# The Terrestrial Planets Do Weird Calculus

**By**

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ENTITY BOOKS

It is as if the planets interior to the asteroid belt are distributed by doing what I call *weird calculus.* And, that the planets exterior to the asteroid belt are doing *normal calculus.* It is as if the planets interior to the asteroid belt are trying to take the derivative of x to the n without using logarithms.

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## Quantization of Planetary Orbits In Terms of AI Binary

I have devised a scheme for the planets in terms of the golden ratio conjugate phi and Euler's number e:

$(1-\phi)e^{\phi} = 0.7AU = Venus$

$\phi e^{(1-\phi)} = 0.9AU = Earth$

$\phi^2 e^{(2-\phi)} = 1.52 = Mars$

$2\phi e^{(2-\phi)} = 4.9 = Jupiter$

$4\phi e^{(2-\phi)} = 10 = Saturn$

$8\phi e^{(2-\phi)} = 19.69 = Uranus$

$16\phi e^{(2-\phi)} = 39.38 = Neptune$

So that $P_n = 2^n \phi e^{(2-\phi)}$ for the planets exterior to the asteroid belt or $P_n = c2^n$ where $c = \phi e^{(2-\phi)} = 2.461$ is $C2^0 = C = 2.461$ is the asteroid belt ($P_0$)

$P_1 = Jupiter$
$P_2 = Saturn$
$P_3 = Uranus$
$P_4 = Neptune$

Which is the solution to the differential equation

$$\frac{d^2y}{dn^2} - 2log(2)\frac{dy}{dn} + log^2(2)y = 0$$

Where have we seen this? In computer science.

$log_2 N = n$ means $2^n = N$

Where n is the number of bits in a number N in binary. We write in binary

0=0
1=1
10=2
11=3
100=4
101=5
110=6

111=7
1000=8
1001=9
1010=10
1011=11
1100=12
1101=13
1110=14
1111=15
10000=16…

But what is interesting about this?

$$log_2 3 = n$$

$$n = \frac{log3}{log2} = 1.5847$$

You can't have a fractional number of bits, thus the spectrum is quantized according to whole number solutions of

$$2^n = N$$

But so are the planets given by

$$P_n = c2^n$$

$$2\phi e^{(2-\phi)} = 4.9 = Jupiter$$

$$4\phi e^{(2-\phi)} = 10 = Saturn$$

$$8\phi e^{(2-\phi)} = 19.69 = Uranus$$

$$16\phi e^{(2-\phi)} = 39.38 = Neptune$$

Meaning, since we have 2, 4, 8. 16 that the planets are quantized into whole number orbits according to computer binary with Jupiter as 2, Saturn as 4, Uranus as 8, and Neptune as 16 if we do it in terms of Euler's number, e and the golden ratio conjugate, $\phi$.

That is, 2=10, 4=100, 8=1000, 16=10000

Are all zeros after a one.

## The Conundrum

It is as if the planets interior to the asteroid belt are distributed by doing what I call *weird calculus.* And, that the planets exterior to the asteroid belt are doing *normal calculus.* It is as if the planets interior to the asteroid belt are trying to take the derivative of x to the n without using logarithms. This in the sense that:

If we refer back to the foundations of calculus, while the integral of simple functions can be considered

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

We have a conundrum for

$$f(x) = \frac{1}{x} = x^{-1}$$

That the power rule gives:

$$\int \frac{1}{x} dx = \frac{x^{-1+1}}{0}$$

Thus to get around this, we searched for a function such that the integral holds, and as such we discovered the natural logarithm (ln) and Euler's number e. And we have

$$\int \frac{1}{x} dx = ln(x) + C$$

$$\frac{\mathrm{d}}{\mathrm{d}x} e^x = e^x$$

Where

$$ln(x) = log_e(x)$$

And, the derivative of $e^x$ is itself and e is the transcendental and irrational number given by

e=2.718…

That is, while

$$f^{-1} ln(x) \neq \frac{1}{ln(x)}$$

$$f^{-1} ln(x) = e^x$$

We can approximate any function with a polynomial, the simplest example being the linear approximation formed by writing the change in f(x) due to a change in x:

$$f(x) = f(a) + f'(a)(x - a)$$

This results in Taylor's formula

$$f(x) = f(a) + f'(a)(x - a) + \frac{f''(a)}{2!}(x - a)^2 + \dots$$

From which we derive the Taylor series

$$\sum_{n=0}^{\infty} \frac{f^n(a)}{n!}(x - a)^n = f(a) + f'(a)(x - a) + \frac{f''(a)}{2!}(x - a)^2 + \dots$$

We know the kth derivative of e to the x is e to the x itself. Thus,

$$f^{(k)}(x) = e^x$$

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$\lim_{n\to\infty} \frac{x^n}{n!} = 0$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$e = \sum_{n=0}^{\infty} \frac{1}{n!} = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \dots = 2.718$$

## The Weird Calculus

The planets seem to the think

$$\frac{\mathrm{d}}{\mathrm{d}x} e^x \neq e^x$$

But, rather is

$$\frac{\mathrm{d}}{\mathrm{d}x} e^x = x e^{-(x-1)}$$

$(1-\phi)e^{\phi}$ makes me think of the derivative of x to the n:

$$\frac{\mathrm{d}}{\mathrm{d}x}x^n = n\,x^{(n-1)}$$

And so does

$\phi e^{(1-\phi)}$

Because we have

$(n-1)$ yields

$(1-\phi)$ by way of

$-(\phi-1)$=$(1-\phi)$

And, the $\phi e$ is like $n\,x$.

And,…

$\phi^2 e^{(2-\phi)}$ makes me think of the second derivative of x to the n:

$$\frac{\mathrm{d}^2}{\mathrm{d}x}x^n = n^2 x^{(n-2)}$$

That is:

$$\frac{d^2}{dx^2}n\,x^{(n-1)} = n^2 x^{(n-1-1)} = n^2 x^{(n-2)}$$

$(n-2)$

Because we have

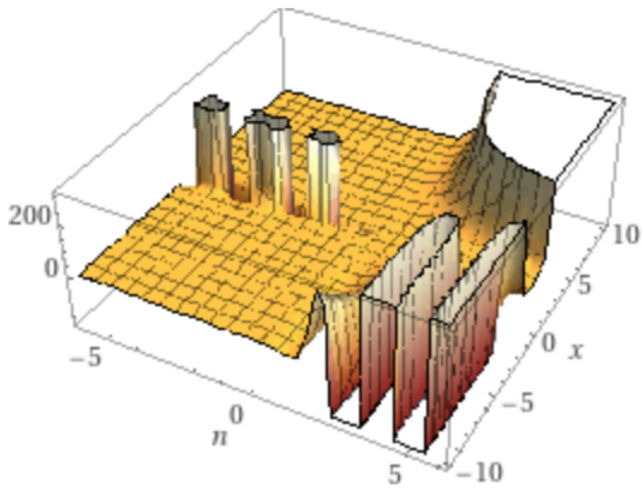
$-(\phi-2) = (2-\phi)$

## Understanding The Weird Calculus

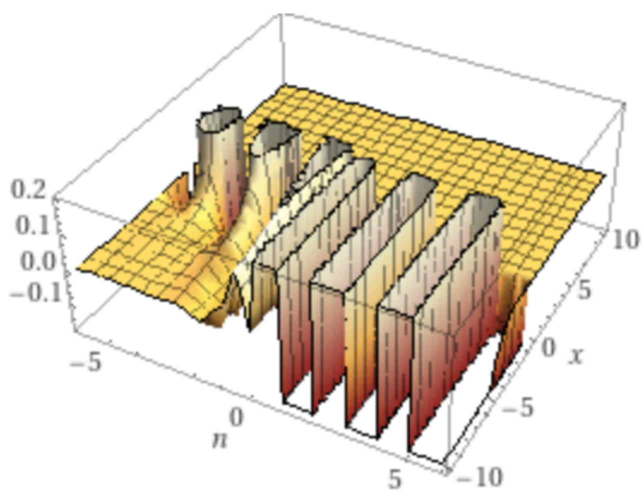
The plot of $n\,x^n$ has got to be one of the most interesting things I have ever seen:

## 3D plots:

### Real part




### Imaginary part



Thus in regular calculus

$$\frac{\mathrm{d}}{\mathrm{d}x}e^x = e^x$$

And, in weird calculus

$$\frac{\mathrm{d}}{\mathrm{d}x}e^x = xe^{-(x-1)}$$

This gives

$$\frac{\mathrm{d}}{\mathrm{d}x}e^\phi = \phi e^{-(\phi-1)} = 0.9055$$

$$\frac{\mathrm{d}}{\mathrm{d}\phi}e^\phi = e^\phi = 1.855$$

Let us compare regular calculus to weird calculus:

$$\frac{1.855}{0.9055} = 2.04859 \approx 2$$

If we take

$$\frac{\mathrm{d}}{\mathrm{d}\phi}\phi e^{(\phi-1)} = e^{(\phi-1)}(\phi+1) = e^{(\phi-1)}1.618=$$

1.10428

Where

$\Phi = \dfrac{1}{\phi}$ and has the property $\Phi = \phi + 1$.

But if we use weird calculus to take the second derivative

$$\frac{\mathrm{d}^2}{\mathrm{d}x^2}e^\phi = \phi^2 e^{-(\phi-2)} = 1.52$$

It is exactly the Mars orbit.

And, if we simply take, we get…

$$\frac{\mathrm{d}}{\mathrm{d}\phi}\phi e^{\phi+1} = e^{\phi+1}(\phi+1) = e^{\Phi}(\phi+1) = e^{\Phi}\Phi=8.15956$$

I think the planets do weird calculus because it is a doubling effect in that

$$\frac{1.855}{0.9055} = 2.04859 \approx 2$$

Because it keeps the planets from interfering with one another so they don't get torn apart as they did with the asteroid belt. The second derivative of e to the phi is itself so the 1.855 is constant. Comparing this to the second derivative of weird calculus we have:

$$\frac{1.855}{1.52} = 1.220$$

Notice that

$$\frac{1.22}{2} = 0.61 \approx \phi$$

## The Golden Ratio

But what is the golden ratio $\Phi$ and its conjugate $\phi$.

We can derive the golden ratio as such (refer to fig 13):

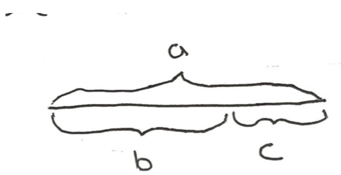



fig 13

$$\frac{a}{b} = \frac{b}{c} = \Phi$$

$$a = b + c$$

$$ac = b^2$$

$$c = a - b$$

$$a(a - b) = b^2$$

$$a^2 - ab - b^2 = 0$$

$$\frac{a^2}{b^2} - \frac{a}{b} - 1 = 0$$

$$\frac{a^2}{b^2} - \frac{a}{b} + \frac{1}{4} = 1 + \frac{1}{4}$$

$$\left(\frac{a}{b}\right)^2 - \frac{a}{b} + \frac{1}{4} = 1 + \frac{1}{4}$$

$$\left(\frac{a}{b}\right)^2 - \frac{a}{b} + \frac{1}{4} = \frac{4}{4} + \frac{1}{4} = \frac{5}{4}$$

$$\left(\frac{a}{b} - \frac{1}{2}\right)^2 = \frac{5}{4}$$

$$\frac{a}{b} - \frac{1}{2} = \frac{\sqrt{5}}{2}$$

$$\Phi = \frac{\sqrt{5} + 1}{2}$$

$$\phi = \frac{b}{a} = \frac{\sqrt{5} - 1}{2}$$

Let us say a/b=x, the golden ratio. Then,…

$$x^2 - x - 1 = 0$$

Let us differentiate this implicitly:

$$\frac{\mathrm{d}}{\mathrm{d}x}x^2 - \frac{\mathrm{d}}{\mathrm{d}x}x - \frac{\mathrm{d}}{\mathrm{d}x}1 = 0$$

$$2x - 1 = 0$$

$$x = \frac{1}{2}$$

Which is similar to Euler's number, e because it is the base such that $\frac{\mathrm{d}}{\mathrm{d}x}e^x$ is itself $e^x$:

$$\frac{\mathrm{d}}{\mathrm{d}x}e^x = e^x$$

But

$$sin 45^\circ = cos 45^\circ = \frac{\sqrt{2}}{2}$$

Which says for this angle the x-component equals the y-component is $\frac{1}{2}90^\circ$ that is , x=1/2 bisects a right angle. Which similar in concept to Euler's number e because it is the base such that $\frac{\mathrm{d}}{\mathrm{d}x}e^x$ is itself $e^x$ . But if $sin 45^\circ = cos 45^\circ = \frac{\sqrt{2}}{2}$, then:

$$2cos\frac{\pi}{4} = \sqrt{2}$$

It is the diagonal of the unit square. We notice something interesting happens:

$$2cos\frac{\pi}{n} =$$

$$2cos\frac{\pi}{4} = \sqrt{2}, 2cos\frac{\pi}{5} = \Phi, 2cos\frac{\pi}{6} = \sqrt{3}$$

Where $\sqrt{3}$ is the cosine of 30 degrees, in the unit equilateral triangle in which the altitude has been drawn in (fig 14):

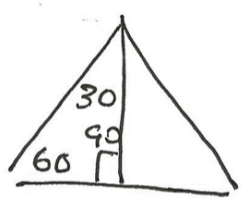
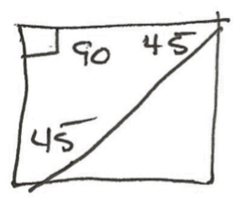



fig 14



## Weird Arithmetic

Characterizing the distribution of the planets around the sun seems to defy a mathematical expression. Even the Titius-Bode rule falls apart pretty badly at Neptune.

The Titius-Bode Rule is:

$$r = 0.4 + (0.3)2^n$$

$$n = -\infty, 0, 1, 2, \ldots$$

Which produces the orbits of the planets in astronomical units as such in AU:

| Planet | Rule | Actual |
|---|---|---|
| Mercury | 0.4 | 0.387 |
| Venus | 0.7 | 0.72 |
| Earth | 1.00 | 1.00 |
| Mars | 1.6 | 1.52 |
| Asteroids | 3.6 | |
| Jupiter | 5.2 | 5.2 |
| Saturn | 10 | 9.5 |
| Uranus | 19.6 | 19 |
| Neptune | 38.8 | 30 |

However, I find if we break-up the solar system into two parts; planets interior to the asteroid belt, and planets exterior to the asteroid belt, quite an interesting pattern forms:

| Planet | Expression | Integer | Predicted | Actual |
| --- | --- | --- | --- | --- |
| Mercury | $\frac{1}{4}n + \frac{1}{4}$ | n=1 | 0.5 AU | 0.4 AU |
| Venus. | $\frac{1}{4}n + \frac{1}{4}$ | n=2 | 0.75 AU | 0.72 AU |
| Earth. | $\frac{1}{4}n + \frac{1}{4}$ | n=3 | 1.00. AU | 1.00 AU |
| Mars. | $\frac{1}{4}n + \frac{1}{2}$ | n=4 | 1.5 AU | 1.52 AU |
| Asteroids | $(2n+1)$ | n=1 | 3.00 AU | 3.00 AU |
| Jupiter | $(2n+1)$ | n=2 | 5 AU | 5.2 AU |
| Saturn | $(2n-1)2$ | n=3 | 10 AU | 9.5 AU |
| Uranus | $(2n-1)2$ | n=5 | 18 AU | 19 AU |
| Neptune | $(2n+1)2$ | n=7 | 30 AU | 30 AU |

| Planet | Expression | n | integer | Orbit |
| --- | --- | --- | --- | --- |
| Asteroids | $(2n+1)$ | n=2i-1 | i=1 | 3.00 AU |
| Saturn | $(2n-1)2$ | n=2i-1 | i=2 | 9.5 AU |
| Uranus | $(2n-1)2$ | n=2i-1 | i=3 | 19 AU |
| Neptune | $(2n+1)2$ | n=2i-1 | i=4 | 30 AU |

Thus we can define a *weird arithmetic* too. We begin by changing the order of operations and say that:

$$2n - 3 = 2(n - 3)$$

So that

2n-3=2(2-3)=2(-1)=-4

We see that since in normal math

(1)x=x

Is the multiplicative identity and

x+0=x

Is the additive identity that in weird math

-1/4=4, -1/2=2,…

Thus,…

2(1-3)=-4=1/4=0.25=mercury=0.4 AU

2(2-3)=-2=1/2=0.5=venus=0.72 AU

2(3-3)=0.0=1=Earth=1.00 AU

(In weird math zero the additive identity is the 1 the multiplicative identity. Which, resolves the enigma of infinity: $1/0 = 2/0, 3/0, \ldots = \infty$ which says $\infty = 2\infty = 3\infty$ because infinity is now 1/0=1/1=1 infinity is 1, a whole encompassing any multiplicative of it.)

2(4-3)=2=Mars=1.52 AU

2(5-3)=4=Asteroids=2-2AU

2(6-3)=6=Jupiter=5.2 AU

2(7-3)=8=Saturn=9.5 AU

2(8-3)=10=Uranus=19 AU

2(9-3)=12=Neptune=30 AU

Then we establish the connection between regular math and weird math by taking

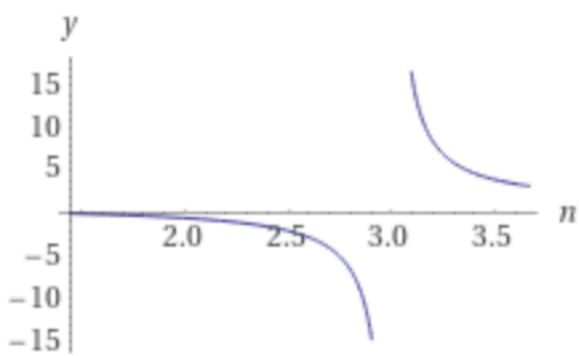
$$\frac{2n-3}{2n-6}$$

Which has plots:

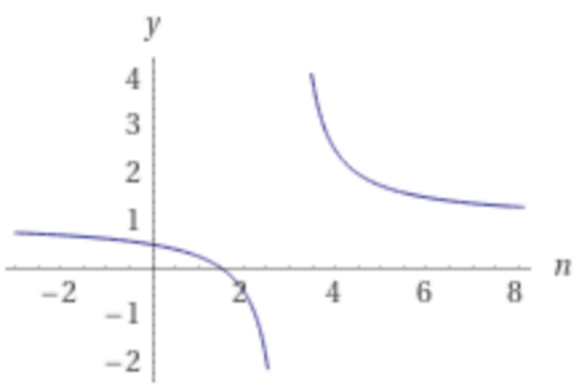
Input:

$$\frac{2n-3}{2n-6}$$

Plots:




(n from 1.4 to 3.7)




(n from −3 to 8.1)

Its Taylor Expansion is:

$$\frac{2n-3}{2n-6} = \frac{1}{2} - \frac{n}{6} - \frac{n^2}{18} - \frac{n^3}{54} - \frac{n^4}{162} + O(n^5)$$

Which approaches the orbits of the first five planets including the asteroid belt if we take each term separately:

$$n = \sqrt{18} = 4.24264$$

$$\frac{1}{2} = 0.5 = mercury = 0.4AU$$

$$\frac{n}{6} = 0.7 = venus = 0.72AU$$

$$\frac{n^2}{18} = 1.00 = earth = 1.00AU$$

$$\frac{n^3}{54} = 1.412 \approx \sqrt{2} = mars = 1.52AU$$

$$\frac{n^4}{162} = 1.999 \approx 2 = asteroids = 2AU - 3AU$$

Then after the asteroids it skips to n to the sixth for Jupiter:

$$\frac{n^6}{1458} = 5.1 = jupiter = 5.2AU$$

$$\frac{n^9}{39366} = 11.31AU = saturn = 9.5AU$$

$$\frac{n^{11}}{354294} = 22.624AU = uranus = 19AU$$

$$\frac{n^{12}}{1062882} = 32AU = neptune = 30AU$$

Thus, the after the asteroid the exponent of n counts 6, 9, 11,12 which is

9-6=3 and 11-9=2 and 12-11=1 producing

3, 2, 1

Thus the equation for the planets is:

$$\left(\frac{1}{2}, \frac{n}{6}, \frac{n^2}{18}, \frac{n^3}{54}, \frac{n^4}{162}\right)$$

Which is

$$P_i = \left(\frac{1}{2}, \frac{n^{i+1}}{2 \cdot 3^x}\right)$$

i=(0, 1, 2, 3, 4…)
x=(1, 2, 3, 4, 5..)

$$P_0 = \frac{n^{0+1}}{2 \cdot 3^1} = \frac{n}{6}$$

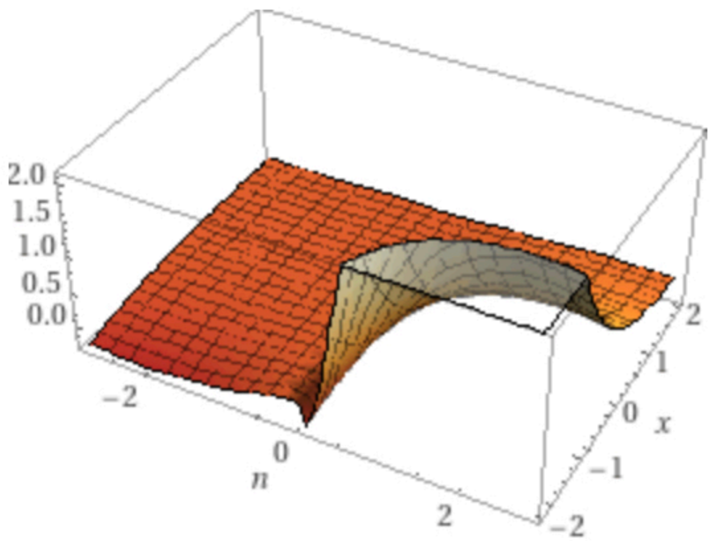
$$P_1 = \frac{n^{1+1}}{2 \cdot 3^2} = \frac{n^2}{18}$$

.
.
.

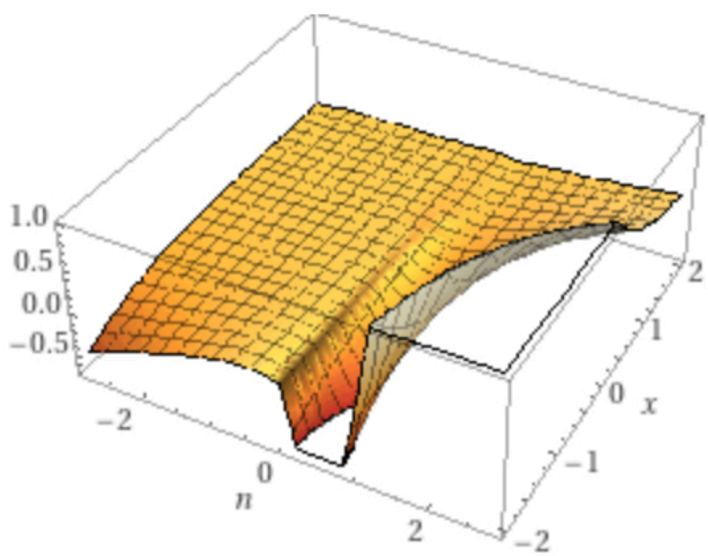
The plots are…

## 3D plots:

### Real part




### Imaginary part



We can produce the exponents for the planets with a short piece of code. The idea that we can model reality with a few short lines of code instead of algebra, comes from Wolfram. If you know C++, here is the code

```
//
//  main.cpp
//  planets
//
//  Created by Ian Beardsley on 12/4/20.
//  Copyright © 2020 Ian Beardsley. All rights reserved.
//

#include <iostream>

int main(int argc, const char * argv[])
{

  int i=0;
  {
      printf("0\n");
   while (i!=4)
   {
       i=i+1;
    printf("%i\n",i);

   }
          int i=4;
          printf("\n");
          printf("\n");

          while (i!=1)
          {
              i=i-1;
              printf("%i\n",i);
          }
      }
    return 0;
}
```

And Running the Code we have:

```
/Users/beardsleyian/Desktop/planets ; exit;
Ians-MBP:~ beardsleyian$ /Users/beardsleyian/Desktop/planets ; exit;
0
1
2
3
4


3
2
1
logout
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.
```

The Author