

Names: _____

Writing Conditions

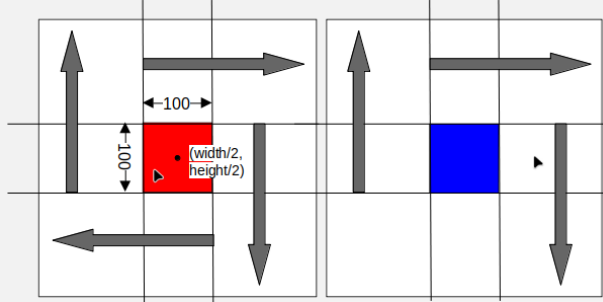
Conditions are *boolean expressions* – something which evaluates to true or false.

Tools –

- *relational operators* ==, !=, <, <=, >, >= for comparing two values
- *logical operators* &&, ||, ! for combining simple conditions into more complex conditions

A	B	!A	A && B	A B
T	T	F	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	F

&& – both parts must be true for the whole condition to be true
|| – only one part needs to be true for the whole condition to be true



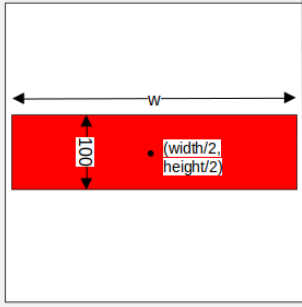
to be over the rectangle, the mouse needs to be simultaneously –

- to the right of the left side of the rectangle
- to the left of the right side of the rectangle
- below the top of the rectangle
- above the bottom of the rectangle

```
mouseX >= width/2-50 &&  
mouseX <= width/2+50 &&  
mouseY >= height/2-50 &&  
mouseY <= height/2+50
```

mouse is left of the right side, below the top, and above the bottom but not right of the left side

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reset when –

- the right side of the rectangle is past (to the right of) the right side of the window
- and when the left side of the rectangle is past (to the left of) the left side of the window – but these things will occur at the same moment, so it is only necessary to check one

```
width/2+w/2 >= width
```

width

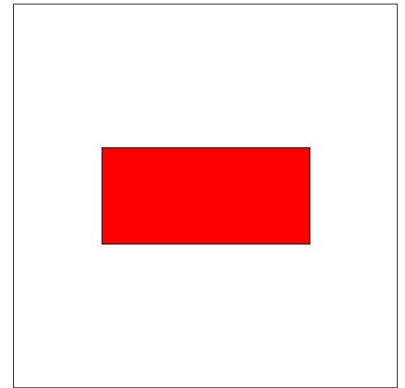
At the End of Class

Hand in this worksheet at the end of class, even if you haven't finished everything.

Exercises

For each exercise on the following pages, answer “when does each alternative occur?” in words and label the picture to help you figure out the condition. Choose reasonable values for any values you need that aren't provided.

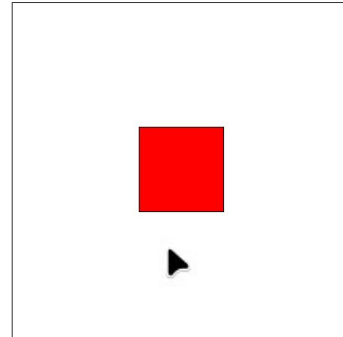
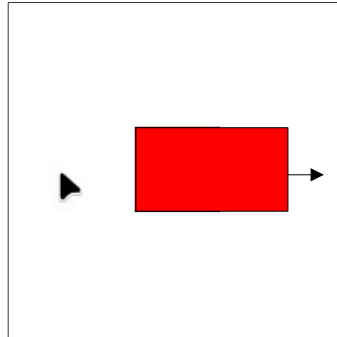
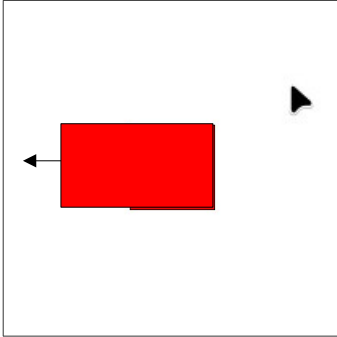
1. A sketch contains a rectangle whose width grows until it reaches the edges of the window, then its height grows. Once the rectangle reaches the top/bottom of the window, both width and height reset to 100 and the animation repeats.



what are the alternatives?	when does each alternative occur?	condition
grow width	rect hasn't reached the edge of the window	rect width < width
grow height	otherwise	n/a – else

what are the alternatives?	when does each alternative occur?	condition
reset	rect reaches the top/bottom of the window	rect height >= height
don't reset	otherwise	n/a – do nothing case

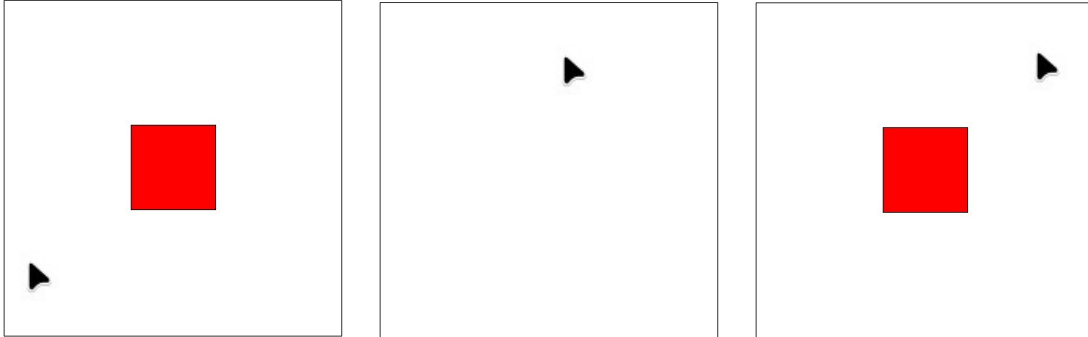
2. A sketch contains a rectangle which is initially 100x100 and centered in the window. The rectangle grows to the left (the left edge moves left) when the mouse is in the right third of the window, grows to the right (the right edge moves right) when the mouse is in the left third of the window, and doesn't change when the mouse is in the middle of the window.



what are the alternatives?	when does each alternative occur?	condition
grow to the left	mouse is in the right third of the window	$\text{mouseX} > 2 \cdot \text{width} / 3$
grow to the right	mouse is in the left third of the window	$\text{mouseX} < \text{width} / 3$
don't grow	otherwise	n/a – do nothing case

3. A sketch contains a rectangle that disappears if the mouse gets within 100 pixels horizontally of the center of the window. The drawing window is 400x400.

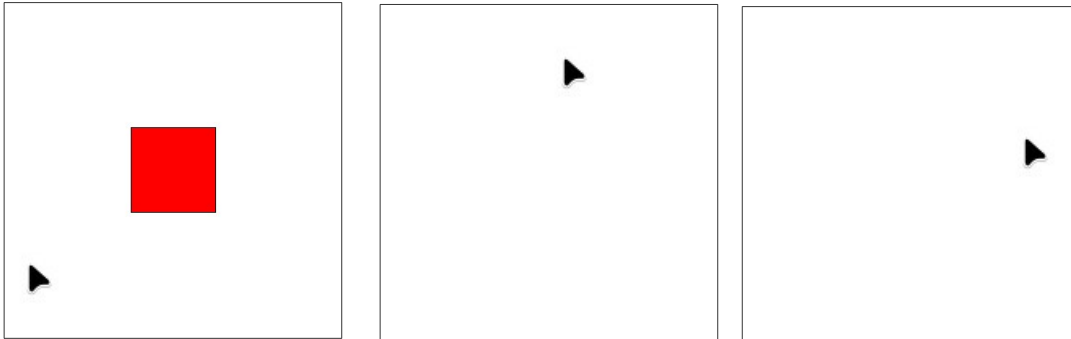
Hint: think about the opposite condition – when not to draw the rectangle – and then use “not” (!) i.e. draw the rectangle when it is not the time not to draw the rectangle.



what are the alternatives?	when does each alternative occur?	condition
draw rect	mouse is at least 100 pixels horizontally from the center of the window	$\text{mouseX} \leq \text{width}/2 - 100 \parallel \text{mouseX} \geq \text{width}/2 + 100$
don't draw rect	otherwise	n/a – do nothing case

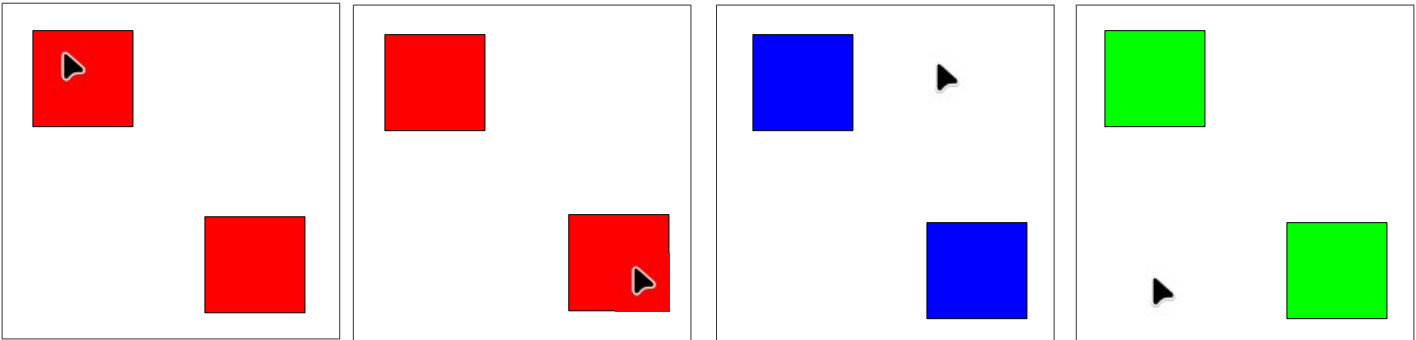
4. A sketch contains a rectangle that disappears if the mouse gets within 100 pixels horizontally or vertically of the center of the window. The drawing window is 400x400.

Hint: think about the opposite condition – when not to draw the rectangle – and use “not” (!).



what are the alternatives?	when does each alternative occur?	condition
draw rect	mouse is at least 100 pixels horizontally and vertically from the center of the window	<pre>(mouseX <= width/2-100 mouseX >= width/2+100) && (mouseY <= height/2-100 mouseY >= height/2+100)</pre>
don't draw rect	otherwise	n/a – do nothing case

5. A sketch contains two 100x100 rectangles positioned as shown in a 400x400 drawing window. Both rectangles are red if the mouse is over either rectangle, otherwise they are blue if the mouse is in the top half of the window and green if the mouse is in the bottom half of the window.



what are the alternatives?	when does each alternative occur?	condition
red rects		
blue rects		
green rects	otherwise	else

