**What is window.devicePixelRatio?**

A computer screen is made up of pixels – call these pixels *physical pixels* for short.

The height and width of a **canvas element** (see below) specifies the total number of *physical pixels* that will be allocated to vertical and horizontal lines drawn on it. For example, the snippet below shows 300 physical pixels have been allocated to horizontal lines on the canvas and 150 physical pixels to vertical lines.

<canvas id="myCanvas" width = "300" height = "150">

However, the size of a pixel that is displayed on the canvas (i.e., what the user will see) is specified using *CSS pixels* – the *CSS pixels* defines the dimensions of the canvas the user will see.

The *window.devicePixelRatio* is a ratio representing the size of a *physical pixel* compared to a *CSS pixel*. If the ratio is greater than 1 then physical pixels are smaller than the CSS pixels, if it is less than 1 the physical pixels are larger than the CSS pixels, and if the ratio is 1 then the physical and CSS pixels are the same size. For example, suppose the *window.devicePixelRatio* is 1.25. Then 5 *physical pixels* fit inside 1 *CSS pixel* and the *physical pixel* is smaller than the *CSS pixel*.

**Case 1**: Physical pixels < CSS pixels => stretching

Now suppose that we set the display size of the canvas using CSS to 300 px by 150 px (see below).

#myCanvas {

    width  : 300px;

    height : 150px;

    border : 1px solid #000000;

}

Since the *window.devicePixelRatio* is 1.25, if we draw a horizontal line that is 300 physical pixels (the width of the canvas) in length, this will correspond to 240 CSS pixels. But we require the user see a line with length 300 CSS pixels. So, the pixels will be stretched by a factor of 1.25 and a blurred line will result. Likewise for the case of vertical lines.

**Case 2**: Physical pixels = CSS pixels => no stretching/compression

If we set the canvas element height and width to be 375 and 187.5 respectively without changing the CSS (display) canvas size, then a horizontal line that is 375 physical pixels in length will correspond to a line that is 300 CSS pixels in length, and no stretching is required.

**Case 3**: Physical pixels > CSS pixels => compression

If we set the canvas element height and width to be 750 and 375 respectively, then a horizontal line that is 750 physical pixels (the width of the canvas element) will correspond to a line that is 300 pixels in length (the width of the display canvas) and the line is compressed by a factor of 2.5. Likewise for the case of vertical lines.