



# Graphic Haiku on F#

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**Silicon Valley Forth Interest Group**

June 25, 2011

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# Summary

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- Graphic Haiku
- Floating point functions
- Redefined Forth words
- Haiku production
- Demonstrations



# Graphic Haiku

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- Coordinates:  $x(0.0-1.0)$ ,  $y(0.0-1.0)$
- Color:  $red(0.0-1.0)$ ,  $green(0.0-1.0)$ ,  $blue(0.0-1.0)$
- 3 Functions produce a Haiku:  
 $Red(x,y)$ ,  $Green(x,y)$ ,  $Blue(x,y)$
- All numbers are floating point numbers
- Transcendental functions  
 $\sin$ ,  $\cos$ ,  $\tan$ ,  $atan2$ ,  $\log$ ,  $\exp$ ,  $\text{pow}$ ,  $\text{sqrt}$



# Floating Point Functions

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- All Forth functions are redefined using floating point numbers
- All floating point operations are performed by Intel Floating Point Coprocessor
- IF-ELSE-THAN still uses integer flags



# Floating Point Functions

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- Interpreter still gets integer inputs
- Following words convert integers to floating point numbers:  
FLOAT, TENTH, HUNDREDTH,  
THOUSANDTH, 0.0, 1.0
- F.S dumps top 4 elements on floating point stack



# Redefined Forth Words

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- Stack operators

DUP, DROP, SWAP, OVER

- Logic operators

AND, OR, XOR, =, >, <, <>, >=, <=,  
0=



# Haiku Production

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```
variable 'draw
: haiku 0 yy !
  height for aft
    0 xx !
    width for aft
      xx @ yy @
      'draw @execute
      to-color 8 lshift
      to-color or 8 lshift
      to-color or pix!
      1 xx +!
    then next
      1 yy +!
  then next
  update ;
: paint ` `draw ! Haiku ;
```



# Haiku Production

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: red ( f: -- f )

x 33 hundredth > ;

: green ( -- n , color shade 0-1 )

x 50 hundredth - abs 17 hundredth < ;

: blue ( -- n , color shade 0-1 )

x 67 hundredth < ;

: france ( -- r g b) red green blue ;

Paint france





# Demonstrations

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- Brad Nelson's Haikus
- Flags of nations

usa

france

england

taiwan

...



# Tao of Arduino

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For knowledge, add a little everyday.  
For wisdom, delete a little everyday.  
Delete and delete, until nothing is left.  
With nothing, you can do everything.

--Lao Tzi, Tao Te Ching, Chapter 48



**Thank You**

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