

wasm: open to interpretation



Webassembly

High level overview of webassembly, current uses



Compilers

Compilers enter the mix, how we use webassembly with them



Stack

What use is a stack machine, why use one? Let's write one and find out



Memory

Let's add memory to our stack machine



Goto

How can we ask the ultimate question of life if our machine can't decide?



Mandelbrot

We attempt to render a mandelbrot with our new machine





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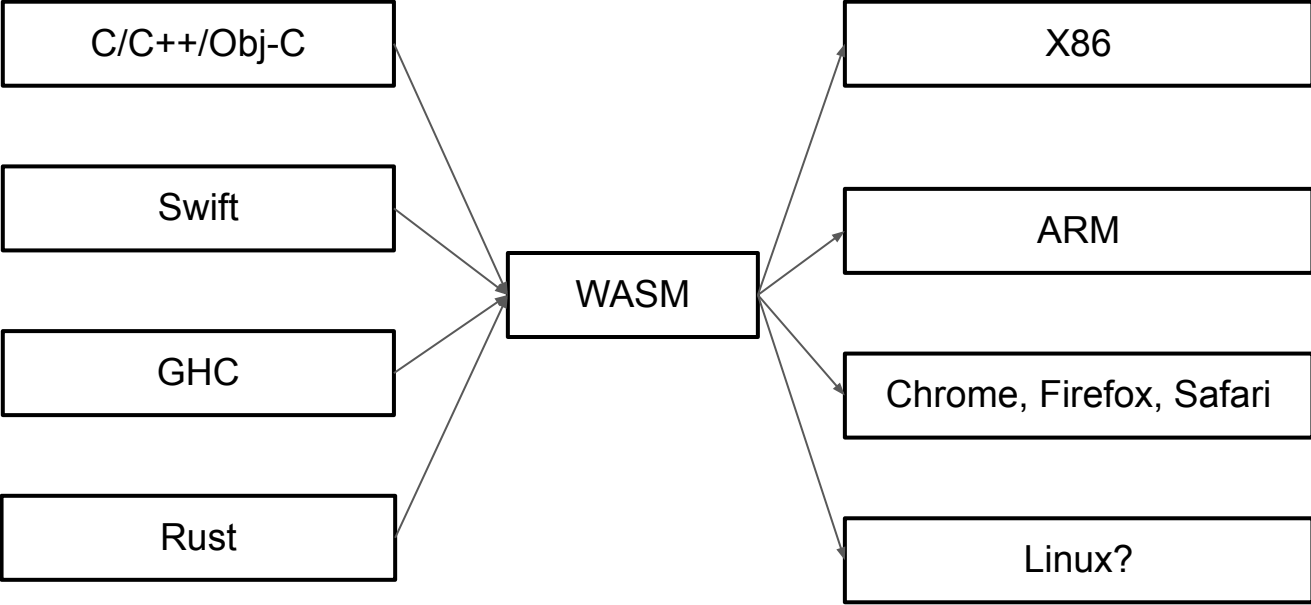
Let's add memory to our stack machine

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Joe Groff

@jckarter



Writing your own compiler is easier than ever now,
thanks to two key technologies:

- WASM, short for Low Level Virtual Machine, and
- LLVM, short for Weird ASseMbly language

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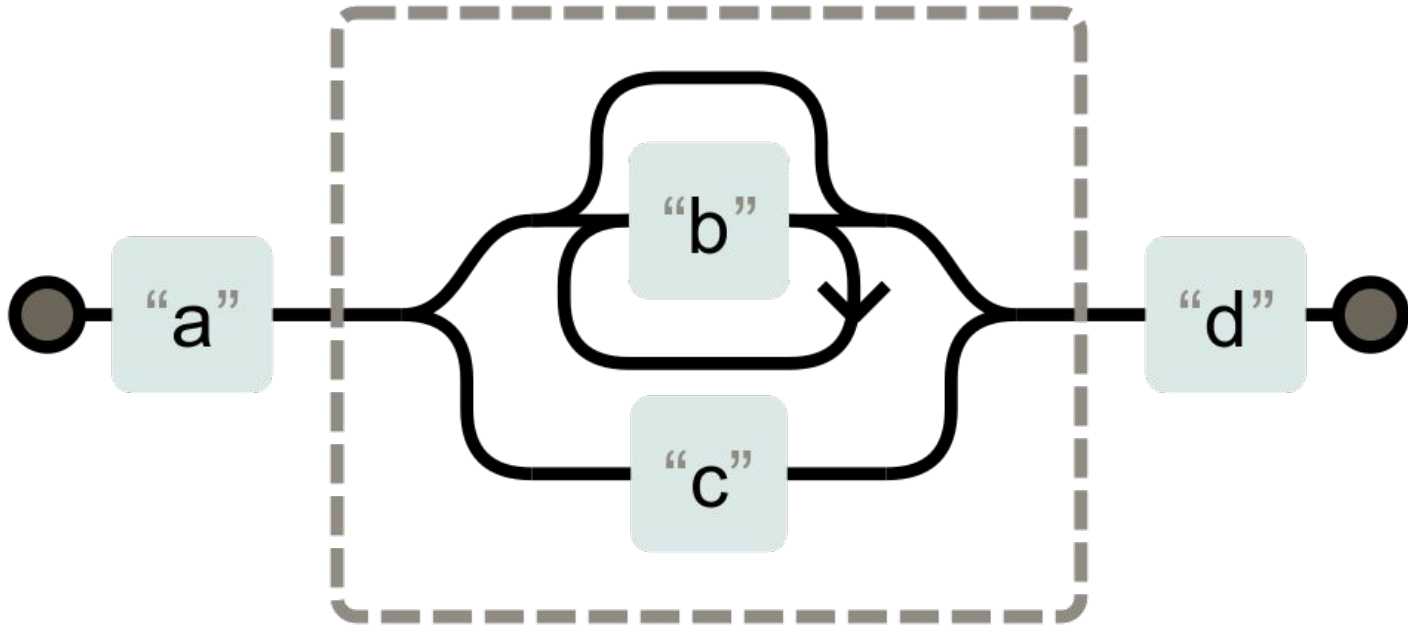
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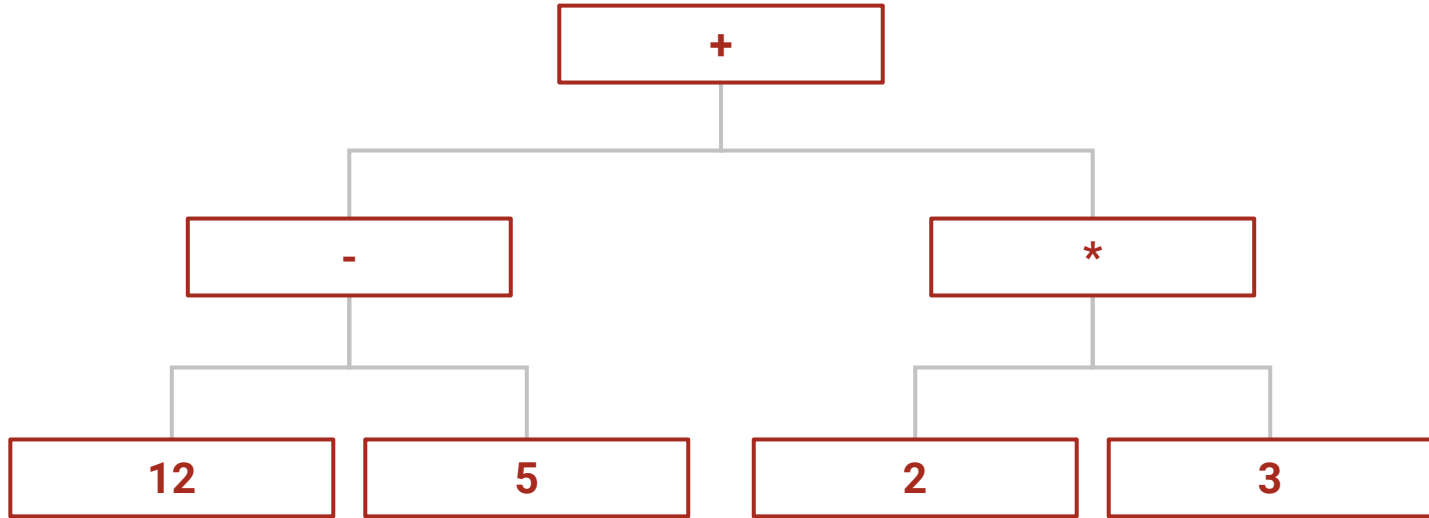
/a (b* | c) d/



Full stack developer

$$12 - 5 + 2 * 3$$

$$12 - 5 + 2 * 3$$





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64k should be enough for anyone



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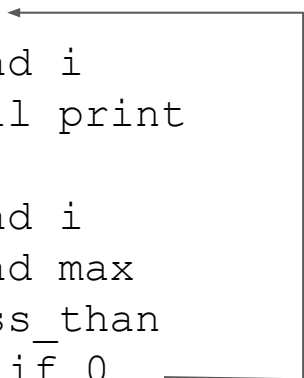


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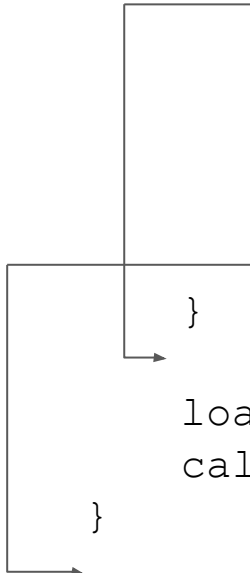
Goto considered harmful

```
loop {  
  load i  
  call print  
  
  load i  
  load max  
  less_than  
  br_if 0  
}
```



A diagram illustrating a loop structure. A horizontal line from the right side of the `br_if 0` instruction in the code block above connects to a vertical line that goes up and then left, ending in an arrow pointing to the start of the `loop {` block.

```
block {  
  block {  
    load i  
    load j  
    less_than  
    br_if 0  
  
    load "j is greater than i"  
    call print  
  
    br 1  
  }  
  
  load "i is less than j"  
  call print  
}
```



A diagram illustrating a nested block structure. A horizontal line from the right side of the `br_if 0` instruction in the inner block connects to a vertical line that goes up and then left, ending in an arrow pointing to the start of the inner `block {`. Another horizontal line from the right side of the `br 1` instruction in the inner block connects to a vertical line that goes down and then left, ending in an arrow pointing to the start of the outer `block {`.



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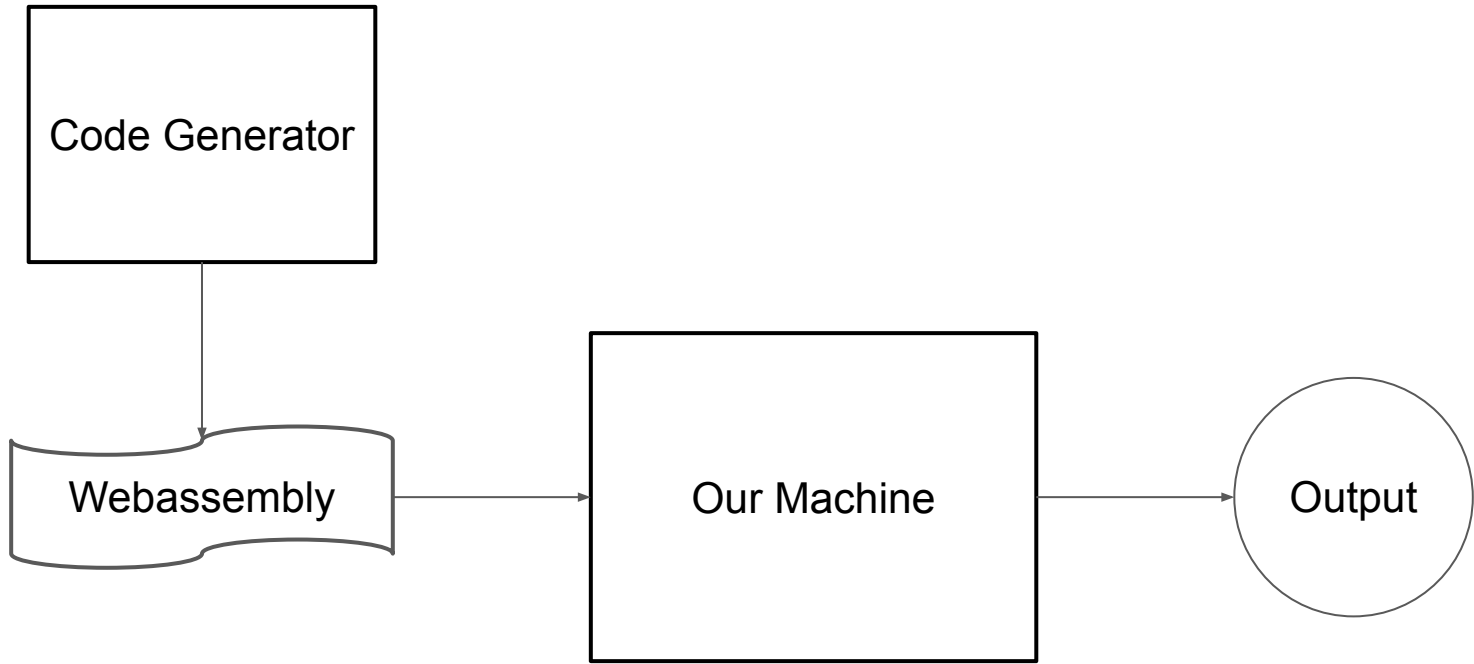
Goto

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Filmed at
QCon San Francisco 2019

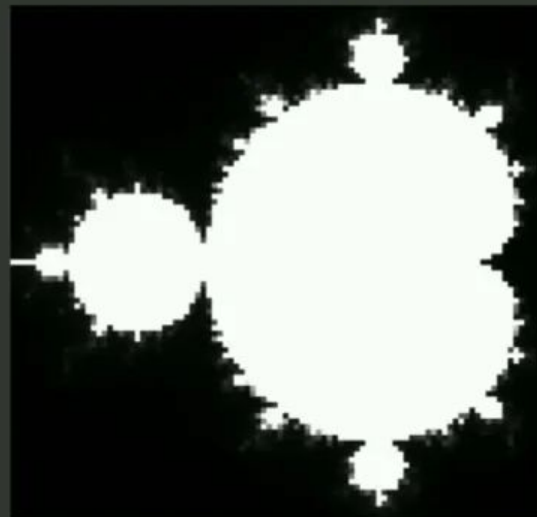
Brought to you by
InfoQ
queue

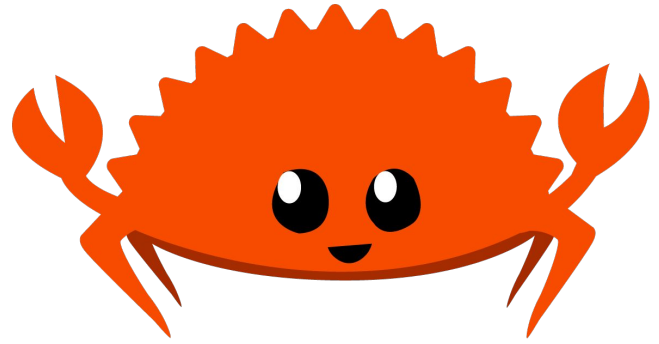
```
var y = 0
while (y < 100)
  y = (y + 1)
  var x = 0
  while (x < 100)
    x = (x + 1)

    var e = ((y / 50) - 1.5)
    var f = ((x / 50) - 1)

    var a = 0
    var b = 0
    var i = 0
    var j = 0
    var c = 0

    while (((i * i) + (j * j)) < 4) && (c < 255)
      i = (((a * a) - (b * b)) + e)
      j = (((2 * a) * b) + f)
      a = i
      b = j
      c = (c + 1)
    endwhile
```







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Thanks!



<https://github.com/bobripping>