

Argument
local
this
that
pointer
temp
static
constant

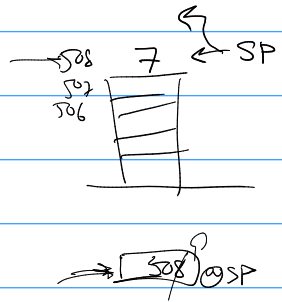
these all can change location — their location is stored in a register.

"indirect addressing".

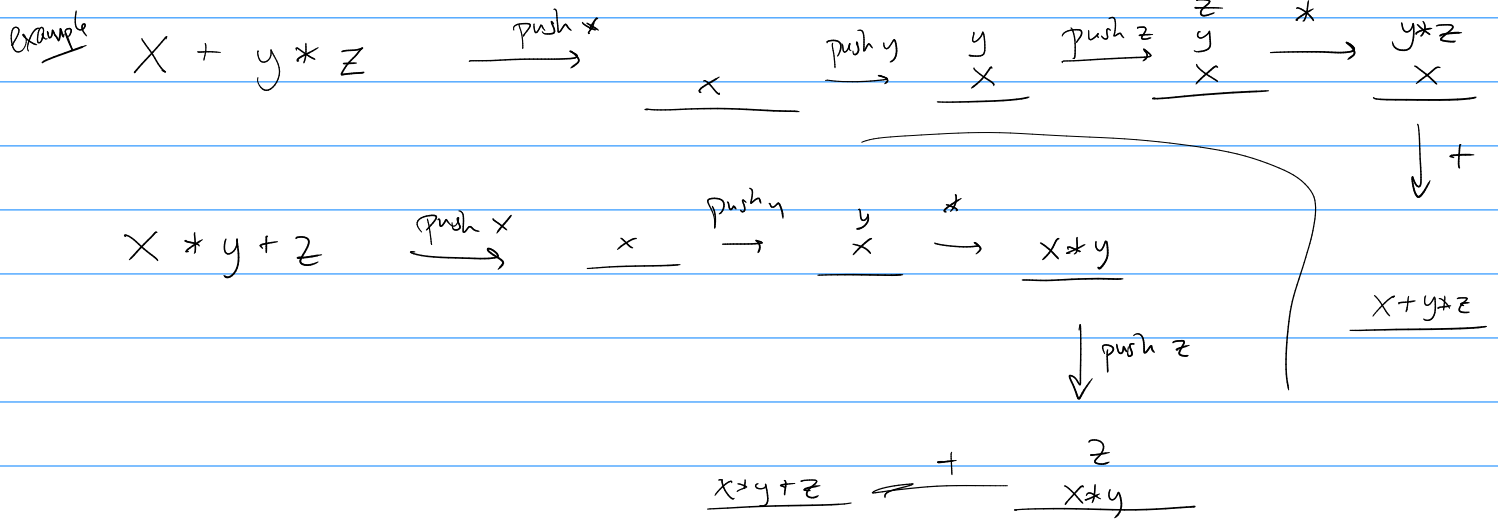
these are always in the same place! "direct addressing".

push static j → @ filename.j

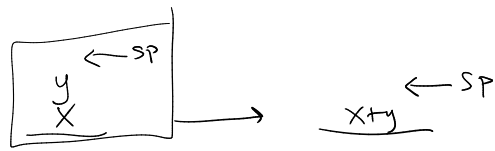
eg. push constant 7 → @ 7
 D = A
 @ SP
 A = M
 M = D
 @ SP
 M = M + 1



Stack arithmetic



$$x + 3 * f(9 - y, g(x))$$



Subtraction: get order right!

Remember: $x - y$ means
push x , push y , subtract.

add
sub

neg

eq

gt

lt

and

or

not

just negate top of stack in-place! $M = -M$.

eg. eq means: pop top two things from stack.

Compare them.

if equal, push -1 , else push 0 .

Subtract the two values on the stack

if zero, jump to (ZERO 29)

push 0

jump to END 30

(ZERO 29)

push -1

(END 30)

Need a way
to generate
unique label names!

eg. keep a counter
+ increment each time.

Branching

label name \longrightarrow (name)

goto name \longrightarrow @name
0; JMP

if-goto name \longrightarrow pop from stack
jump if true.

Function calls

3 VM instructions:

- function name n \longleftarrow name of function
 \longleftarrow # of local variables. — defining a new function.

- call name m \longleftarrow # of arguments. — call a function.

- return. — return from a function.