

Computer Graphics and Animation in HTML5

Do your programming at <http://o.ooli.ca/canvasjsbin>
(get a copy of the presentation at <http://o.ooli.ca/canvasjs>)

Checking for Errors



F12



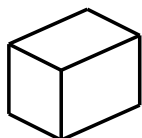
ctrl - shift↑ - J



In menus: Safari→Preferences→Advanced→Show Develop Menu
cmd# - option~alt - C

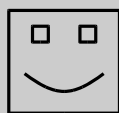
Drawing a Line

```
c.moveTo(20,90);  
c.lineTo(90,90);  
c.stroke();
```



Extra: Drawing a Curve

```
c.moveTo(20,20);  
c.quadraticCurveTo(90,20,100,90);  
c.stroke();
```



Colored Lines

```
c.beginPath();  
c.moveTo(20,20);  
c.lineTo(90,20);  
c.lineTo(90,90);  
c.strokeStyle='red';  
c.stroke();
```



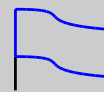
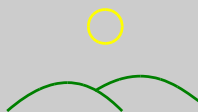
Colors

black brown orange red yellow gray
blue green purple white pink



Extra: Bezier Curves

```
c.beginPath();  
c.moveTo(10,10);  
c.bezierCurveTo(10,50,90,50,90,90);  
c.stroke();
```



Filled Shapes

```
c.beginPath();  
c.moveTo(20,20);  
c.lineTo(90,20);  
c.lineTo(90,90);  
c.fillStyle='red';  
c.fill();
```



Extra: Text

```
c.fillStyle='blue';  
c.font = '20px sans-serif';  
c.fillText('Hello', 20, 100);
```

Hello

Red

Moon

Images

```
a = new Image();  
a.src = 'http://o.ooli.ca/mona.jpg';  
  
wait(function() {  
  
c.drawImage(a,100,50);  
  
});
```

Program



<http://o.ooli.ca/mona.jpg>



<http://o.ooli.ca/ele.png>



<http://o.ooli.ca/person.png>



<http://o.ooli.ca/dog.png>



<http://o.ooli.ca/leaves.png>



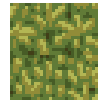
<http://o.ooli.ca/stone.png>



http://o.ooli.ca/car_top.png



<http://o.ooli.ca/tree.png>



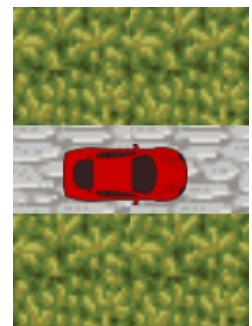
<http://o.ooli.ca/grass.png>



<http://o.ooli.ca/brick.png>

Getting Images from the Internet

- Find an image
- Right-click (ctrl-click)
- Copy
 - Copy Image URL
 - Copy Image Location
 - Copy Image Address
 - Properties...Address
- Paste it



Extra: Affine Transforms

```
a = new Image();
a.src = 'http://o.ooli.ca/car_top.png';
wait(function() {
  c.translate(200, 200);
  c.rotate(30 * Math.PI / 180);
  c.translate(-37, -19);
  c.scale(1, 1);
  c.drawImage(a, 0, 0);

  // Reset
  c.setTransform(1,0,0,1,0,0);
});
```



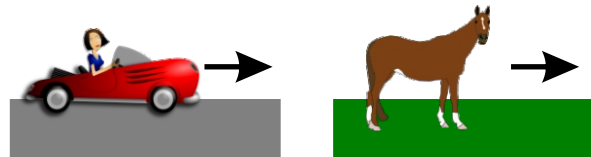
- Stretch an image
- Mirror or flip an image
- Rotate an image around its lower-right

Animation

```
a = new Image();
a.src = 'http://o.ooli.ca/person.png';
x = 50;
repeat(function() {

  c.clear();
  c.drawImage(a, x, 50);
  x = x + 1;

});
```



Extra: Advanced Animation

```
a = new Image();
a.src = 'http://o.ooli.ca/person.png';
x = 50;
y = 50;
time = 1;
repeat(function() {
  c.clear();
  c.drawImage(a, x, y);
  time = time + 1;
  if (time > 1 && time < 50) {
    x = x + 1;
  }
  if (time > 50 && time < 100) {
    x = x + 1;
    y = y + 1;
  }
});
```

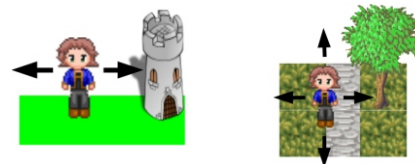


Using the Keyboard

```
a = new Image();
a.src = 'http://o.ooli.ca/person.png';
x = 50;
repeat(function() {

  c.clear();
  c.drawImage(a, x, 50);
  x = x + dx;

});
```



Extra: Driving Car

```
a = new Image();
a.src = 'http://o.ooli.ca/car_top.png';
x = 50;
y = 50;
angle = 0;
repeat(function() {

  angle = angle + dx;
  x = x - dy * Math.cos(angle * Math.PI / 180);
  y = y - dy * Math.sin(angle * Math.PI / 180);
  c.clear();
  c.translate(x, y);
  c.rotate(angle * Math.PI / 180);
  c.translate(-37, -19);
  c.drawImage(a, 0, 0);
  c.setTransform(1,0,0,1,0,0); // reset
});
```

Graph Paper

