

### 13-1 Fibonacci Spiral with code and drawing

Fibonacci's equation with a recurrence relation:

$$X_n = X_{n-1} + X_{n-2}$$

So, this will be an iterative process that draws the golden rectangle along with the Fibonacci spiral.

Need to use Fibonacci golden ratio:  $a + b/a = a/b = 1.618 = \varphi$

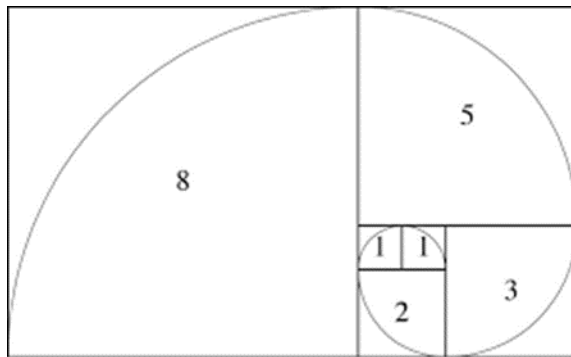
JavaScript program for drawing the Golden Rectangle and Fibonacci Spiral using the first six numbers in the Fibonacci Sequence.

#### Golden Rectangle Code in JavaScript

|    |                                                                                                                   |
|----|-------------------------------------------------------------------------------------------------------------------|
| 1  | <html>                                                                                                            |
| 2  | -->                                                                                                               |
| 3  | <head>                                                                                                            |
| 4  | <title>Golden Rectangle Spiral</title>                                                                            |
| 5  | <script type="text/javascript"<br>src="http://ajax.googleapis.com/ajax/libs/jquery/1.4.4/jquery.min.js"></script> |
| 6  |                                                                                                                   |
| 7  | <script type="text/javascript">                                                                                   |
| 8  | function loadCanvas(){                                                                                            |
| 9  | // get available screen size                                                                                      |
| 10 | var availWidth = \$(window).width() - 20;                                                                         |
| 11 | var availHeight = \$(window).height() - 20;                                                                       |
| 12 |                                                                                                                   |
| 13 | // instantiate golden ratio constant                                                                              |
| 14 | var PHI = (1+ Math.sqrt(5))/2;                                                                                    |
| 15 |                                                                                                                   |
| 16 | // resize canvas based on golden ratio                                                                            |
| 17 | if(availWidth/availHeight > PHI){                                                                                 |
| 18 | availWidth = availHeight * PHI;                                                                                   |

|    |                                                                                                  |
|----|--------------------------------------------------------------------------------------------------|
| 19 | } else if(availWidth/availHeight < PHI){                                                         |
| 20 | availHeight = availWidth/PHI;                                                                    |
| 21 | }                                                                                                |
| 22 |                                                                                                  |
| 23 | // add canvas HTML tag to body                                                                   |
| 24 | var canvasTag = '<canvas id="canvas" width="'+availWidth+'" height="'+availHeight+'"></canvas>'; |
| 25 | \$('body').html(canvasTag);                                                                      |
| 26 |                                                                                                  |
| 27 | // prepare to draw                                                                               |
| 28 | var canvas = \$('canvas').get(0);                                                                |
| 29 | if(canvas.getContext){                                                                           |
| 30 | var ctx = canvas.getContext('2d');                                                               |
| 31 | }                                                                                                |
| 32 |                                                                                                  |
| 33 | // draw first inner golden rectangle                                                             |
| 34 | var x1 = availWidth/PHI;                                                                         |
| 35 | ctx.beginPath();                                                                                 |
| 36 | ctx.moveTo(x1, 0);                                                                               |

Golden Rectangle with Fibonacci Spiral for first 6 numbers in Fibonacci sequence



Thank you, David Xia, for use of your code for drawing the Fibonacci Spiral of the Golden Rectangle. The code is copyrighted by David Xia, 2012, and is used along with the stated permissions: Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use,

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