixel.getRed());
  }
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");

for (var pixel of img.values()) {
  if (pixel.getX() >= img.getWidth()/2) {
    → pixel.setRed(pixel.getRed()/2);
      0/2 = 0
  }
  else {
    pixel.setBlue(pixel.getRed());
  }
}
```



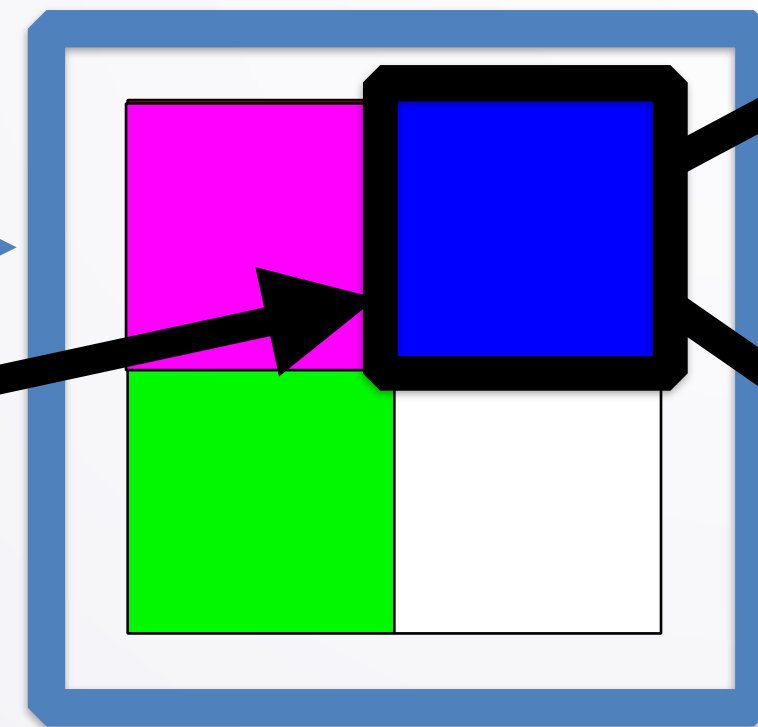
Putting Pieces Together

```
var img = new SimpleImage("small.png");

for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```

img

pixel

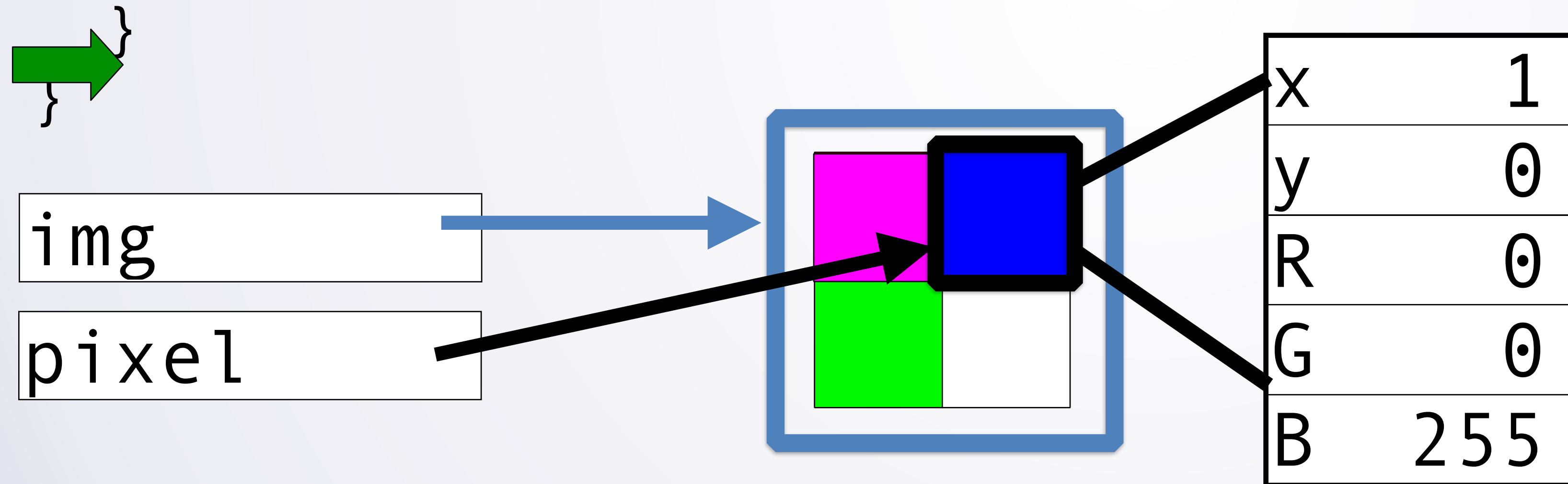


x	1
y	0
R	0
G	0
B	255

Putting Pieces Together

```
var img = new SimpleImage("small.png");

for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```



Putting Pieces Together

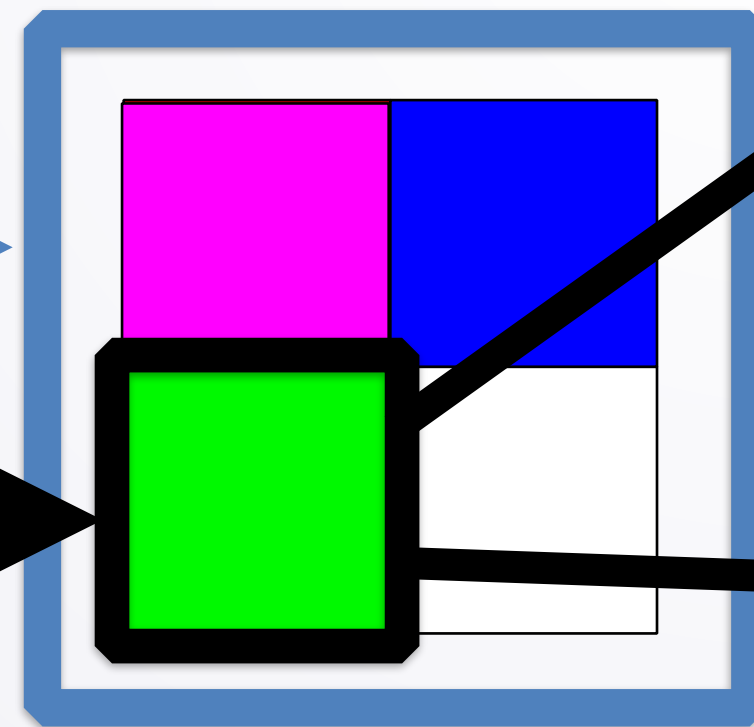
```
var img = new SimpleImage("small.png");
```

➔

```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

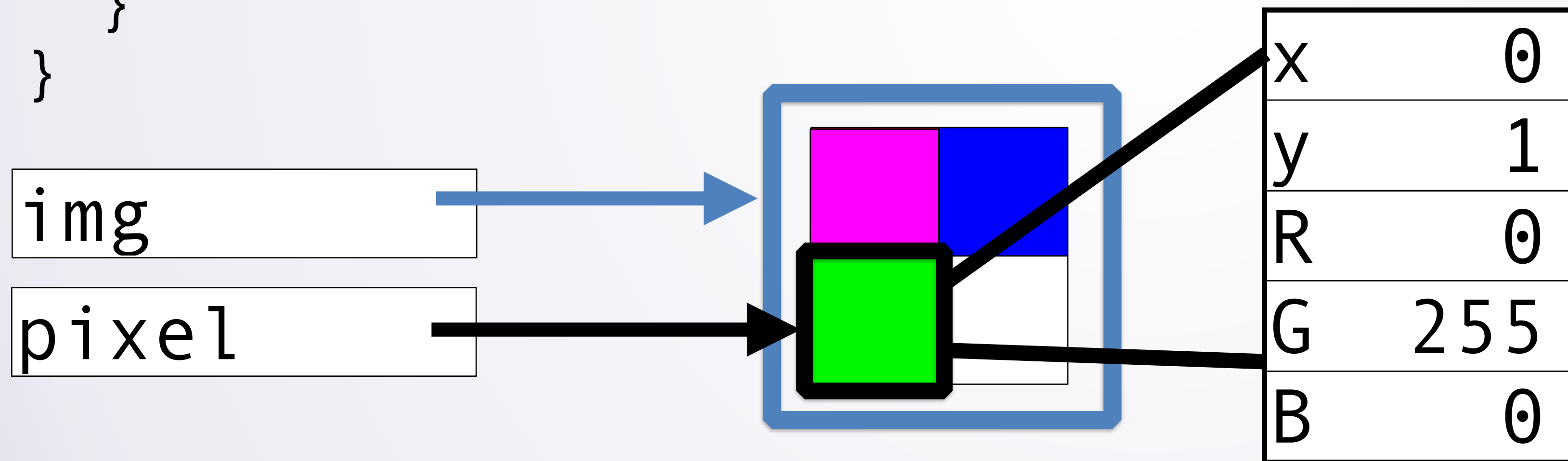
pixel



x	0
y	1
R	0
G	255
B	0

Putting Pieces Together

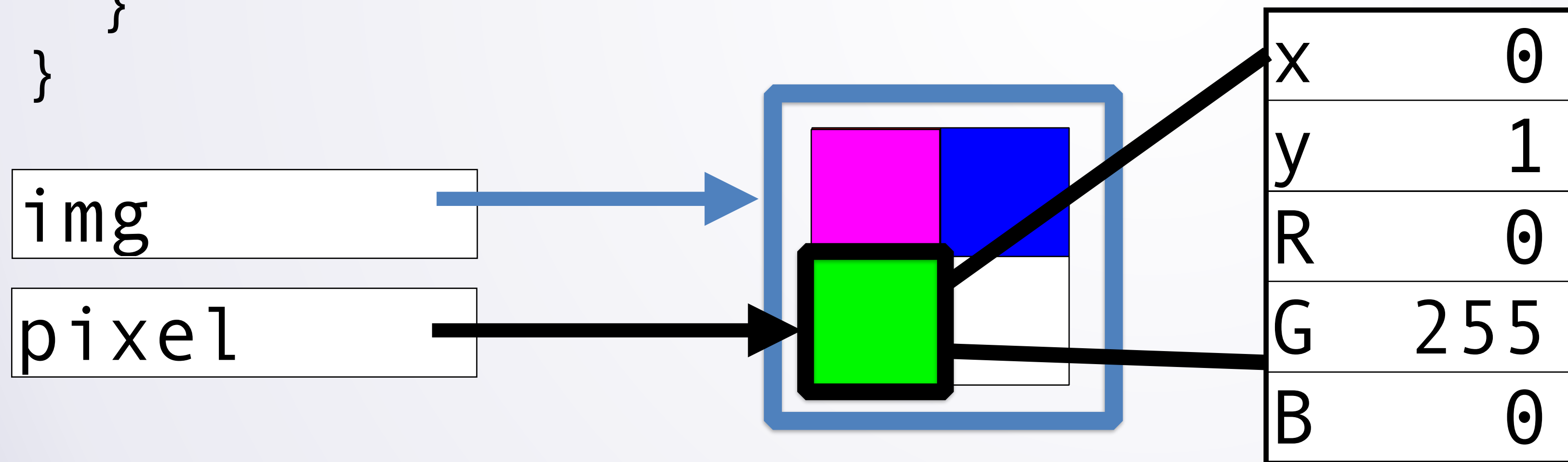
```
var img = new SimpleImage("small.png");  
  
for (var pixel of img.values()) { is 0 >= 2/2 ?  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");

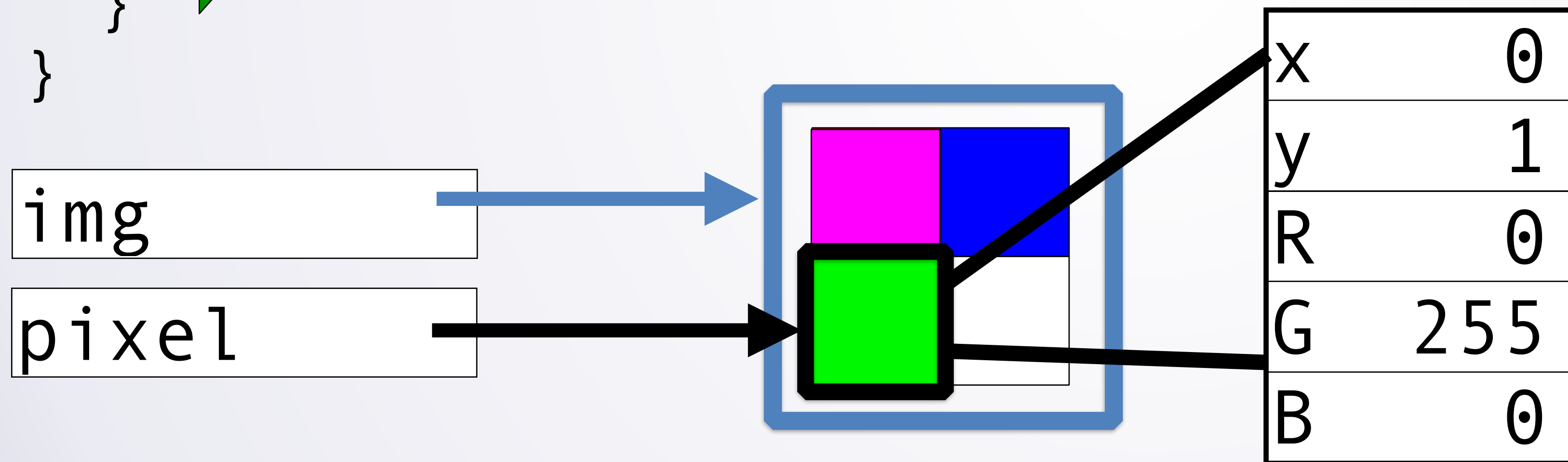
for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");

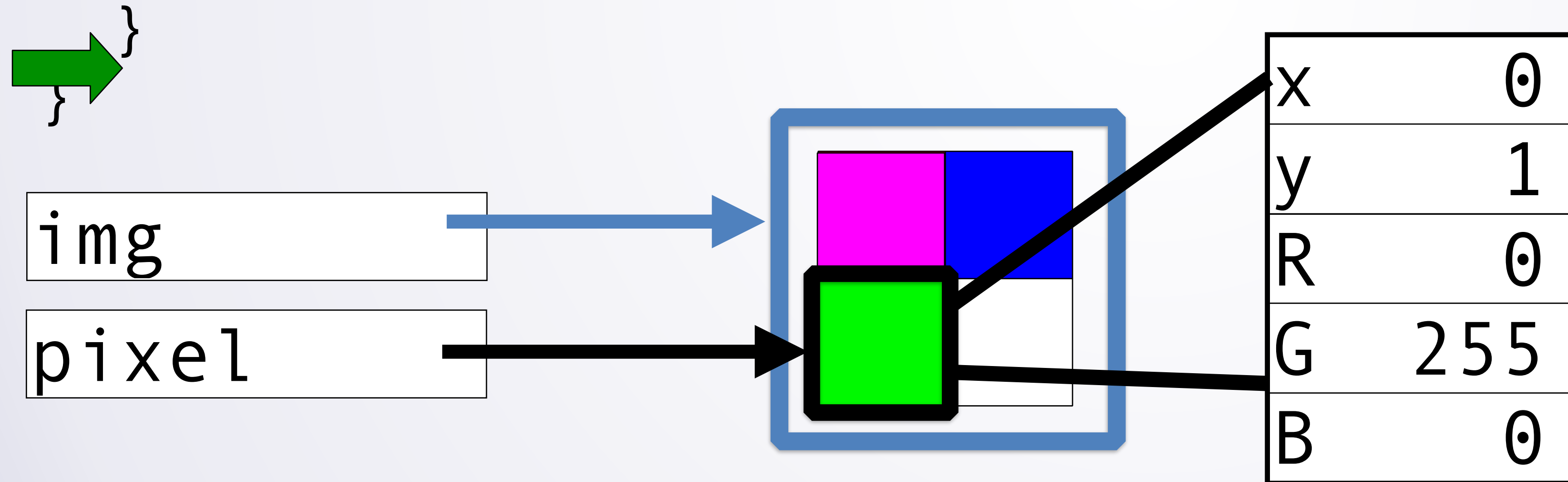
for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



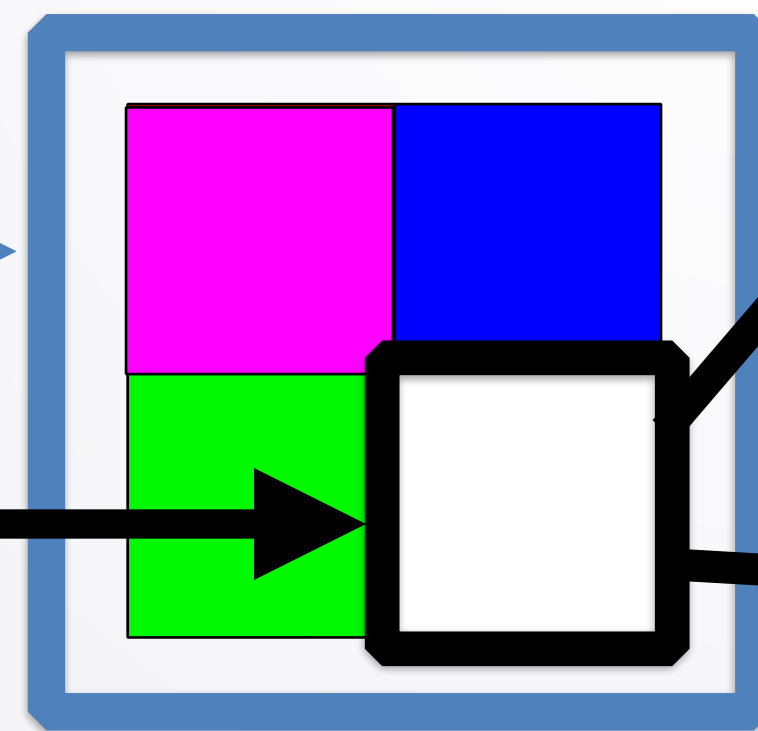
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel



x	1
y	1
R	255
G	255
B	255

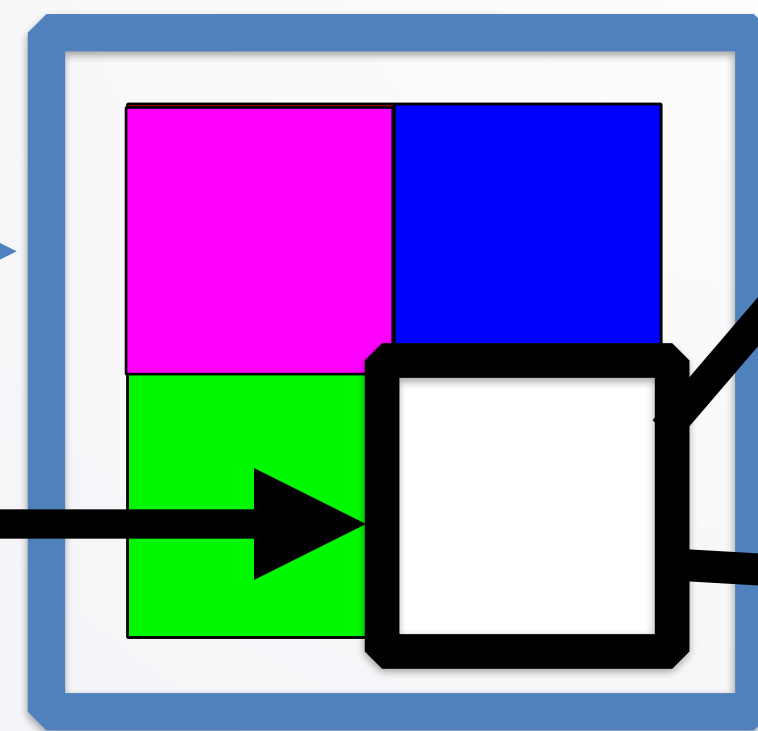
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
for (var pixel of img.values()) { is 1 >= 2/2 ?  
→ if (pixel.getX() >= img.getWidth()/2){  
    pixel.setRed(pixel.getRed()/2);  
}  
else {  
    pixel.setBlue(pixel.getRed());  
}  
}
```

img

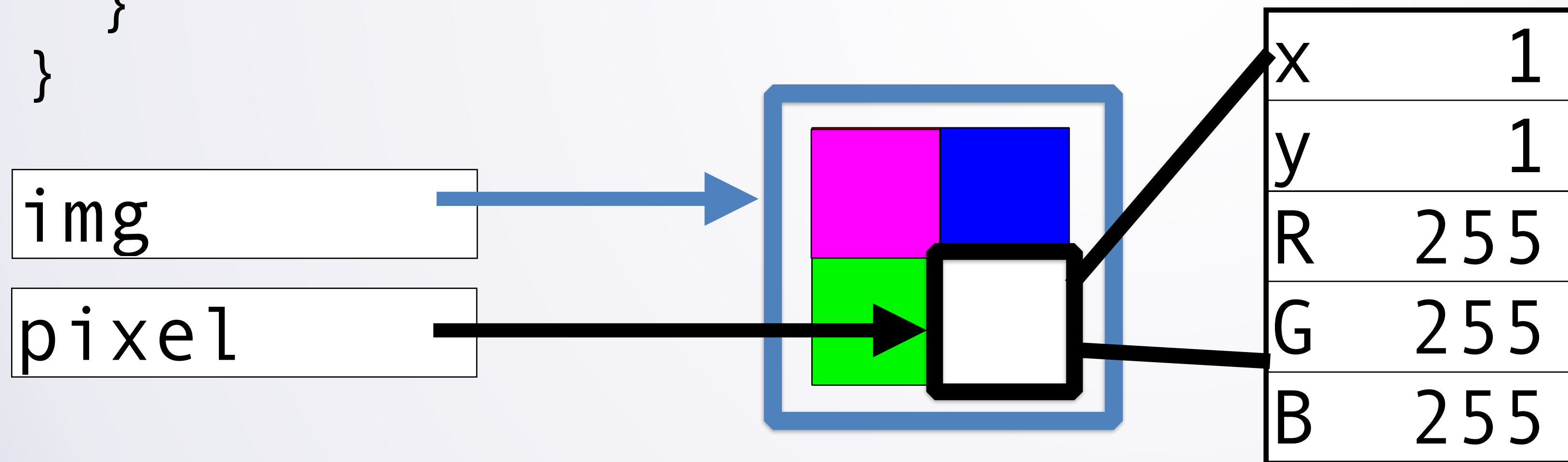
pixel



x	1
y	1
R	255
G	255
B	255

Putting Pieces Together

```
var img = new SimpleImage("small.png");  
  
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        → pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

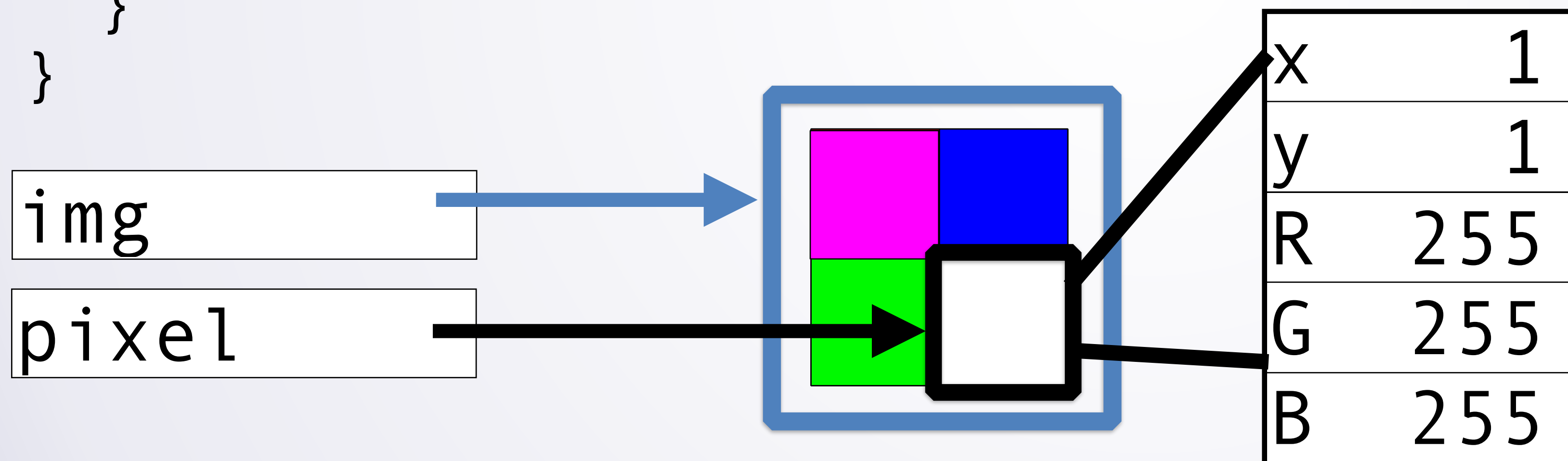


Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
for (var pixel of img.values()) {  
  if (pixel.getX() >= img.getWidth()/2) {  
    → pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
      pixel.setBlue(pixel.getRed());  
    }  
}
```

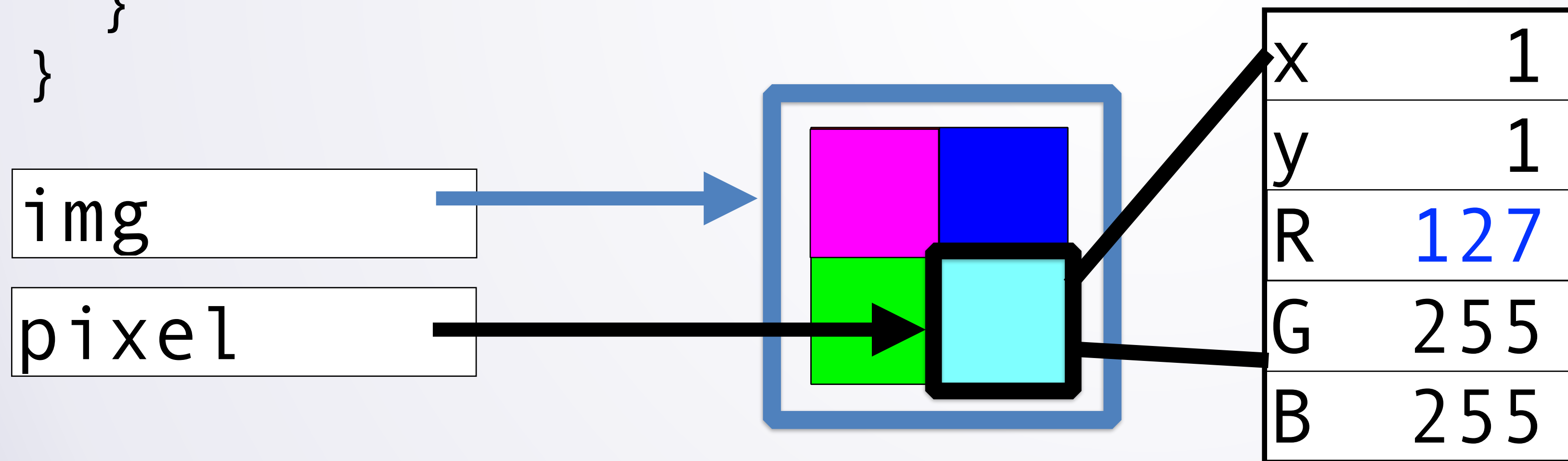
$255/2 = 127.5$



Putting Pieces Together

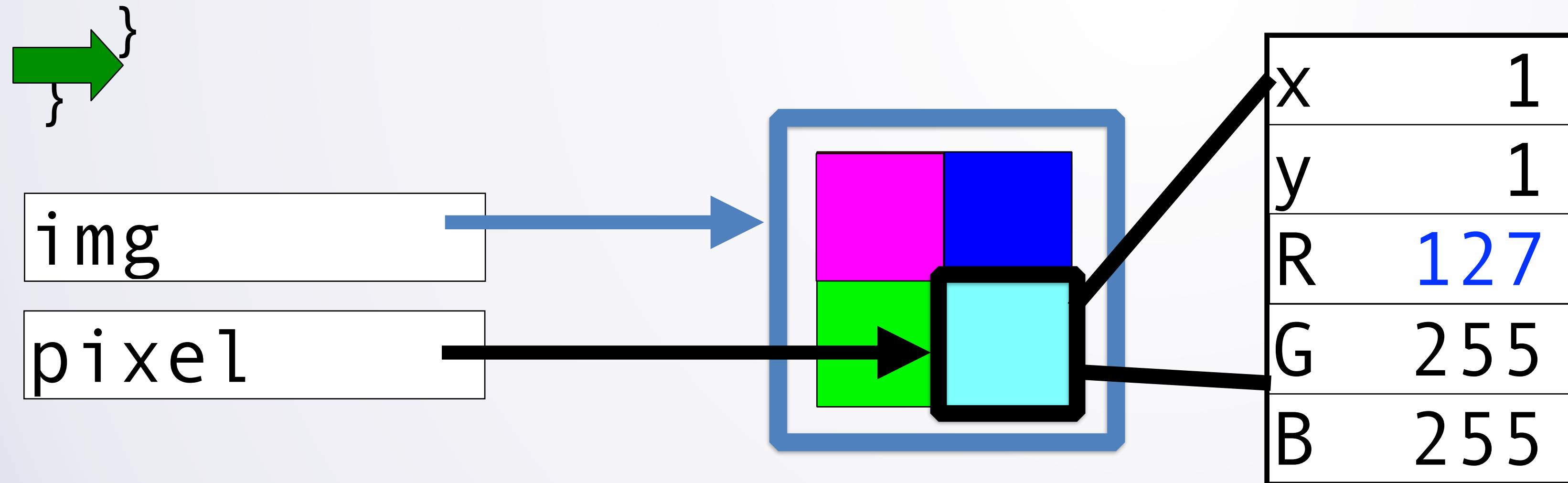
```
var img = new SimpleImage("small.png");

for (var pixel of img.values()) {
    if (pixel.getX() >= img.getWidth()/2){
        pixel.setRed(pixel.getRed()/2);
    }
    else {
        pixel.setBlue(pixel.getRed());
    }
}
```



Putting Pieces Together

```
var img = new SimpleImage("small.png");  
  
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```



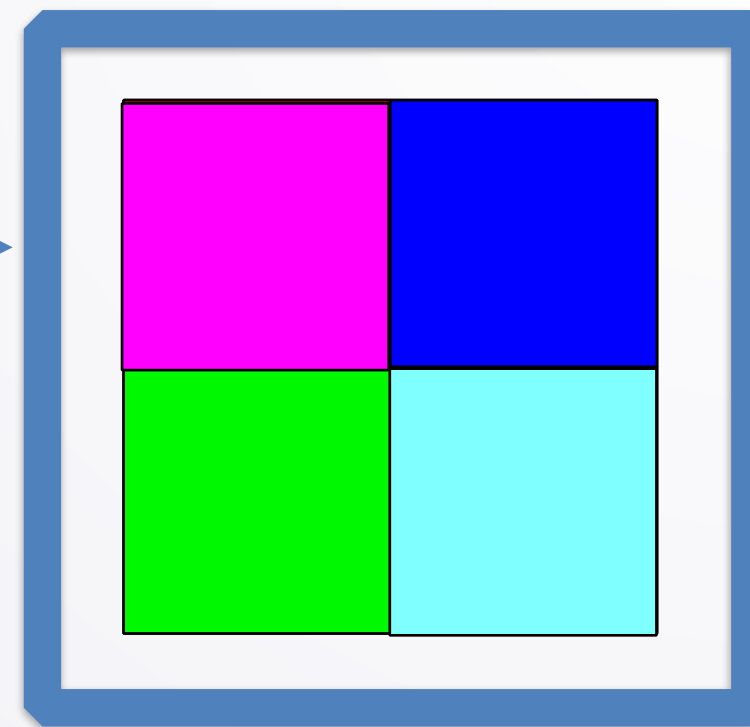
Putting Pieces Together

```
var img = new SimpleImage("small.png");
```

```
→ for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2) {  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

img

pixel none



Putting Pieces Together

```
var img = new SimpleImage("small.png");  
  
for (var pixel of img.values()) {  
    if (pixel.getX() >= img.getWidth()/2){  
        pixel.setRed(pixel.getRed()/2);  
    }  
    else {  
        pixel.setBlue(pixel.getRed());  
    }  
}
```

