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contents

Elementary concepts

1.0: The Canvas

The canvas is an html5 tag introduced by (no it's not a typo) in 2004 and then *quickly* adopted and available in every browser as standard core feature (2008).
It provides a bitmap-based area on the browser allowing to draw programmatically shapes, graphics and more. This was the demise of macromedia Flash.

Start from a canvas tag in a html document <canvas id="myCanvas"></canvas>. That's all the markup we need in that book.

```
var FOREGROUND = "#FF0000",
    BACKGROUND = "#000000",
    W = 600,
    H = 600,
    c = window.myCanvas, // or document.getElementByTagName("canvas")[0]
                         // if we set no idattribute and there is only one canvas
    ctx = c.getContext("2d");

c.width = W;
c.height = H;

function clear () {
  ctx.fillStyle = BACKGROUND;
  ctx.fillRect(0, 0, c.width, c.height);
}

function draw(x, y, color) {
  const PSIZE = 50;
  ctx.fillStyle = color || FOREGROUND;
  ctx.fillRect(x-PSIZE/2, y-PSIZE/2, PSIZE, PSIZE);
}

clear();

draw(0, 0);       draw(W/2, 0, "green");     draw(W, 0, 'blue');

draw(0, H/2, 'yellow');     draw(W/2, H/2, 'cyan');   draw(W, H/2, 'magenta');

draw(0, H, '#ddd');      draw(W/2, H, '#888');     draw(W, H, '#555');
```

1.1: Coordinates and logical coordinates

In *math* almost all the numerical results will be similar to rational numbers (indeed a computer can only have finite decimal digits). The native methods available for us to draw on the canvas though accepts only integers; those parameters are exactly the coordinates of our points in the coordinates system of the canvas. This system has the origin in the top left of the screen, the x-axis is horizontal pointing toward the right and they-axis is vertical pointing toward the bottom.

This means to draw a line we have to that this coordinate system into account

```
        A    B
drawLine(6,2, 10,6).  // watch the canvas does NOT provide that, we will in out simple library
```

the truth is that to draw a line in the canvas we have to write something like:

```
ctx.beginPath();   // Start a path
ctx.moveTo(6, 2);  // Move to initial point
ctx.lineTo(10, 6); // Draw a line to (10, 6)
ctx.stroke();      // Render
```

but we can create out own drawLine function to do that.
Another more important thing is to change the coordinate system into one we all feel more comfortable to draw in.