Thank you for your time

Any Problem Appears I beg you to email

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First

How to compile the code

0.confirm the file is now

```
tree
```

```
(base) eamin@EamindeMacBook-Pro YimingChengProject11 % tree
.
├── README.md
├── Test
│   ├── Average
│   │   └── Main.jack
│   ├── ComplexArrays
│   │   └── Main.jack
│   ├── ConvertToBin
│   │   └── Main.jack
│   ├── Pong
│   │   ├── Ball.jack
```

```
│   │   ├── Ball.jack.bak
│   │   ├── Bat.jack
│   │   ├── Bat.jack.bak
│   │   ├── Main.jack
│   │   ├── Main.jack.bak
│   │   ├── PongGame.jack
│   │   └── PongGame.jack.bak
│   ├── Seven
│   │   └── Main.jack
│   └── Square
│       ├── Main.jack
│       ├── Square.jack
│       └── SquareGame.jack
└── src
    ├── JackCompiler.java
    └── test_in_one_file.sh

9 directories, 18 files
```

1.Go to folder `src/`

```
cd  path to src
```

Make sure you can see

```
ls
```

```
(base) eamin@EamindeMacBook-Pro src % ls
JackCompiler.java       test_in_one_file.sh
```

2.Run command

```
javac JackCompiler.java
```

Make sure you can see

```
(base) eamin@EamindeMacBook-Pro src % javac JackCompiler.java
(base) eamin@EamindeMacBook-Pro src % ls
CompilationEngine$1.class       JackCompiler.java               JackTokenizer.class
SymbolTable.class               VMWriter.class
CompilationEngine.class         JackTokenizer$KEYWORD.class     Symbol$KIND.class
VMWriter$COMMAND.class          test_in_one_file.sh
JackCompiler.class              JackTokenizer$TYPE.class        Symbol.class
VMWriter$SEGMENT.class
```

3.After compiling, there will be lots of classes file shown above in current path

How to run the code

1.Command format is

a:

```
   java JackCompiler XXX.jack
```

Analyzer will generate

`XXX.vm`:result of orginal jack file

in the same directory of `XXX.jack`.

b:

```
java Analyzer directory
```

Analyzer will generate

several `.vm` files according to the number of .jack files named by filename in the same directory.

[Saving Your Time]:Test Yourself

Generate vm files one by one:

make sure you are at `src`

Compile

```
cd src
```

```
javac JackCompiler.java
```

Processing directory `Average`

```
java JackCompiler ../Test/Average
```

Processing directory `ComplexArrays`

```
java JackCompiler ../Test/ComplexArrays
```

Processing directory `ConvertToBin`

```
java JackCompiler ../Test/ConvertToBin
```

Processing directory `Pong`

```
java JackCompiler ../Test/Pong
```

Processing directory `Seven`

```
java JackCompiler ../Test/Seven
```

Processing directory `Square`

```
java JackCompiler ../Test/Square
```

Generate vm files with one shell:

make sure you are at `src`

```
sudo ./test_in_one_file.sh
```

All vm are generated at once like follow：

```
(base) eamin@EamindeMacBook-Pro src % sudo ./test_in_one_file.sh
Password:
Compiling JackCompiler.java...
----------------------------------------
Processing directory: Average
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Average/Main.vm
----------------------------------------
Processing directory: ComplexArrays
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/ComplexArrays/Main.vm
----------------------------------------
Processing directory: ConvertToBin
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/ConvertToBin/Main.vm
----------------------------------------
Processing directory: Pong
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Pong/Ball.vm
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Pong/Main.vm
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Pong/PongGame.vm
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Pong/Bat.vm
----------------------------------------
Processing directory: Seven
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Seven/Main.vm
----------------------------------------
Processing directory: Square
----------------------------------------
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Square/Square.vm
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Square/SquareGame.vm
File created : /Users/eamin/Desktop/data/学习资料/芝加哥大学/2025_spring/System/MPCS-52011-2-1-Winter-2025-Introduction-to-Computer-Systems-2025-Jan-10_00-25-49-069/viewer/files/Hw/YimingChengProject11/src/../Test/Square/Main.vm
✅ All file processed.
```

Now you can see vm files:

```
(base) eamin@EamindeMacBook-Pro YimingChengProject11 % tree ../
.
├── README.md
├── Test
│   ├── Average
│   │   ├── Main.jack
│   │   └── Main.vm
│   ├── ComplexArrays
│   │   ├── Main.jack
│   │   └── Main.vm
│   ├── ConvertToBin
│   │   ├── Main.jack
│   │   └── Main.vm
│   ├── Pong
│   │   ├── Ball.jack
```

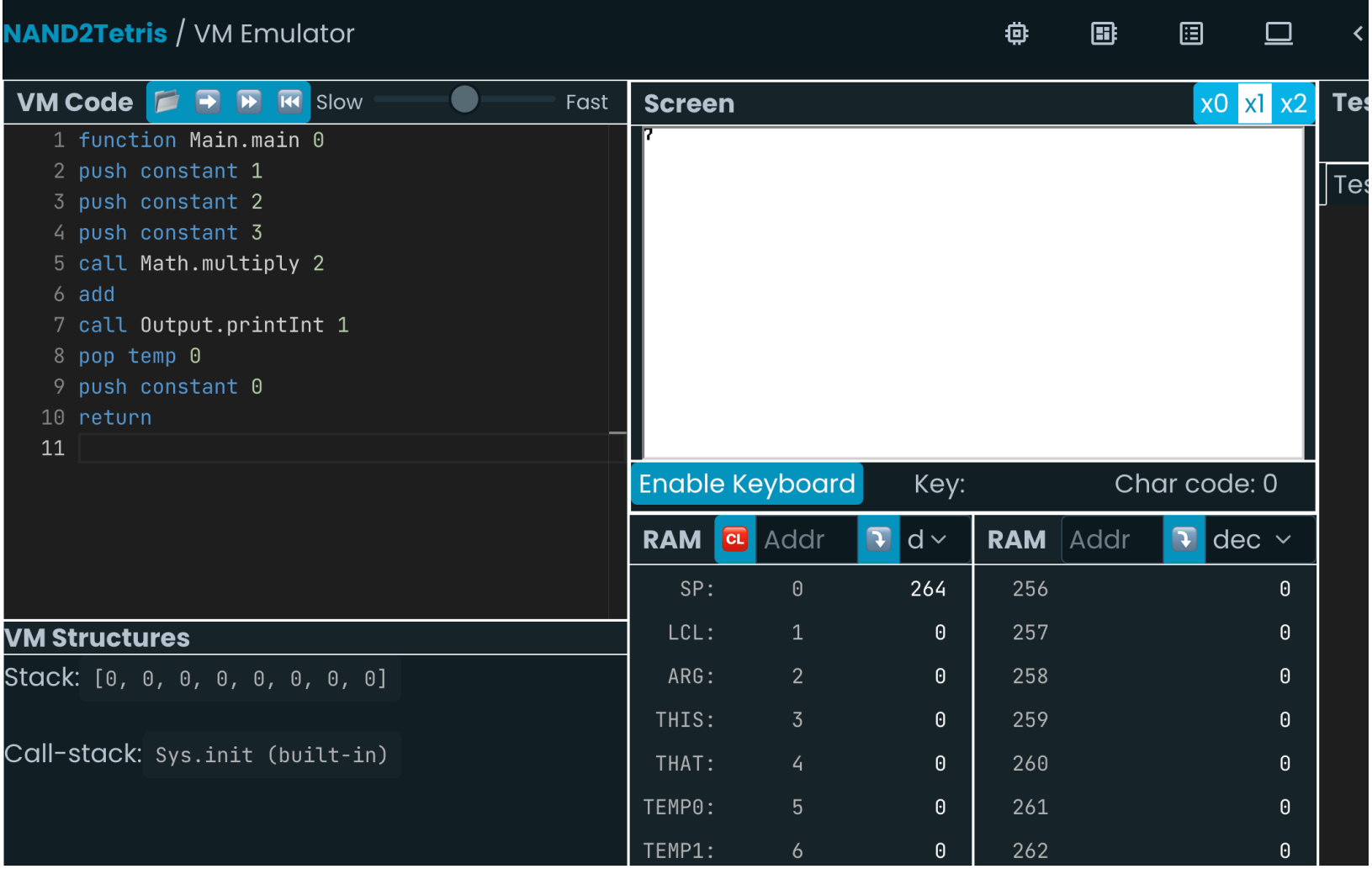
```
│   │   ├── Ball.jack.bak
│   │   ├── Ball.vm
│   │   ├── Bat.jack
│   │   ├── Bat.jack.bak
│   │   ├── Bat.vm
│   │   ├── Main.jack
│   │   ├── Main.jack.bak
│   │   ├── Main.vm
│   │   ├── PongGame.jack
│   │   ├── PongGame.jack.bak
│   │   └── PongGame.vm
│   ├── Seven
│   │   ├── Main.jack
│   │   └── Main.vm
│   └── Square
│       ├── Main.jack
│       ├── Main.vm
│       ├── Square.jack
│       ├── Square.vm
│       ├── SquareGame.jack
│       └── SquareGame.vm
└── src
    ├── CompilationEngine$1.class
    ├── CompilationEngine.class
    ├── JackCompiler.class
    ├── JackCompiler.java
    ├── JackTokenizer$KEYWORD.class
    ├── JackTokenizer$TYPE.class
    ├── JackTokenizer.class
    ├── Symbol$KIND.class
    ├── Symbol.class
    ├── SymbolTable.class
    ├── VMWriter$COMMAND.class
    ├── VMWriter$SEGMENT.class
    ├── VMWriter.class
    └── test_in_one_file.sh

9 directories, 41 files
```

[Saving Your Time] :Test Result

Seven:✅

(7 is shown in the screen)



ConvertToBin☑️

$23456_{10} = 0101101101000000_2$

SO theortically

If Ram[8000]=23456

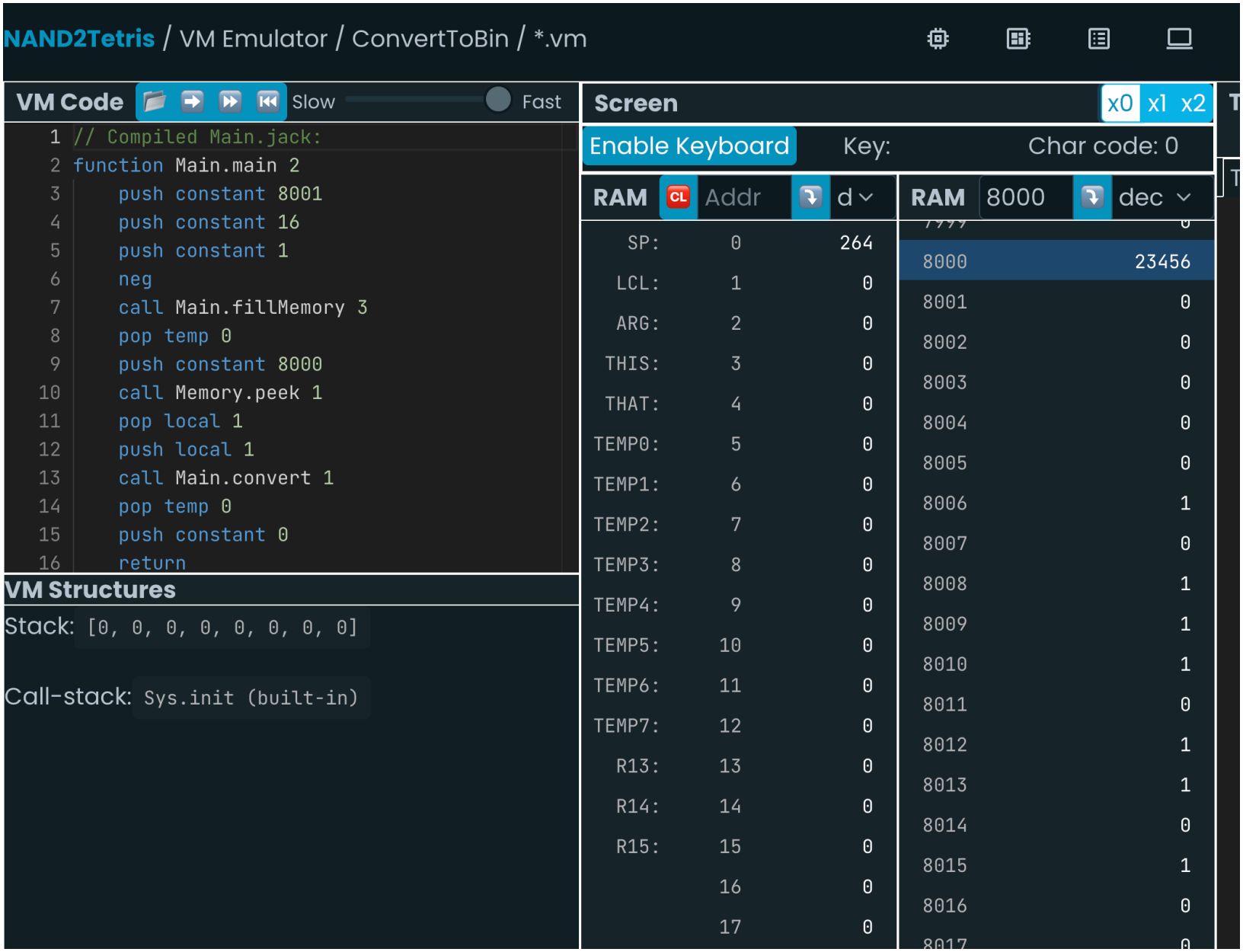
The result should be

Ram[8001] is LSB means the number is Writing FromRam[8016] to Ram[8001]

Convert Hack Number Types

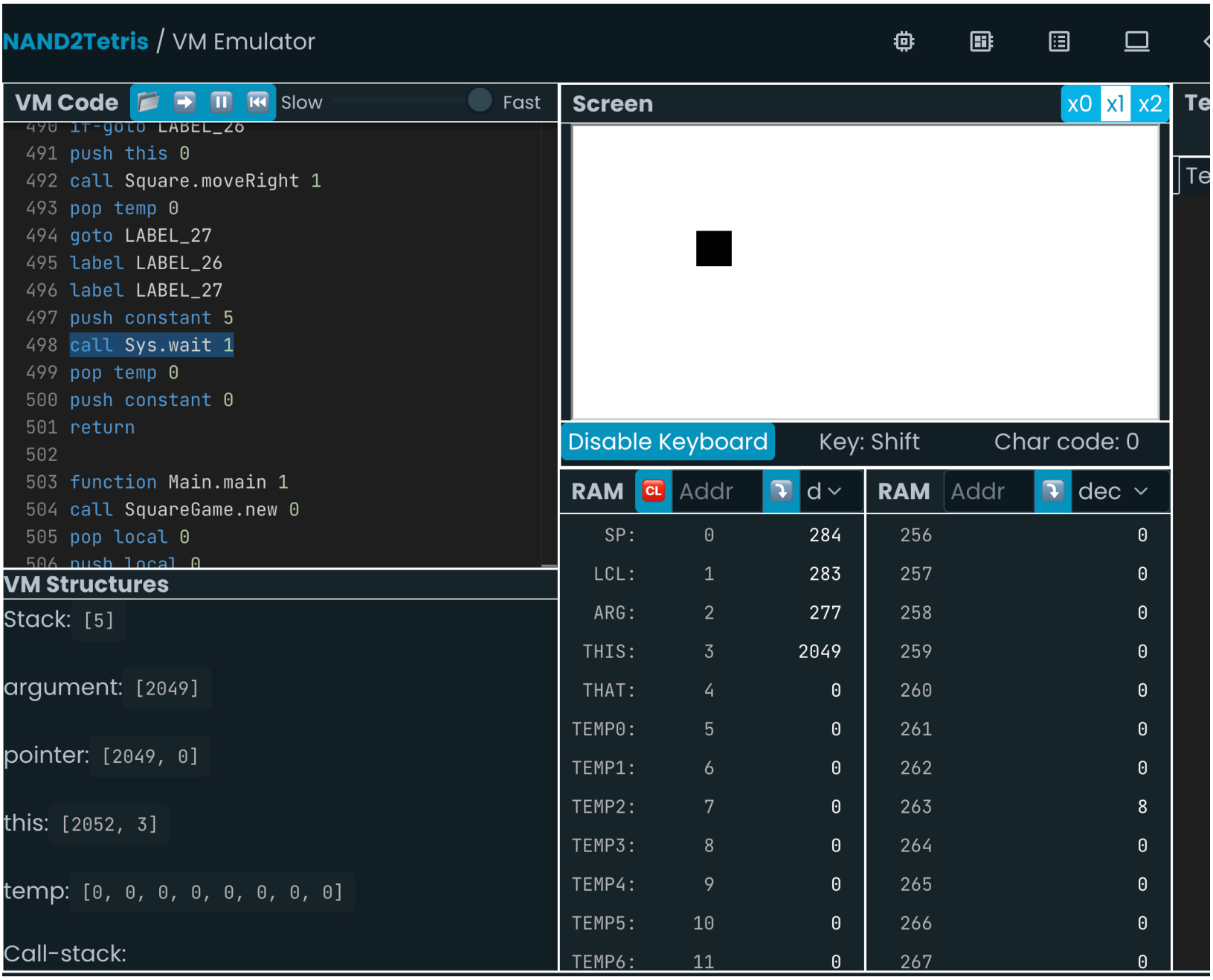
Binary	0101101110100000
Decimal	23456
Unsigned	23456
Hex	0x5BA0
HACK ASM	@23456

Output:☑

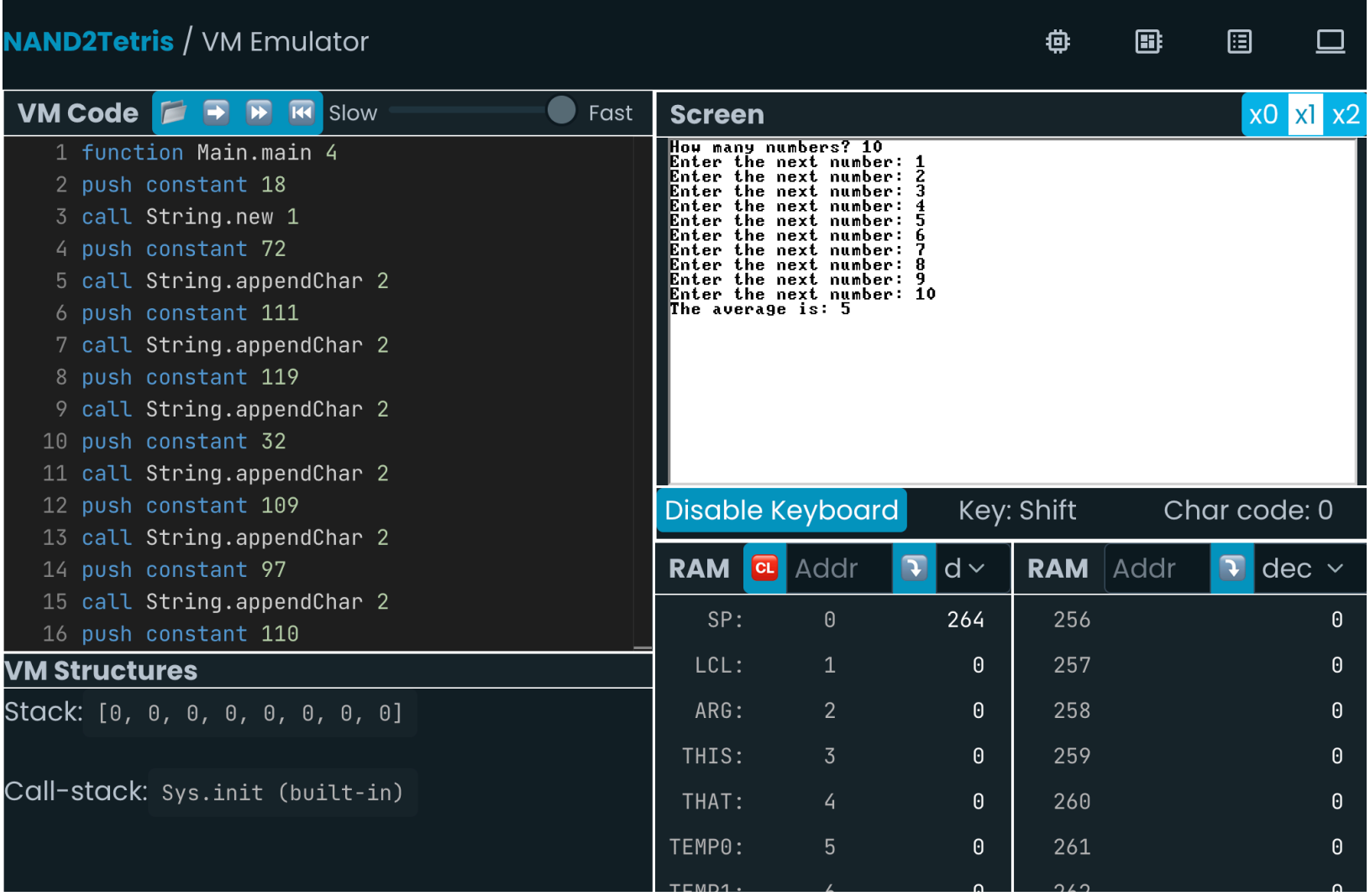


Square Dance☑

see detail in the `video_of_some_result/Square.mp4`

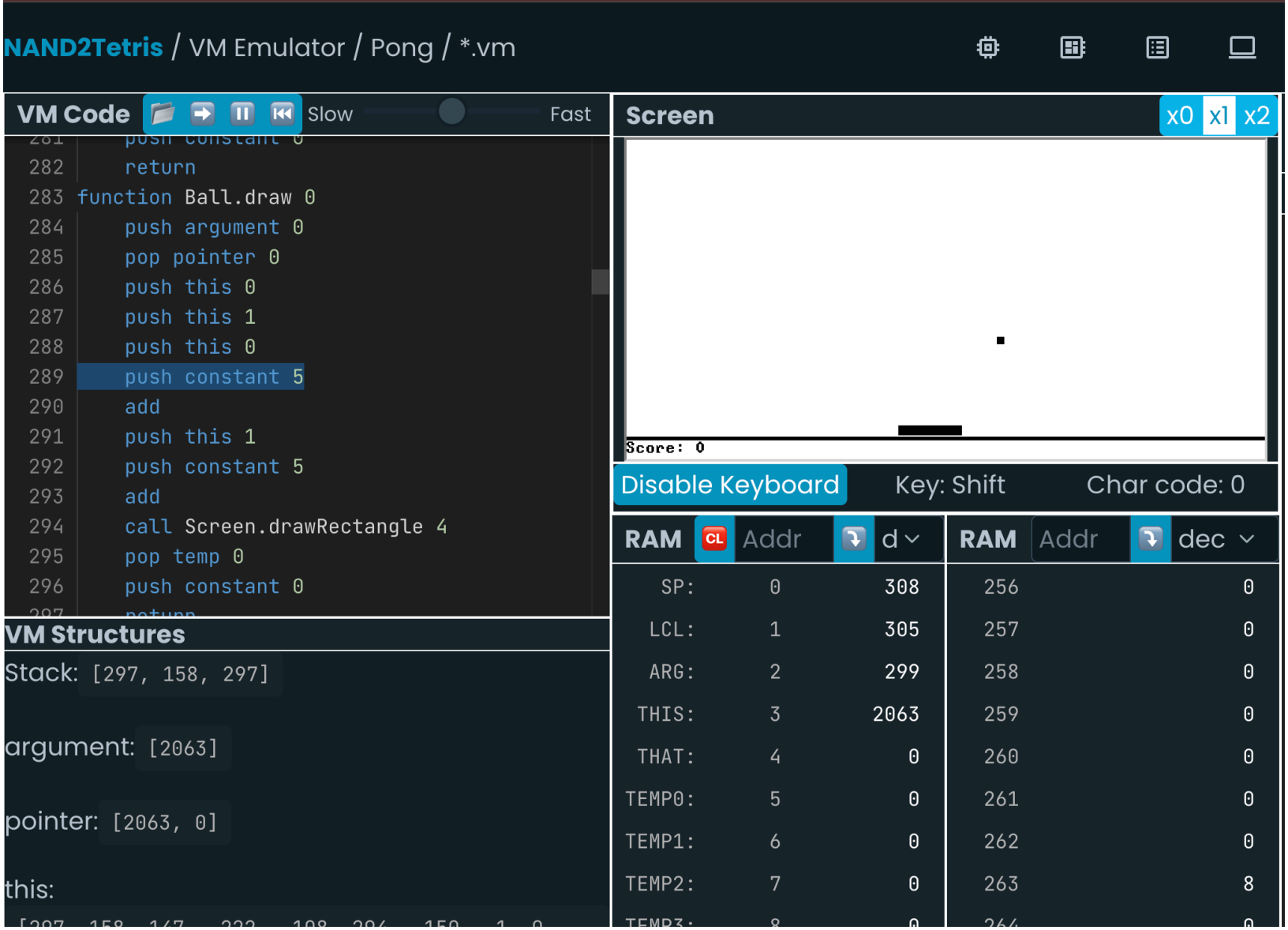


Average☑

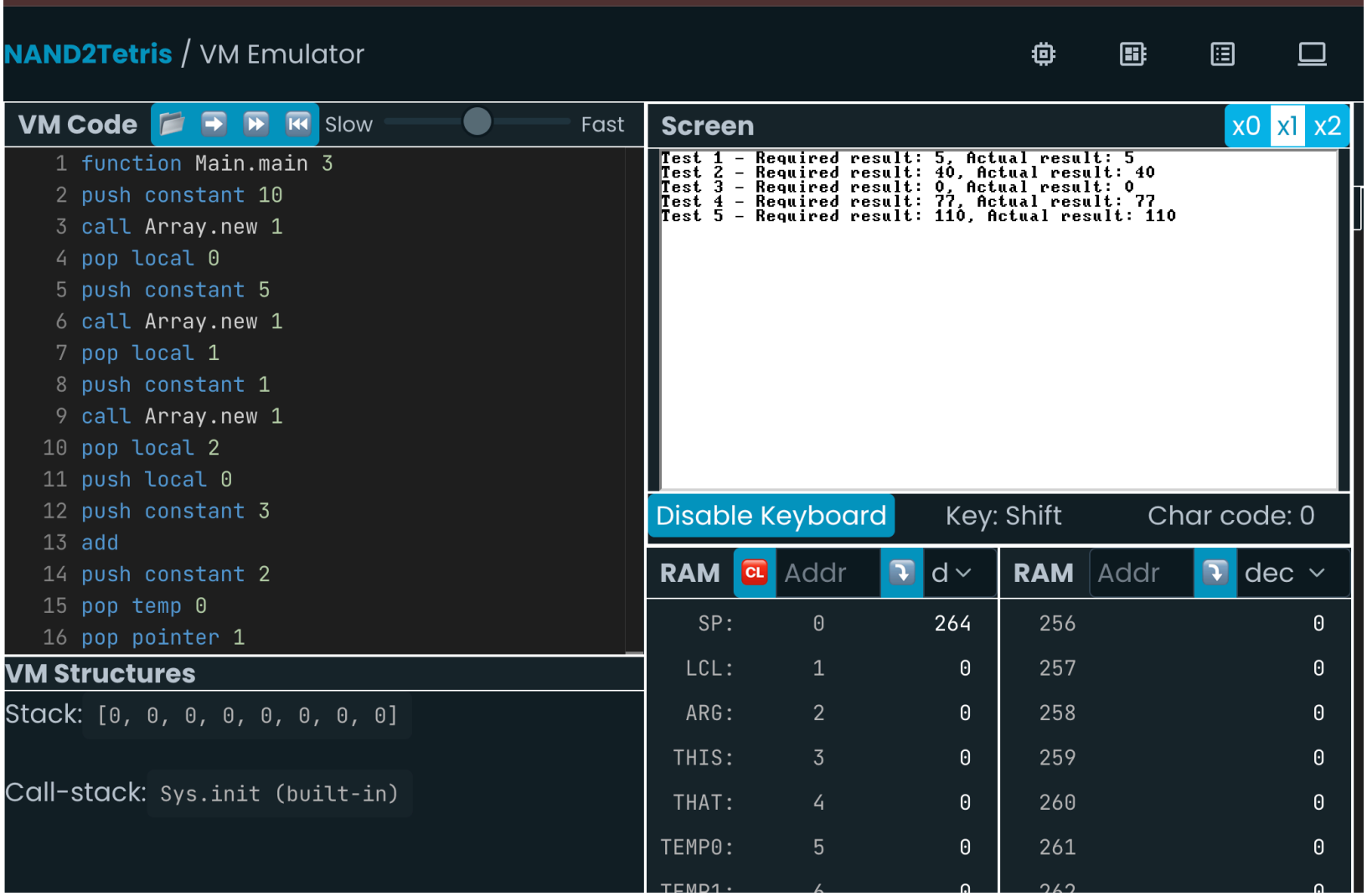


Pong☑

the program is too slow in `video_of_some_result/Pong.mp4`



ComplexArrays☑


NAND2Tetris / VM Emulator
VM Code
Slow
Fast
1 function Main.main 3
2 push constant 10
3 call Array.new 1
4 pop local 0
5 push constant 5
6 call Array.new 1
7 pop local 1
8 push constant 1
9 call Array.new 1
10 pop local 2
11 push local 0
12 push constant 3
13 add
14 push constant 2
15 pop temp 0
16 pop pointer 1
VM Structures
Stack: [0, 0, 0, 0, 0, 0, 0, 0]
Call-stack: Sys.init (built-in)
Screen
x0 x1 x2
Test 1 - Required result: 5, Actual result: 5
Test 2 - Required result: 40, Actual result: 40
Test 3 - Required result: 0, Actual result: 0
Test 4 - Required result: 77, Actual result: 77
Test 5 - Required result: 110, Actual result: 110
Disable Keyboard
Key: Shift
Char code: 0
RAM
Addr
d
RAM
Addr
dec
SP: 0 264 256 0
LCL: 1 0 257 0
ARG: 2 0 258 0
THIS: 3 0 259 0
THAT: 4 0 260 0
TEMP0: 5 0 261 0