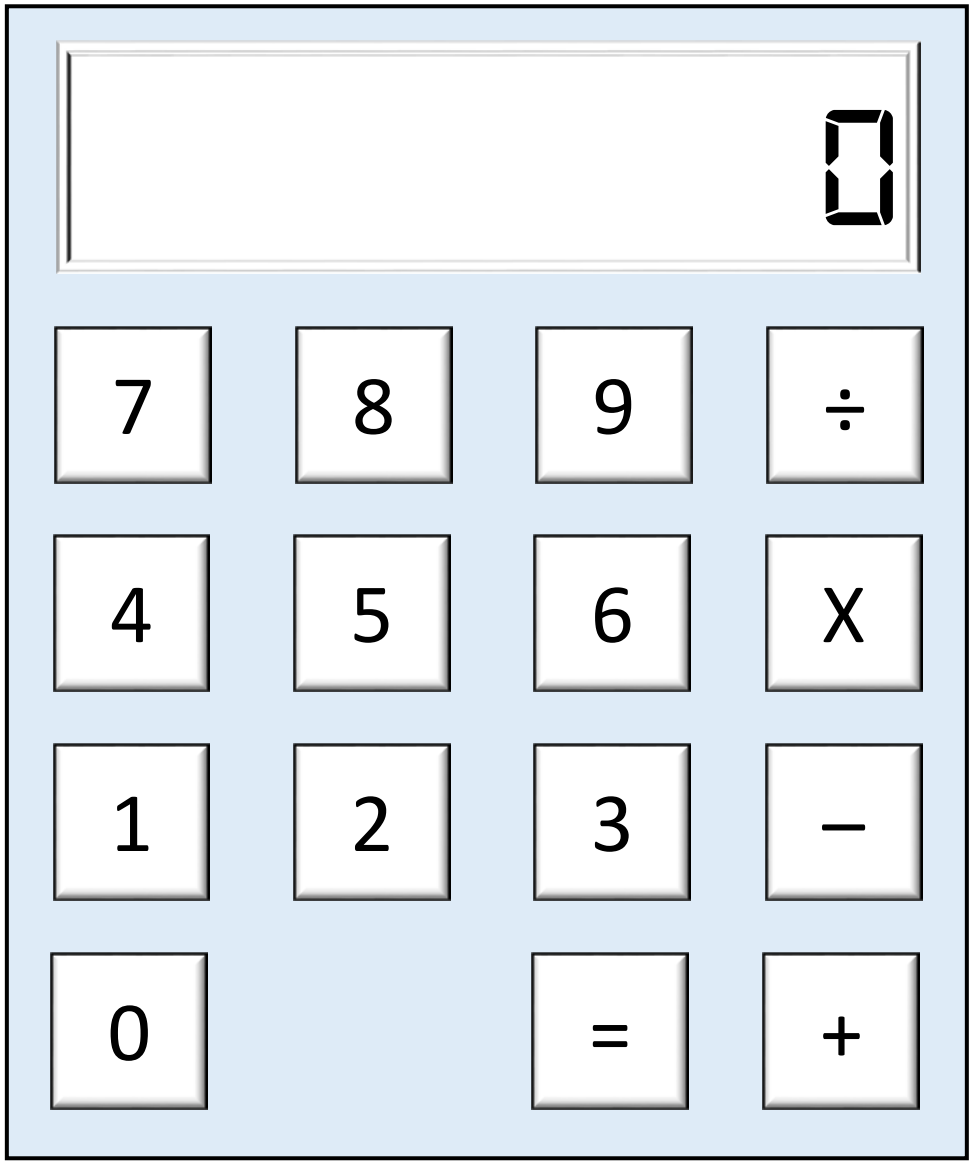
Designing a calculator FSM

https://www.theonlinecalculator.com/

Design the FSM for parsing an input string for a calculator

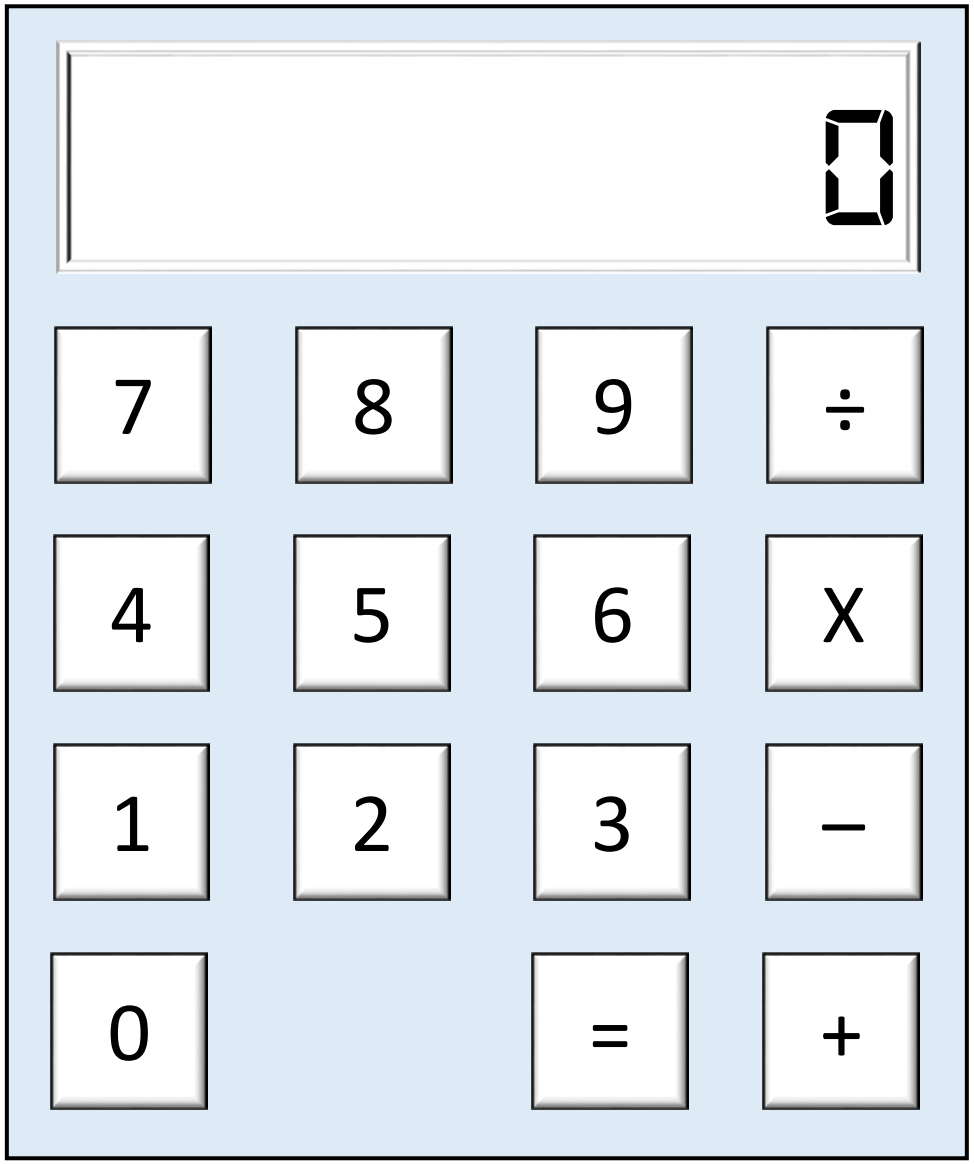
What must the finite state machine remember to execute the operation

1+2?

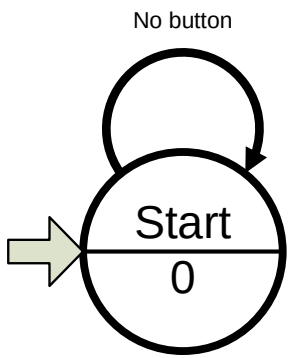


Try one on your own:
Draw a state diagram for

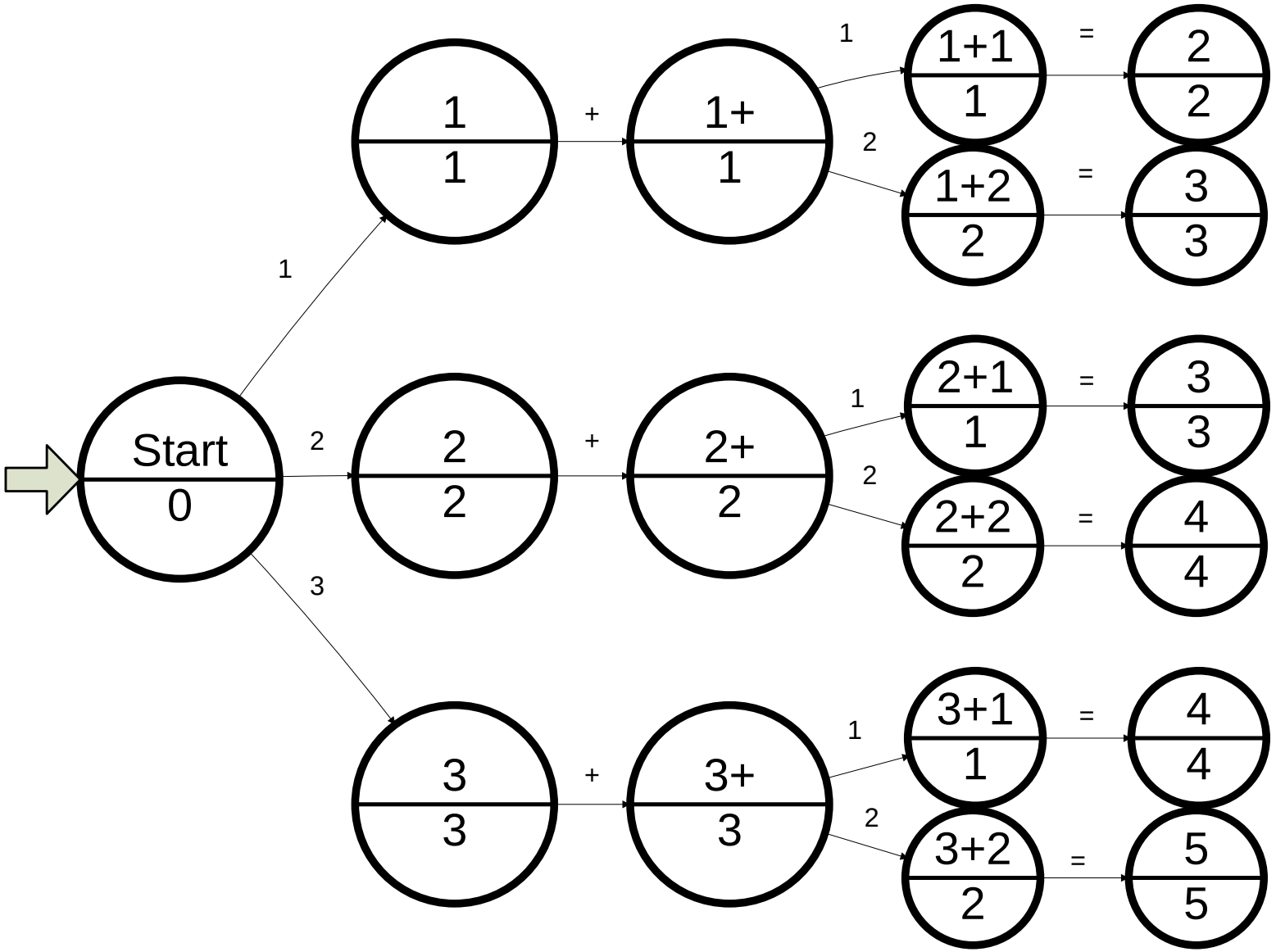
2+2+5



Let’s build a FSM that allows for several operations and data sequences



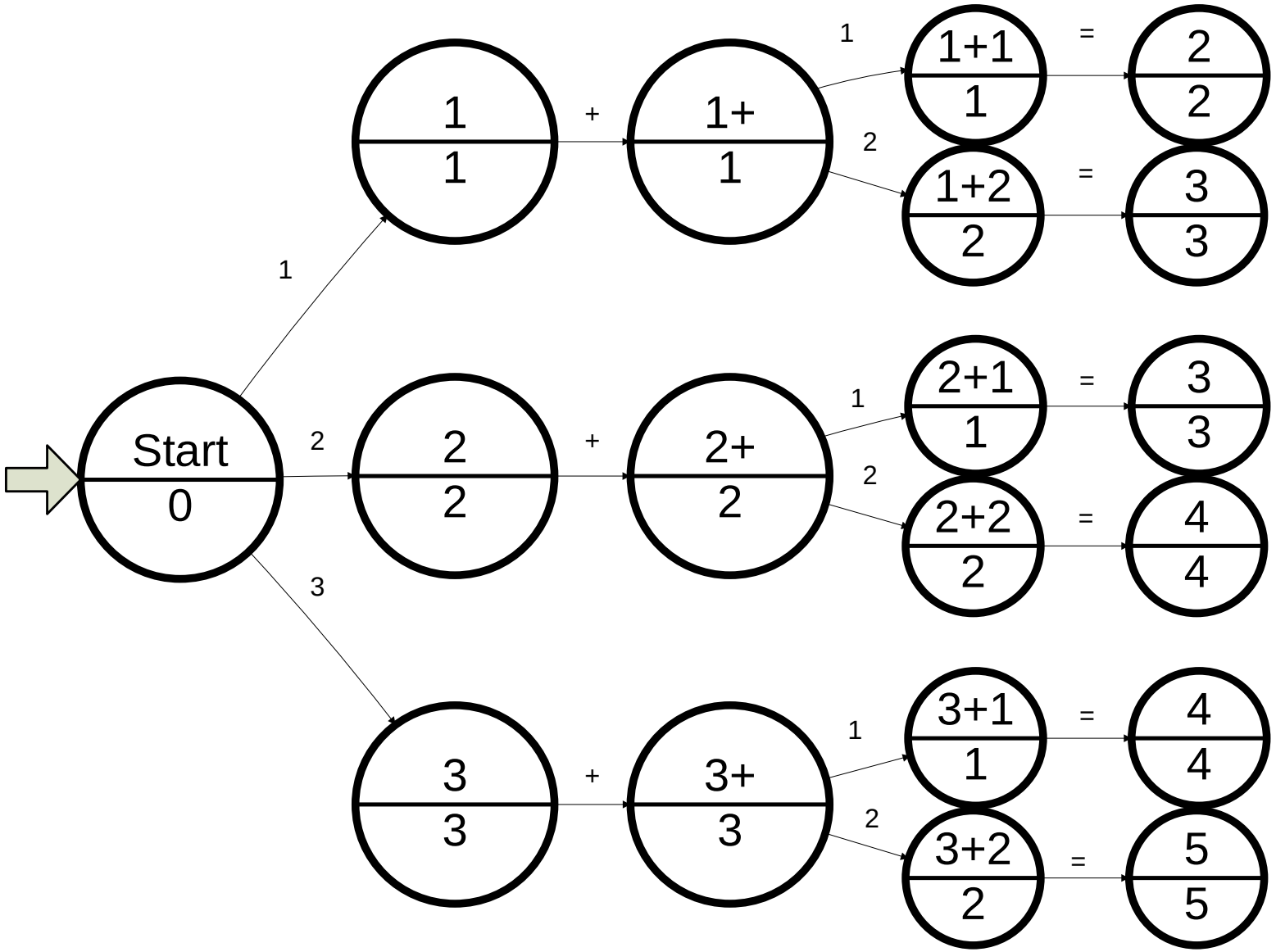
Separate the data from the control using indirection (self loops are implicit to minimize clutter)



operand1, operand2, operator, and result are data

Start state and "which data has been entered" are control

Offload data onto external variables



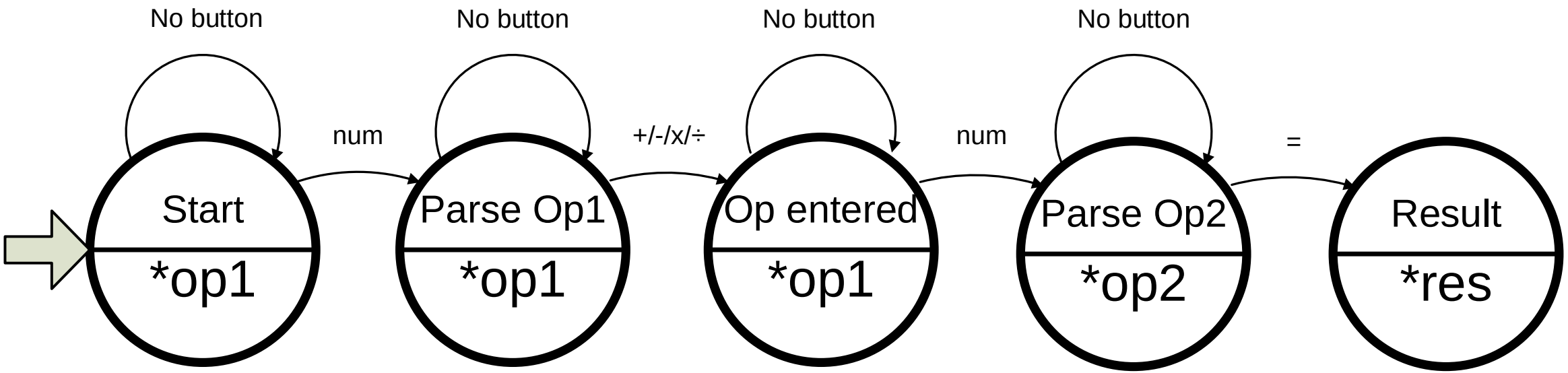
operand1 (op1)

operand2 (op2)

operator (op)

result (res)

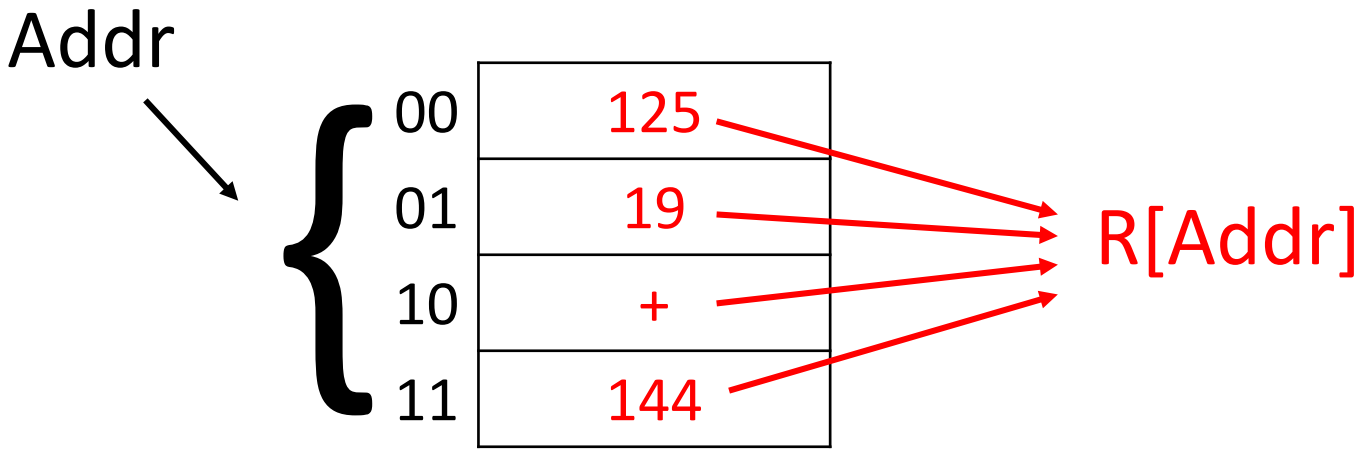
Our generalized calculator FSM so far



What else do we still need this state machine to do?

operand1 (op1)	
operand2 (op2)	
operator (op)	
result (res)	

Use brackets to indicate the data stored at an address in an array (a.k.a. a register file)



Use the FSM and system input to control the register file and ALU (the datapath)