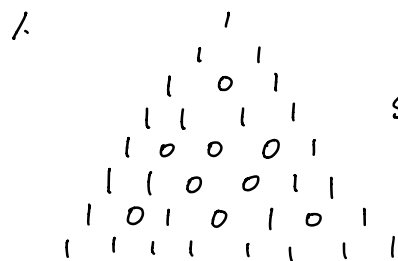


NAME: Tianyi He
 E-MAIL ADDRESS: th586@scarletmail.rutgers.edu
 It is OK to post the homework in your web-site



It is a fractal because it appears same at different scales, as illustrates in Pascal's Triangle Mod 2 up to the 8th row.

2. (i) $a=1$, $x_0=0.5$, $f(x) \rightarrow x(1-x)$

0.5, 0.25, 0.1875, 0.625, 0.234375, 0.17944336,
 0.14724344, 0.12556281, 0.10979678, 0.09774145

It tends to a single number.

(ii) $a=2.5$, $x_0=0.5$, $f(x) \rightarrow 2.5x(1-x)$

0.5, 0.625, 0.5859375, 0.60653687, 0.59662475,
 0.60165915, 0.59916354, 0.60041648, 0.59979133,
 0.60010423

It does not tend to a single number.

(iii) $a=3.1$, $x_0=0.5$, $f(x) \rightarrow 3.1x(1-x)$

0.5, 0.775, 0.5405625, 0.76989952, 0.54917817, 0.76750267,
 0.55317121, 0.76623576, 0.55526742, 0.76553109.

It does not tend to a single number.

(iv) $a=3.5$, $x_0=0.5$, $f(x) \rightarrow 3.5x(1-x)$

0.5, 0.875, 0.3828125, 0.82693481, 0.50089771, 0.87499719,
 0.38281988, 0.82694087, 0.50088383, 0.87499727.

It does not tend to a single number.

4. In mathematics, specifically bifurcation theory, the Feigenbaum constants are two mathematical constants which both express ratios in a bifurcation diagram for a non-linear map.