Novosibirsk State University

Course Project

”The Snake” game

Made by:

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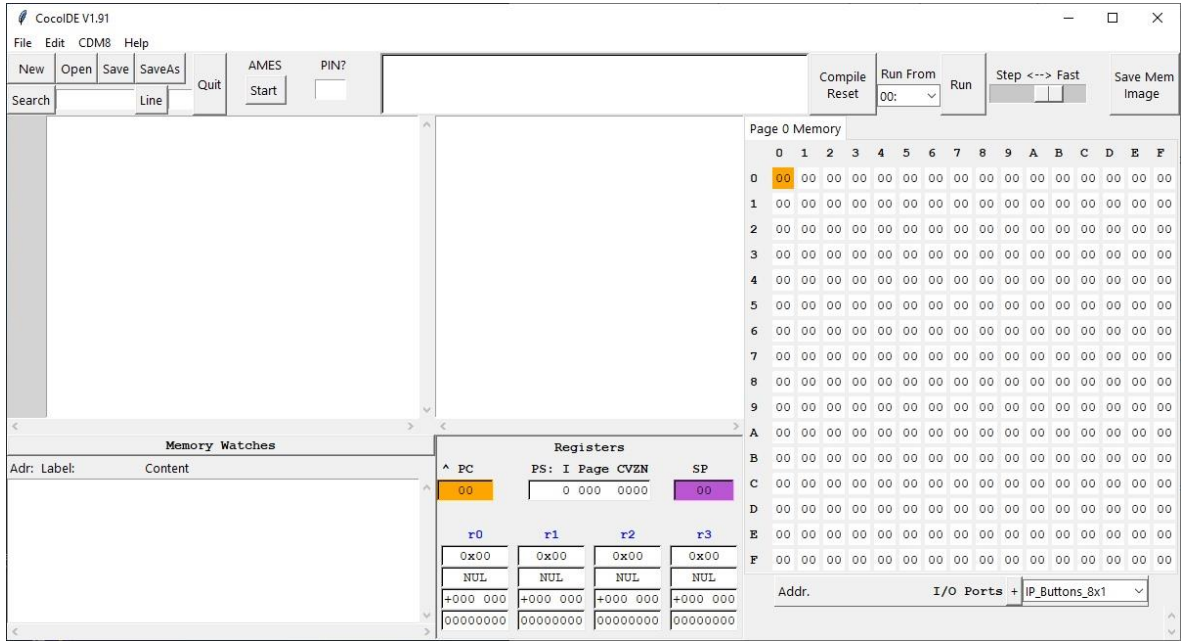
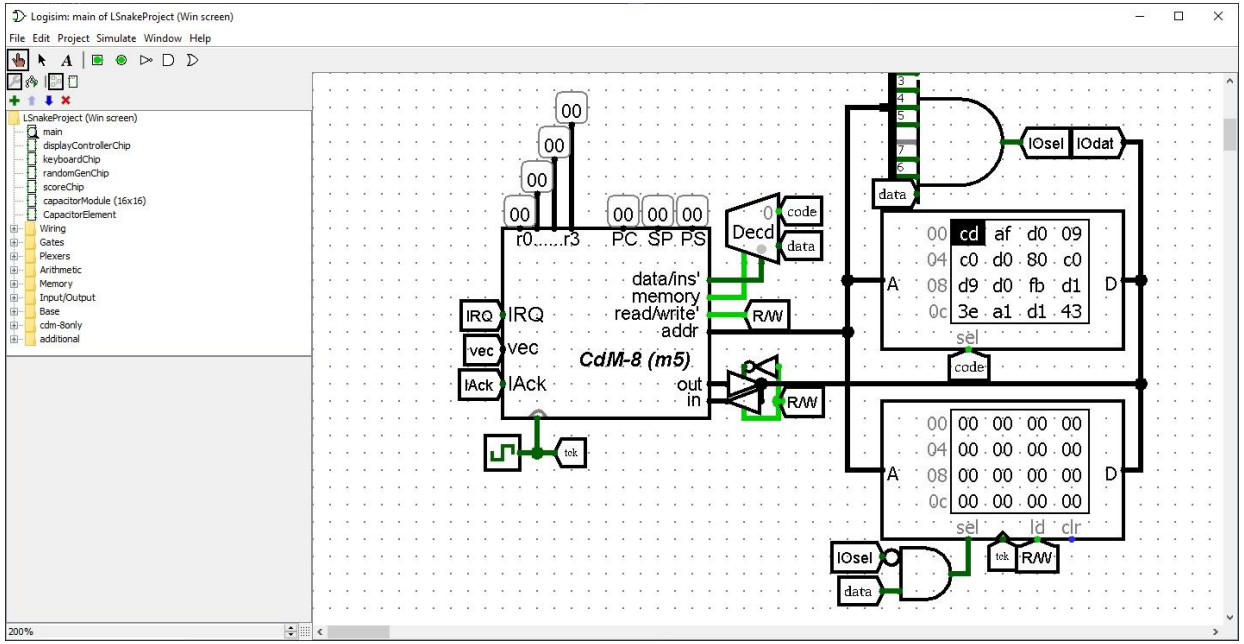
Concept

- Moving around playing field
- The generating apples
- Eating apples
- Bumping into tail or into borders
- Defeat
- Victory
- Moving “inside itself”

We used

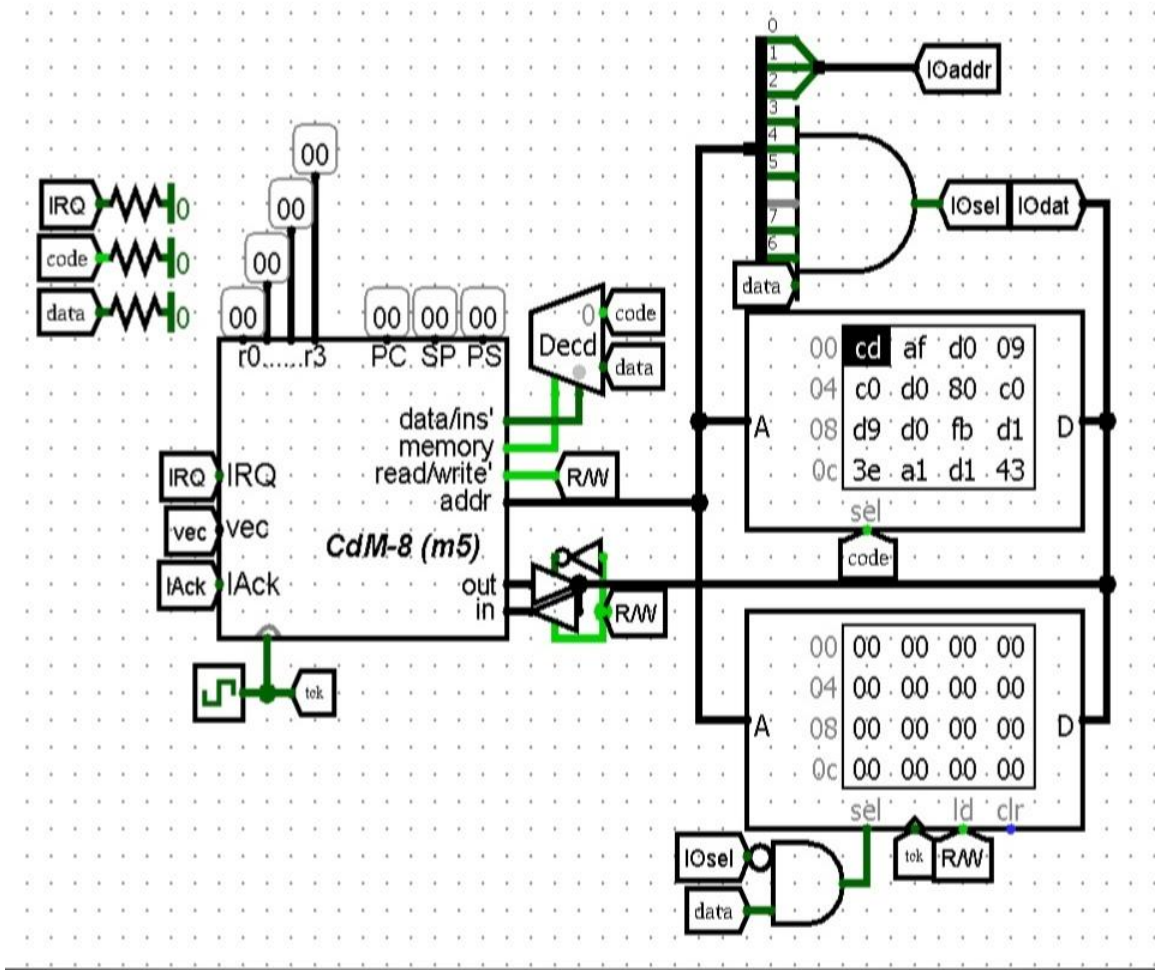

CocoIDE V1.91
File Edit CDM8 Help
New Open Save SaveAs Quit
AMES Start
PIN?
Search Line
Compile Reset
Run From 00:
Run
Step <--> Fast
Save Mem Image
Page 0 Memory
Memory Watches
Adr: Label: Content
Registers
^ PC
PS: I Page CVZN
SP
r0 r1 r2 r3
Addr.
I/O Ports
IP_Buttons_8x1

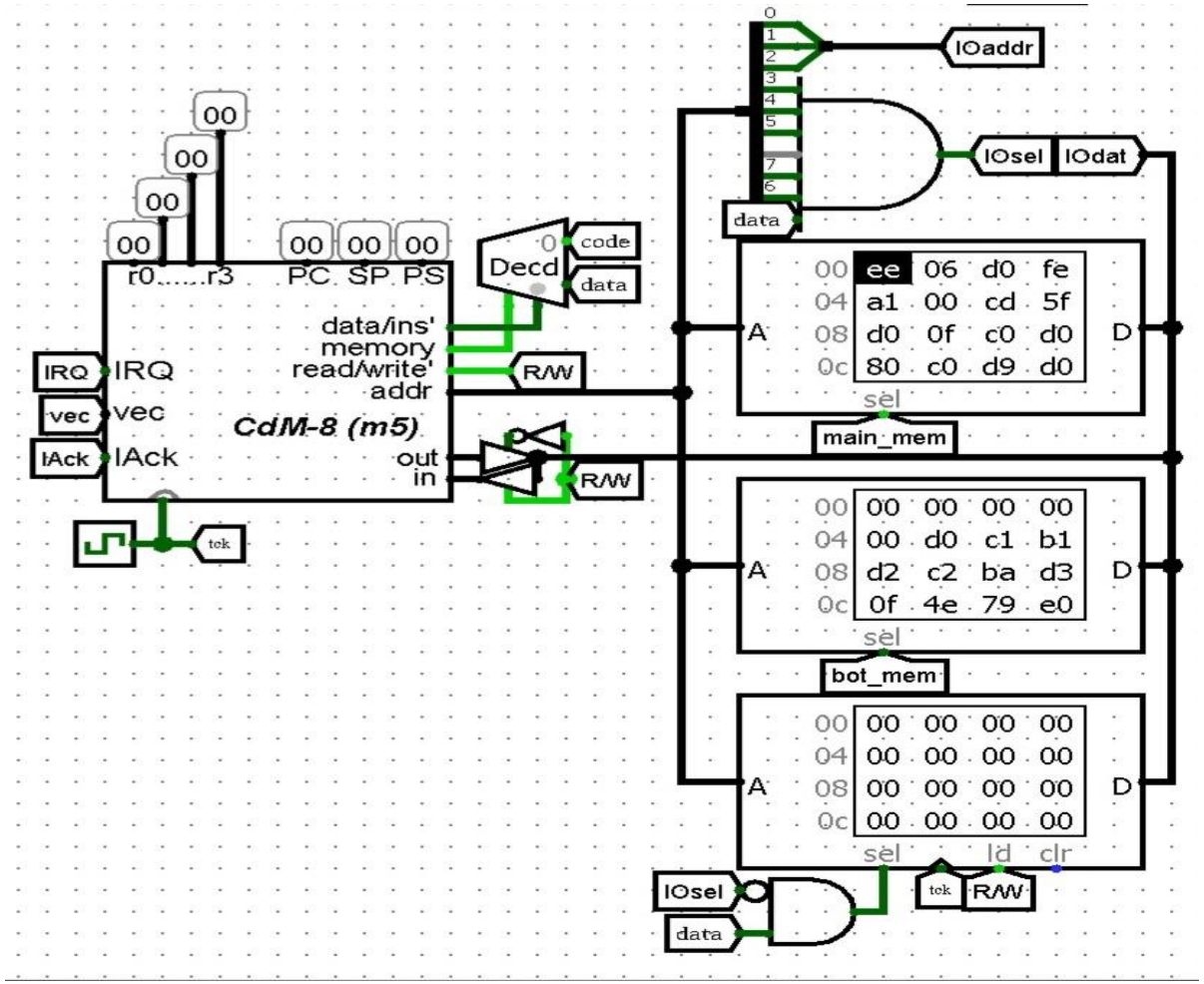

Logisim: main of LSnakeProject (Win screen)
File Edit Project Simulate Window Help
LSnakeProject (Win screen)
main
displayControllerChip
keyboardChip
randomGenChip
scoreChip
capacitorModule (16x16)
CapacitorElement
Wiring
Gates
Plexers
Arithmetic
Memory
Input/Output
Base
cdm-8only
additional
r0.....r3
PC SP PS
Decd
code
data
data/ins'
memory
read/write'
addr
R/W
IRQ
vec
IAck
CdM-8 (m5)
out
in
tck
IOsel
IOdat
sel
ld
clr
200%

Versions

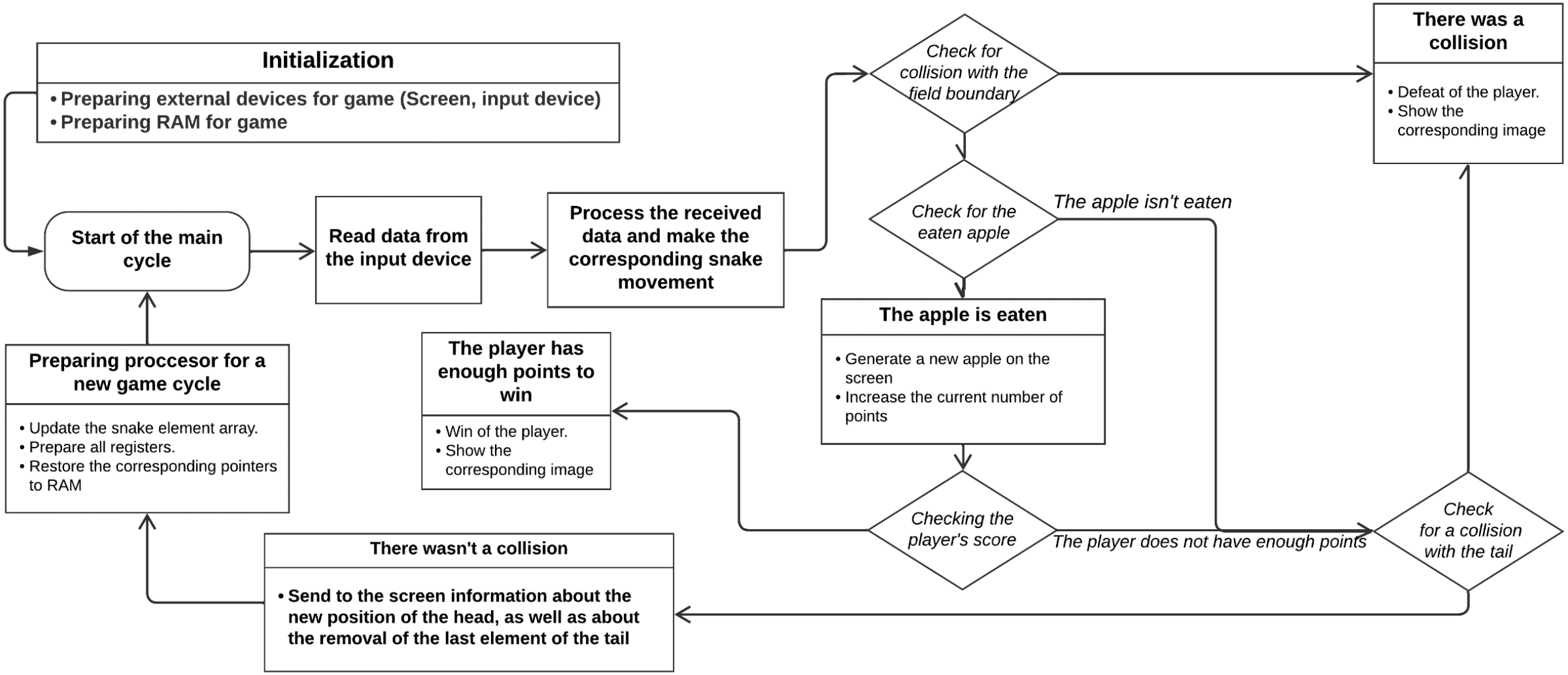
Software version
Game rules - software
Hardware version
Game rules - hardware
Bot version
Game rules - hardware

Processor

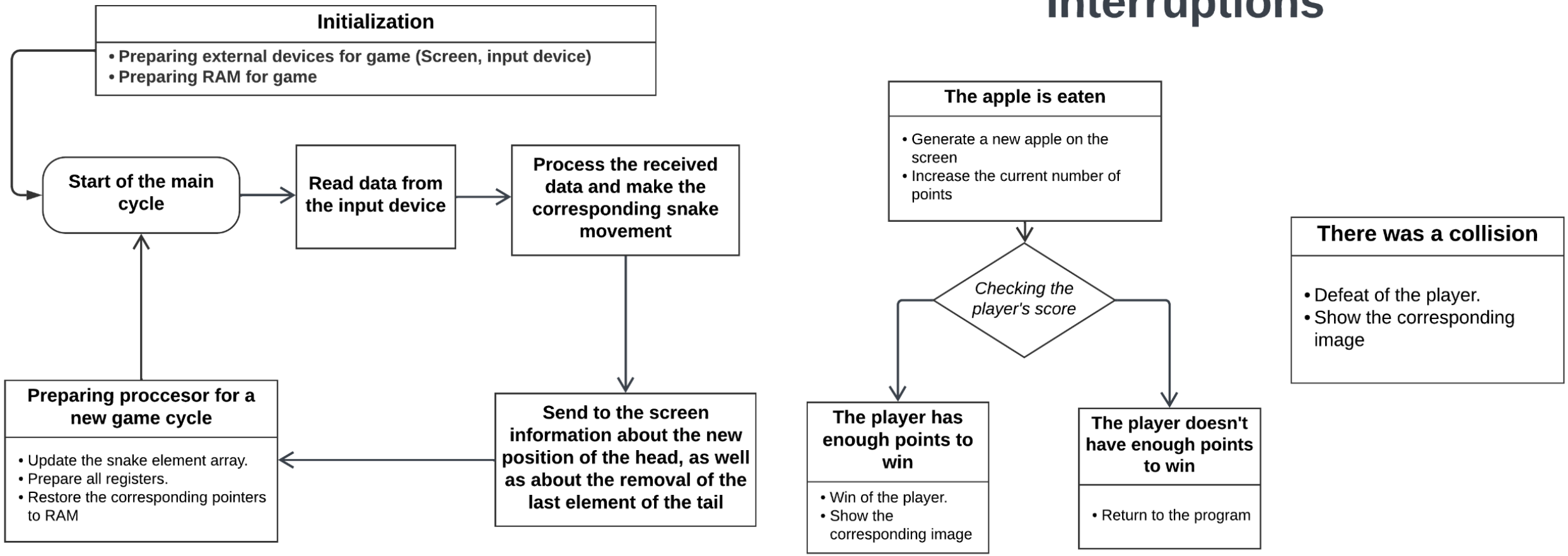

IRQ
code
data
00
r0.....r3
PC SP PS
Decd
data/ins'
memory
read/write'
addr
R/W
CdM-8 (m5)
vec
IAck
out
in
tck
IOaddr
IOsel
IOdat
A
D
sel
ld
clr
00 cd af d0 09
04 c0 d0 80 c0
08 d9 d0 fb d1
0c 3e a1 d1 43
00 00 00 00 00
04 00 00 00 00
08 00 00 00 00
0c 00 00 00 00


00
r0.....r3
PC SP PS
Decd
data/ins'
memory
read/write'
addr
R/W
CdM-8 (m5)
out
in
tck
IOaddr
IOsel
IOdat
A
D
sel
main_mem
bot_mem
00 ee 06 d0 fe
04 a1 00 cd 5f
08 d0 0f c0 d0
0c 80 c0 d9 d0
00 00 00 00 00
04 00 d0 c1 b1
08 d2 c2 ba d3
0c 0f 4e 79 e0
00 00 00 00 00
04 00 00 00 00
08 00 00 00 00
0c 00 00 00 00

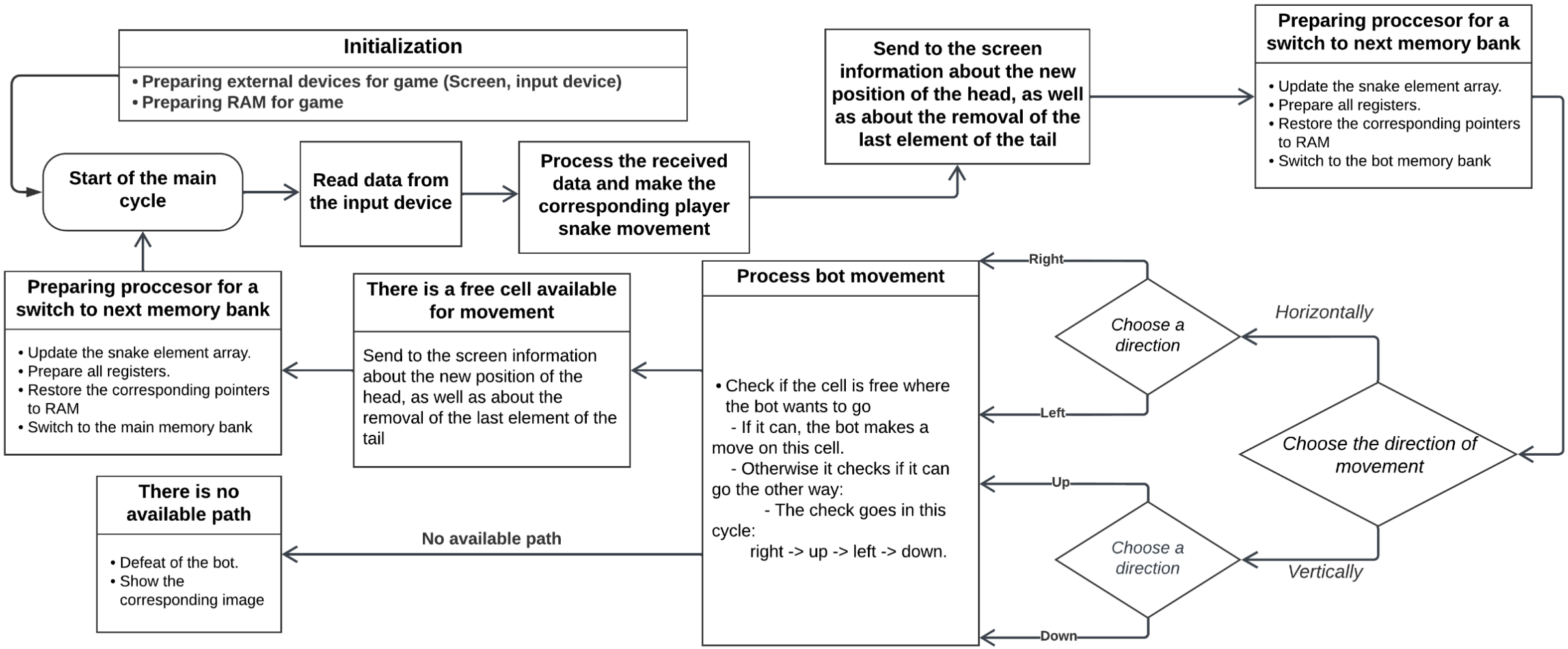
Software version



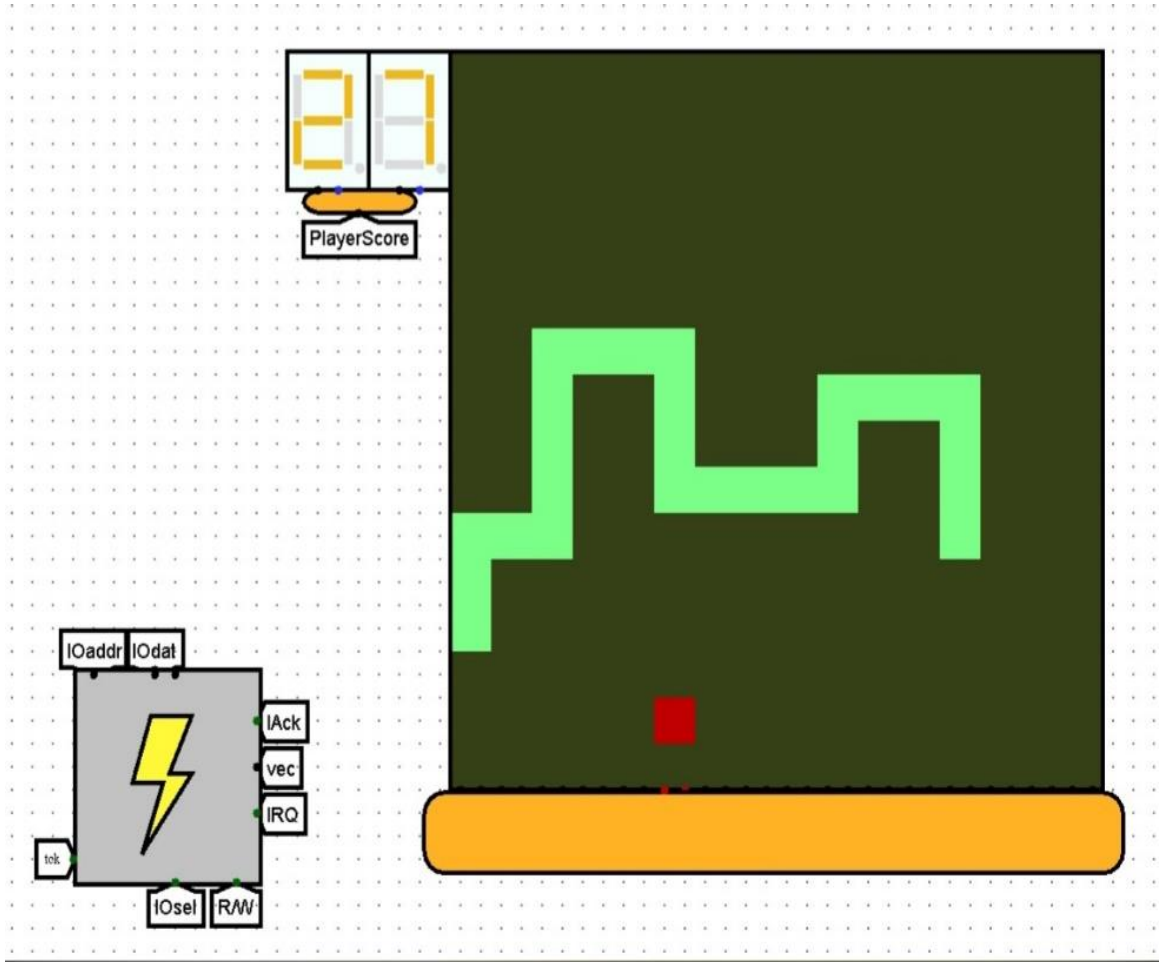
Hardware version

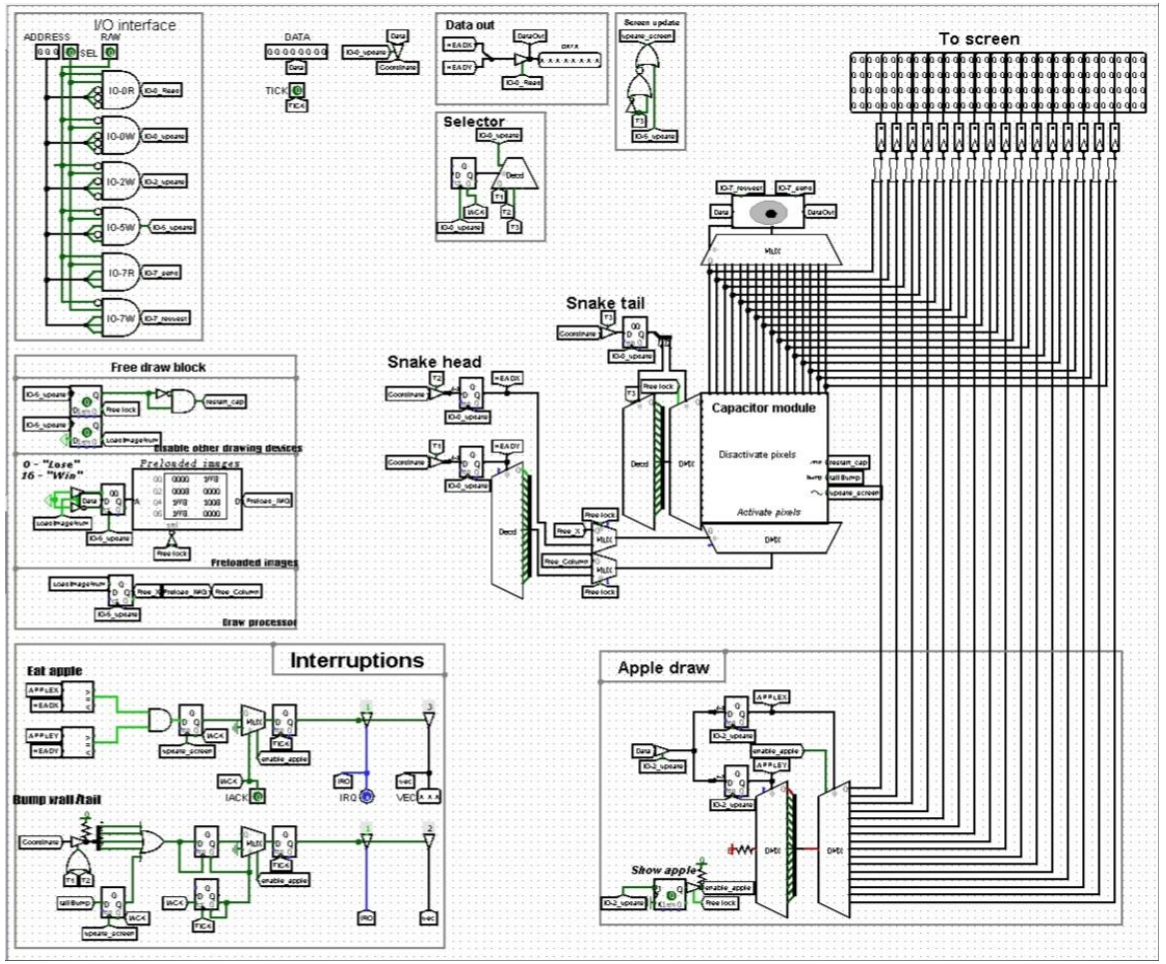


Bot version

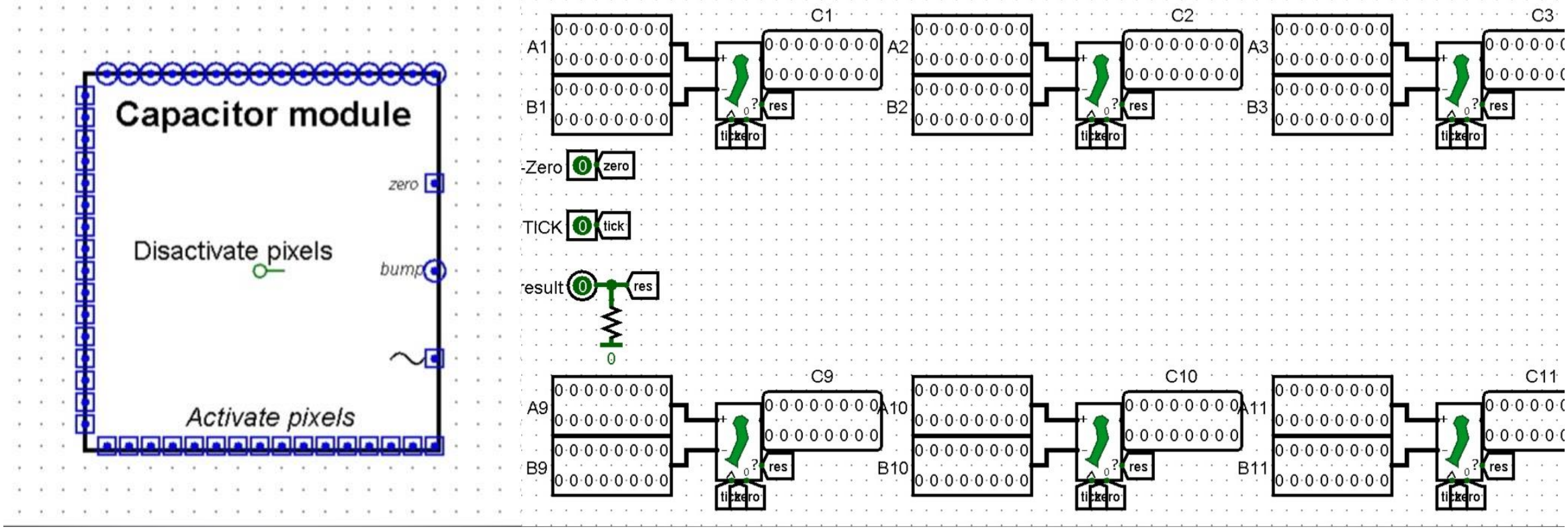

Initialization
• Preparing external devices for game (Screen, input device)
• Preparing RAM for game
Start of the main cycle
Read data from the input device
Process the received data and make the corresponding player snake movement
Send to the screen information about the new position of the head, as well as about the removal of the last element of the tail
Preparing proccesor for a switch to next memory bank
• Update the snake element array.
• Prepare all registers.
• Restore the corresponding pointers to RAM
• Switch to the bot memory bank
Process bot movement
• Check if the cell is free where the bot wants to go
- If it can, the bot makes a move on this cell.
- Otherwise it checks if it can go the other way:
- The check goes in this cycle:
right -> up -> left -> down.
Right
Left
Up
Down
Choose a direction
Horizontally
Choose the direction of movement
Choose a direction
Vertically
No available path
There is no available path
• Defeat of the bot.
• Show the corresponding image
There is a free cell available for movement
Send to the screen information about the new position of the head, as well as about the removal of the last element of the tail
Preparing proccesor for a switch to next memory bank
• Update the snake element array.
• Prepare all registers.
• Restore the corresponding pointers to RAM
• Switch to the main memory bank

Display

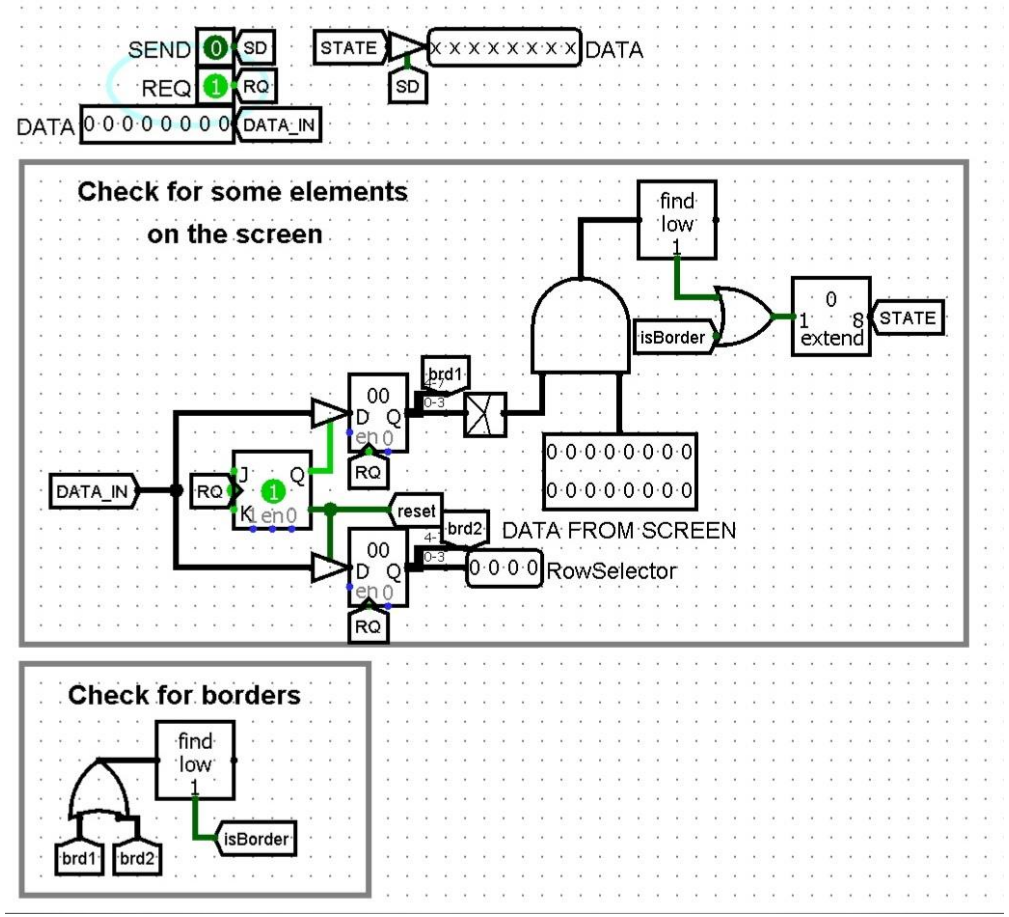

PlayerScore
IOaddr
IOdat
IAck
vec
IRQ
tck
IOsel
R/W

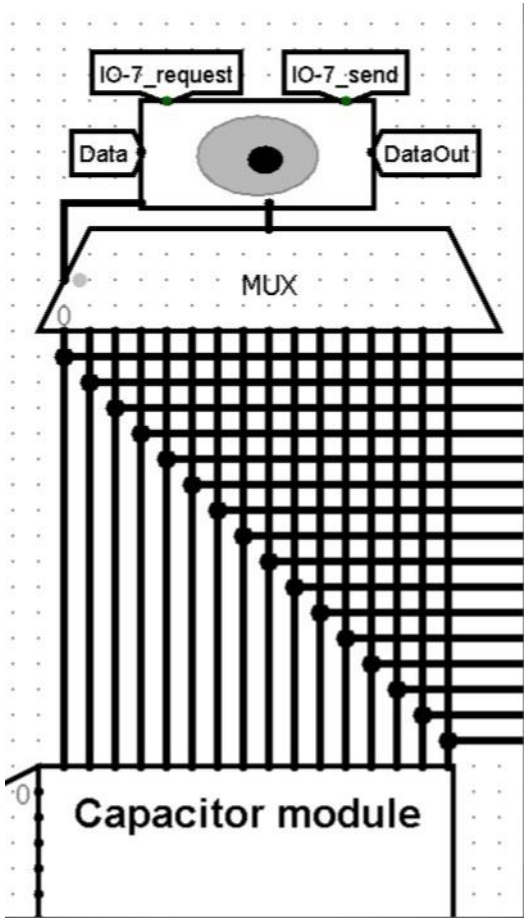

I/O interface
ADDRESS
R/W
SEL
DATA
Data out
Selector
To screen
Snake tail
Snake head
Free draw block
Capacitor module
Disactivate pixels
Activate pixels
Preloaded images
Interruptions
Fat apple
Bump wall /tail
Apple draw
Show apple

Capacitor module

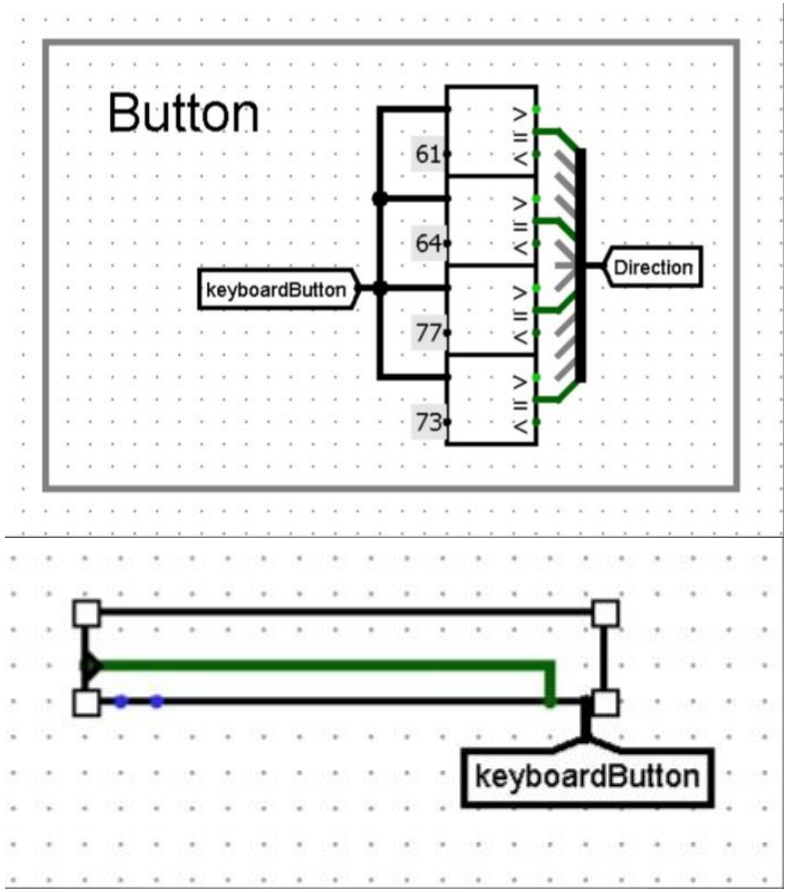


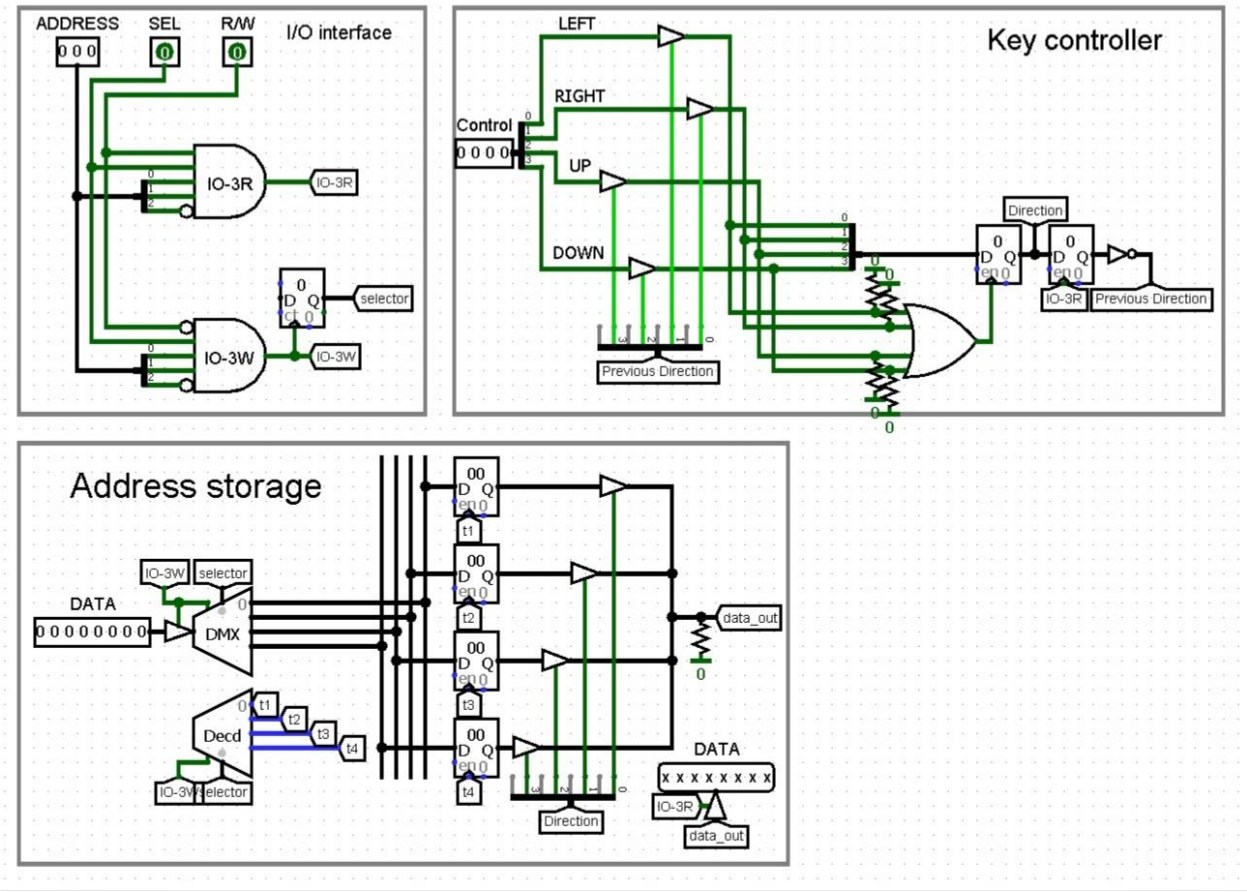
BotEyes


SEND
REQ
DATA
SD
RQ
DATA_IN
STATE
SD
DATA
Check for some elements
on the screen
find
low
1
isBorder
0
1
8
extend
STATE
brd1
00
D Q
en 0
RQ
DATA_IN
RQ
J Q
K en 0
reset
brd2
00
D Q
en 0
RQ
DATA FROM SCREEN
RowSelector
Check for borders
find
low
1
isBorder
brd1
brd2

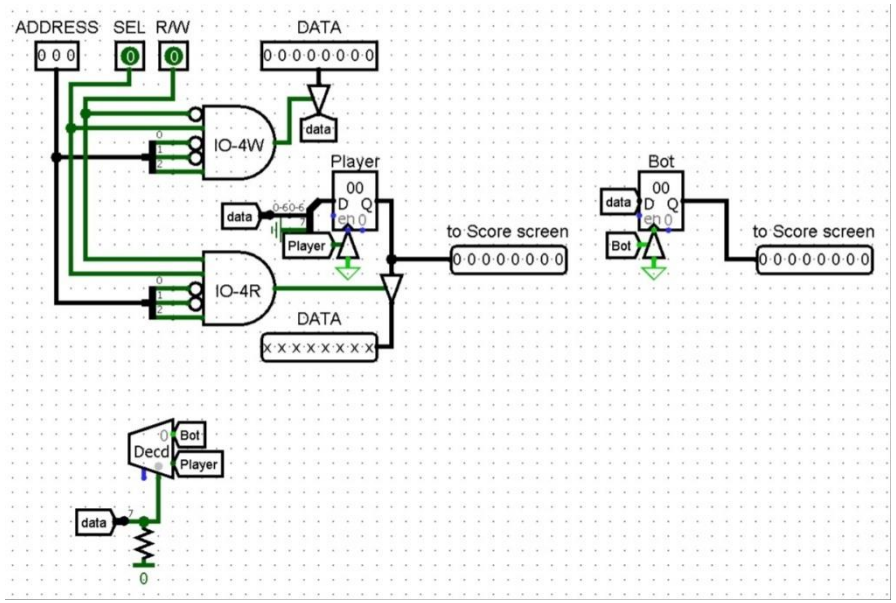

IO-7_request
IO-7_send
Data
DataOut
MUX
Capacitor module

Keyboard

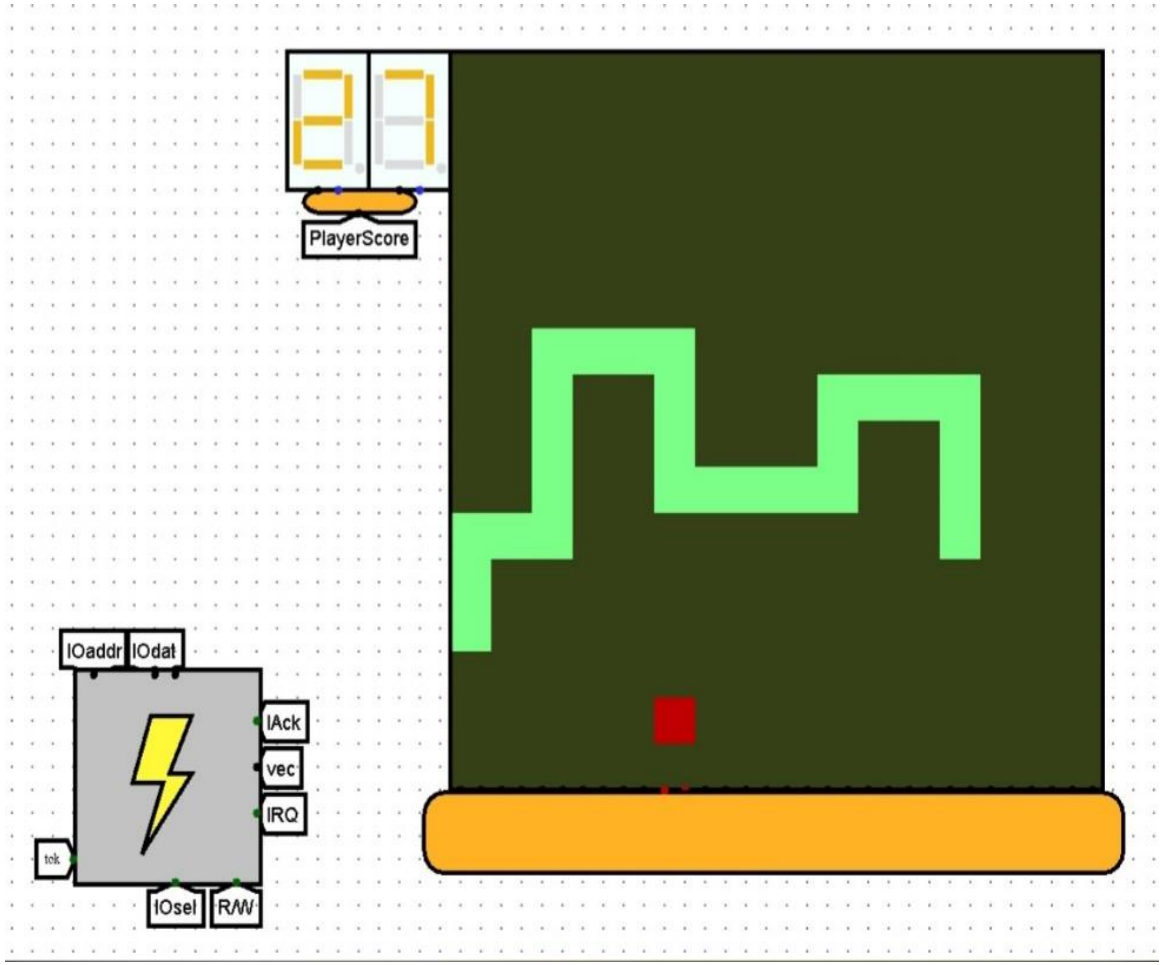

Button
61
64
77
73
keyboardButton
Direction
keyboardButton


ADDRESS
SEL
R/W
I/O interface
IO-3R
IO-3W
selector
LEFT
RIGHT
UP
DOWN
Control
Key controller
Direction
Previous Direction
Address storage
DATA
DMX
Decd
data_out

Displaying points



Results



Thanks for your attention!