

The STEPS Project recap and more

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SAP CDG**

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The STEPS Project



**Make a personal computing environment
with a concise and understandable representation.
~ 20,000 LOC, maybe?**

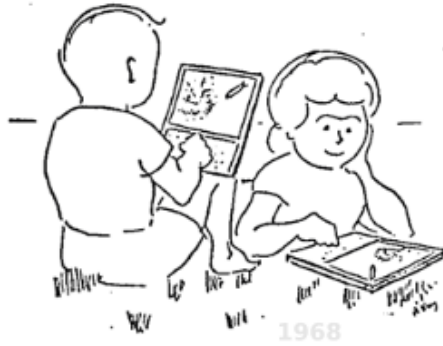
The STEPS Project



**Make a personal computing environment
with a concise and understandable representation.
~ 20,000 LOC, maybe?**

Squeak Smalltalk System: 400,000 LOC
- experiments, dead code, optimization (2x)
- we would just need 10x reduction?

The STEPS Project



**Make a personal computing environment
with a concise and understandable representation.
~ 20,000 LOC, maybe?**

Squeak Smalltalk System: 400,000 LOC
- experiments, dead code, optimization (2x)
- we would just need 10x reduction?

**Design DSLs to describe different
parts of the system clearly.**

The Frankenstein's Monster Model!



The Frankenstein's Monster Model!



The Frankenstein's Monster Model!



Execution Engine



The Frankenstein's Monster Model!

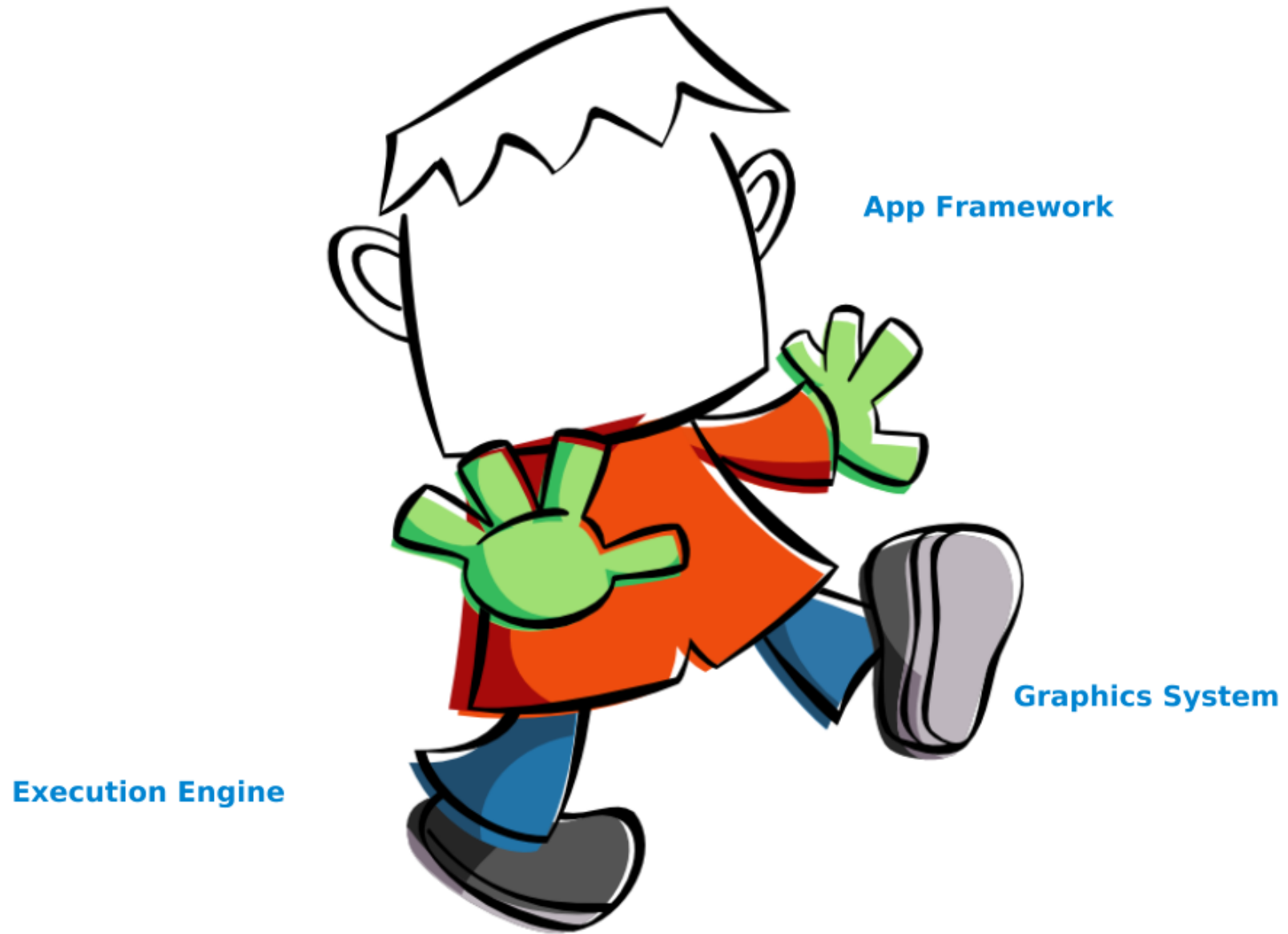
Execution Engine



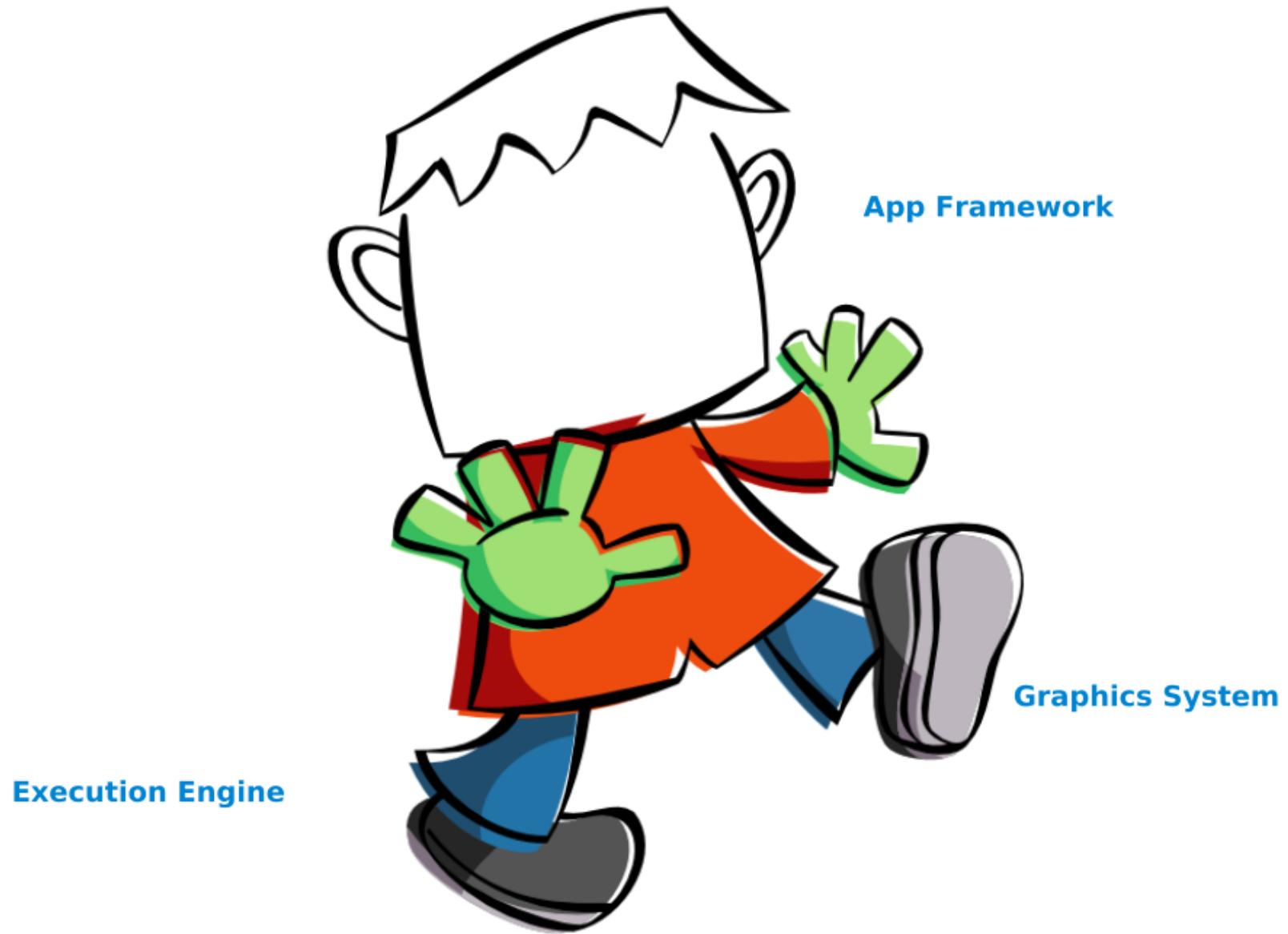
Graphics System



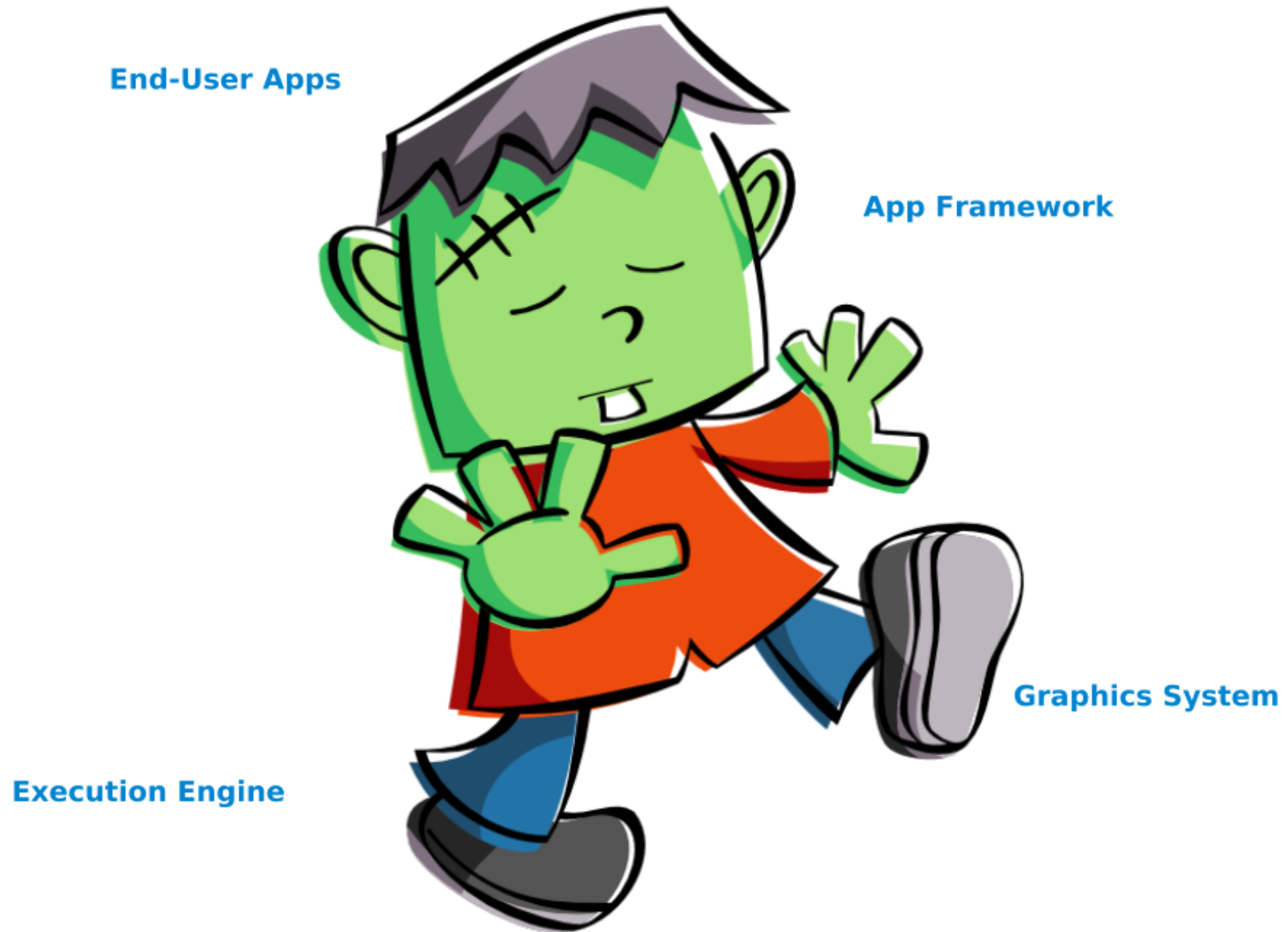
The Frankenstein's Monster Model!



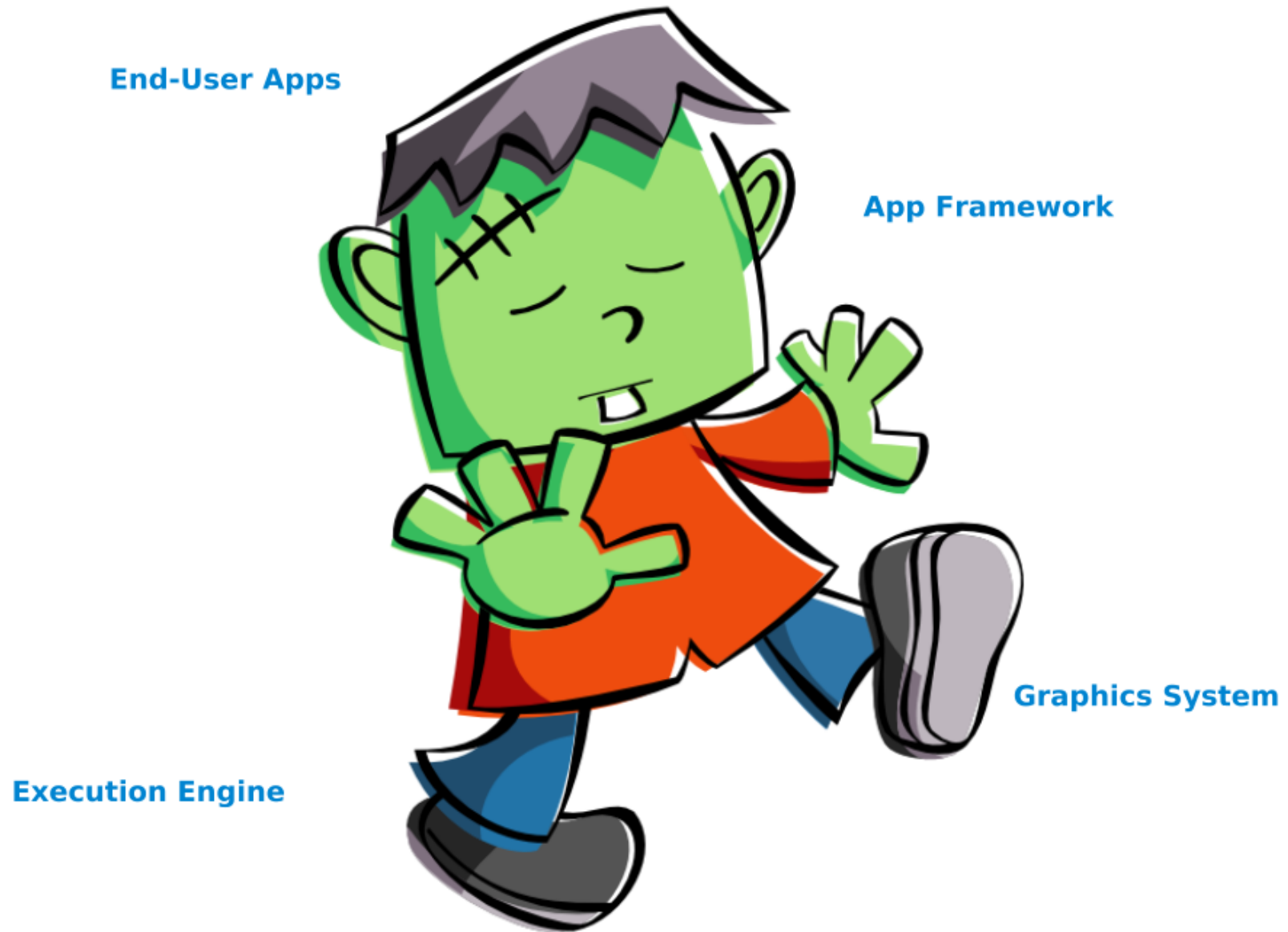
The Frankenstein's Monster Model!



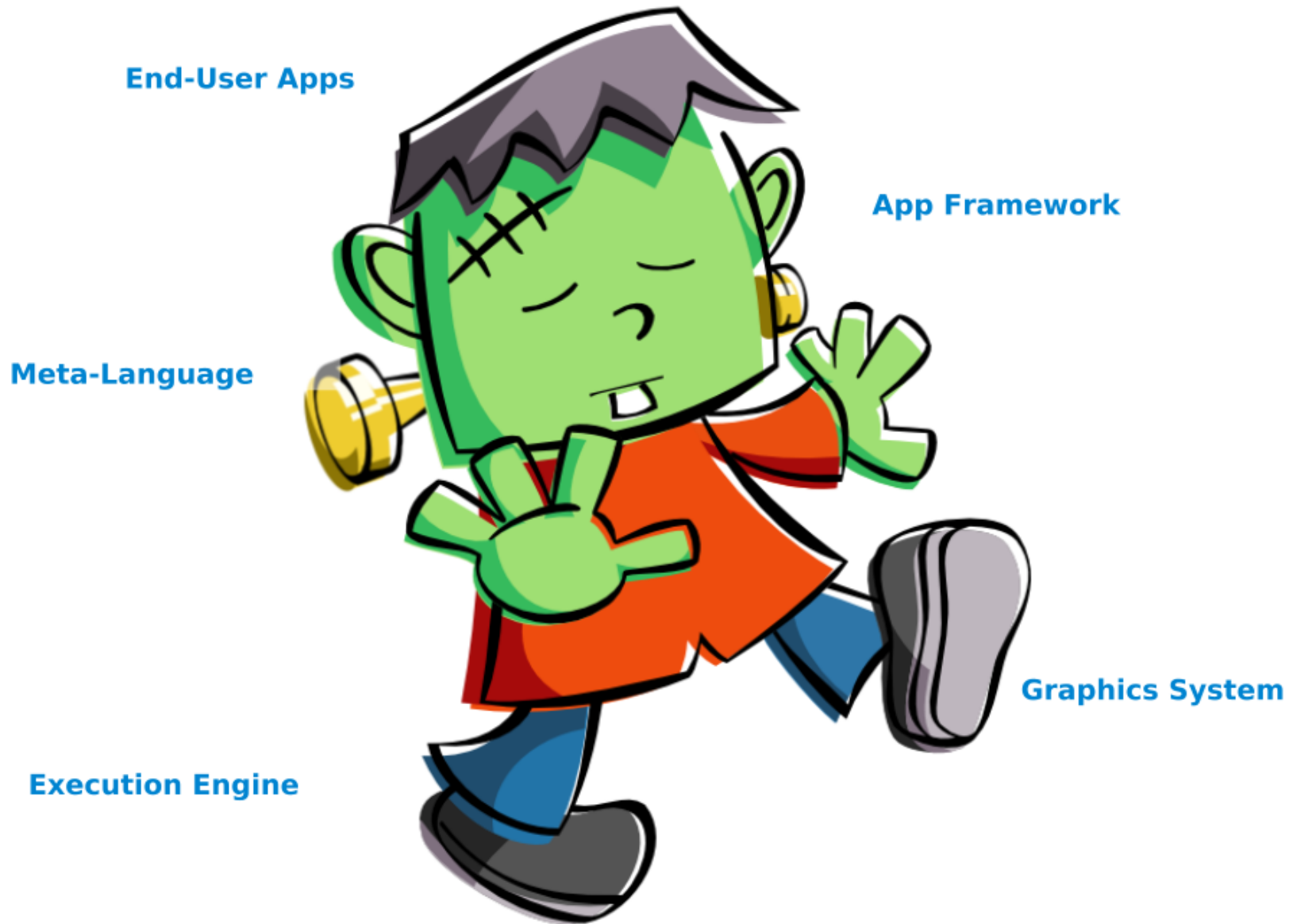
The Frankenstein's Monster Model!



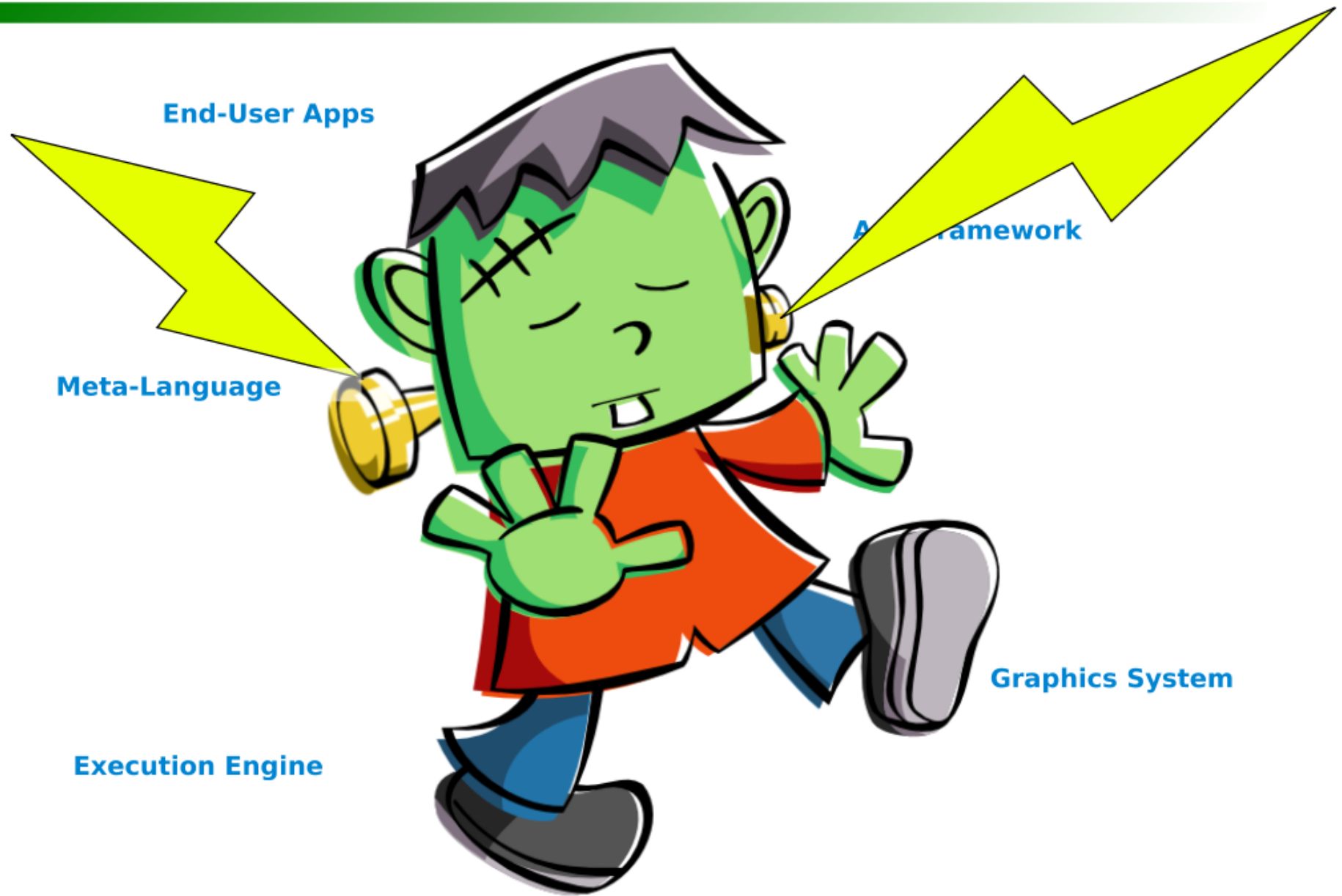
The Frankenstein's Monster Model!



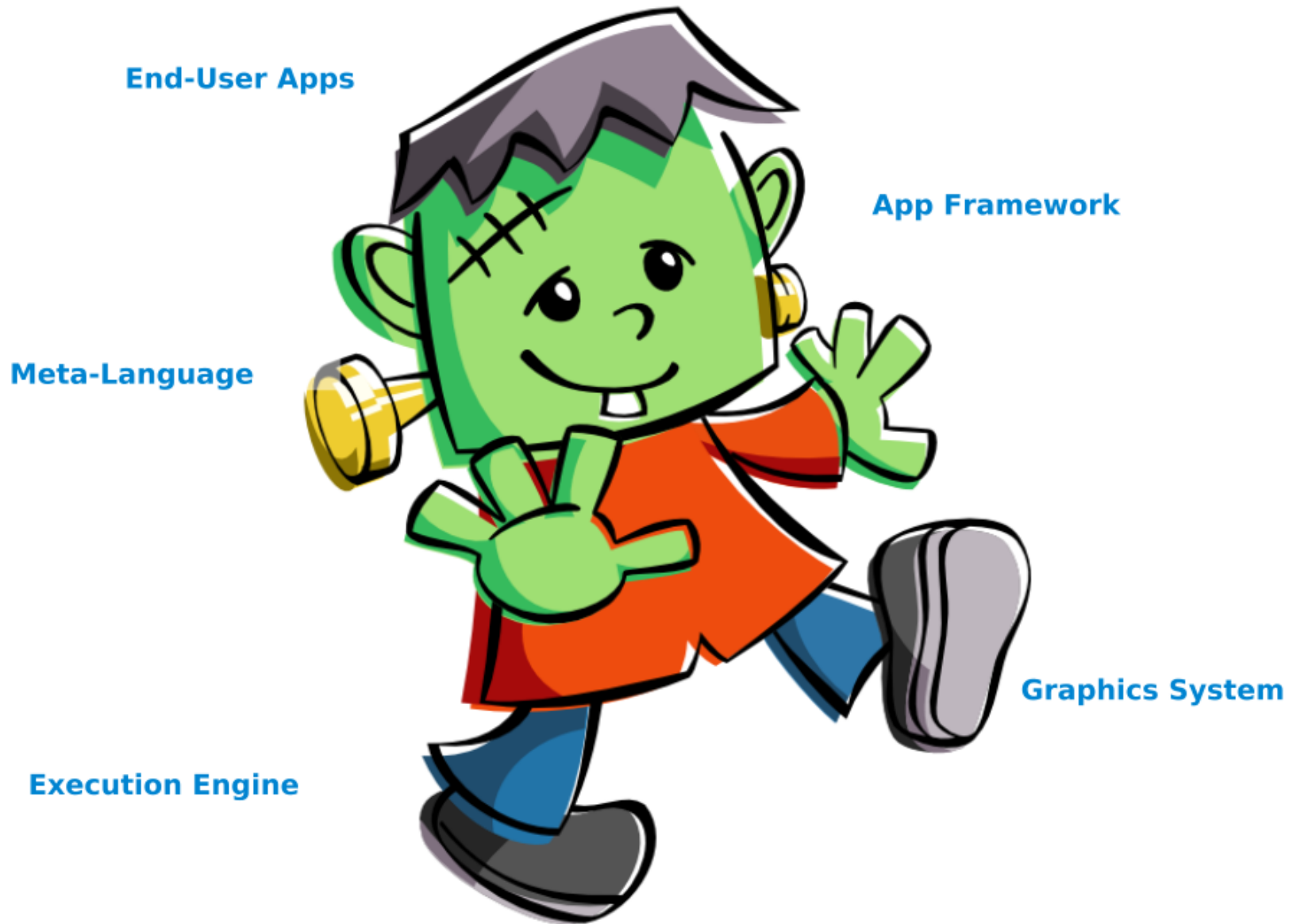
The Frankenstein's Monster Model!



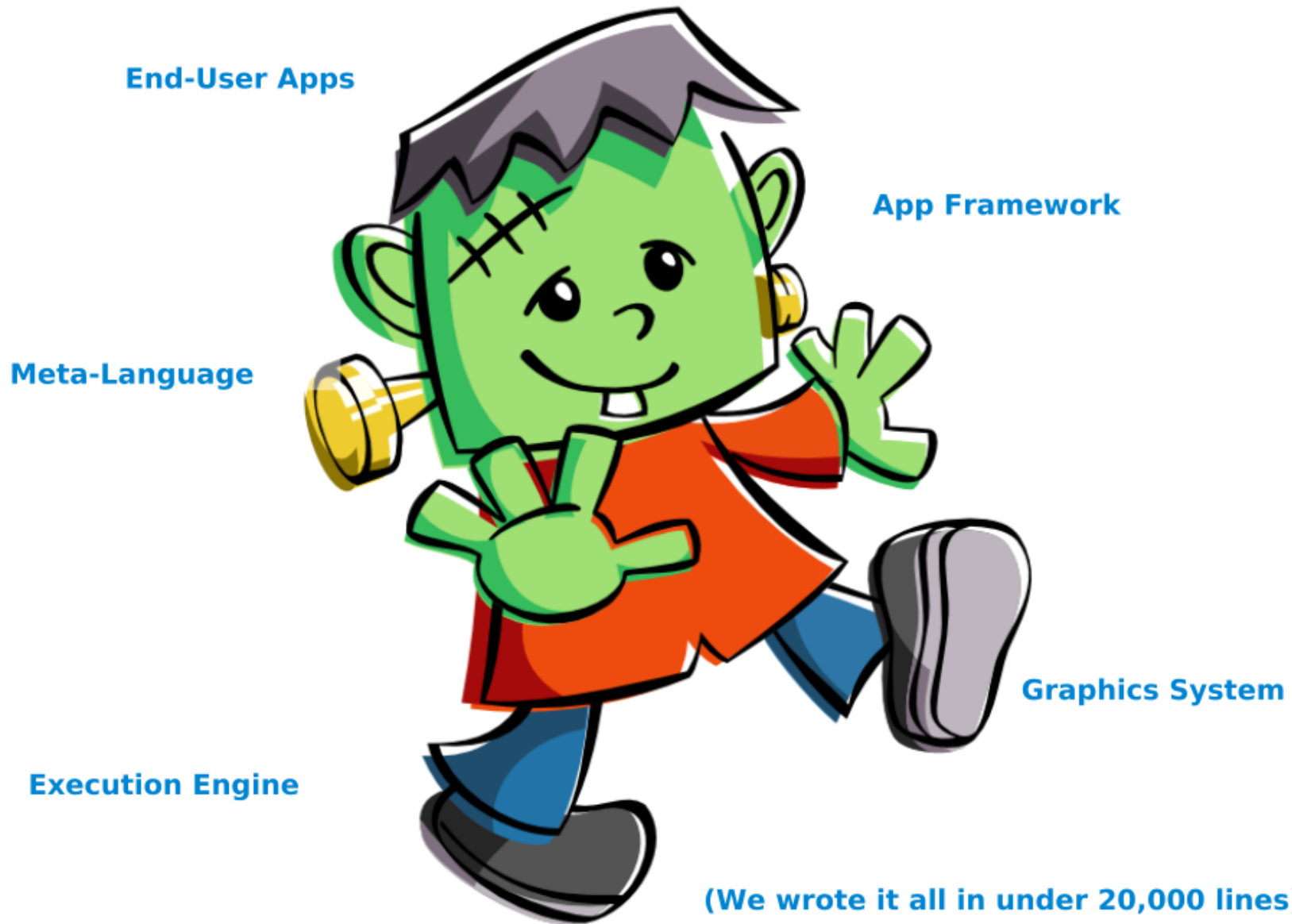
The Frankenstein's Monster Model!



The Frankenstein's Monster Model!



The Frankenstein's Monster Model!



An App Framework



What do we want in a GUI framework?



A uniform graphical object model.

We at least want to do the stuff we can do in Etoys.

Etoys

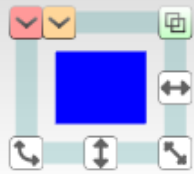
Can we have a clean, time-aware implementation?

Functional Reactive Programming (FRP) seems to be a good way.





-
- pick up
 - delete
 - duplicate
 - accept drops
 - set name...
 - edit gradient
 - edit script
 - edit shape
 - new box
 - be something...



aBox

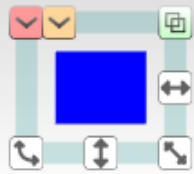
+/- b <- a + 1

b

b = undefined

b <- a + 1|

The image shows a window titled "aBox" with a yellow title bar. The window is divided into three sections. The top section contains a small box with "+/-" and the text "b <- a + 1". The middle section is split into two parts: the left part contains the letter "b", and the right part contains "b = undefined". The bottom section contains the text "b <- a + 1|" with a cursor at the end.



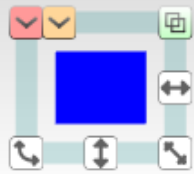
aBox

+/-

```
a <- 10  
b <- a + 1
```

```
a = 10  
b = 11
```

```
b <- a + 1  
a <- 10|
```



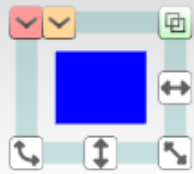
aBox

```

+/- a <- 10
    b <- a + 1
    c <- a * b

a = 10
b = 11
c = 110

b <- a + 1
a <- 10
c <- a * b|
```



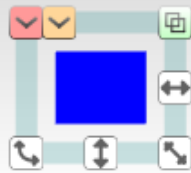
aBox

+/- timerE(1000)

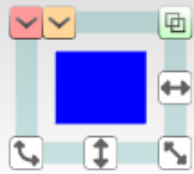
a	
b	
c	

75000

```
b <- a + 1  
a <- 10  
c <- a * b
```

```
aBox
+/- a <- timerE(1000)
a
b
c
a = 81000
b = 81001
c = 6561081000
b <- a + 1
a <- 10
c <- a * b
```



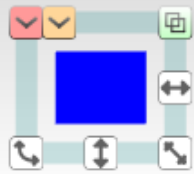
aBox

+/-

```
b <- a + 1  
c <- a * b
```

```
b = 94001  
c = 8836094000
```

delete this.a



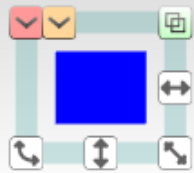
aBox

+/- undefined

b
buttonDown
c

undefined

buttonDown <- undefined



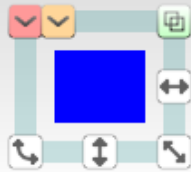
aBox

+/- undefined

b
buttonDown
c

UserEvent {buttons: 4,
defaultHandler: ..., event:
"buttonDown", hand: ..., handler: ...,
isMouseEvent: true, position:
P(227,174), root: ..., time: 118179,
timeStamp: 5123817}

buttonDown <- undefined



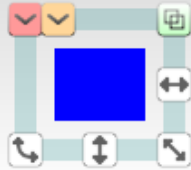
aBox

+/- undefined

b
buttonDown
c
mover

UserEvent {buttons: 4,
defaultHandler: ..., event:
"buttonDown", hand: ..., handler: ...,
isMouseEvent: true, position:
P(227,174), root: ..., time: 118179,
timeStamp: 5123817}

mover <- this.center(buttonDown.position)



aBox

+/- M(1.0, 0.0, 0.0, 0.0, 1.0, 0.0)

c	
clipping	
container	
contents	
desiredExtent	
extent	
glVertices	
layout	
layoutChanged	
mover	
name	M(1.0, 0.0, 202.0, 0.0, 1.0, 154.0)
optimizedField	
optimizedGlyph	
parts	
pivotRatio	
shape	
transformation	
visible	

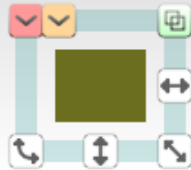


aBox

```
b  
buttonDown  
c  
colorChanger  
mover
```

+/-

```
b <- a + 1  
buttonDown <- undefined  
c <- a * b  
colorChanger <- when buttonDown  
then this.fill(:Color.random())  
mover <-  
this.center(buttonDown.position)  
  
b = 94001  
buttonDown =  
KSUserEvent(#buttons->4,  
#defaultHandler->...,  
#event->buttonDown, #hand->...,  
#handler->..., #isMouseEvent->true,  
#position->218@189, #root->...,  
  
colorChanger <- when buttonDown then  
this.fill(:Color.random())
```



```
aBox
+/- b <- a + 1
buttonDown <- undefined
c <- a * b
mover <-
this.center(buttonDown.position)

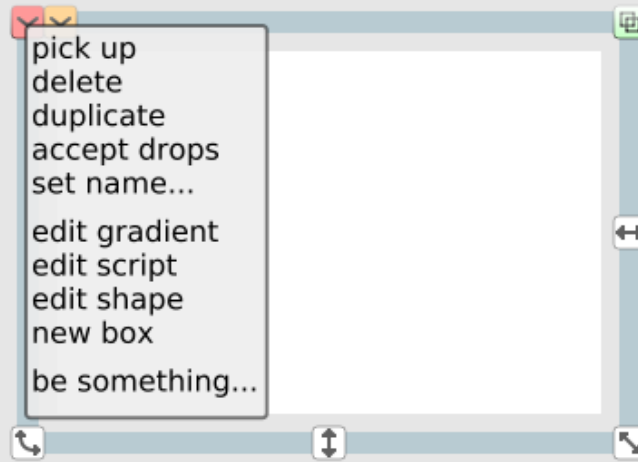
b = 94001
buttonDown =
KSUserEvent(#buttons->4,
#defaultHandler->...,
#event->buttonDown, #hand->...,
#handler->..., #isMouseEvent->true,
#position->218@189, #root->...,

delete this.colorChanger|
```

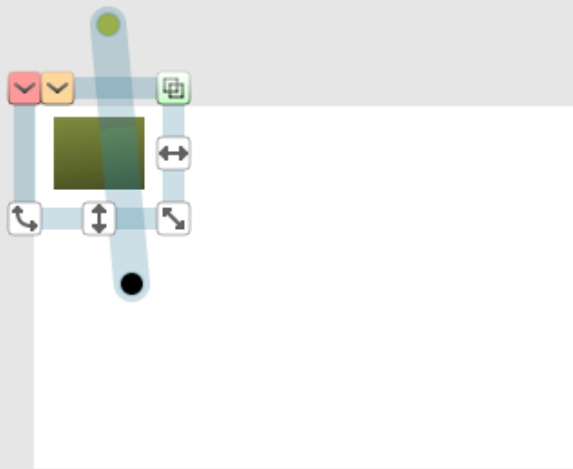



Open the Oven now





Open the Oven now



Open the Oven now

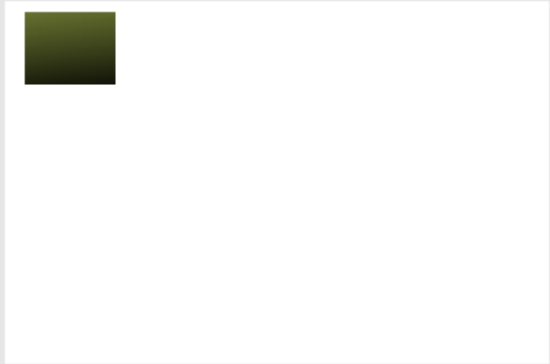




be a button
be a slider
be a list
be a line of text
be a text field
be movable

Open the Oven now






Navigation controls:

- new page
- delete page
- back
- copy page
- paste page
- pages


A floating toolbar with a light blue border and rounded corners. At the top left are two small downward-pointing arrow icons. The main area contains several icons: two left-pointing arrows followed by the text 'back', two right-pointing arrows, 'new page', 'copy page', 'delete page', and 'paste page'. Below these is a yellow bar with the text 'pages'. On the right side, there are three vertical icons: a green square with a white document icon, a double-headed horizontal arrow, and a double-headed vertical arrow. At the bottom left and right corners are two circular icons with arrows pointing outwards.

A window titled 'KSBox(, 127@152)' with a yellow title bar. In the top right corner of the window is a zoom control icon labeled '+/-'. The main content area is a large, empty white rectangle with a thin brown border. A vertical yellow bar is visible on the right side of the window, likely representing a scrollbar. The window is set against a light gray background.

Open the Oven now



Document
In & Out
Content
Script

AGERE2013 

back

new page copy page

delete page paste page

pages

back

choose thread

new edit

threads

blank background

page like...

new document

blank page

Palatino Linotype 10

A A A

default font

portrait/landscape fullscreen

margin narrower screen DPI

margin wider page size

extra window

frame

- Inbox
- Sent
- Trash
- Draft
- Spam
- local
- remote
- ODF
- cache


- Onward2013.odp
- AGERE2013.odp
- SPLASH2013.odp
- expo.odp
- shapetest.odp
- kscript-first.odp
- Heidelberg Draft - Test 4 Alt.oc
- Heidelberg Draft - Test -yoshik
- Heidelberg Draft - Test 2.odp
- Systems we live in.odp
- newtest.odp
- Heidelberg - NEW - Demo Test.
- etoys-sample.odp
- KS SAP Walldorf Talk.odp
- SAP Walldorf Talk.odp
- box2.odp
- box.odp
- Sketchpad Page.odp
- Mitou.odp
- turing-test2.odp
- Turing Gig Test 12.odp
- turing-test.odp
- turing-one.odp
- Turing Gig Test 2.odp
- COFES Keynote copy.odp
- C5-2012.odp

Frank Document Editor


(Exit fullscreen mode.)

start

40%



Document
In & Out
Content
Script

ESUG2014 

back

new page copy page

delete page paste page

pages

back

choose thread▼

new edit

threads

blank background

page like...

new document

blank page

Palatino Linotype ▼ 10 ▼

A A A

default font

portrait/landscape fullscreen

margin narrower screen DPI

margin wider page size

extra window

frame

- Inbox
- Sent
- Trash
- Draft
- Spam
- local
- remote
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- cache

- ESUG2014.odp
- lverson-orig.odp
- CS239sp14.odp
- New Sketchpad Transition Slide
- Onward2013.odp
- AGERE2013.odp
- SPLASH2013.odp
- expo.odp
- shapetest.odp
- kscript-first.odp
- Heidelberg Draft - Test 4 Alt.oc
- Heidelberg Draft - Test -yoshik
- Heidelberg Draft - Test 2.odp
- Systems we live in.odp
- newtest.odp
- Heidelberg - NEW - Demo Test.
- etoys-sample.odp
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- box2.odp
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- Sketchpad Page.odp
- Mitou.odp
- turing-test2.odp
- Turing Gig Test 12.odp
- turing-test.odp
- turing-one.odp
- Turing Gig Test 2.odp
- COFES Keynote copy.odp
- CS-2012.odp

- Inbox
- Sent
- Trash
- Draft
- Spam
- local
- remote
- ODF
- cache

back

new page copy page

delete page paste page

pages

back

choose thread▼

new edit


threads

blank background

page like...




new document




blank page

empty.ks 

- Inbox
- Sent
- Trash
- Draft
- Spam
- local
- remote
- ODF
- cache

Let's make the document better

 40%
 15%


Document In & Out Content Script ESUG2014

pages

threads

blank background
 page like...
 new document
 blank page

Palatino Linotype 10

 default font

portrait/landscape
 margin narrower
 margin wider
 fullscreen
 screen DPI
 page size
 extra window
 frame

- Inbox
 - Sent
 - Trash
 - Draft
 - Spam
 - local
 - remote
 - ODF
 - cache
- ESUG2014.odp
 - lverson-orig.odp
 - CS239sp14.odp
 - New Sketchpad Transition Slide
 - Onward2013.odp
 - AGERE2013.odp
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 - Heidelberg Draft - Test 4 Alt.oc
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 - Systems we live in.odp
 - newtest.odp
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 - box2.odp
 - box.odp
 - Sketchpad Page.odp
 - Mitou.odp
 - turing-test2.odp
 - Turing Gig Test 12.odp
 - turing-test.odp
 - turing-one.odp
 - Turing Gig Test 2.odp
 - COFES Keynote copy.odp
 - C5-2012.odp

Document In & Out Content Script empty.ks

pages

threads

blank background
 page like...
 new document
 blank page

Let's make the Document Editor!

Bert Freudenberg Ted Kaizer Aran Lunzer

52%

40%

Let's make the Document Editor!



Bert Freudenberg




Ted Kaehler



Aran Lunzer

Document In & Out Content Script empty.ks


back copy page delete page paste page **pages**

back choose thread new edit **threads**

blank background
 page like...
 new document
blank page

PalatinoLinotype
 10
default font

portrait/landscape
 margin narrower
 margin wider
frame


fullscreen
 screen DPI
 page size
 extra window

find abc
 in: everyth
 load


- Inbox
- Sent
- Trash
- Draft
- Spam
- local
- remote
- ODF
- cache

sawtooth-demo.ks
 empty.ks
 deviation-demo.ks
 sawtooth-demo-old.ks
 sawtooth10-2.ks
 deviation6-button.ks
 deviation5-button.ks
 deviation5.ks
 deviation4.ks
 deviation3.ks
 sawtooth9-2.ks
 sawtooth8-2.ks
 sawtooth7-2.ks
 deviation2.ks
 Front page2.ks
 deviation.ks
 sawtooth.ks
 KSWorld.ks
 dormant.ks
 Stack3.ks
 stack2.ks
 plfield.ks
 fileList.ks
 filelist-settingNames.ks
 filelist-settingFills.ks
 filelist-besomething.ks
 filelist-rough.ks
 testIndex.ks
 extentPrinter.ks
 lettersBubble.ks
 shapeEditor.ks
 playfield2.ks
 sendBubble.ks
 paragraphBubble.ks
 pagesBubble.ks
 insertBubble.ks
 findBubble.ks
 wanderBubble.ks
 visibleBubble.ks
 turnBubble.ks
 threadsBubble.ks
 shadowBubble.ks
 scriptsBubble.ks
 replyBubble.ks
 overlapBubble.ks
 newBubble.ks
 neziraBubble.ks


Let's make the Document Editor!



Bert Freudenberg




Ted Kaehler



Aran Lunzer

90%

Document In & Out Content Script sawtooth-tmp.ks


back copy page delete page paste page **pages**

choose thread new edit **threads**

blank background
 page like...
 new document
blank page

PalatinoLinotype
 10
default font

portrait/landscape
 margin narrower
 margin wider
frame

fullscreen
 screen DPI
 page size
 extra window

find abc
 in: everyth
 load

Inbox
 Sent
 Trash
 Draft
 Spam
 local
 remote
 ODF
 cache

sawtooth-demo.ks
 empty.ks
 deviation-demo.ks
 sawtooth-demo-old.ks
 sawtooth10-2.ks
 deviation6-button.ks
 deviation5-button.ks
 deviation5.ks
 deviation4.ks
 deviation3.ks
 sawtooth9-2.ks
 sawtooth8-2.ks
 sawtooth7-2.ks
 deviation2.ks
 Front page2.ks
 deviation.ks
 sawtooth.ks
 KSWorld.ks
 dormant.ks
 Stack3.ks
 stack2.ks
 plfield.ks
 fileList.ks
 filelist-settingNames.ks
 filelist-settingFills.ks
 filelist-besomething.ks
 filelist-rough.ks
 testIndex.ks
 extentPrinter.ks
 lettersBubble.ks
 shapeEditor.ks
 playfield2.ks
 sendBubble.ks
 paragraphBubble.ks
 pagesBubble.ks
 insertBubble.ks
 findBubble.ks
 wanderBubble.ks
 visibleBubble.ks
 turnBubble.ks
 threadsBubble.ks
 shadowBubble.ks
 scriptsBubble.ks
 replyBubble.ks
 overlapBubble.ks
 newBubble.ks
 neziraBubble.ks

What does the Fourier Series for the Sawtooth Wave look like?
 - Suzie, 14 yrs

Table
 Arms
 Graph
 Clear
 Hide

next

90%

***What does the Fourier Series for the Sawtooth Wave
look like?***
- Suzie, 14 yrs

Table

Arms

Graph

Clear

Hide

next

Sawtooth					
		heading	length	speed	timer
1		0.00	100.00	0.03	0.00
2		0.00	50.00	-0.09	
3		0.00	33.33	0.15	
4		0.00	25.00	-0.21	
5		0.00	20.00	0.27	
		<-			

**Sawtooth Wave
ie, 14 yrs**

Table

Arms

Graph

Clear

Hide

next

Sawtooth

	heading	length	speed	timer
1	0.00	100.00	0.03	0.00
2	0.00	50.00	-0.09	
3	0.00	33.33	0.15	
4	0.00	25.00	-0.21	
5	0.00	20.00	0.27	

heading2 <- 0.0 fby heading2' + speed2 on timer1

Sawtooth Wave
ie, 14 yrs

Table

Arms

Graph

Clear

Hide

next

Sawtooth

	heading	length	speed	timer
1	0.00	100.00	0.03	0.00
2	0.00	50.00	-0.09	
3	0.00	33.33	0.15	
4	0.00	25.00	-0.21	
5	0.00	20.00	0.27	

heading2 <- 0.0 fby heading2' + speed2 on timer1

Sawtooth Wave
ie, 14 yrs

Table

Arms

Graph

Clear

Hide



next

Sawtooth				
	heading	length	speed	timer
1	0.00	100.00	0.03	0.00
2	0.00	50.00	-0.09	
3	0.00	33.33	0.15	
4	0.00	25.00	-0.21	
5	0.00	20.00	0.27	

timer1 <- timerE(20)

Sawtooth Wave
ie, 14 yrs

Table

Arms

Graph

Clear

Hide



next

Sawtooth					
	heading	length	speed	timer	
1	8.04	100.00	0.03	6225800.00	
2	-24.12	50.00	-0.09		
3	40.20	33.33	0.15		
4	-56.28	25.00	-0.21		
5	72.36	20.00	0.27		

timer1 <- timerE(20)

Sawtooth Wave
ie, 14 yrs

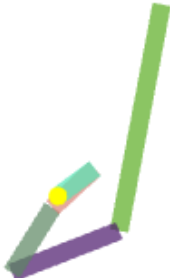
Table

Arms

Graph

Clear

Hide



next

My Another Project...



My Another Project...

Bunch of Tapes!



My Another Project...

Bunch of Tapes!

VHS tapes



My Another Project...

Bunch of Tapes!

VHS tapes

Beta tapes



My Another Project...

Bunch of Tapes!

VHS tapes

Beta tapes

U-Matic tapes



My Another Project...

Bunch of Tapes!

VHS tapes

Beta tapes

U-Matic tapes



[youtube.com/user/yoshikiohshima](https://www.youtube.com/user/yoshikiohshima)