Retrocomputing with RISC-V as a Learning Plataform

Jecel Assumpção Jr
Mario Gazziro

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Motivation

Robotics

IoT

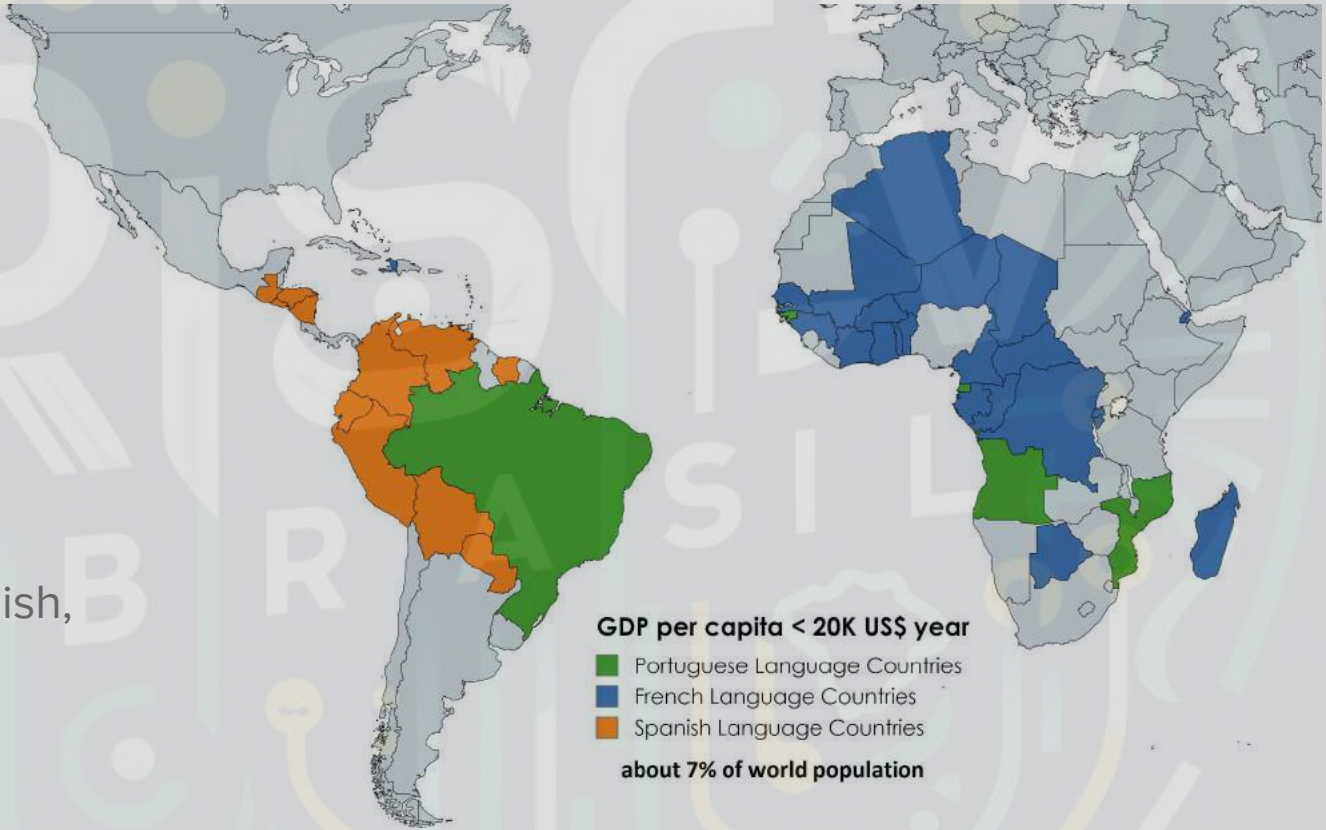
Videogames

AI

Students trying our console here, in RISC-V Eldorado

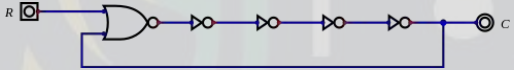
Target Audience

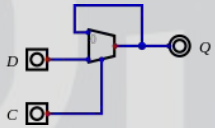
Portuguese, Spanish, French, English

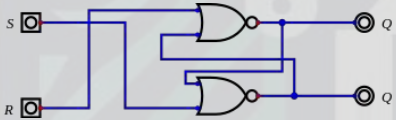


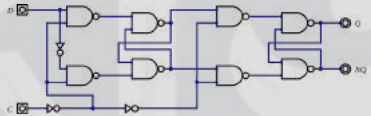
Building Blocks

Combinational Logic Circuits

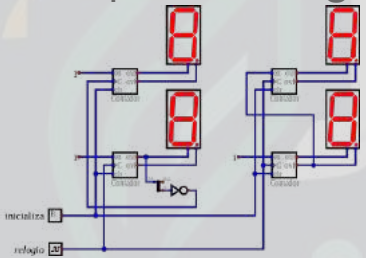


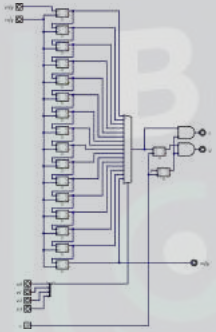


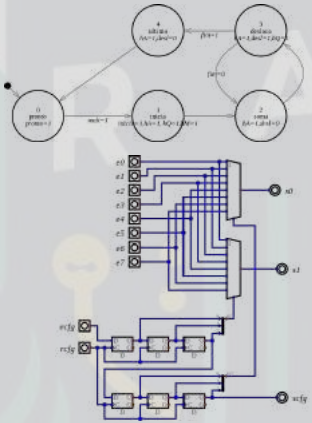


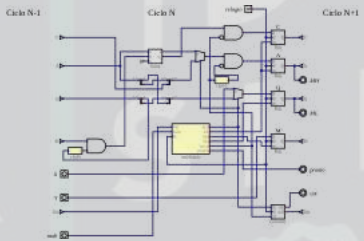


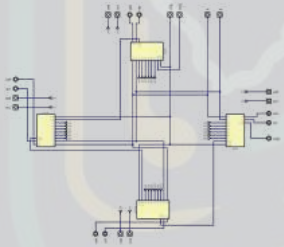
Sequential Logic Circuits

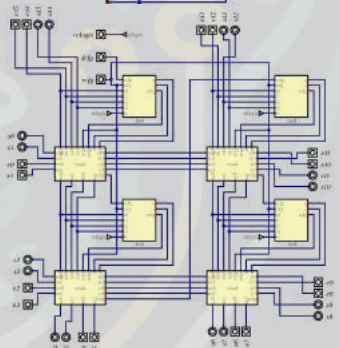




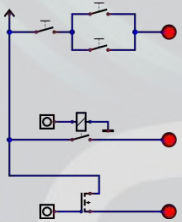


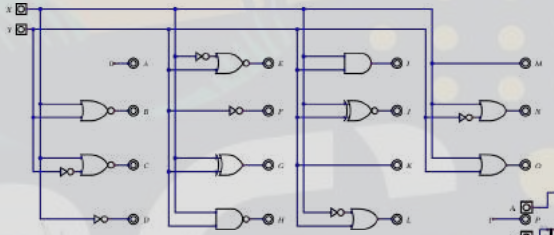


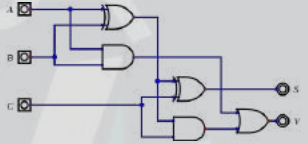


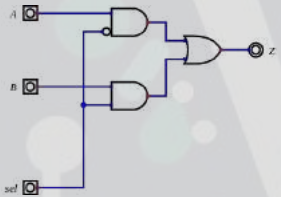


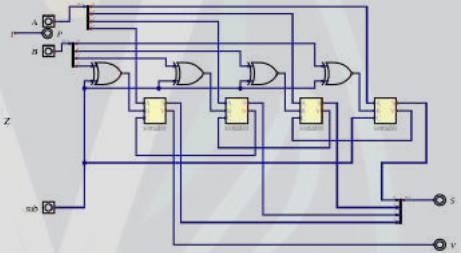
FPGAs

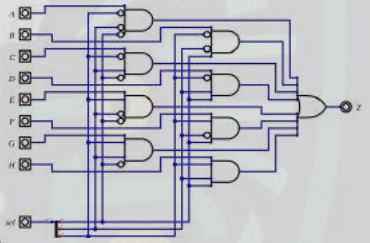




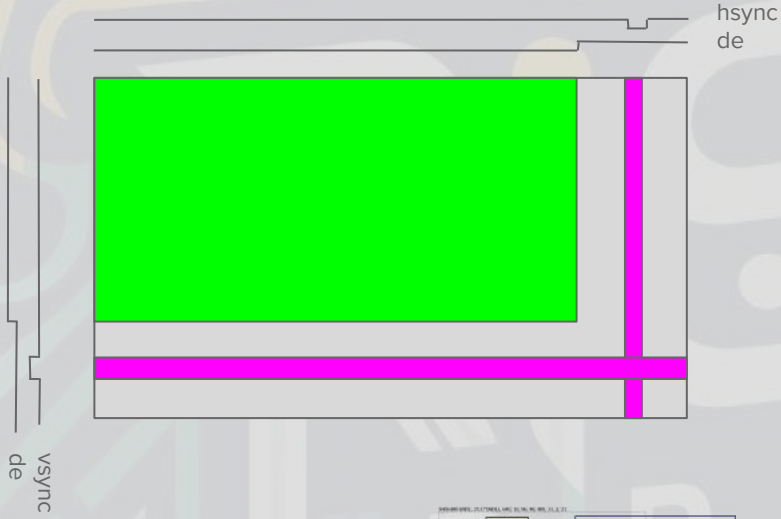








Video


hsync
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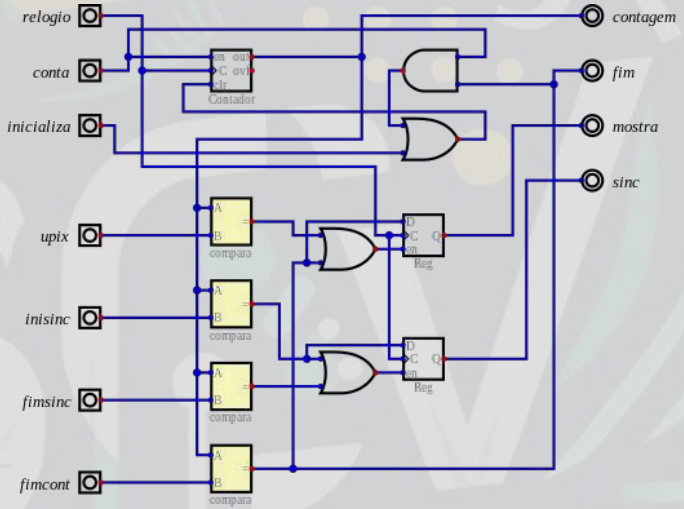
vsync
de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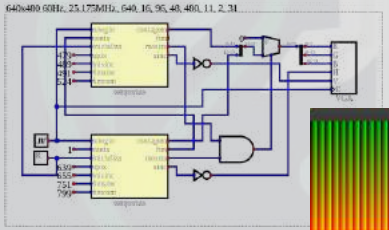
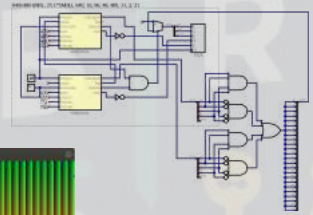
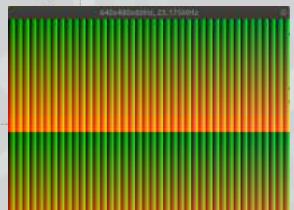
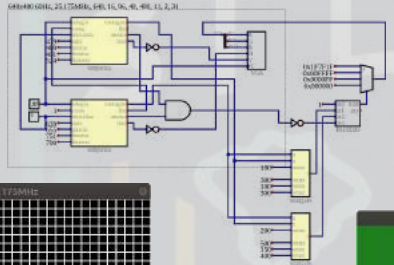
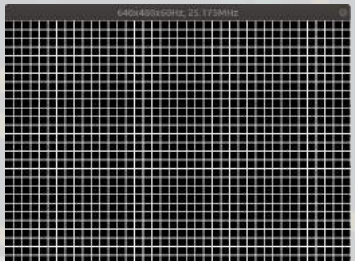
conta
inicializa
upix
inisinc
fimsinc
fimcont
contagem
fim
mostra
sinc
Contador
compara
Reg

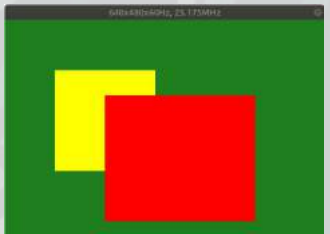




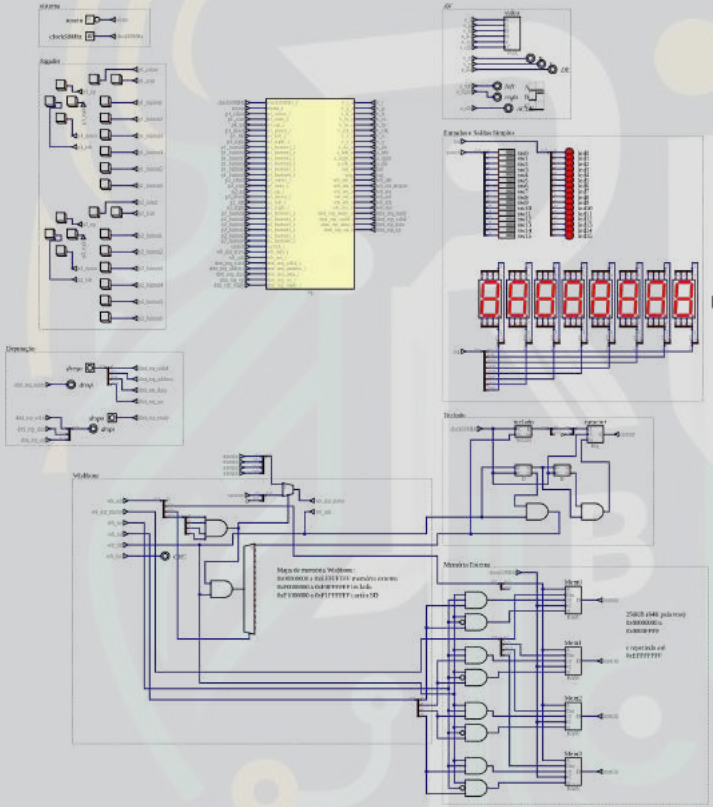


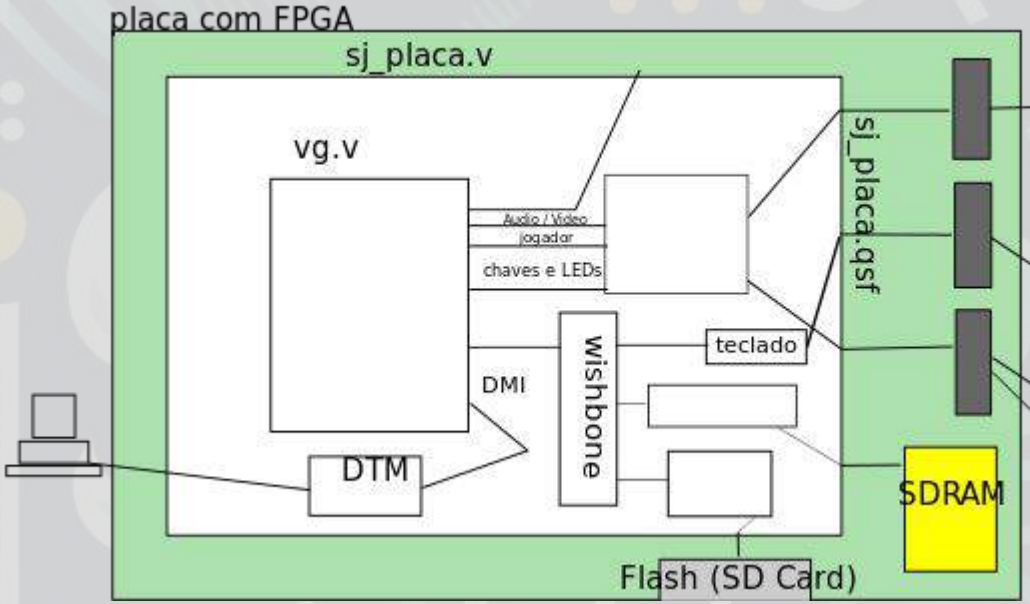






Shin JAMMA





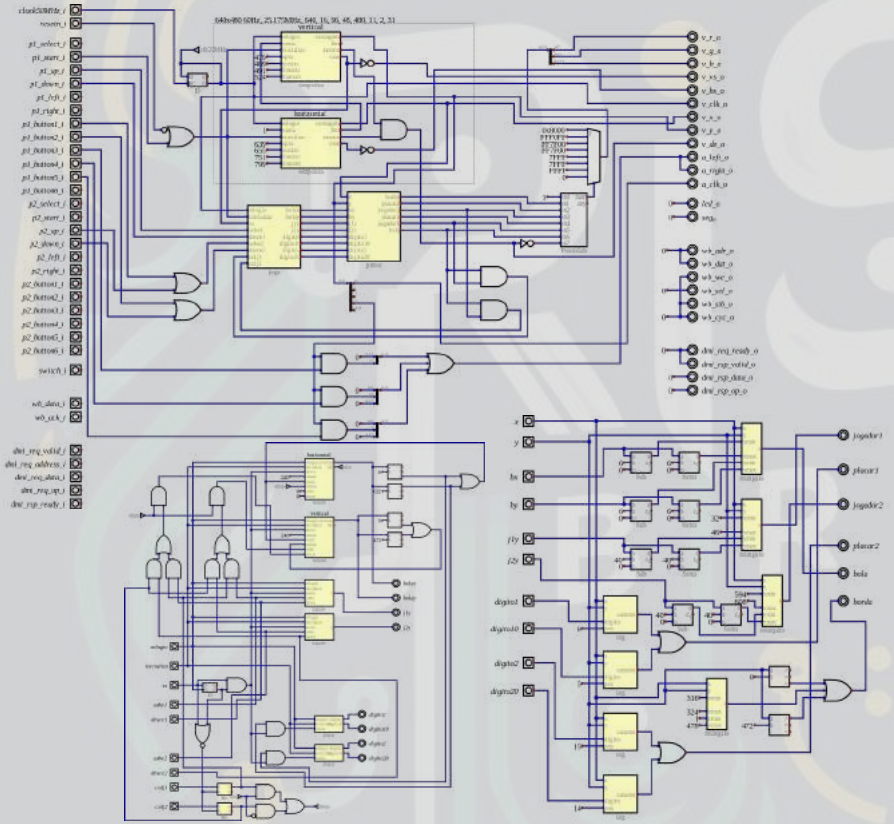
Sipeed Tang Nano 20K

Arty A7-35T

Terasic DE0

Terasic DE0-Nano

First Generation (Retro)



First Generation (Vintage)

Manavox 1972

Atari Home Pong 1975

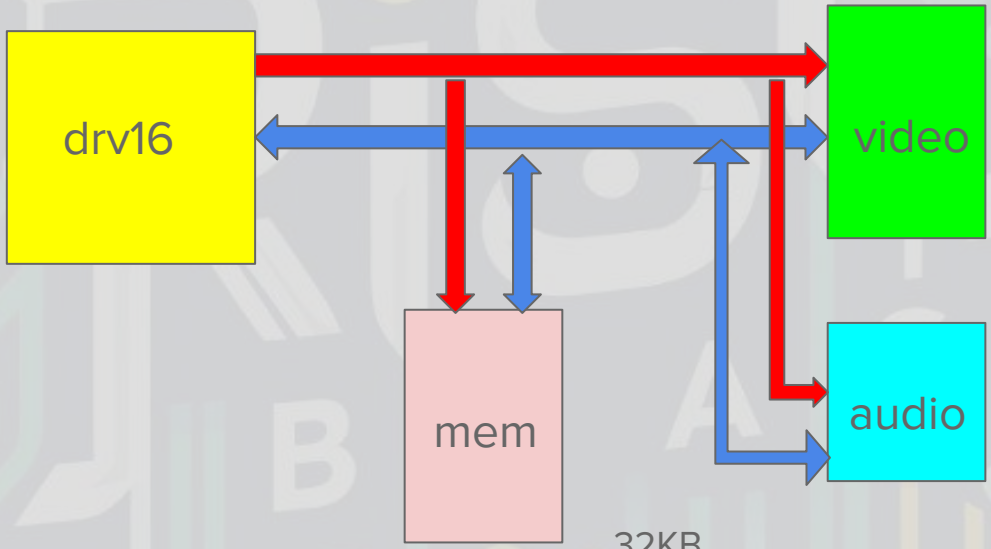
Nintendo TV-Game 1977

Coleco Telstar 1976

Philco-Ford Telejogo (1977)

Philco-Ford
Telejogo II (1979)

Second Generation (Retro)

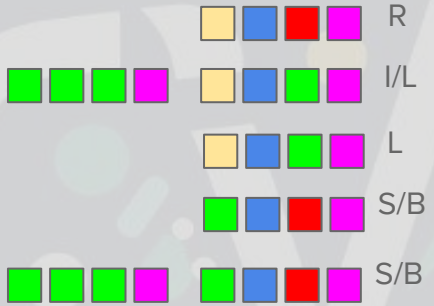


40x30 text
32 sprites
1 bit per pixel

3 voices:
Pulse, Triangle,
Sawtooth, Noise

drv16 and drv32I processors

state



	xx00	xx01	xx10	xx11
00xx		AND ANDI	OR ORI	XOR XORI
01xx	JAL	ADD ADDI	SUB SUBI	SLT SLTI
10xx	JALR	LH	LB	LBU
11xx	SH	SB	BEQ BNE	BLT BGE

OP codes

Second Generation (Vintage)

Fairchild
Channel F 1976
F8 1.79MHz 2KB

Atari
2600 1977 (1983)
6507 1.19MHz 128

Bally
Astrocade 1978
Z80 1.79MHz 4KB

Philips/Magnavox
Odyssey^2 1978 (1983)
8048 1.79MHz 192

Mattel
Intellivision 1980
(1984)
CP1610 2MHz 1.4KB

Emerson
Arcadia 1982
2650 3.58MHz 512

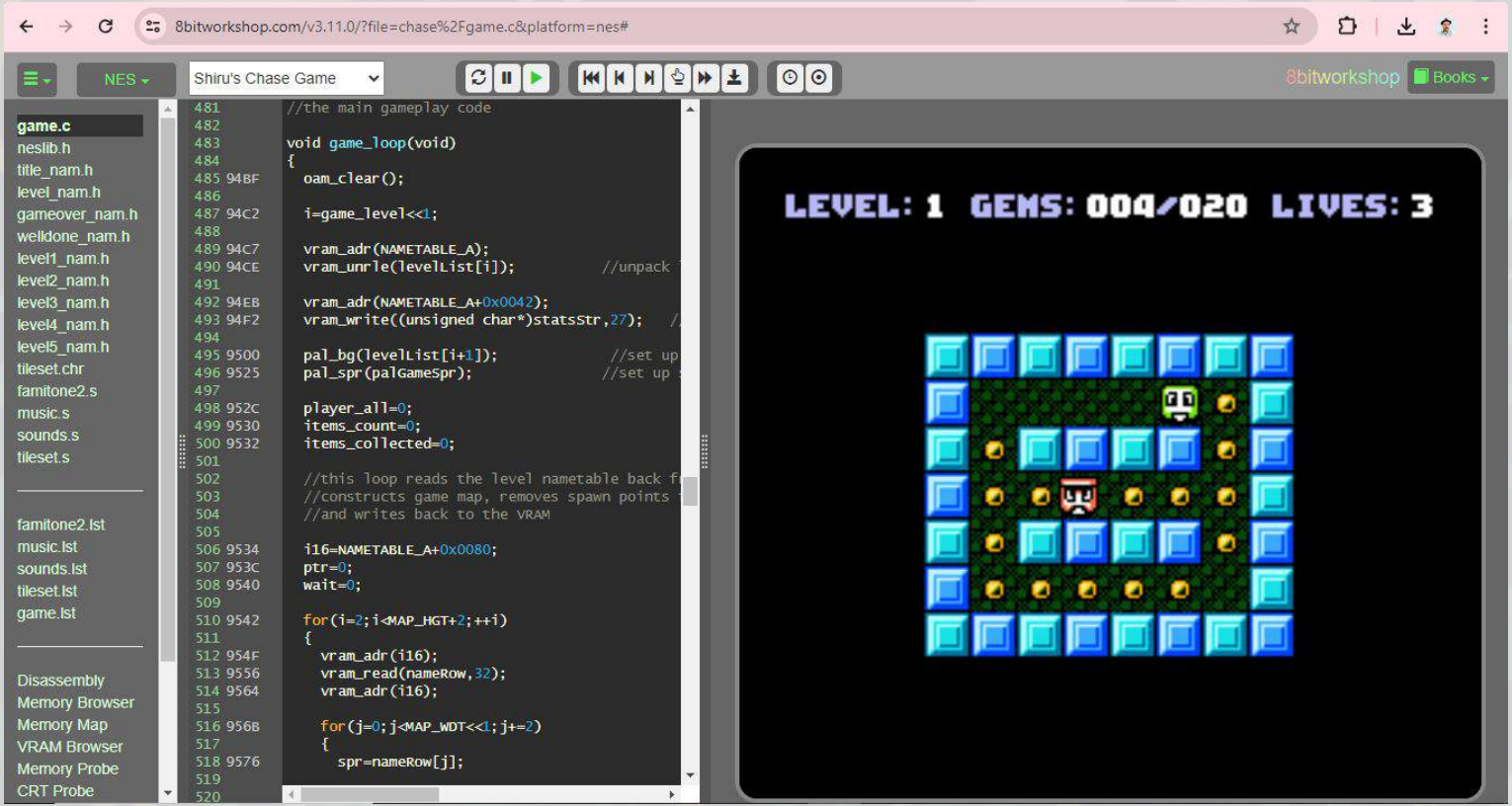
Coleco
ColecoVision 1982
Z80 3.58MHz 17KB

GCE/Milton Bradly
Vectrex 1982
6809 1.5MHz 1KB

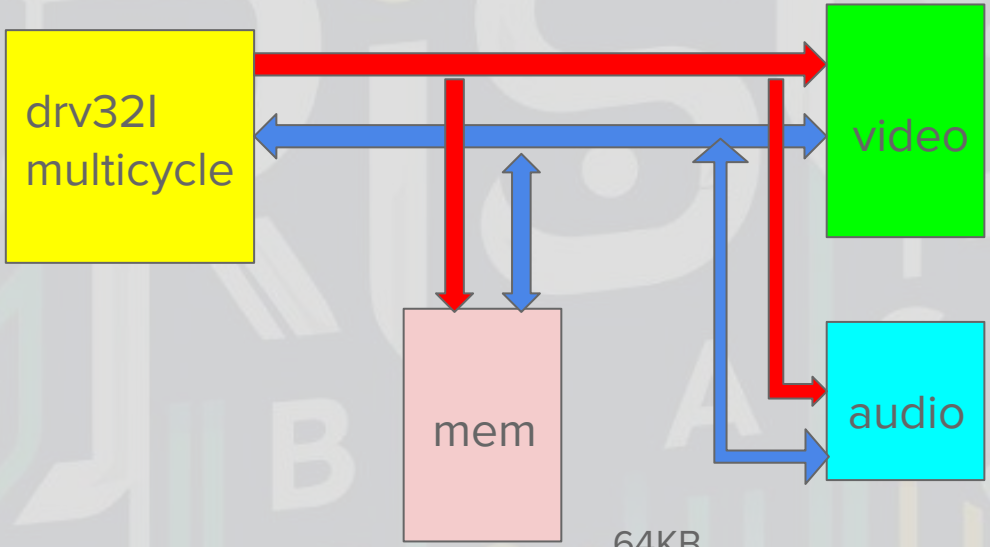
Sharp
HotBit (1985)
Z80 3.58MHz 80KB

Gradiente
Expert (1985)
Z80 3.58MHz 80KB

8 Bit Workshop



Third Generation (Retro)



40x30 text with
h&v scroll
32 sprites
2 bits per pixel

3 voices:
Pulse, Triangle,
Sawtooth, Noise
FM:
26 operators

Third Generation (Vintage)

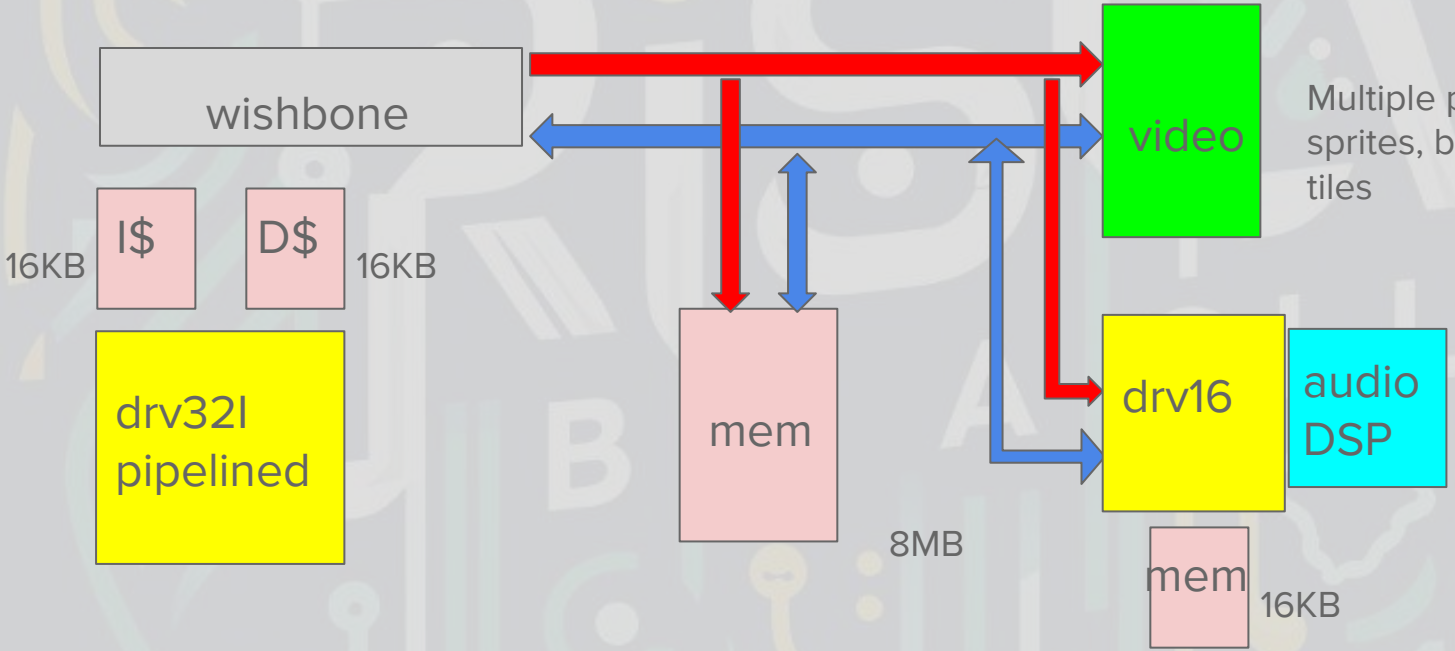
Sega
SG-1000 1983
NEC 780C 3.58MHz
9918, 76489
3KB

Nintendo
Famicom 1983/
NES 1985 (1985)
2A03 1.79MHz
PPU
4.3KB

Sega
Mark III 1985/
Master System
1986 (1989)
Z80 3.58MHz
YM2602, 76496
24KB

Atari
7800 1986
6502C 1.79MHz
MARIA
4KB

Fourth Generation (Retro)



Fourth Generation (Vintage)

Plus
CD-ROM!

NEC
PC-Engine 1987
HuC6280A
1.79MHz/7.16MHz
HuC6260+HuC6270A,
HuC6280A
72KB

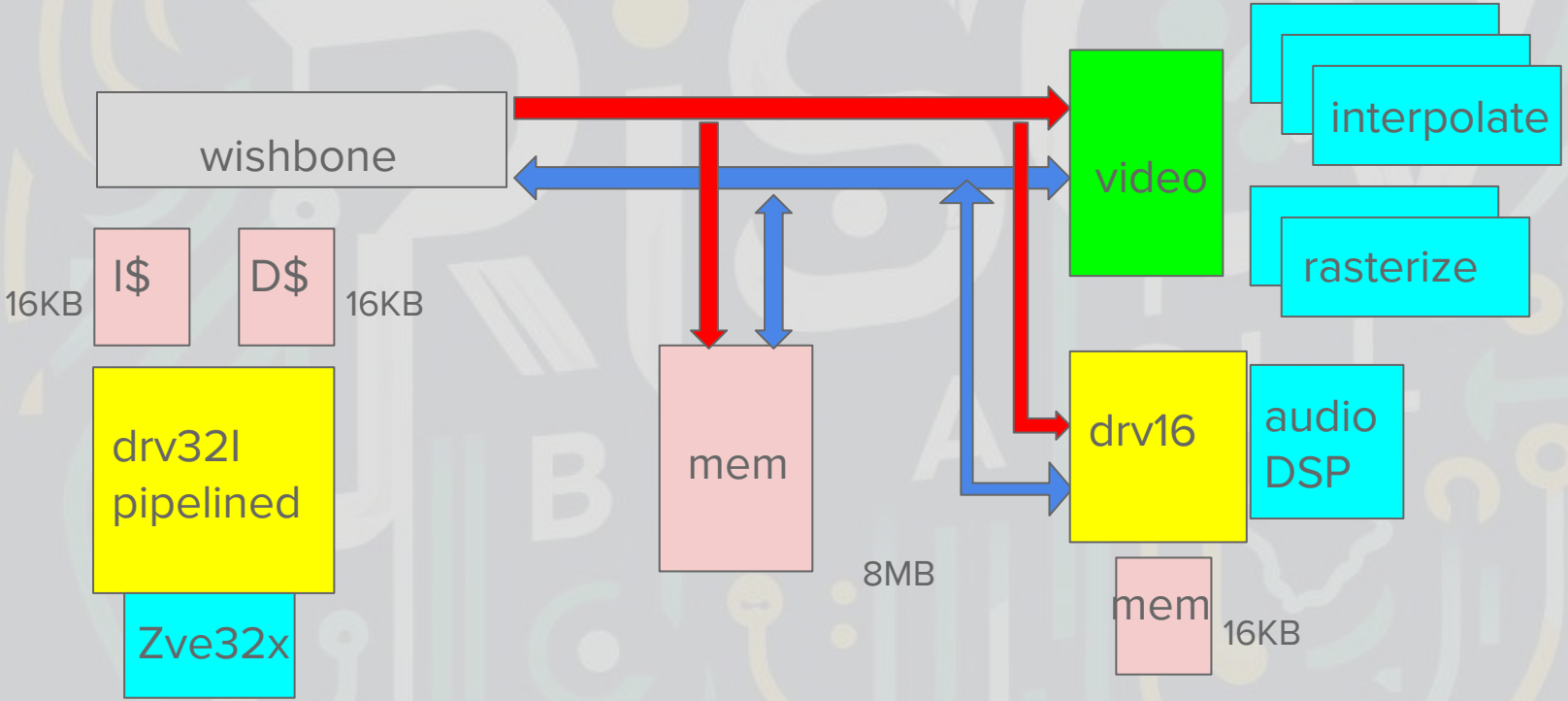
NEC
SuperGrafx 1989
HuC6280A
1.79MHz/7.16MHz
HuC6260+2xHuC6270A,
HuC6280A
160KB

Sega
Mega Drive 1988/
Genesis 1989
68000 7.67MHz,
Z80 3.58MHz
YM7101, YM2612
136KB

Nintendo
Super Famicom 1990/
Super Nintendo 1991
5A55 3.58MHz
PPU1+PPU2, APU
256KB

SNK
Neo Geo 1991
68000 12MHz,
Z80 4MHz
LSPC2-A2+
PRO-B0,
YM2610
140KB

Fifth Generation (Retro) ??



Fifth Generation (Vintage)

3DO
various 1994
ARM60
12.5MHz
2x Video
Coprocessors,
DSP
3MB

Atari
Jaguar 1993
68000 13.3MHz,
TOM 26.59MHz,
Jerry 26.59MHz
2MB

Sega
Saturn 1994
2x SH-2
28.63MHz,
SH-1 20MHz,
68EC000 11.3MHz
VDP1+VDP2,
YMF292
4.5MB

Sony
PlayStation
1994
MIPS R3051
33.87MHz
GPU,
SPU
3.6MB

Nintendo
Nintendo 64
1996
MIPS VR4300
93.75MHz
Reality
Coprocessor
4MB

Thanks!

Online copy of the book and project sources:

https://github.com/jeceljr/LivroComputadoresEVideogames