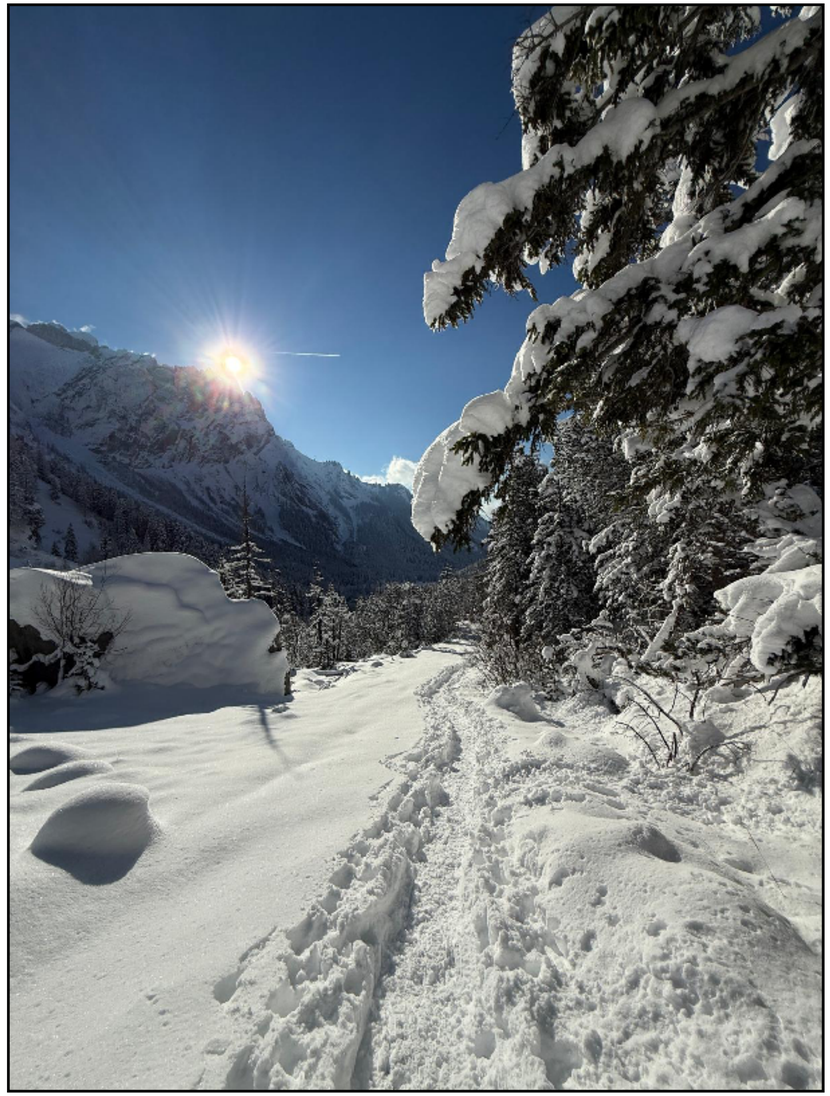
Nicolas Seriot
29th November 2025
GambiConf, Sao Paulo

Games in PostScript

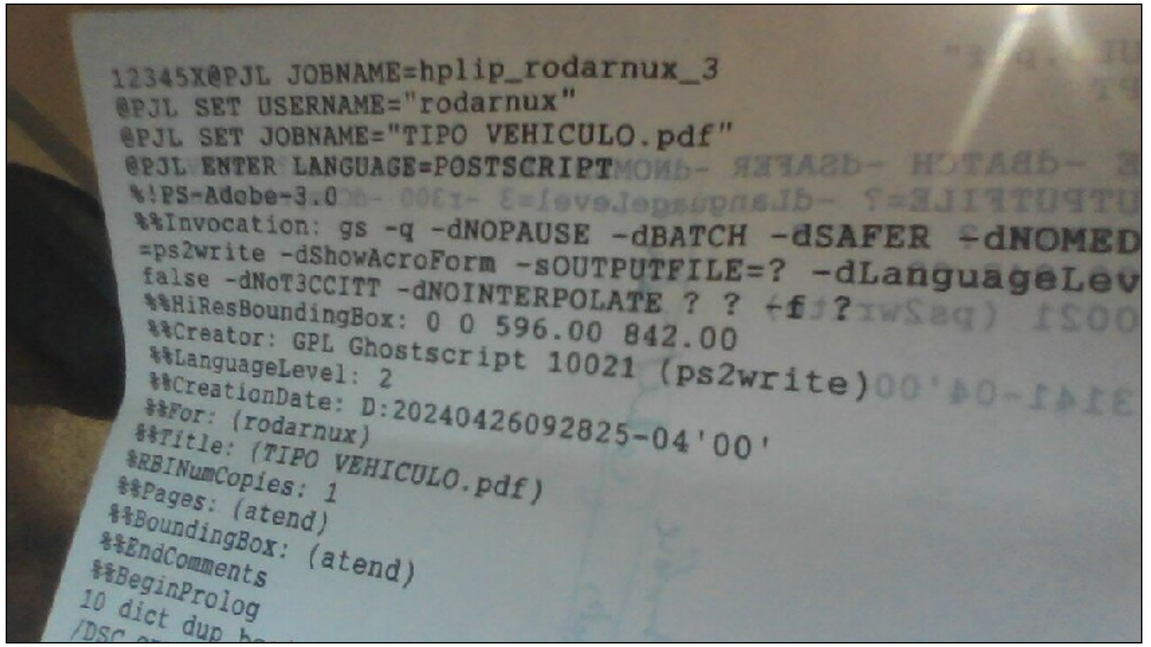
Play chess against your printer

About Last Week-end…



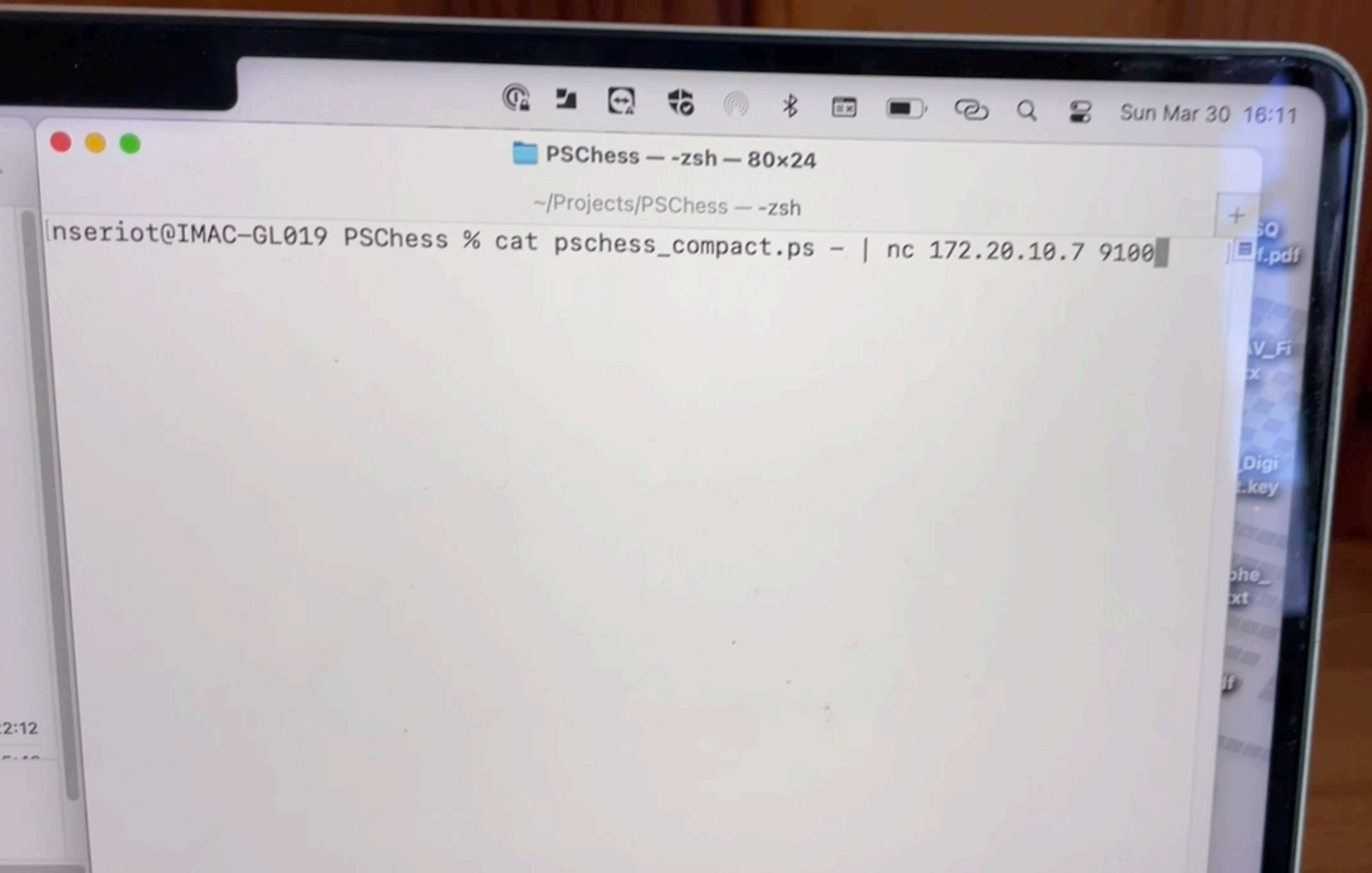
JaMaDu: Mambi Swiss Distant Cousin

Back to Printers



Printers are hated, boring appliances.

I got obsessed with their language and here's what happend…


Sun Mar 30 16:11
PSChess — -zsh — 80×24
~/Projects/PSChess — -zsh
nseriot@IMAC-GL019 PSChess % cat pschess_compact.ps - | nc 172.20.10.7 9100

1. Programming in PostScript
2. Games on Printer
3. Games on Desktop
4. Golfing

PostScript

Adobe Illustrator

Adobe PostScript

early 80s

device and resolution independant

interpreted on printer

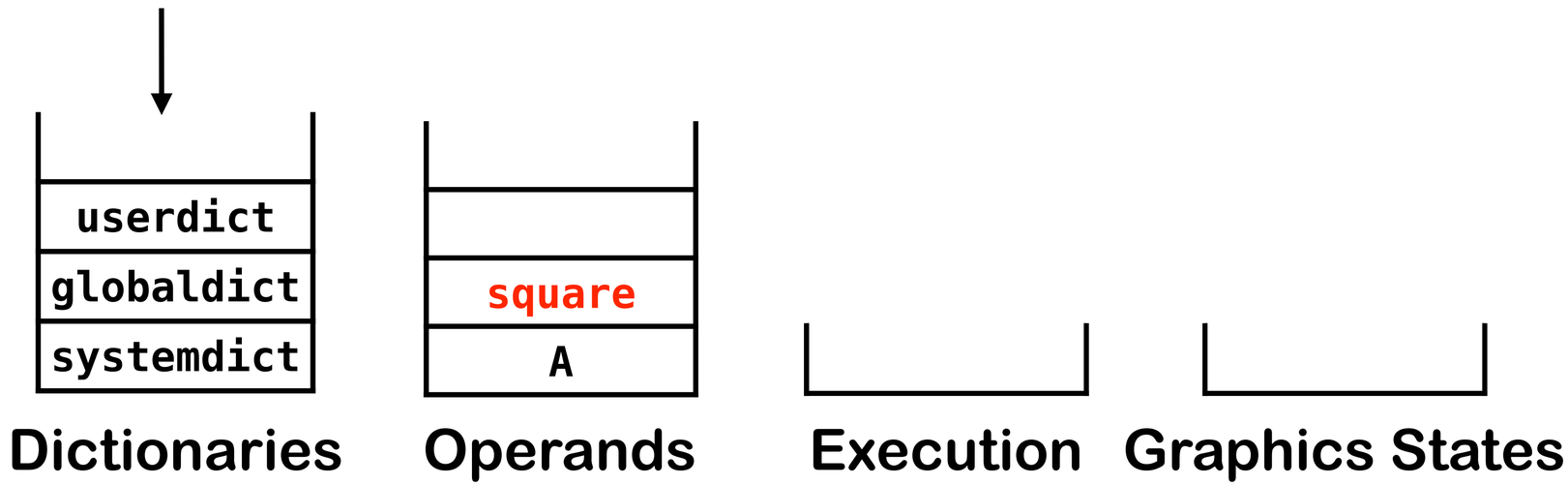
PostScript Interpreter

four stacks

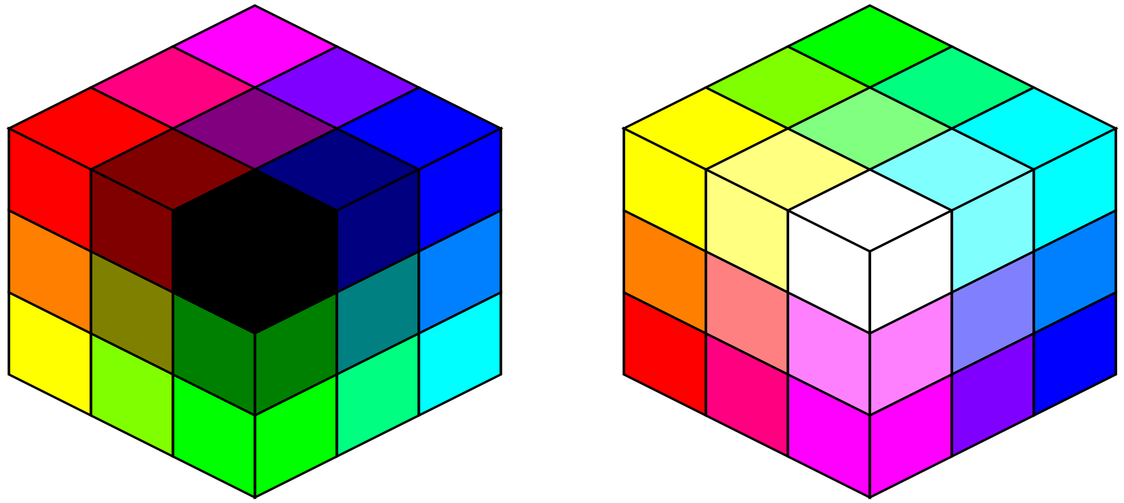
powerful set of ~400 operators

no librairies

```
/A 3 def
/square { dup mul } def
```



Sample Code



```
/S 32 def
/N 2 def % steps 0-1-2

/_r_g_b_m_DrawSide {
    gsave
    concat
    /B exch def
    /G exch def
    /R exch def
    0 1 N { /x exch def
        gsave
        0 1 N { /y exch def
            R G B setrgbcolor
            0 0 S S rectfill
            0 setgray
            0 0 S S rectstroke
            0 S translate
        } for
        grestore
        S 0 translate
    } for
    grestore
} def

/_a_b_c_DrawCube {
    /c exch def
    /b exch def
    /a exch def

    gsave
    c 1 eq { [-1 0 0 1 0 0] concat } if % flip left-right
    { b } { c } { a } [  1  0.5 -1   0.5 0 0 ] _r_g_b_m_DrawSide % top
    { c } { b } { a } [  1  0.5  0  -1   0 0 ] _r_g_b_m_DrawSide % right
    { a } { b } { c } [ -1  0.5  0  -1   0 0 ] _r_g_b_m_DrawSide % left
    grestore
} def

gsave
{ x N div       } { y N div       } 0 _a_b_c_DrawCube
240 0 translate
{ N x sub N div } { N y sub N div } 1 _a_b_c_DrawCube
grestore
```

Graphics oriented language

First-class functions, passed as arguments

Write and Run

https://www.ghostscript.com/

Interactively…

```
gs -q
GS>1 2 add
GS<1>pstack
3
```

b.ps

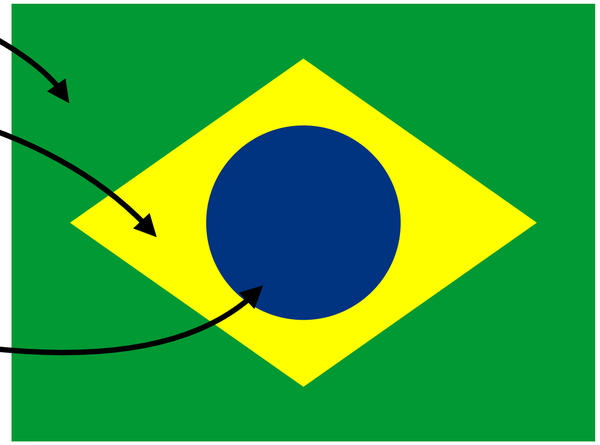
1:0 <No selected symbol> Written by me 357 characters

```
/W 400 def
/H 300 def

<< /PageSize [W H] >> setpagedevice

0 0.6 0.2 setrgbcolor
0 0 W H rectfill

1 1   0 setrgbcolor
newpath
W 10 div         H 2 div         moveto
W  2 div         H 8 div 7 mul   lineto
W 10 div 9 mul   H 2 div         lineto
W  2 div         H 8 div         lineto
closepath
fill

0 0.2 0.5 setrgbcolor
W 2 div H 2 div W 6 div 0 360 arc
fill
```

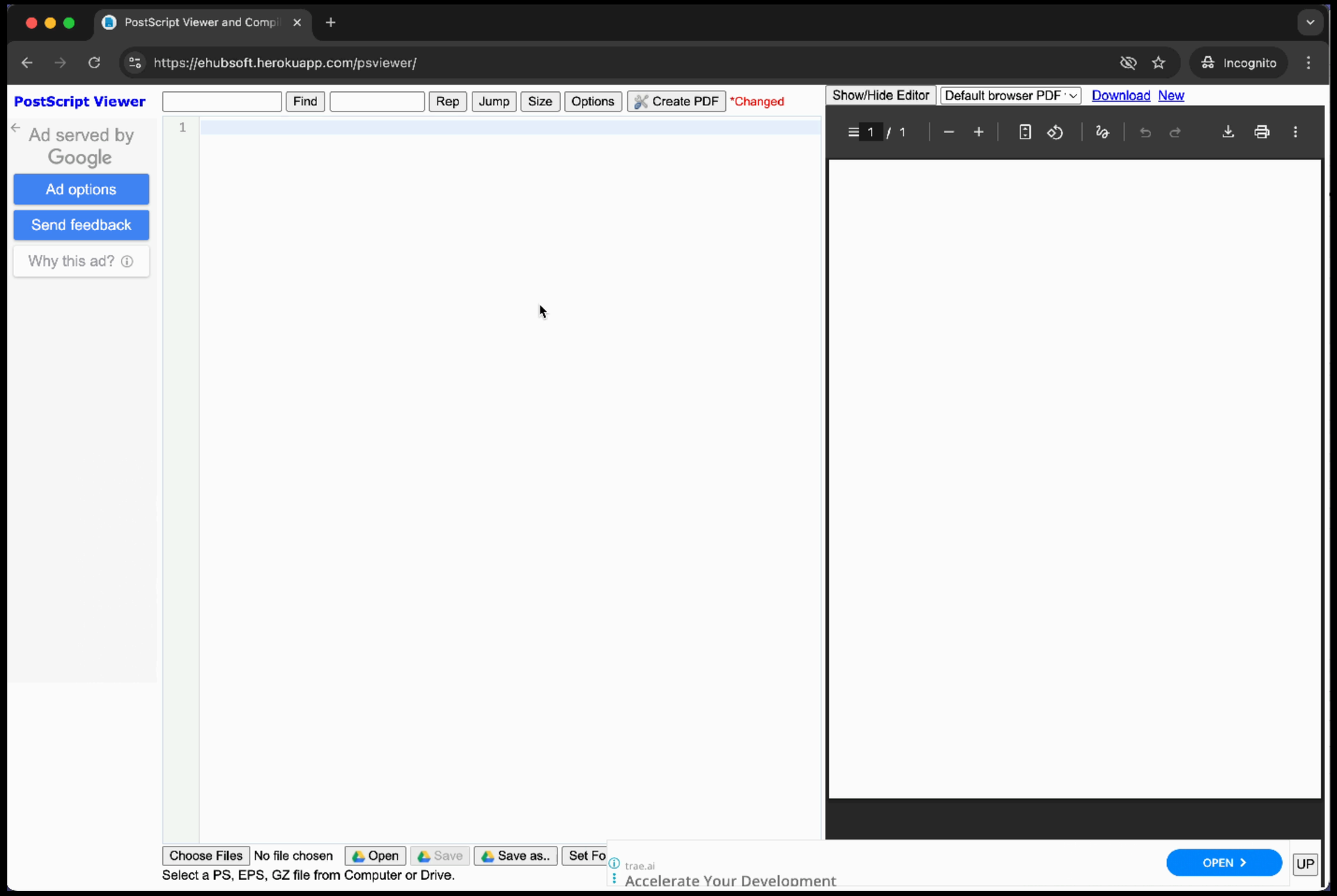
PostScript Spaces (4) LF Unicode (UTF-8) 41w

… or from a file

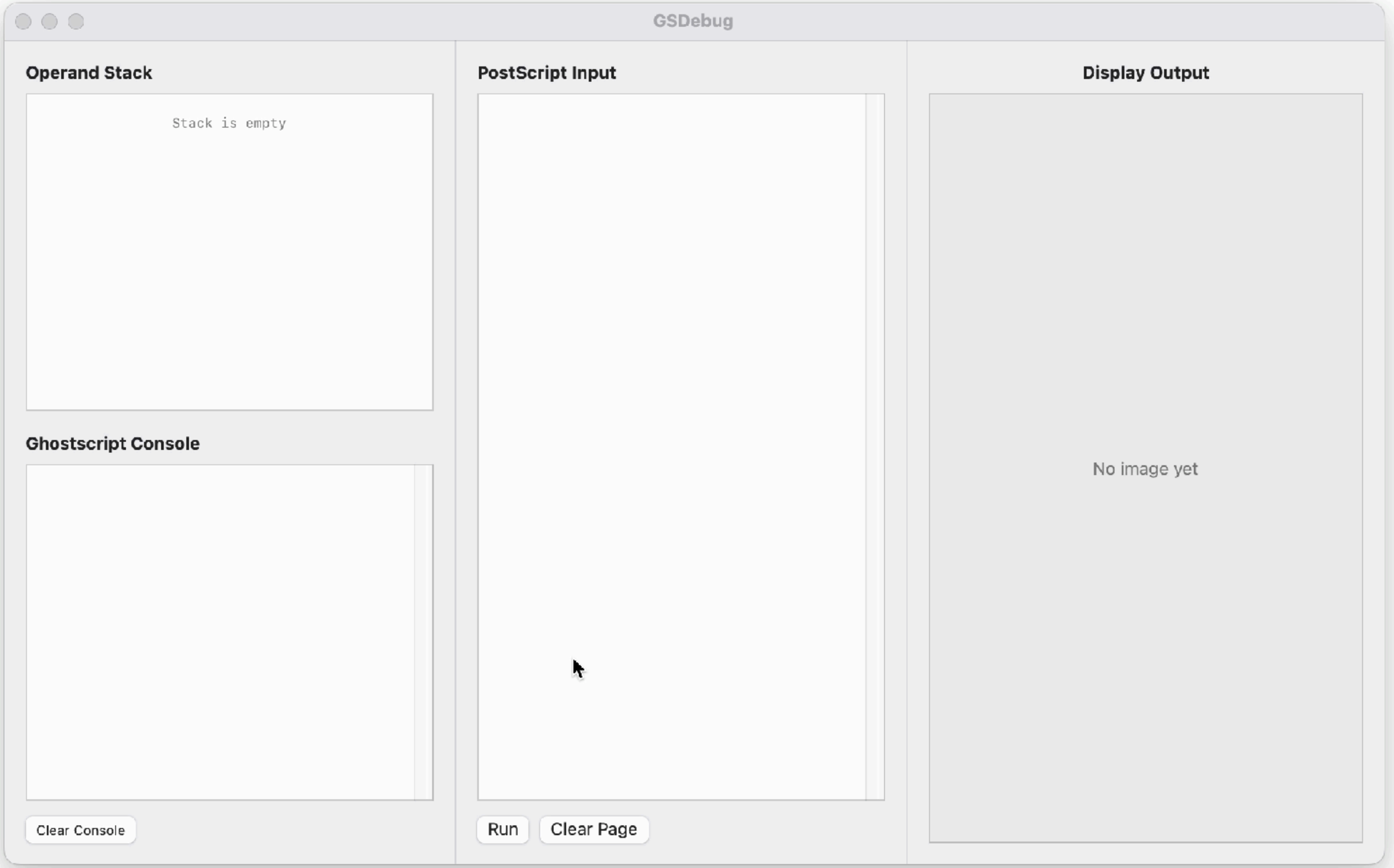
```
gs (b.ps)
ps2pdf b.ps
```



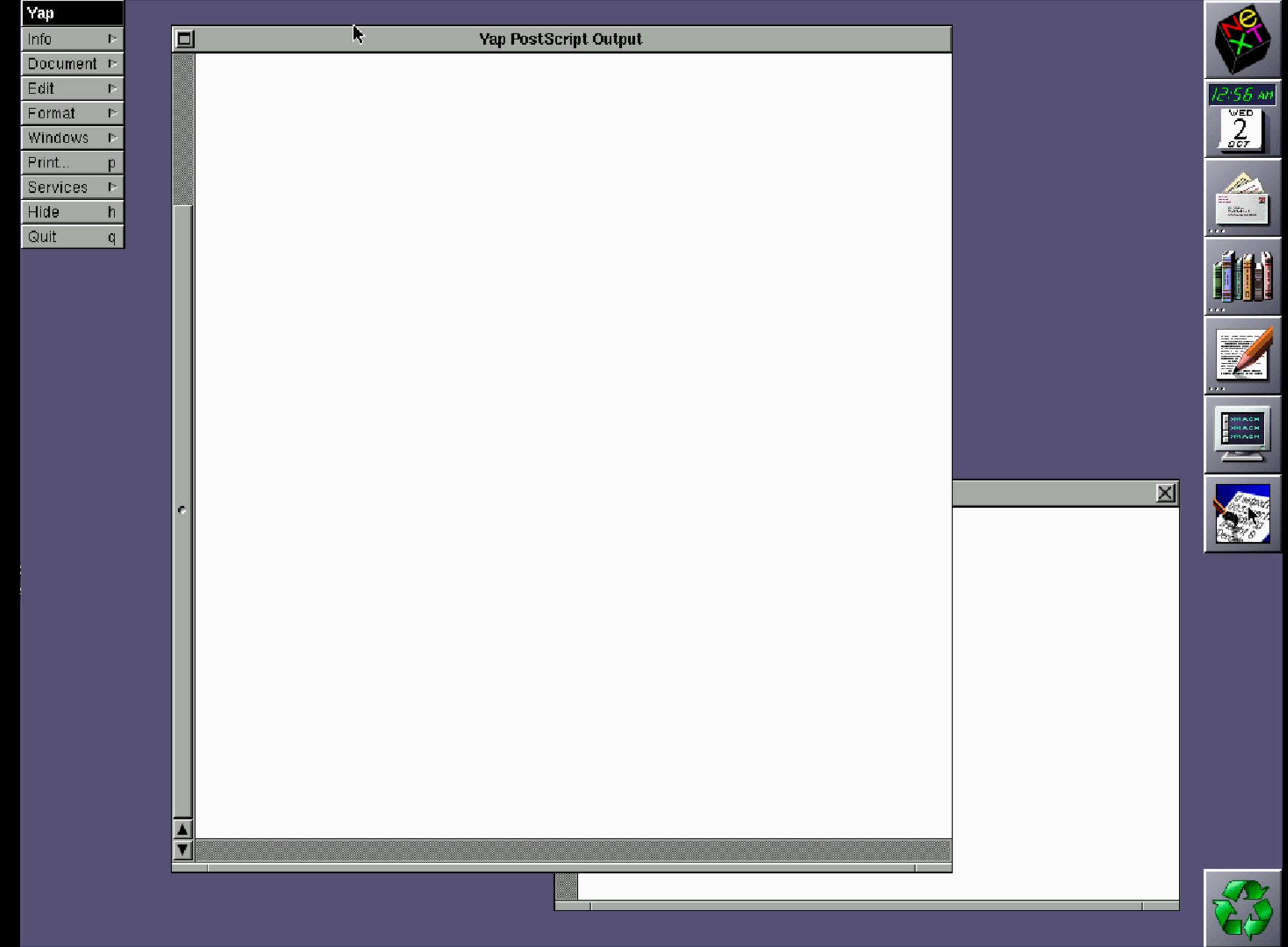
SubEthaEdit PostScript mode



using ps-wasm:
Ghostscript compiled
in web assembly



prototype in Swift, linking with libgs.dylib



NeXTStep 3.3
(1995)

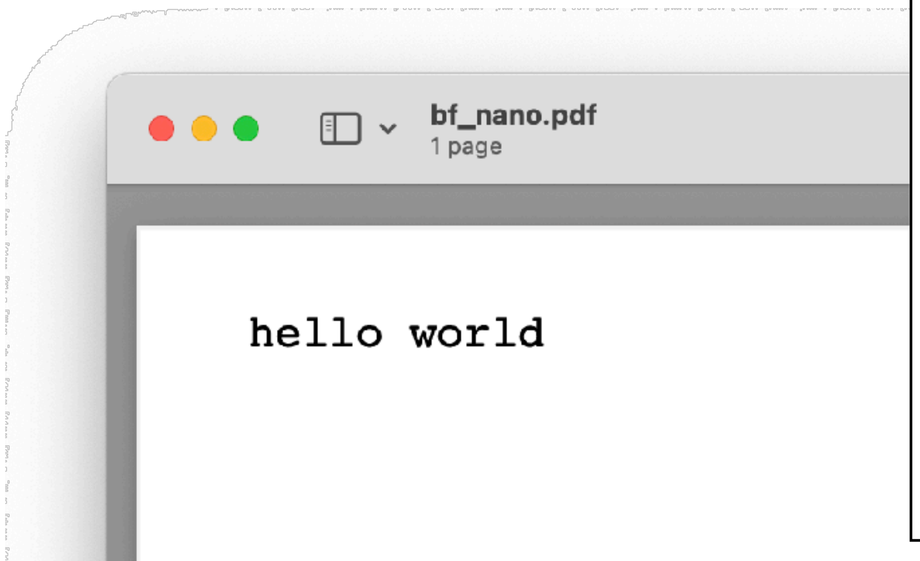
Brainfuck Interpreter

https://github.com/nst/bfps/

Brainfuck is Turing-complete.

I wrote a Brainfuck interpreter.

This proves PostScript is Turing-complete, unlike PDF.



hello world

```
/Courier findfont 12 scalefont setfont 32 740 moveto
/P (+[-[<<[+[--->]-[<<<]]]>>>-]>-.-- -.>..>.<<<<-.<+.>>>>>.>.<<.<-.) def
/p 0 def                                                    % program pointer
/C { P p 1 getinterval } def                                % read program char
/M 30000 string def                                         % memory array
/m 0 def                                                    % memory pointer
/V { M m get } def                                          % read mem value

{   p P length ge { exit } if                               % exit if out of prog

    C (+) eq { M m V 1 add 255 and put } if                 % increment mem value
    C (-) eq { M m V 1 sub 255 and put } if                 % decrement mem value
    C (>) eq { /m m 1 add def } if                          % move p to right
    C (<) eq { /m m 1 sub def } if                          % move p to left

    C ([) eq {
        p                                                   % push p on stack
        V 0 eq {                                            % if V == 0
            mark
            {   C ([) eq { 0 } if                           % move after matching ]
                C (]) eq { pop } if
                counttomark 0 eq { pop exit } if
                /p p 1 add def
            } loop
        } if
    } if

    C (]) eq {
        /x exch def                                         % pop p for matching [
        V 0 ne { /p x def p } if                            % jump back if V != 0
    } if

    C (.) eq { ( ) dup 0 V put show } if                    % show mem value
    C (,) eq { M m (%lineedit) (r) file read pop put } if % read user input

    /p p 1 add def                                          % move p to right
} loop
```

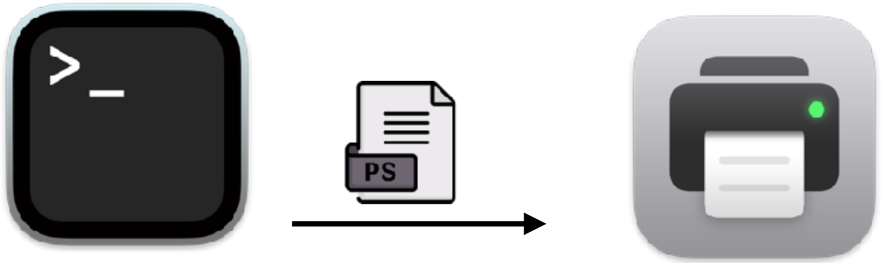
1. Programming in PostScript
2. Games on Printer
3. Games on Desktop
4. Golfing

Powerful in theory,
very limited in practice

Let's overcome that!

Run Code on Printer

One-way



fire and forget

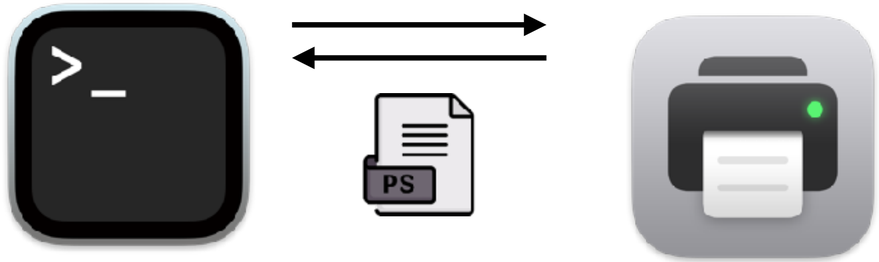
```
cat x.ps    | nc 172.20.10.13 9100
```

mental model:
from "printing"
to "executing"

Interactive

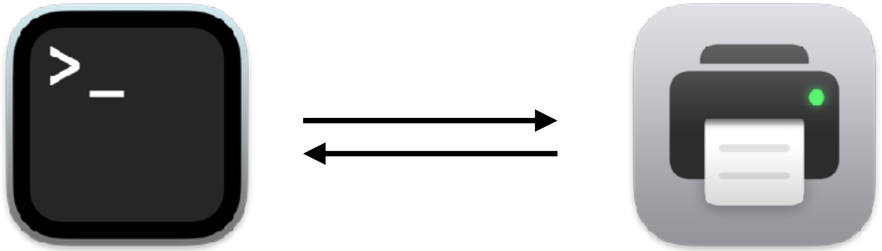
```
cat x.ps - | nc 172.20.10.13 9100
```

bi-directional com.




```
(echo $'%!PS\nexecutive\n'; cat) \
| nc 172.20.10.13 9100
```

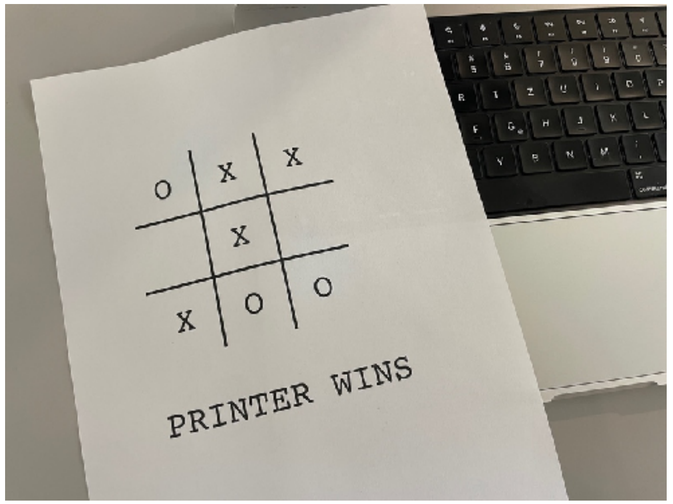
executive Mode (REPL)



💡 Dash “-“ to read stdin

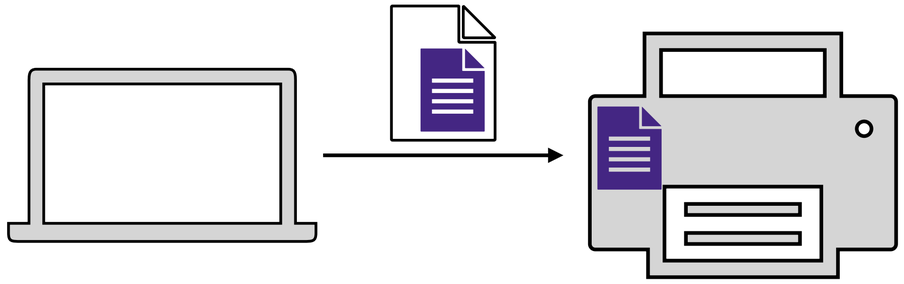
Tic-Tac-Toe

Tic-Tac-Toe




```
cat ttt.ps - | nc 172.20.10.13 9100
```

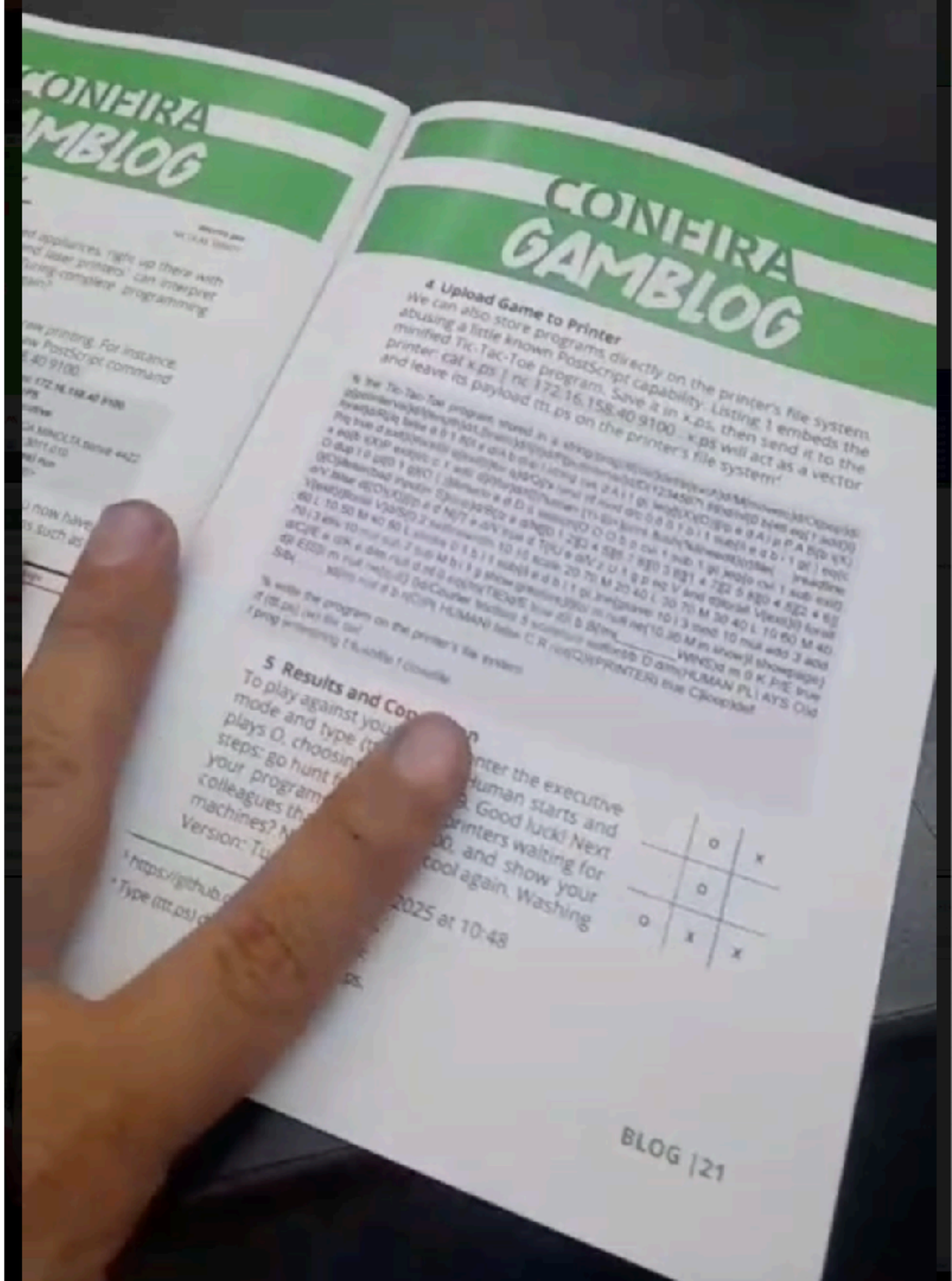
Store Code on Printer



vector: x.ps

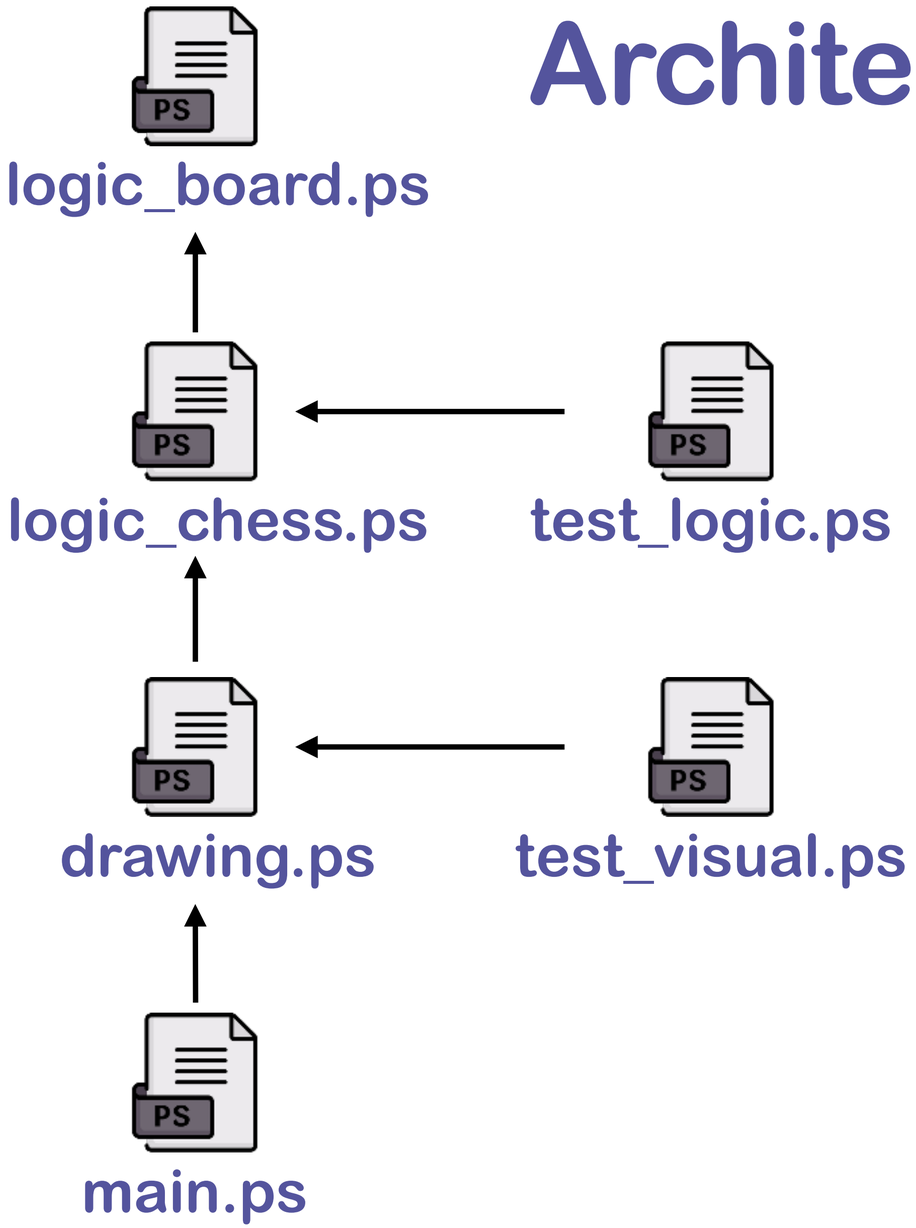
payload: ttt.ps

```
% a handwritten Tic-Tac-Toe program stored in a string
/prog(/d{def}def/e{exch}d/M{moveto}d/O{pop}d/g{getinterval
}d/l{length}d/L{lineto}d/I{if}d/P{putinterval}d/D(1234567\
89)d/nf{0 b{46 eq{1 add}I}forall}d/R{/q false d 0 1 8{/i e
d/A b dup l string cvs d A i 1 g(.)eq{[(X)(O)]{/p e d A i
p P A B{b i(X)P/q true d exit}I}forall}I q{exit}I}for q}d
/Q{/x rand nf mod d/c 0 d 0 1 b l 1 sub{/i e d b i 1 g(.)
eq{c x eq{b i(X)P exit}I/c c 1 add d}I}for}d/r{{(human (1\
-9)>)print flush(%lineedit)(r)file(________)readline O dup
l 0 gt{0 1 g}{O ( )}ifelse/o e d D o search{O O O b o cvi
1 sub 1 g(.)eq{o cvi 1 sub exit}I}{O}ifelse(bad input)= S}
loop}d/B{/z e d/N[[0 1 2][3 4 5][6 7 8][0 3 6][1 4 7][2 5
8][0 4 8][2 4 6]]d/V false d[(O)(X)]{/p e d N{/T e d/V
true d T{/U e d/V z U 1 g p eq V and d}forall V{exit}I}
forall V{exit}I}forall V}d/S{0.2 setlinewidth 10 10 scale
20 70 M 20 40 L 30 70 M 30 40 L 10 60 M 40 60 L 10 50 M 40
50 L stroke 0 1 b l 1 sub{/i e d b i 1 g(.)ne{gsave 10 i 3
mod 10 mul add 3 add 70 i 3 idiv 10 mul sub 7 sub M b i 1
g show grestore}I}for m null ne{10 30 M m show}I showpage}
d/C{/E e d/K e d/m null d nf 0 eq{/m(TIE)d/E true d}I b B{
/m(________WINS)d m 0 K P/E true d}I E{S}I m null ne{quit}
I}d/Courier findfont 5 scalefont setfont/b D d/m(HUMAN PL\
AYS O)d S/b(.........)d{/m null d b r(O)P(__HUMAN) false C
R not{Q}I(PRINTER)true C}loop)def

% leave the program on the printer's file system
/f (ttt.ps) (w) file def
f prog writestring f flushfile f closefile
```

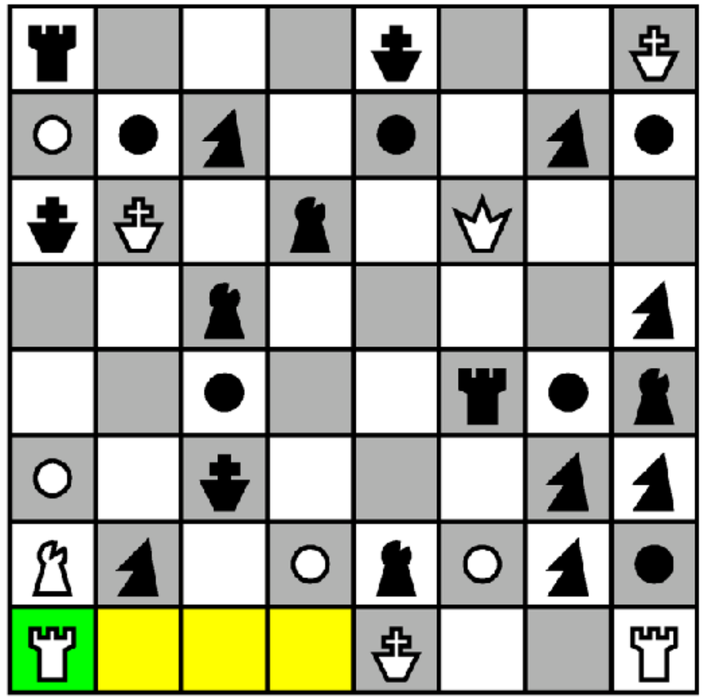


Chess

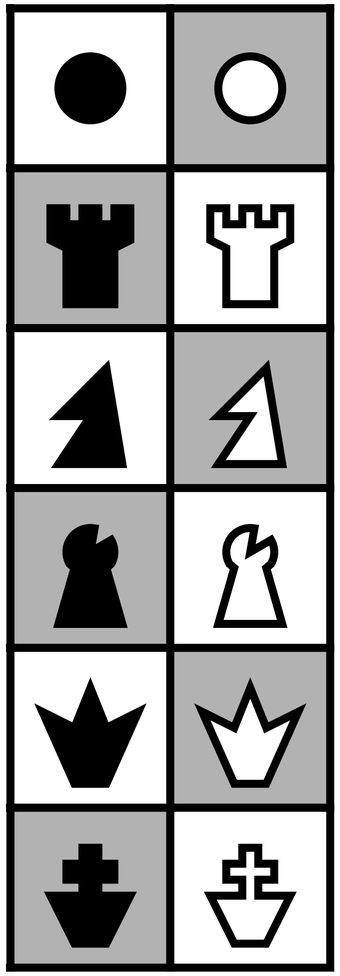
Architecture and Tests




```
/board (\
........\
...p....\
........\
....P...\
........\
........\
........\
........\
) def
```

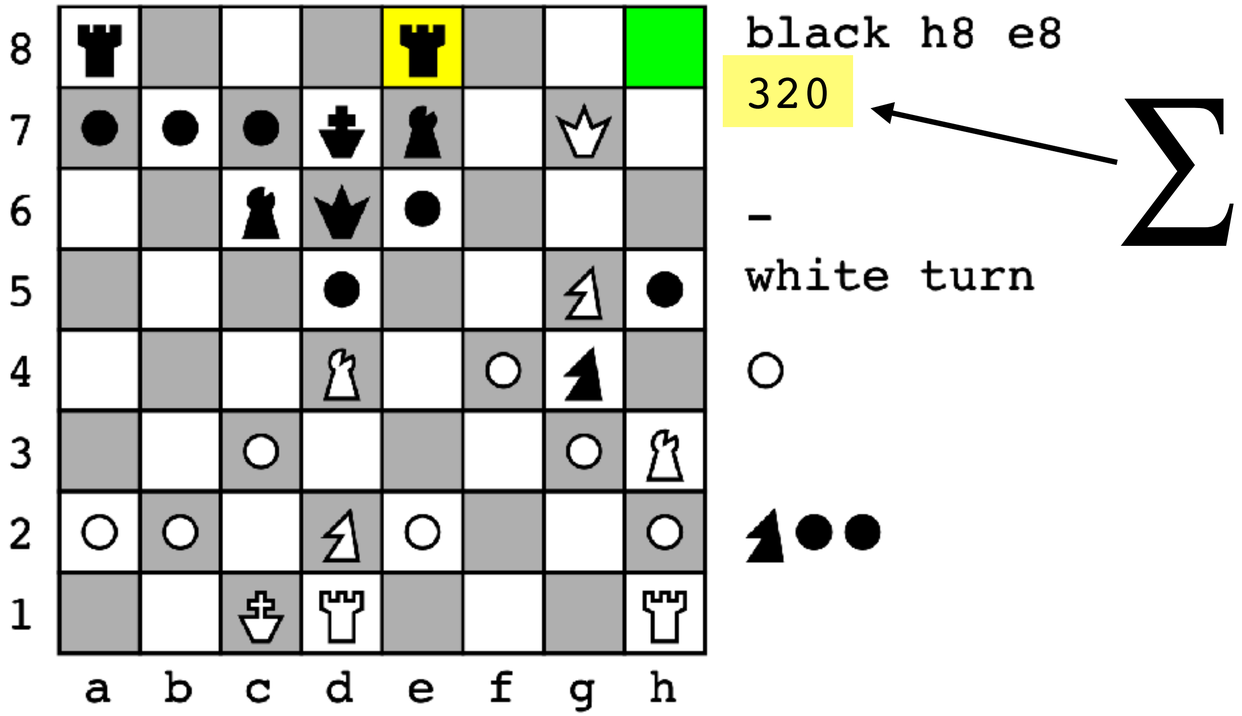


UI Design



```
/m { moveto } def
/l { lineto } def

/p { newpath SQUARE_SIZE 2 div SQUARE_SIZE 2 div 4 0 360 arc closepath } def

/r { newpath 5 15 m 7 15 l 7 13 l 9 13 l 9 15 l 11 15 l 11 13 l 13 13 l
     13 15 l 15 15 l 15 11 l 13 10 l 13 3 l 7 3 l 7 10 l 5 11 l 5 15 l
     closepath } def

/n { newpath 12 15 m 14 3 l 6 3 l 10 9 l 6 9 l closepath } def

/b { newpath 14 3 m 12 10 l 10 12 3 -30 30 arc
     10 12 l 10 12 3 80 210 arc 8 10 l 6 3 l closepath } def

/q { newpath 4 12 m 8 10 l 10 15 l 12 10 l 16 12 l 12 3 l 8 3 l closepath } def

/k { newpath 8 3 m 5 9 l 9 9 l 9 11 l 7 11 l 7 13 l 9 13 l 9 15 l 11 15 l
    11 13 l 13 13 l 13 11 l 11 11 l 11 9 l 15 9 l 12 3 l closepath } def
```

Game Engine



fixed values

```
/WhitePieceValueDict
<<
    (P) 100
    (N) 320
    (B) 330
    (R) 500
    (Q) 900
    (K) 20000
    (.) 0
>> def
```

relative values

```
(N) [ -50 -40 -30 -30 -30 -30 -40 -50
      -40 -20   0   0   0   0 -20 -40
      -30   0  10  15  15  10   0 -30
      -30   5  15  20  20  15   5 -30
      -30   0  15  20  20  15   0 -30
      -30   5  10  15  15  10   5 -30
      -40 -20   0   5   5   0 -20 -40
      -50 -40 -30 -30 -30 -30 -40 -50 ]
```

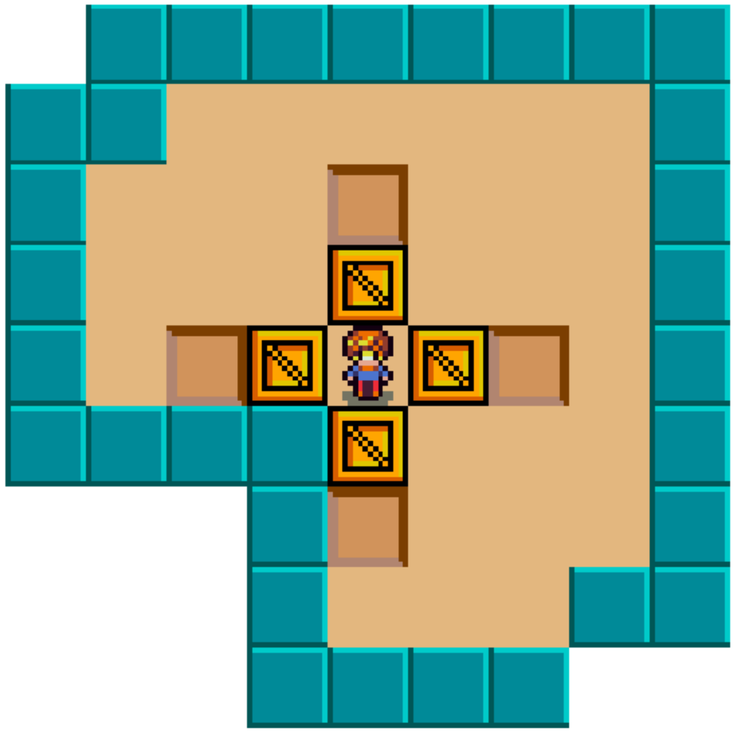
printer tries to minimize ∑ using minmax algorithm

1. Programming in PostScript
2. Games on Printer
3. **Games on Desktop**
4. Golfing

Drop the printer's constraints.
What can we do?

Sokoban

Sokoban



Level:0 Moves:0 Push:0

PSSokoban

```
%!PS
%%Title: sokoban.ps
%%Creator: Nicolas Seriot
%%BoundingBox: 0 0 600 300

% rm /tmp/p; mkfifo /tmp/p; cat sokoban.ps /tmp/p | gs -

% stty raw -echo; cat > /tmp/p

% Game symbols:
% (@) Man
% (+) ManOnGoal
% ($) Box
% (*) BoxOnGoal
% (#) Wall
% (.) Goal
% ( ) or (-) Floor

/DeviceRGB setcolorspace

/S 16 def % square size

/MAX_WIDTH 24 def
/MAX_HEIGHT 12 def

/Helvetica findfont 10 scalefont setfont

% undo manager
/umSize 1000 def
/umRingBuffer umSize array def
/umHead 0 def
/umDo {
    umRingBuffer umHead 3 -1 roll put
    /umHead umHead 1 add umSize mod def
} def
/umUndo {
    /umHead umHead 0 eq { umSize 1 sub } { umHead 1 sub } ifelse def
    umRingBuffer umHead get % result
    umRingBuffer umHead null put
} def

% converts a level string into a 2D array of characters
/_s_ParseLevel_a_ {

  /s exch def
  /sLength s length def

  /lines MAX_HEIGHT array def
  /line MAX_WIDTH array def

  /x 0 def % iterates on line
  /y 0 def % iterates on lines

  0 1 sLength 1 sub {
    /i exch def

    /c s i 1 getinterval def
```

PSSokoban — -zsh — 77×7

~/Projects/PSSokoban — -zsh

```
nseriot@IMAC-GL019 PSSokoban %
```

PSSokoban — -zsh — 77×17

~/Projects/PSSokoban — -zsh

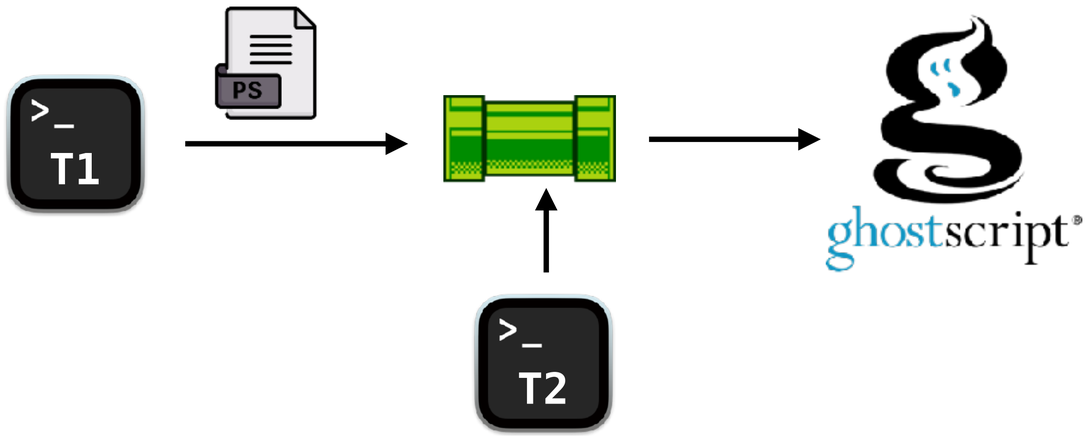
```
nseriot@IMAC-GL019 PSSokoban % mkfifo /tmp/p; cat sokoban.ps /tmp/p | gs -
```

Immediate Keystrokes

we don't want to hit
the "enter" key

1. cat file and unix pipe

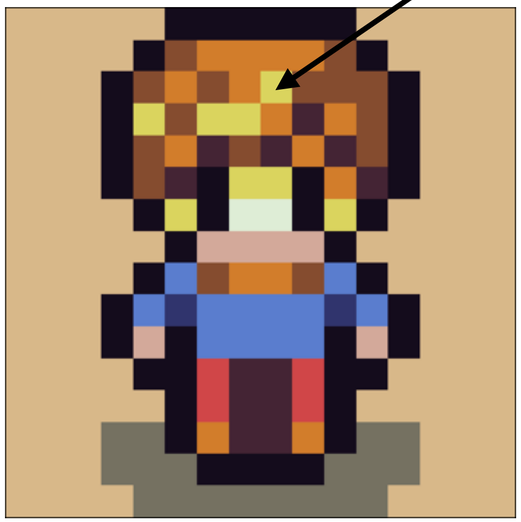
```
$ mkfifo /tmp/p; cat sokoban.ps /tmp/p | gs -
```




```
$ stty raw -echo; cat > /tmp/p
```

2. write with immediate input

Images



https://opengameart.org/

DD5

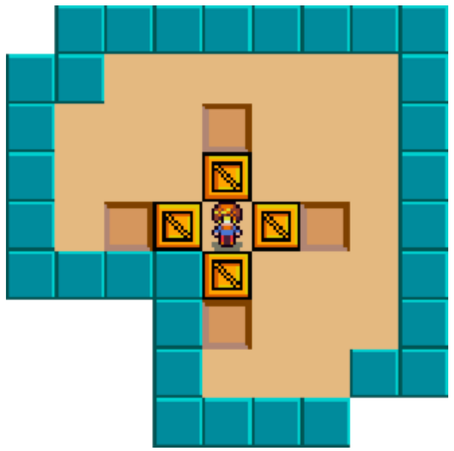
```
/DeviceRGB setcolorspace

/imageData {
    (
        DB8 DB8 DB8 DB8 DB8 101 101 101 101 101 101 DB8 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 101 843 D72 D72 D72 D72 843 101 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 101 843 D72 843 D72 DD5 843 843 843 101 DB8 DB8 DB8
        DB8 DB8 DB8 101 DD5 843 DD5 DD5 D72 423 D72 843 101 DB8 DB8 DB8
        DB8 DB8 DB8 101 843 D72 423 843 423 D72 423 843 101 DB8 DB8 DB8
        DB8 DB8 DB8 101 843 423 101 DD5 DD5 101 D72 423 101 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 101 DD5 101 DED DED 101 DD5 101 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 DB8 101 DA9 DA9 DA9 DA9 101 DB8 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 101 57C 843 D72 D72 843 57C 101 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 101 57C 336 57C 57C 57C 57C 336 57C 101 DB8 DB8 DB8
        DB8 DB8 DB8 101 DA9 101 57C 57C 57C 57C 101 DA9 101 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 101 101 D44 423 423 D44 101 101 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 DB8 101 D44 423 423 D44 101 DB8 DB8 DB8 DB8 DB8
        DB8 DB8 DB8 776 776 101 D72 423 423 D72 101 776 776 DB8 DB8 DB8
        DB8 DB8 DB8 776 776 776 101 101 101 101 776 776 776 DB8 DB8 DB8
        DB8 DB8 DB8 DB8 776 776 776 776 776 776 776 776 DB8 DB8 DB8 DB8
    )
} def
```

```
<<
    /ImageType          1
    /Width              16
    /Height             16
    /BitsPerComponent   4   % 0-F
    /ColorSpace         /DeviceRGB
    /ImageMatrix        [1 0 0 -1 0 0]
    /DataSource         imageData /ASCIIHexDecode filter
>>
image
```

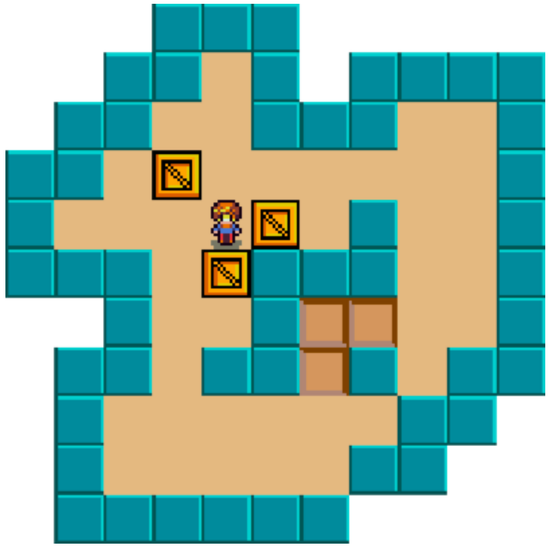
inverted y coord.

Levels

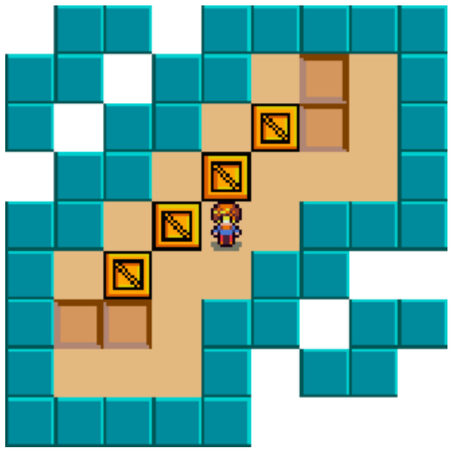
```
% Game symbols:
% (@) Man
% (+) ManOnGoal
% ($) Box
% (*) BoxOnGoal
% (#) Wall
% (.) Goal
% ( ) or (-) Floor
```



```
/l0 (
########
##------#
#---.---#
#---$---#
#-.$@$.-#
####$---#
   #.---#
   #---##
   #####) def
```



```
/l1 (
    ###
  ##-# ####
 ##--###--#
##-$------#
#---@$-#--#
###-$###--#
  #--#..--#
 ##-##.#-##
 #------##
 #-----##
 #######) def
```

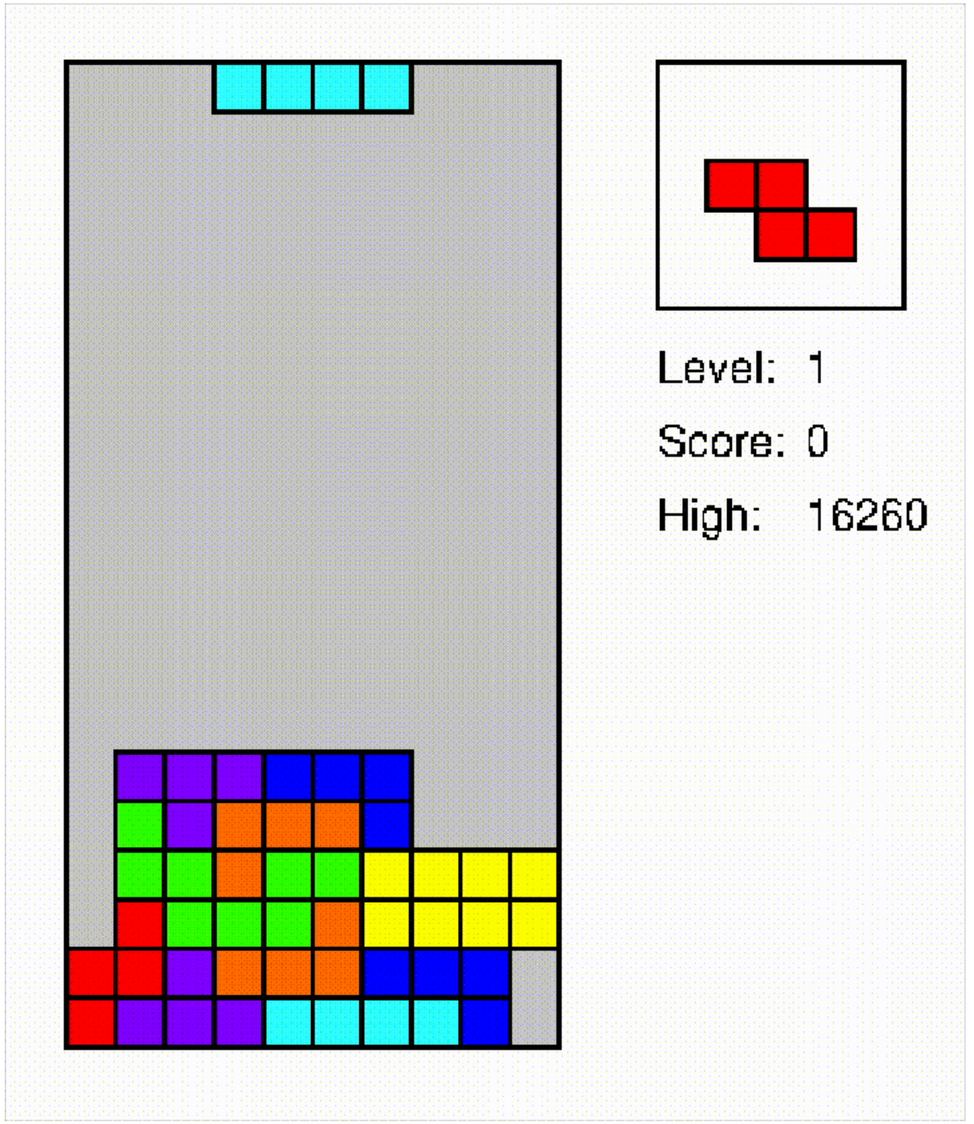


```
/l2 (
 ## #####
## ##-.-#
# ##-$.-#
 ##-$---#
##-$@-###
#-$--##
#..-## ##
#---# ##
##### #) def
```

Tetris

Tetris in PostScript

- realtime input
- direct drop
- levels with increasing speed
- 7-tetriminos random bags
- high scores
- Nintendo scoring scheme
- sound through external MIDI synthetizer



600 lines

60 operators

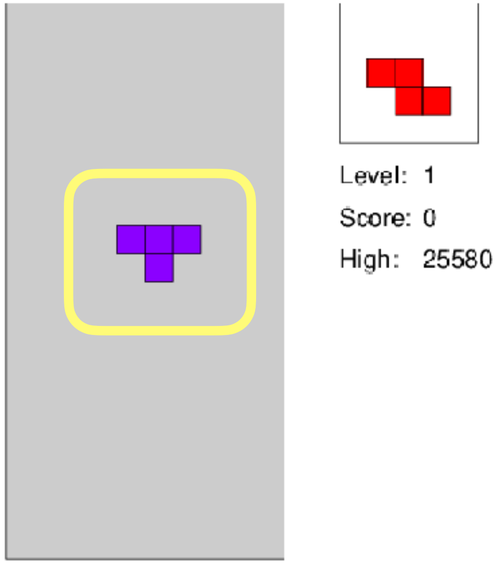
10 KB

Tetriminos


```
/Tetriminos [
    [Td Tl Tu Tr]
    [Jd Jl Ju Jr]
    [Zh Zv]
    [O]
    [Sh Sv]
    [Ld Ll Lu Lr]
    [Ih Iv]
] bind def
```

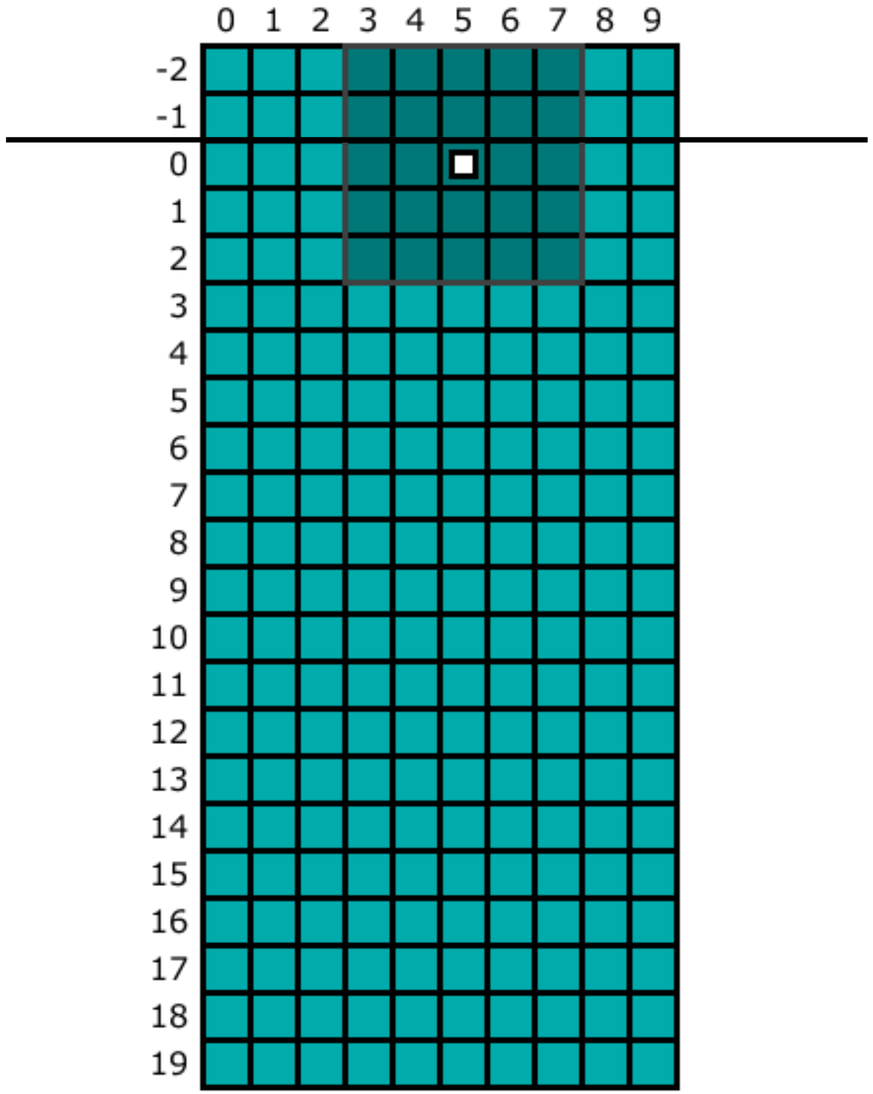
```
/t1c 0 def % code
/t1r 0 def % rotation

/t2c 2 def % code
/t2r 0 def % rotation
```

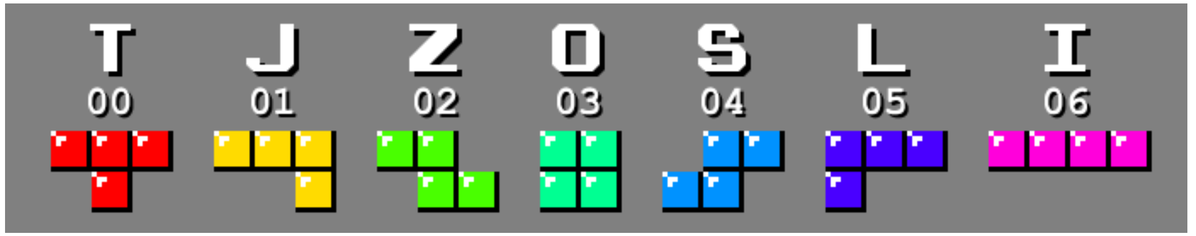
Only 4 integers to keep track of



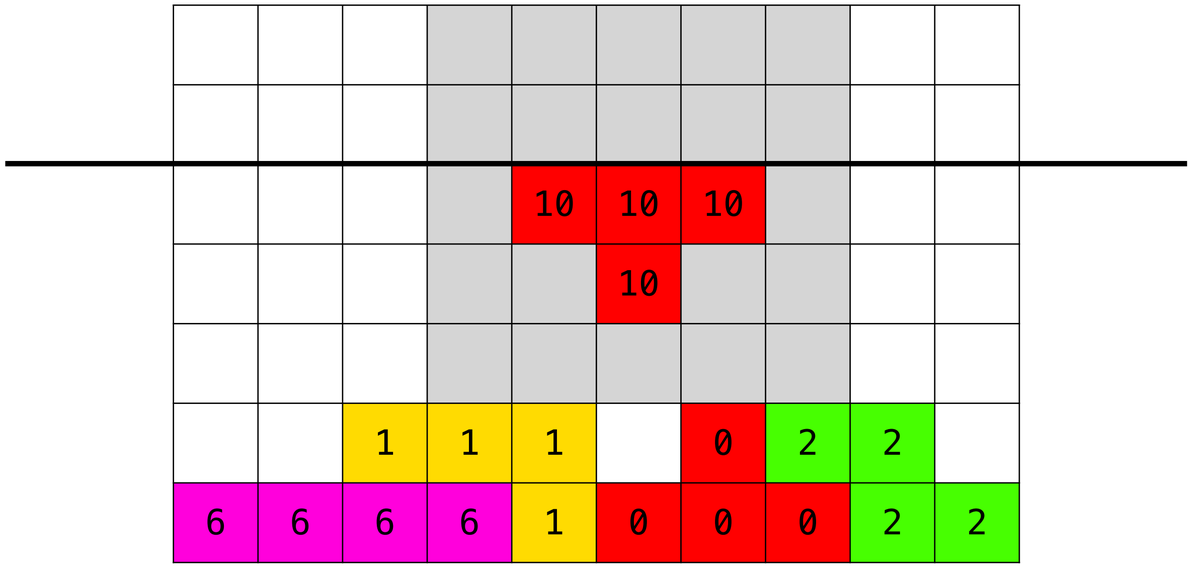

```
/Tu [0 0 0 0 0 0 0 1 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0] def
/Tr [0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 1 0 0 0 0 0 0 0] def
/Td [0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 1 0 0 0 0 0 0 0] def
/Tl [0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0] def
/Jl [0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0] def
/Ju [0 0 0 0 0 0 1 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0] def
/Jr [0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0] def
/Jd [0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 1 0 0 0 0 0 0] def
/Zh [0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0] def
/Zv [0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 1 0 0 0 0 0 0 0] def
/O  [0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 1 0 0 0 0 0 0] def
/Sh [0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 0 0 0 0 0 0 0] def
/Sv [0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0] def
/Lr [0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0] def
/Ld [0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 1 0 0 0 0 0 0 0 0] def
/Ll [0 0 0 0 0 0 1 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0] def
/Lu [0 0 0 0 0 0 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0] def
/Iv [0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0] def
/Ih [0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0] def
```

Board

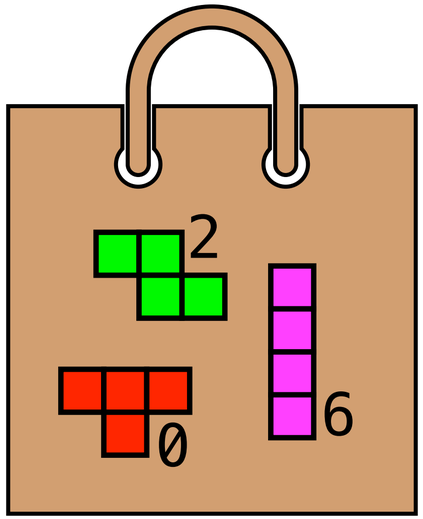


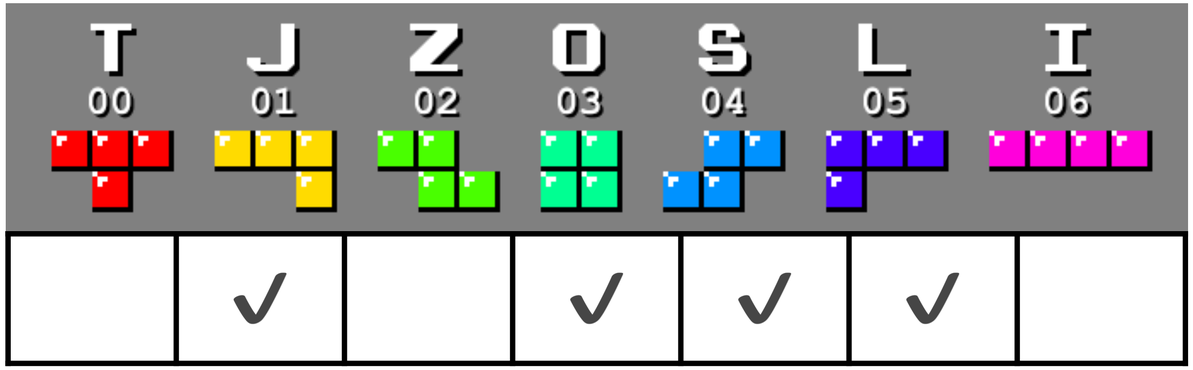


+10 for active tetrimino



Random Bag





Ensures game fairness

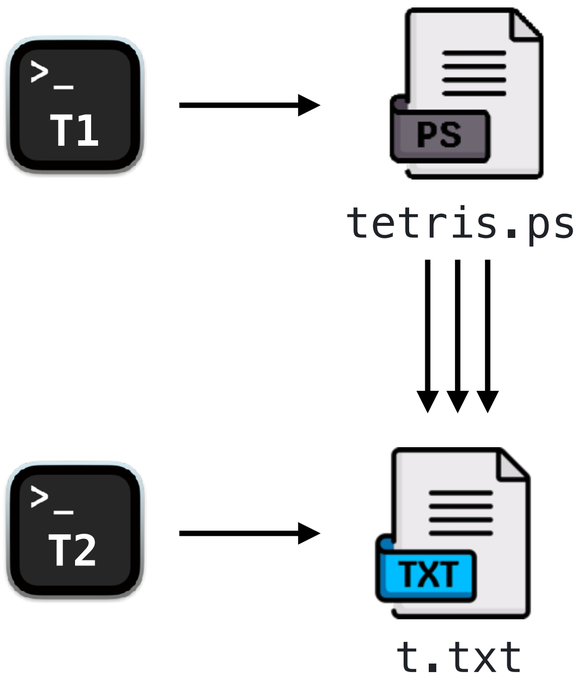
Yes, PostScript has a rand operator!

Non-Blocking I/O

ie. keep pieces falling
when no input

1. read and truncate continuously

```
$ gs -sNOSAFER tetris.ps
```



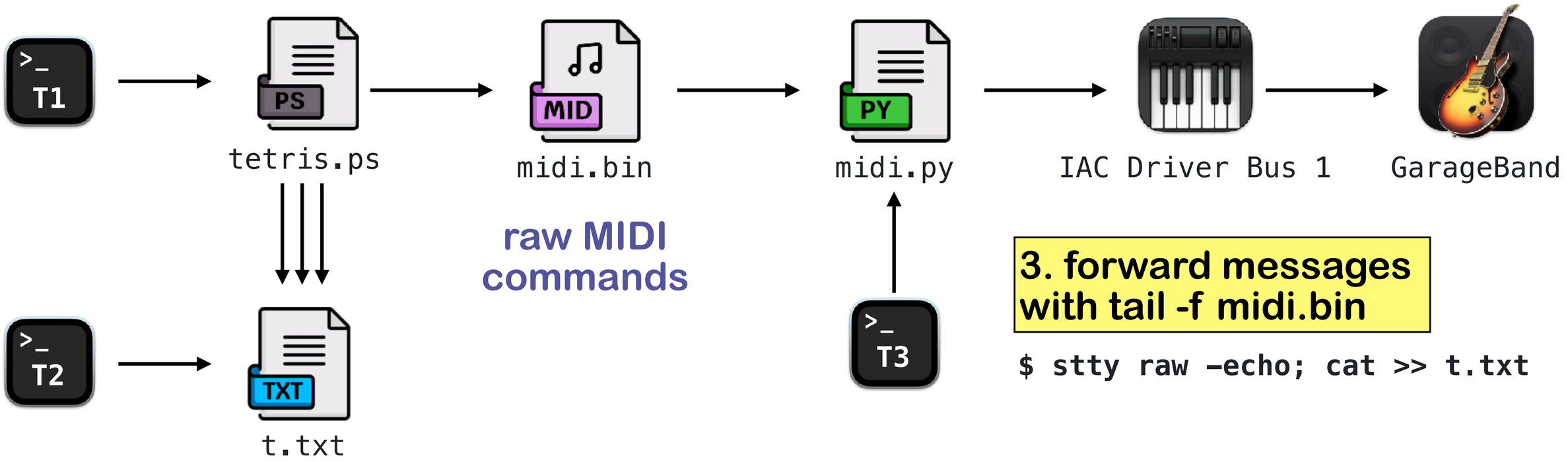
2. write with immediate input

```
$ stty raw -echo; cat >> t.txt
```

Bonus: MIDI Sound

1. read and truncate continuously

```
$ gs -sNOSAFER tetris.ps
```



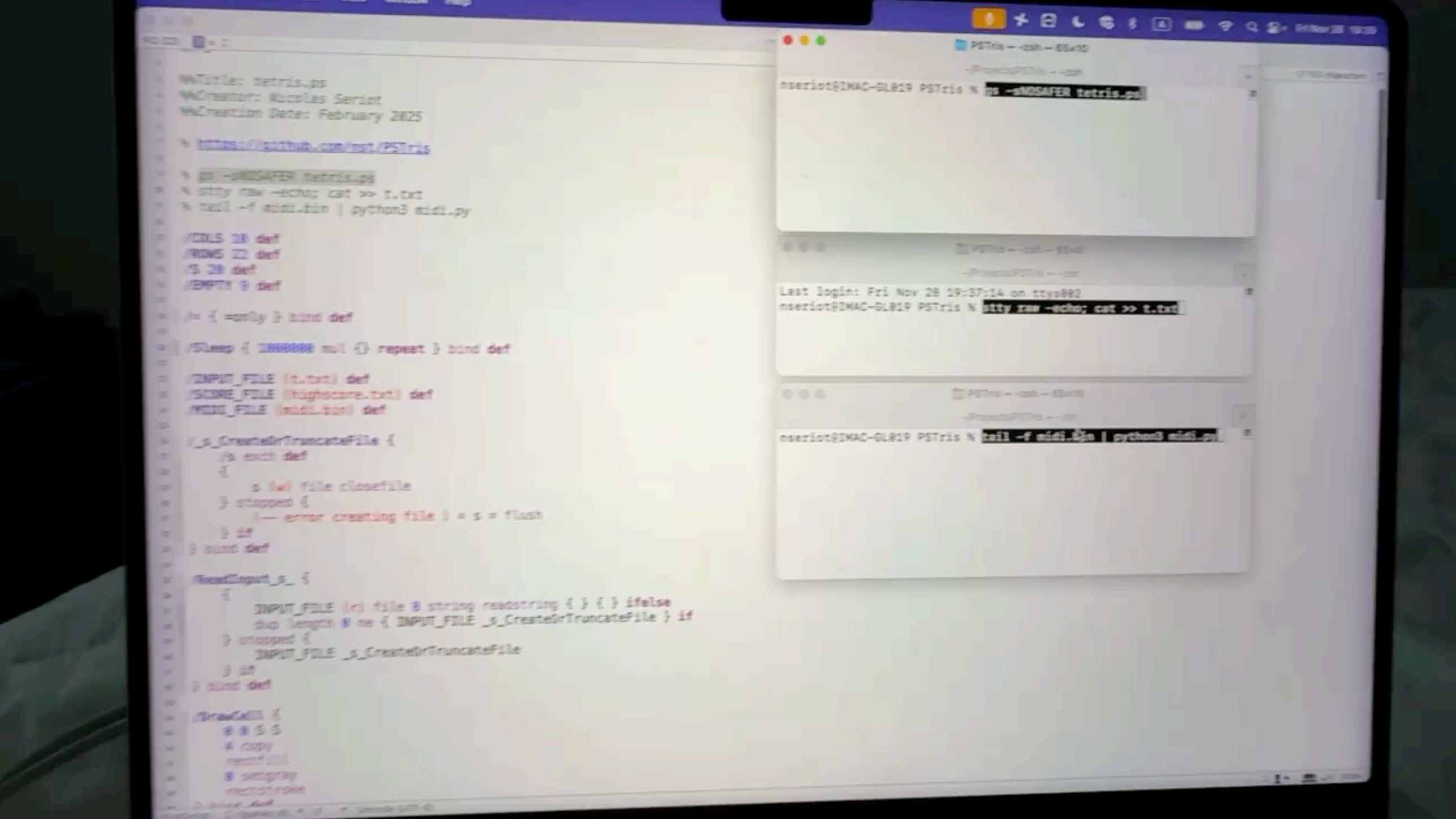
2. write with immediate input

```
$ stty raw -echo; cat >> t.txt
```

3. forward messages with tail -f midi.bin

```
$ stty raw -echo; cat >> t.txt
```

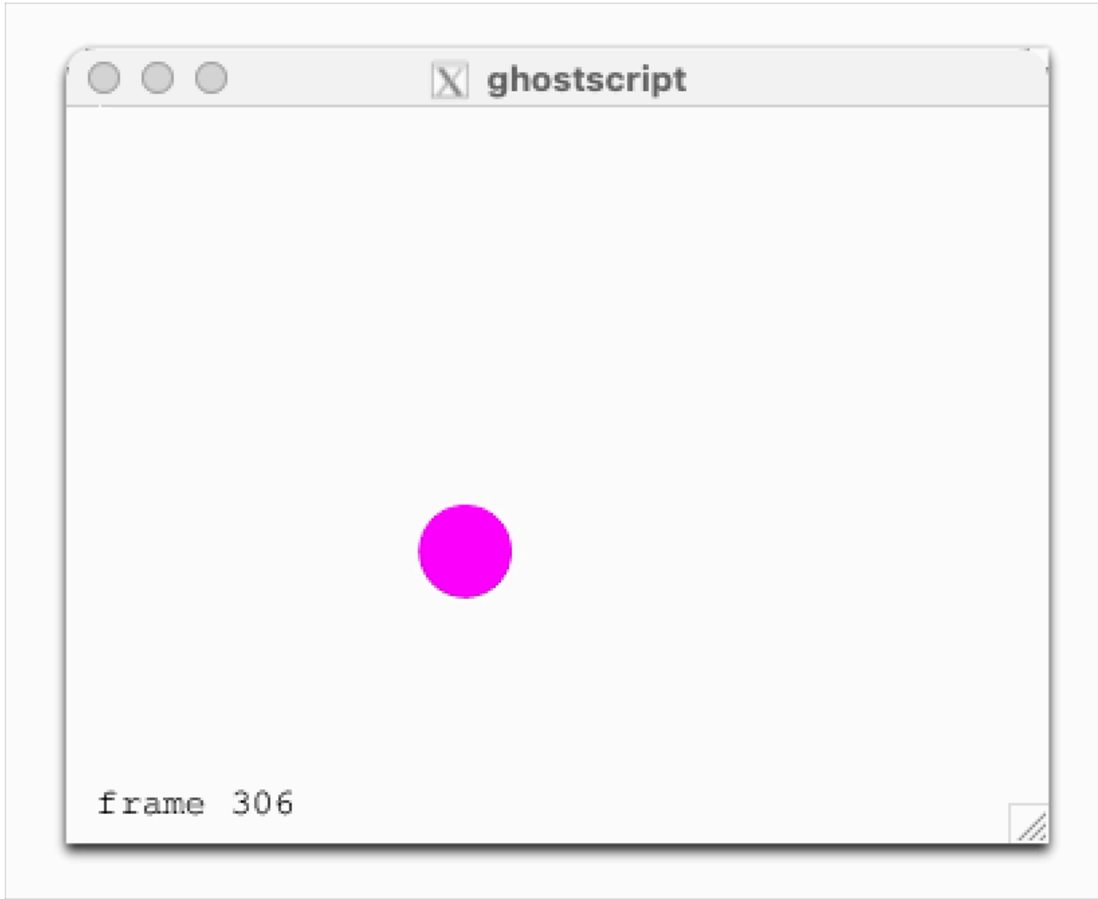
**Thanks to simple unix mechanisms,
we can stream keystrokes,
and even MIDI commands!**


%%Title: tetris.ps
%%Creator: Nicolas Serint
%%Creation Date: February 2025
% https://github.com/nsr/PSTris
% gs -dNOSAFER tetris.ps
% stty raw -echo; cat >> t.txt
% tail -f midi.bin | python3 midi.py
/COLS 10 def
/ROWS 22 def
/S 20 def
/EMPTY 0 def
/= { exch } bind def
/Sleep { 1000000 mul {} repeat } bind def
/INPUT_FILE (t.txt) def
/SCORE_FILE (highscore.txt) def
/MIDI_FILE (midi.bin) def
/_s_CreateOrTruncateFile {
/s exch def
{
s (w) file closefile
} stopped {
(--- error creating file) = s = flush
} if
} bind def
/ResetInput_s_ {
{
INPUT_FILE (r) file 0 string readstring { } { } ifelse
dup length 0 ne { INPUT_FILE _s_CreateOrTruncateFile } if
} stopped {
INPUT_FILE _s_CreateOrTruncateFile
} if
} bind def
/DrawCell {
0 0 S S
4 copy
rectfill
0 setgray
rectstroke
nseriot@INAC-GL819 PSTris % gs -dNOSAFER tetris.ps
Last login: Fri Nov 28 19:37:14 on ttys002
nseriot@INAC-GL819 PSTris % stty raw -echo; cat >> t.txt
nseriot@INAC-GL819 PSTris % tail -f midi.bin | python3 midi.py

Your Own Games


brotherbrain.com

Animations




```
/W 320 def /H 240 def /R 15
/x 100 def /y 50 def def /x_ 2 def /y_ 1 def
<< /PageSize [W H] >> setpagedevice

{
   1 setgray 0 0 320 240 rectfill

   x R sub 0 lt x R add W gt or {
       /x_ x_ -1 mul def
   } if
   y R sub 0 lt y R add H gt or {
       /y_ y_ -1 mul def
   } if
   /x x x_ add def /y y y_ add def
   newpath x y R 0 360 arc
   1 0 1 setrgbcolor fill
   10 10 moveto 0 setgray
   flushpage

   1000000 {} repeat
} loop
```

Clear

Draw

Sleep

1. Programming in PostScript
2. Games on Printer
3. Games on Desktop
4. Golfing

extreme code minimization

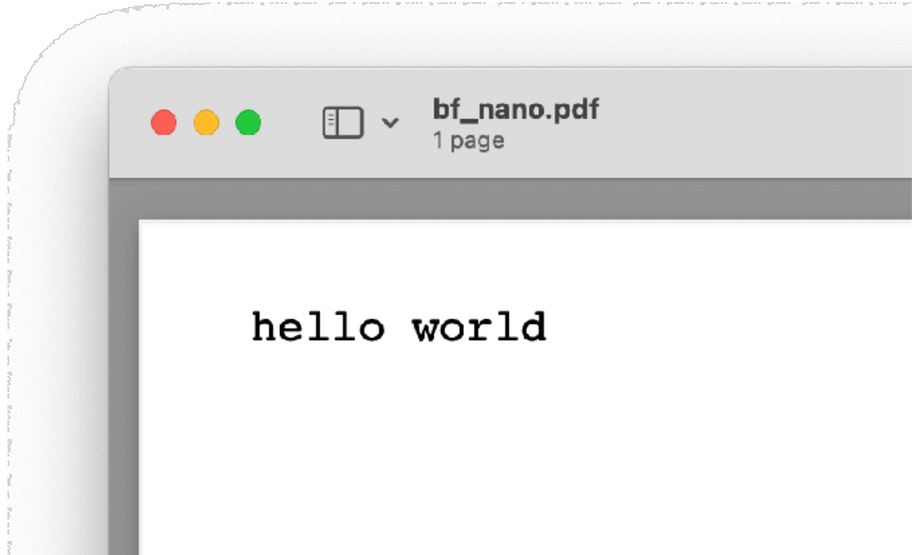
gambiarra inside gambiarra

bf_nano.ps

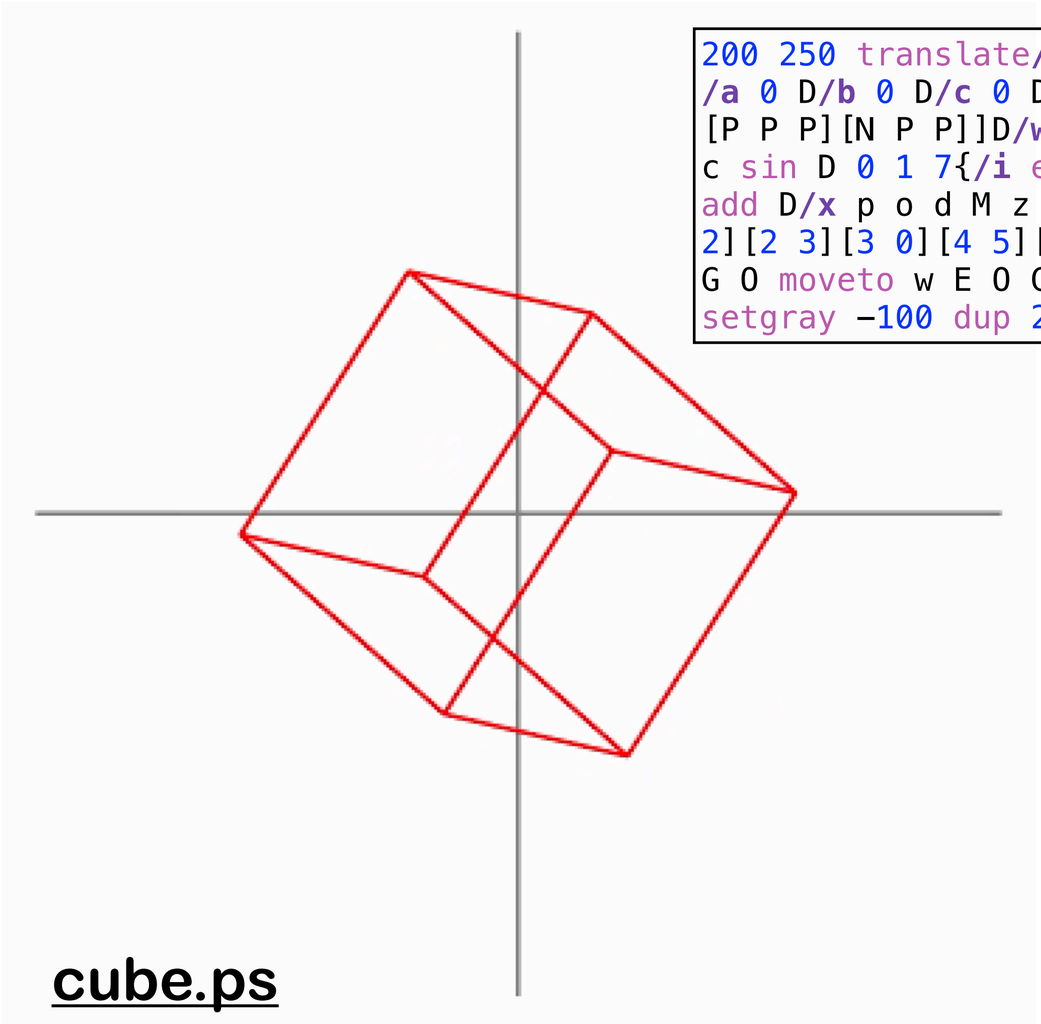
```
/Courier findfont 12 scalefont setfont 32 740 moveto

/P (+[-[<<[+[--->]-[<<<]]]>>>-]>-.-- -.>..>.<<<<-.<+.>>>>>.>.<<.<-.) def

/!{def}def/o{/c exch C sub ! c abs 1 =}!/p 0 !/={eq}!/?{if}!/+{/p p 1 add !}!/M
30000 string !/m 0 !/V{M m get}!/C{P p get}!{p P length ge{exit}? 44 o{M m V c
add 255 and put}? 61 o{/m m c sub !}? C 91 ={p V 0 ={mark{C 91 ={0}? C 93 ={pop}
? counttomark 0 ={pop exit}? +}loop}?}? C 93 ={/x exch ! V 0 ne{/p x ! p}?}? C
46 ={( )dup 0 V put show}? C 44 ={M m (%lineedit)(r)file read pop put}? +}loop
```

hello world

5 lines Brainfuck interpreter



3D



cube.ps

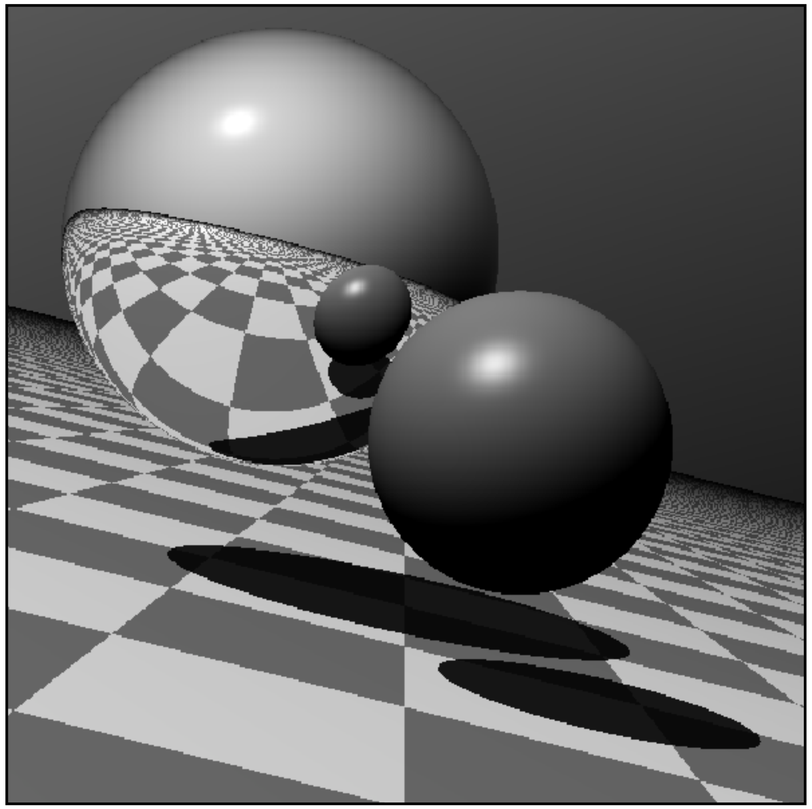
```
200 250 translate/D{def}def/M{mul}D/Z{2000000{}repeat}D/P 50 D/N{P neg}D/G{get}D
/a 0 D/b 0 D/c 0 D/o{0 G}D/O{1 G}D{/v[[N N N][P N N][P P N][N P N][N N P][P N P]
[P P P][N P P]]D/w 8 array D/f a cos D/d b cos D/e c cos D/s a sin D/t b sin D/u
c sin D 0 1 7{/i exch D/p v i G D/y p O f M p 2 G s M sub D/z p O s M p 2 G f M
add D/x p o d M z t M add D w i[x e M y u M sub x u M y e M add]put}for[[0 1][1
2][2 3][3 0][4 5][5 6][6 7][7 4][0 4][1 5][2 6][3 7]]{/E exch D w E o G o w E o
G O moveto w E O G o w E O G O lineto}forall 1 0 0 setrgbcolor stroke flushpage Z 1
setgray -100 dup 200 dup rectfill/a a 0.1 add D/b b 0.3 sub D/c c 0.5 sub D}loop
```

demo-scene like

Tiny Ray Tracer

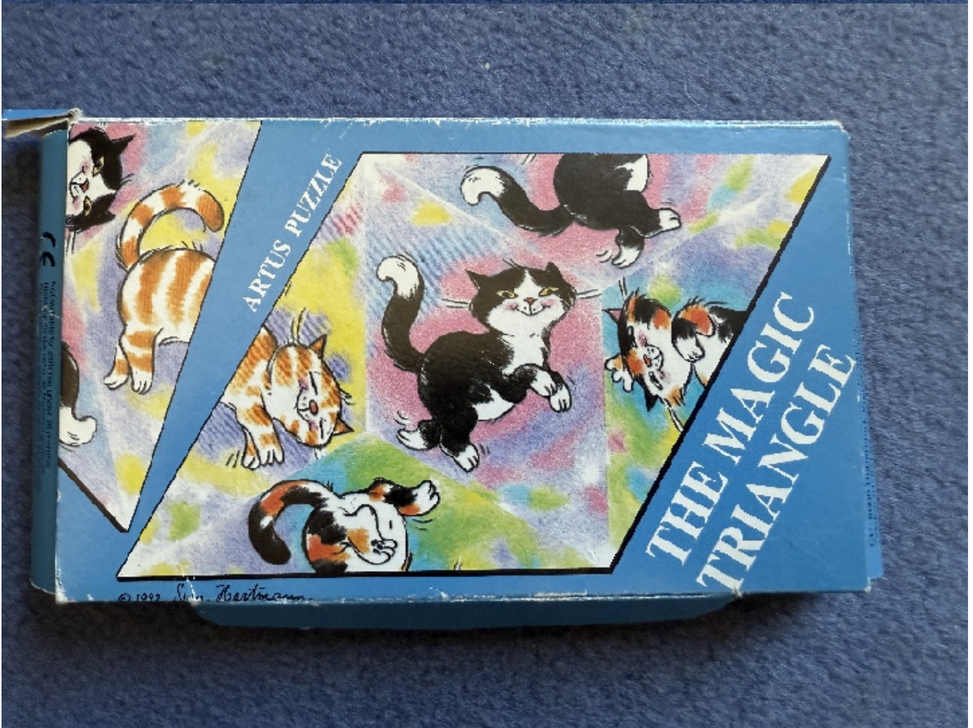
Obfuscated PostScript Contest 1993

```
%!OPS-1.0 %%Creator: HAYAKAWA,Takashi
/A/copy/p/floor/q/gt/S/add/n/exch/i/index/J/ifelse/r/roll/w/div/H{{loop}stopped
Y}def/t/and/C/neg/T/dup/h/exp/Y/pop/d/mul/s/cvi/e/sqrt/R/rlineto{load def}H 300
T translate(V2L&1i2A00053r45hNvQXz&vUX&UOvQXzFJ!FJ!J!O&Y43d9rE3IaN96r63rvx2dcaN
G&140N7!U&4C577d7!z&&93r6IQO2Z4o3AQYaNlxS2w!!f&nY9wn7wpSps1t1S!D&cjS5o32rS4oS3o
Z&blxC1SdC9n5dh!I&3STinTinTinY!B&V0R0VRVC0R!N&3A3Axe1nwc!l&993dC99Cc96raN!a&1CD
E&YYY!F&&vGYx4oGbxSd0nq&3IGbxSGY4Ixwca3AlvvUkbQkdbGYx4ofwnw!&vlx2w13wSb8Z4wS!J!
c&j1idj2id42rd!X&4I3Ax52r8Ia3A3Ax65rTdCS4iw5o5IxnwTTd32rCST0q&eCST0q&D1!&EYE0!J
&EYEY0!J0q!x&jd5o32rd4odSS!K&WCVW!Q&31C85d4!k&X&E9!&1!J!v&6A!b&7o!o&1r!j&43r!W)
{( )T 0 4 3 r put T(/)q{T(9)q{cvn}{s}J}{($)q{[}{]}J}J cvx}forall 270{def}H
K{K{L setgray moveto B fill}for Y}for showpage
```



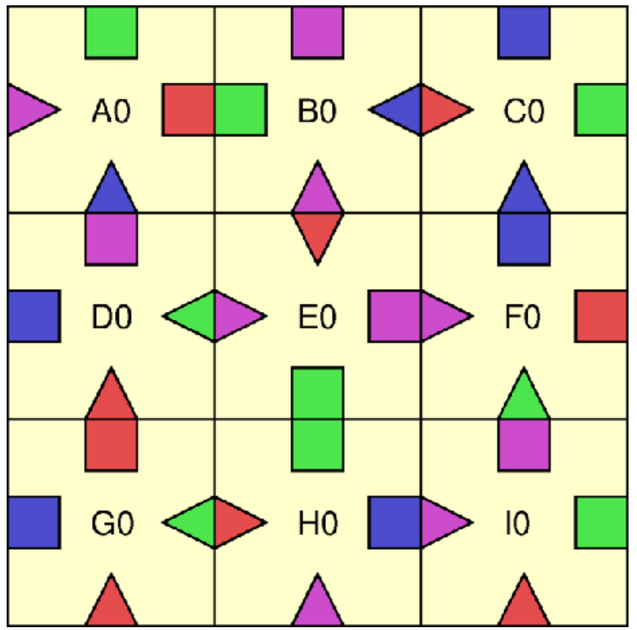
Obsessed for a few days

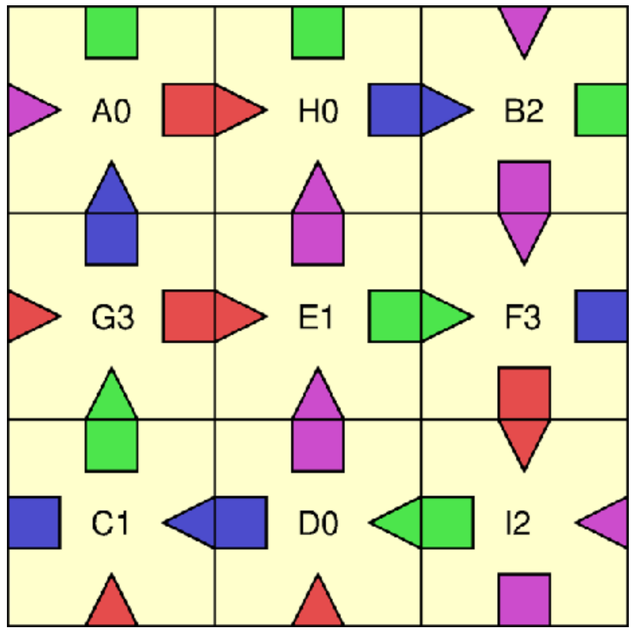
Shrank it from 760 down to 727 bytes

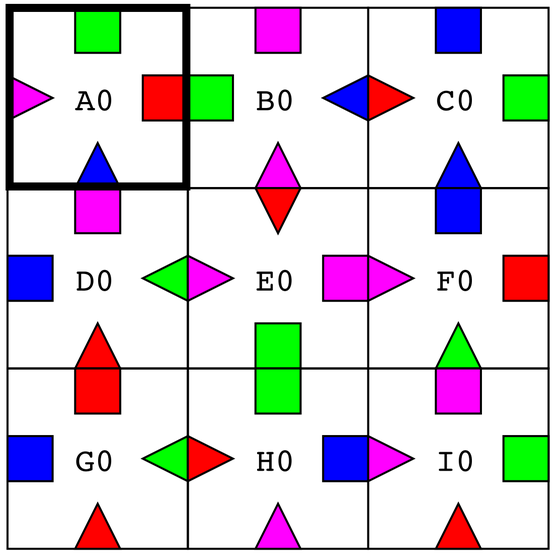


Edge Matching Puzzles

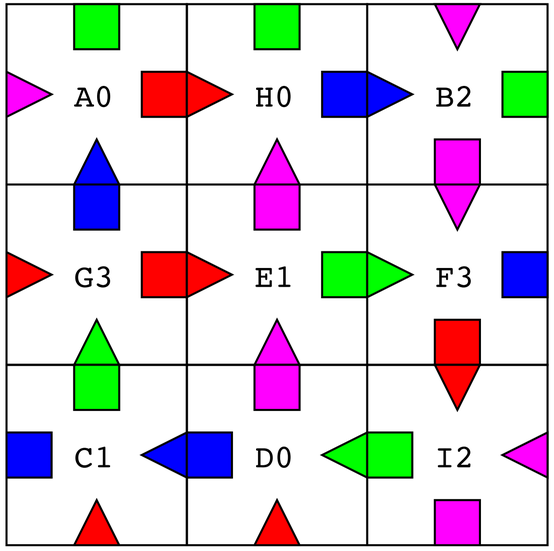
Printer can even play by itself!







A0,H0,B2,
G3,E1,F3,
C1,D0,I2



A0 - green red BLUE PINK

```
/!{def}def/?[(A0grBP)(B0pBPg)(C0bgBR)(D0pGRb)(E0RpgP)(F0brGP)(G0rGRb)(H0gbPR)
(I0pgRP)]!/`{11}!/Courier findfont 16 scalefont setfont/O{( )}!/'{O " 0 4 3 d
h}!/:<</R[1 0 0]/G[0 1 0]/B[0 0 1]/P[1 0 1]>>!/P{/D}!/Q{/C}!/R{/G}!/S{/B}!/T{/A}!/V{/
F}!/X{/E}!/Z{aload}!/@{repeat}!/&{dict begin}!/${count}!/+{add}!/-{sub}!/
#{rectstroke}!/"{dup}!/:{div}!/*{mul}!/~{neg}!/^{gt}!/={eq}!/_{not}!/,{end}!/.
{showpage stop}!/|{32 xor}!/ifelse/moveto/lineto/roll/idiv/stroke/get/put/false/exp/
for/if/translate/fill/mod/setgray/exch/rectfill/setrgbcolor/grestore/gsave/closepath/
getinterval/show/rotate/pop ${O " 0 $ 93 + put exch cvx !}@/H{putinterval}!/W[128{{'
cvn}}@]! W 48[10{{' cvi}}@]H W 123{z[}h W 125{z]}h/Y[9{0}@]!/U[9{i}@]!({0"`2*`2*~}
{0"b``2*~c`2*0cv}{q"1g68*-32d+4o2+g}{J=_{Vi!}l}{Pq!018{Qq!uC3o`8**C3e`8*~*mDCgRq!
0"`8*`8*#`4*`-`4*6-bG02wx013{Sq!u`4*`4*mG1g68*-B-9""*+*yG2B+g":q"9""*+^{84*-}
lO"043dhgZzs`~`4*m9""*+^{Hr0pH#}{In0pIf}at}kt}k}{0&Pq!D9={YL.}{018{Sq!UBg_{013{Tq!X?
Bg!E1A68*+hVi_!D3o0^{E3J|YD1-g1K}lD2^{E0|D3-g2K}lF{YDEhUBi_hD1+MYD0hUBih}l}k}l}k}
a,}{u`8*`87**m?Ltu`8*`83**m0Mu}){" W q g exec cvx}forall ${$ 71 + ' q !}@ N
```

emp_viz_1127.ps

```
0100 0001 65 A
0110 0001 97 a
```

32 xor
flips case

A simple programming language

Turing-complete

no libs

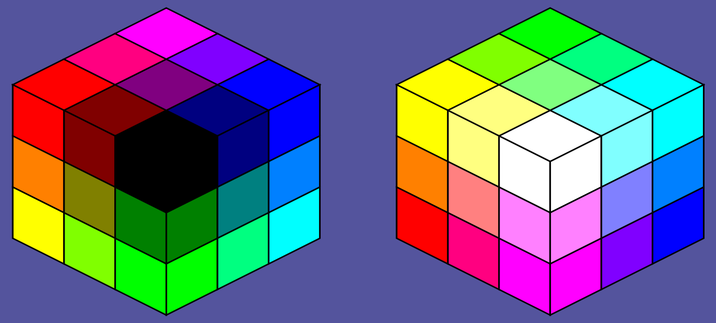
1. Programming in PostScript

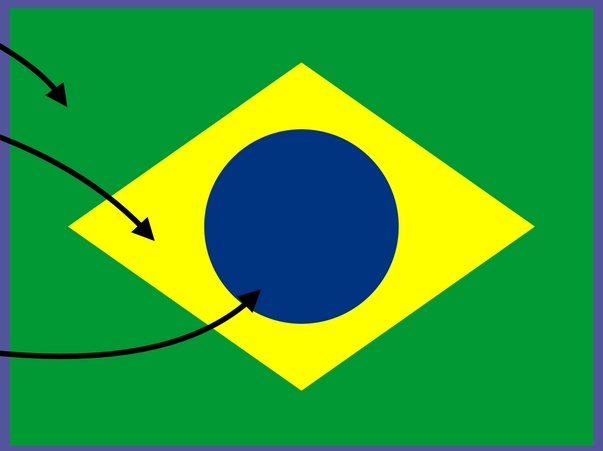
b.ps

1:0 <No selected symbol> Written by me 357 characters

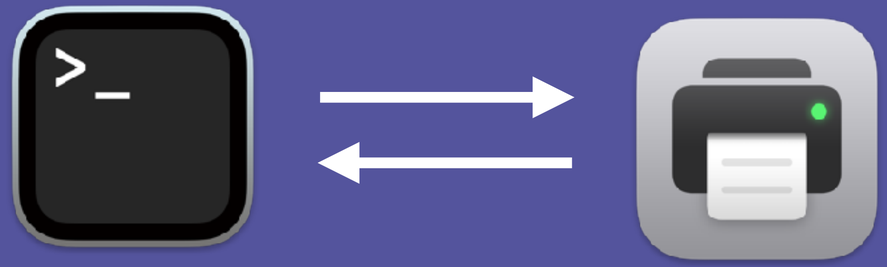
```
/W 400 def
/H 300 def

<< /PageSize [W H] >> setpagedevice

0 0.6 0.2 setrgbcolor
0 0 W H rectfill

1 1   0 setrgbcolor
newpath
W 10 div         H 2 div         moveto
W  2 div         H 8 div 7 mul   lineto
W 10 div 9 mul   H 2 div         lineto
W  2 div         H 8 div         lineto
closepath
fill

0 0.2 0.5 setrgbcolor
W 2 div H 2 div W 6 div 0 360 arc
fill
```

PostScript Spaces (4) LF Unicode (UTF-8) 41w

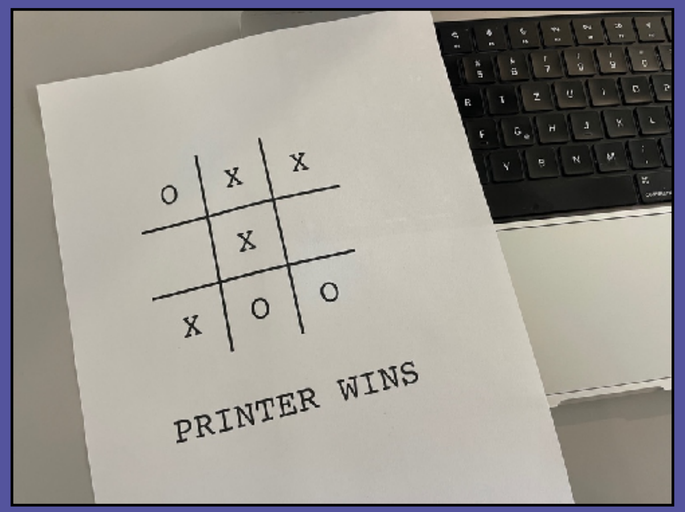


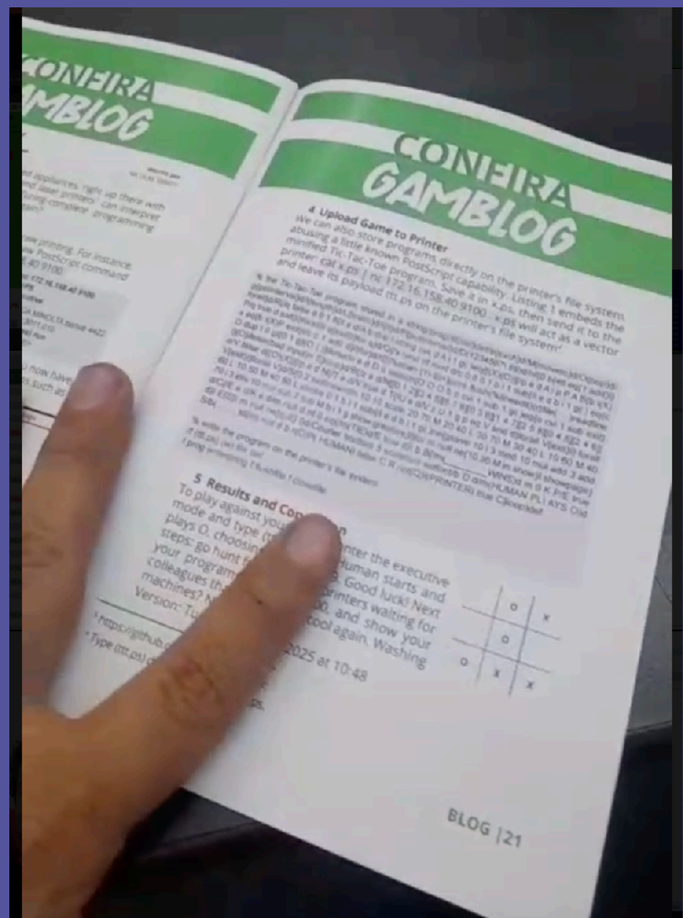


bi-directional com.

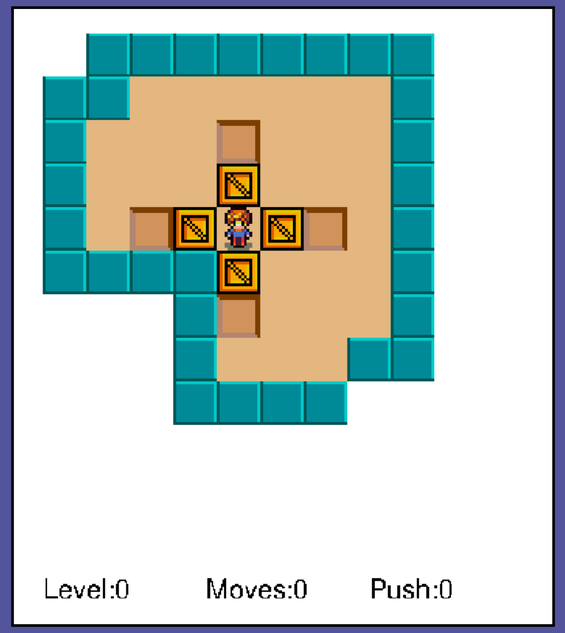


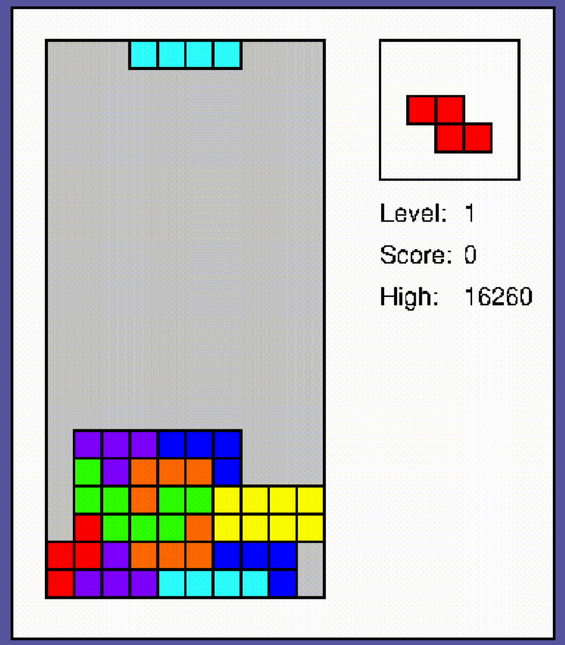
2. Games on Printer





3. Games on Desktop



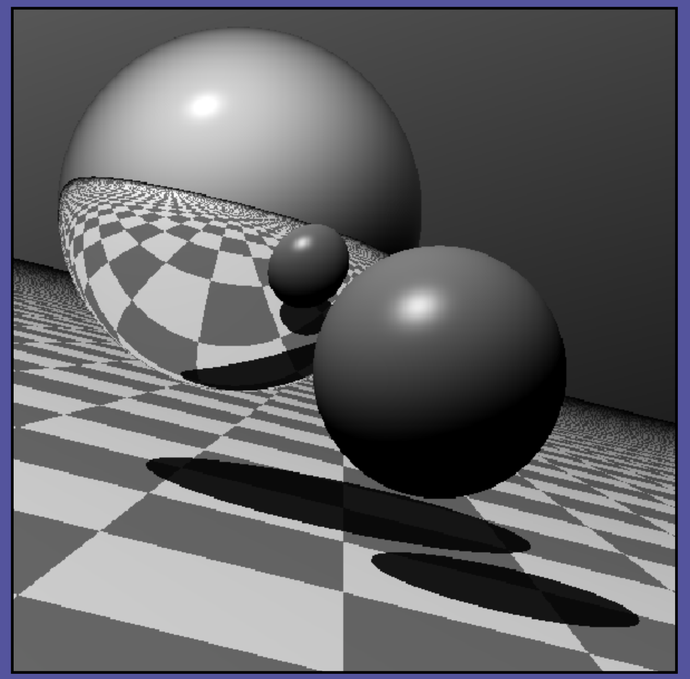


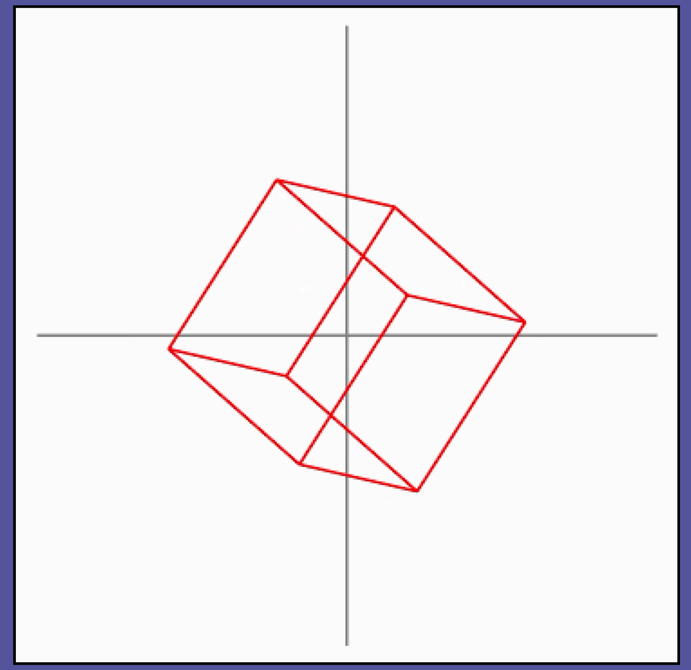
Non-blocking Input

MIDI Sound

Obfuscation
and code
minimization

4. Golfing





Gambiarra Spirit

Constrains and limited ressources foster problem solving and **creativity**

We've twisted a **page description language** meant for 80s printers to create **interactive games**

seriot.ch