PICO-8 Cheat Sheet

SPECIFICATIONS

```
Display: 128x128,16-cols
Input: 6-Button controllers
Carts: 32k data enc.PNG files
Sound: 4-channel,64 chip blerps
Code:  Lua subset
       (Max 8192 code tokens)
CPU:   8MHz,4M lua vm insts/sec
Sprite:1 bank of 128 8x8 SPR's
       (+ 128 shared)
Map:   128x32 Tilemap
       (+ 128x32 shared)
```

CONTROLS
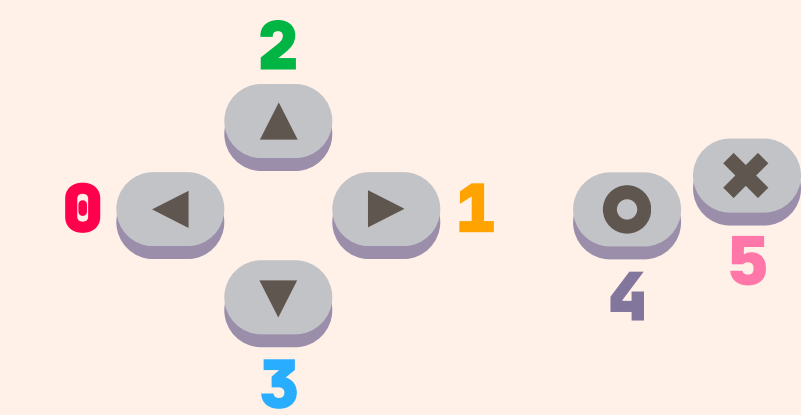
```
P1:▲▼◄► Z,X | C,V | N,M
P2:SFED LSHIFT,A | TAB,Q
PAUSE: P/ENTER
BTN([I],[P])
BTNP([I],[P])
```

COMMAND LINE

```
HELP
SAVE <FILENAME>.P8 /.PNG
LOAD <FILENAME>.P8
RUN([PARAM])    IMPORT S.PNG
S/SPLORE  EXPORT X.BIN/X.HTML
FOLDER   MKDIR <DIR_NAME>
LS([DIR]) CD   CLS    INFO
SHUTDOWN  REBOOT
SAVE/LOAD("@CLIP")
SAVE("@URL") -- P8 EDU URL
EXTCMD(CMD_STR,[P1],[P2])
```

FUNCTIONS

```
FUNCTION SUM(A,B) -- DECLARE
 RETURN A+B -- RETURN VALUE
END
```

PROGRAM STRUCTURE

```
_INIT()  -- 1X ON STARTUP
_UPDATE()    -- UPDATE @ 30FPS
_UPDATE60()  -- UPDATE @ 60FPS
_DRAW()  -- 1X/VISIBLE FRAME

#INCLUDE <FILE_NAME>.LUA
#INCLUDE ONETAB.P8:1
#INCLUDE ALLTABS.P8
```

COMMENTS & TYPES

```
-- THIS IS A COMMENT
--[[ THIS IS A MULTI-
LINE COMMENT ]]
O=NIL N=23    -- GLOBAL SCOPE
LOCAL S="TEXT"-- LOCAL SCOPE
```

TABLES

```
T={1,2,3,4}    T={A="X",B=1}
ADD(T,VAL,[I]) DEL(T,VAL)
DELI(T,[I])
PRINT(T[1]) -- 1-BASED
#T/COUNT(T[,VAL])
ALL(T)         FOREACH(T,F)
PAIRS(T)       IPAIRS(T)
T=PACK(...)
A,B,C=UNPACK(T,[I],[J])
```

FLOW CONTROL

```
::LABEL:: -- LABEL
GOTO LABEL -- JUMP
IF (TRUE) CLS() -- INLINE IF
IF <CONDITION> THEN
 -- IF BLOCK
ELSEIF <CONDITION> THEN
 -- ELSEIF BLOCK
ELSE
 -- ELSE BLOCK
END
WHILE <CONDITION> DO
 -- WHILE BLOCK
 BREAK -- EXIT LOOP EARLY
END
REPEAT
 -- REPEAT BLOCK
UNTIL <CONDITION>
FOR I=1,10 DO
 -- COUNT UP
 -- (DOWN:FOR I=10,0,-1 DO)
END
FOR V IN ALL(T) DO
 -- TABLE/ARRAY
END
FOR K,V IN PAIRS(T) DO
 -- TABLE: T[K]=V
END
```

OPERATORS

```
+   -   *   /   ^   %   =
+=  -=  *=  /=  ^=  %=
<   >   <=  >=  ==  ~=  !=
#LIST    "A".."B"
AND    OR    NOT
```

SHORTCUTS

```
-- COMMON
ALT+ENTER  Fullscreen
CTRL+R     Reload/Run
CTRL+S     Quick-Save
CTRL+M     Mute/Unmute
ENTER/P    Pause Menu
ESC        Console/Editor
CTRL+6     Save Screenshot
CTRL+7     Save Label Image
CTRL+8     Start GIF/video
CTRL+9     Save GIF/video
CTRL+P     Toggle CPU Meter
-- CODE EDITOR
CTRL+X,C,V Cut,Copy,Paste
CTRL+Z,Y   Undo,Redo
CTRL+F     Search
CTRL+G     Next Result
CTRL+H     Next Res(all tabs)
CTRL+L     Jump to Line No.
CTRL+▲,▼   Jump Start,End
ALT+▲,▼    Prev,Next Func()
CTRL+◄,►   Jump Word
CTRL+W,E   Start,End Line
CTRL+D     Duplicate Line
TAB        Indent Selection
SHIFT+TAB  Un-indent Sel.
CTRL+B     Un/Comment Block
CTRL+U     HELP for keyword
SHIFT+L,R,U,D,O,X:
CTRL+J     Hiragana
CTRL+K     Katakana
CTRL+P     Puny Font
CTRL+TAB   Next Tab
" +SHIFT   Prev Tab
-- SPRITE/MAP EDITOR
SPACE      Pan view
TAB        Fullscreen
Mousewheel Zoom
SHIFT+,/.  Zoom In/Out
F,V        Flip Y,X
R          Rotate
▲,▼,◄,►    Move
S          Select
-- DRAW TOOL
CTRL+LMB   Replace Col
RMB        Grab Col
CTRL+G     Toggle Gridlines
-- SFX/MUSIC EDITOR
SPACE      Play/Pause
SHIFT+LMB  Set all notes
◄,►        Modify speed
+,-        Prev/Next Pattern
a          Release Loop
```
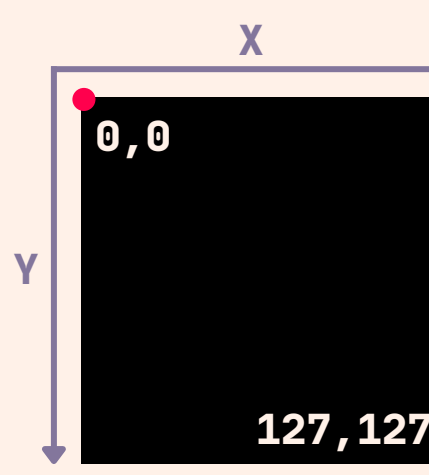
COL PALETTES

0	1	2	3		-16	-15	-14	-13
4	5	6	7		-12	-11	-10	-9
8	9	10	11		-8	-7	-6	-5
12	13	14	15		-4	-3	-2	-1

```
PAL(C0,C1,[P])--P:0=DRAW
PAL(TABLE,[P])--P:1=DISP
              --P:2=2ND PAL
PALT(COL, T) -- TRANS(BOOL)
```

SCREEN

```
CAMERA([X,Y])
CLS([COL])
COLOR([COL])
PGET(X,Y)
PSET(X,Y,[COL])
FLIP()
CLIP([X,Y,W,H,CLIP_PREV])
```
```
        X
  0,0 ┌──────┐
      │      │
    Y │      │
      │      │
      └──────┘ 127,127
```

SHAPES

```
CIRC(X,Y,R,[COL])
CIRCFILL(X,Y,R,[COL])
LINE(X0,Y0,X1,Y1,[COL])
OVAL(X0,Y0,X1,Y1,[COL])
OVALFILL(X0,Y0,X1,Y1,[COL])
RECT(X0,Y0,X1,Y1,[COL])
RECTFILL(X0,Y0,X1,Y1,[COL])
FILLP([MASK])
```

32768	16384	8192	4096
2048	1024	512	256
128	64	32	16
8	4	2	1
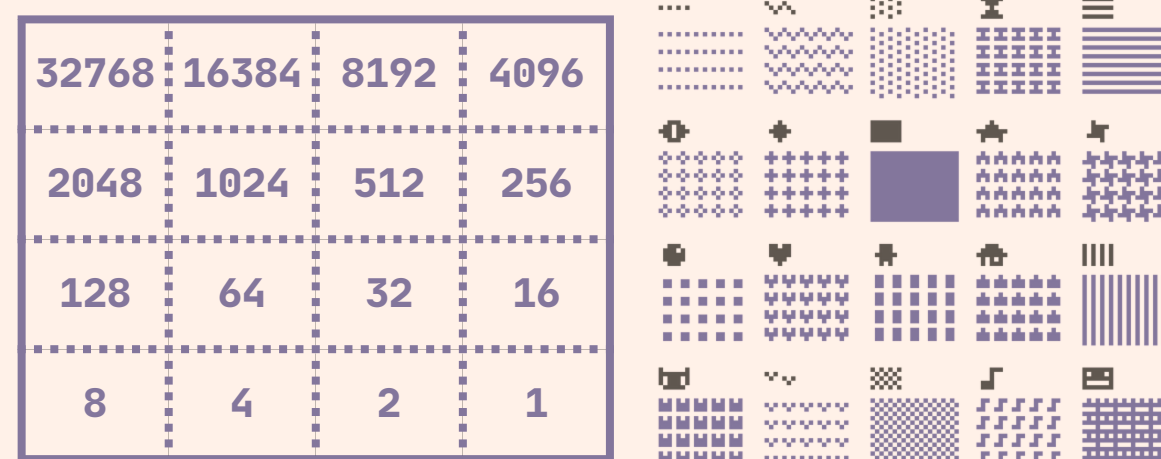
SPRITES

```
SPR(N,X,Y,[W,H,FLIP_X,FLIP_Y])
SSPR(SX,SY,SW,SH,DX,DY,
     [DW,DH,FLIP_X,FLIP_Y])
SGET(X,Y)      SSET(X,Y,[COL])
FGET(N,[F])    FSET(N,[F],V)
```
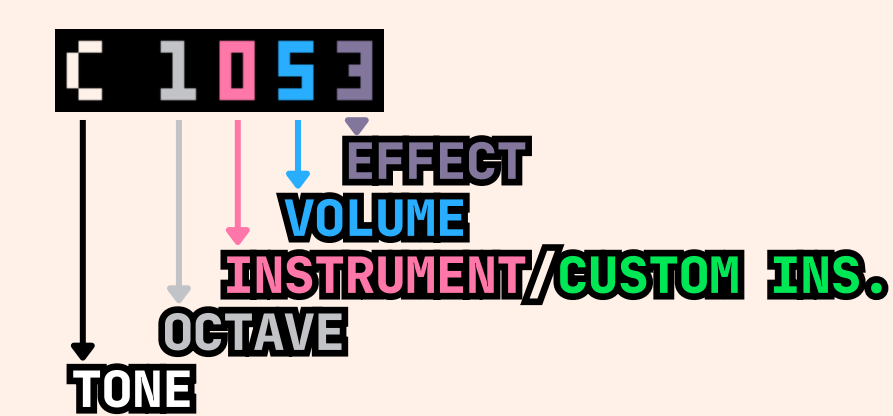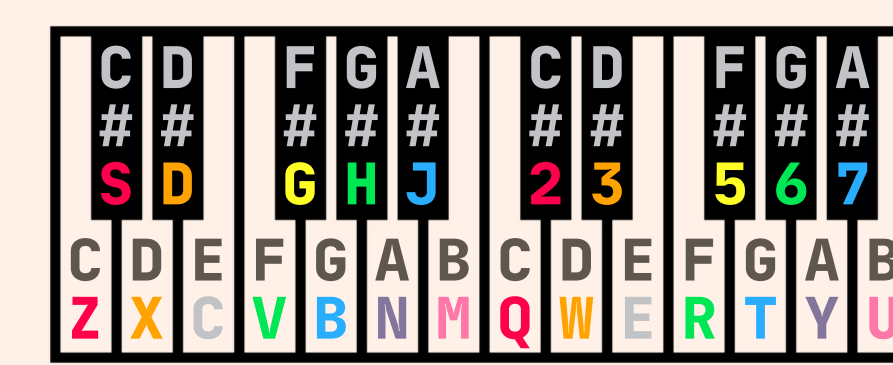
MAP

```
MAP(TILE_X,TILE_Y,[SX,SY],
    [TILE_W,TILE_H],[LAYERS])
MGET(X,Y)
MSET(X,Y,VAL)
TLINE(X0,Y0,X1,Y1,MX,MY,MDX,
      [MDY],[LAYERS])
```

AUDIO

```
SFX(N,[CH],[OFFSET],[LEN])
MUSIC([N,[FADE,[MASK]]])
```

TRACKER

```
C D  F G A  C D  F G A
 #  #  # #   #  #  # #
 S D  G H J  2 3  5 6 7
C D E F G A B C D E F G A
Z X C V B N M Q W E R T Y U
```
```
C 1 0 5 3
     EFFECT
   VOLUME
   INSTRUMENT/CUSTOM INS.
 TONE
OCTAVE
```

```
--INSTRUMENT   --EFFECT
0 Triangle     0 None
1 Tilt.Saw     1 Slide
2 Saw          2 Vibrato
3 Square       3 Drop
4 Pulse        4 Fade In
5 Organ        5 Fade Out
6 Noise        6 Arp Fast
7 Phaser       7 Arp Slow
```
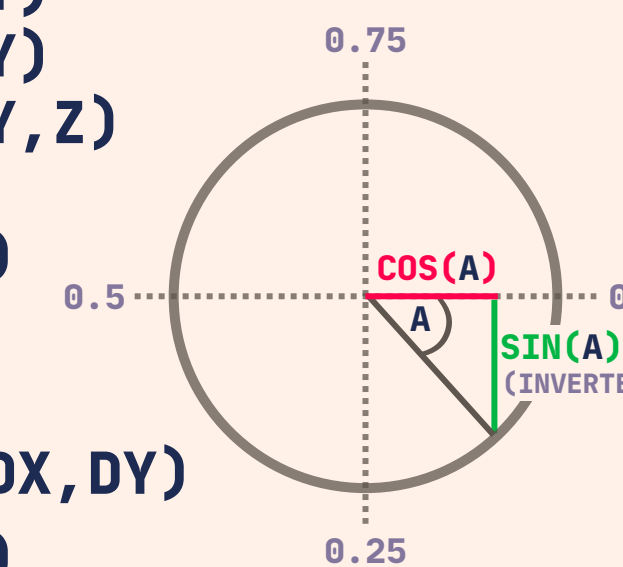
MATH

```
-- NUMERIC RANGE
-32768.0 .. 32767.99
MAX(X,Y)
MIN(X,Y)
MID(X,Y,Z)
FLR(X)
CEIL(X)
COS(X)
SIN(X)
ATAN2(DX,DY)
SQRT(X)
ABS(X)
RND(X)    -- 0 <= N < X
SRAND(X) -- SET RND SEED
SGN(X)    -- -1 OR 1
-- FUNC  -- OPERATOR
BAND(X,Y)      &
BOR(X,Y)       |
BXOR(X,Y)      ^^
BNOT(X)        ~
SHL(X,N)       <<
SHR(X,N)       >>
LSHR(X,N)      >>>
ROTL(X,N)      <<>
ROTR(X,N)      >><
```
```
        0.75
    0.5  COS(A)  0.0
        A SIN(A)
           (INVERTED)
        0.25
```

STRINGS & GLYPHS

```
S="HELLO"     S=[[HELLO
                MULTILINE]]
PRINT(S,[X,Y,COL])
?S,[X,Y,COL] -- SHORTHAND
#S           -- LENGTH
"STR=".."..S  -- CONCAT
CHR(VAL0,VAL1,...)
ORD(STR,[POS],[LEN])
SPLIT(STR,[SEP],[TO_NUM])
SUB(STR,POS0,[POS1])
TOSTR(VAL,[FLAGS])
TONUM(VAL,[FLAGS])
TYPE(VAL)
```

A ▪ = 0.5	N ♩ = -25792.5
B ▨ = 23130.5	O ⊡ = 4
C ▥ = 20767.5	P ✚ = -20032.5
D ▢ = 3	Q ▩ = -2560.5
E ▦ = 32125.5	R ▨ = 1
F ☝ = -18402.5	S ⚑ = -20128.5
G ⬇ = -1632.5	T ⊠ = 6943.5
H ♥ = 20927.5	U ◌ = 2
I ⬤ = -19008.5	V ◠ = -2624.5
J ✦ = -26208.5	W ◠◠ = 31455.5
K ⬆ = -20192.5	X ⊠ = 5
L ⬜ = 0	Y ☰ = 3855.5
M ▬ = -24351.5	Z ∥∥ = 21845.5

RAM MEMORY LAYOUT

```
0X0    GFX
0X1000 GFX2/Map2 (Shared)
0X2000 Map
0X3000 GFX Flags
0X3100 Song
0X3200 SFX
0X4300 User Data
0X5600 Custom Font (If def.)
0X5E00 Persistent Cart Data
0X5F00 Draw State
0X5F40 Hardware State
0X5F80 GPIO Pins (128 Bytes)
0X6000 Screen Data (8K)
0X8000 User Data
```

MEMORY FUNCTIONS

```
CSTORE(DEST,SRC,LEN,[FILENAME])
MEMCPY(DEST_ADDR,SRC_ADDR,LEN)
MEMSET(DEST_ADDR,VAL,LEN)
RELOAD(DEST,SRC,LEN,[FILENAME])
POKE(ADDR,VAL1[,VAL2,...])
PEEK(ADDR,[N])  -- @ADDR
PEEK2(ADDR)     -- %ADDR
POKE2(ADDR,VAL)
PEEK4(ADDR)     -- $ADDR
POKE4(ADDR,VAL)
SERIAL(CH,ADDR,LEN)
```

COROUTINES

```
C=COCREATE(FUNC)
CORESUME(C,[...])  COSTATUS(C)
YIELD()
```

SYSTEM & DEBUG

```
TIME()/T()
ASSERT(CONDITION,[MESSAGE])
PRINTH(STR,[FILE],[O/W],[DESK])
STOP([MESSAGE])
RESUME() -- "."=Frame-by-Frame
TRACE([C],[MESSAGE],[SKIP])
STAT(X) -- Status of X:
 0 Mem Usage    1 CPU Used
 4 Clipboard    6 Param str
 7 Curr fps    30 Keypressed
31 Key char    32,33 Mouse X,Y
34 Mouse btns  36 Mouse Wheel
38,39 Rel.X,Y move (Req. 0x4)
46..49 Curr SFX (CH 0..3)
50..53 Curr Note (CH 0..3)
54 Patt.Idx    55 Patt.Played
56 Patt.Ticks  57 Music Playing
80..85 UTC Time (Y,M,D,H,M,S)
90..95 Local Time
100 Breadcrumb Label
110 Frame-by-Frame Mode
```

CARTRIDGE DATA

```
-- GAME SAVES
CARTDATA("ID")
DGET(I)   -- 0..63
DSET(I,VAL)
```

SYSTEM FLAGS

```
POKE(0x5F2D,FLAGS)
-- DEVKIT MODE FLAGS:
 0x1 Enable
 0x2 Mouse buttons>btn()
 0x4 Pointer lock
POKE(0x5F5C,D)--BTNP 1X DELAY
POKE(0x5F5D,D)--REPEAT DELAY
POKE(0x5F34,1)--INT.FILLP
POKE(0x5F36,0x8)--DRAW SPR 0
```