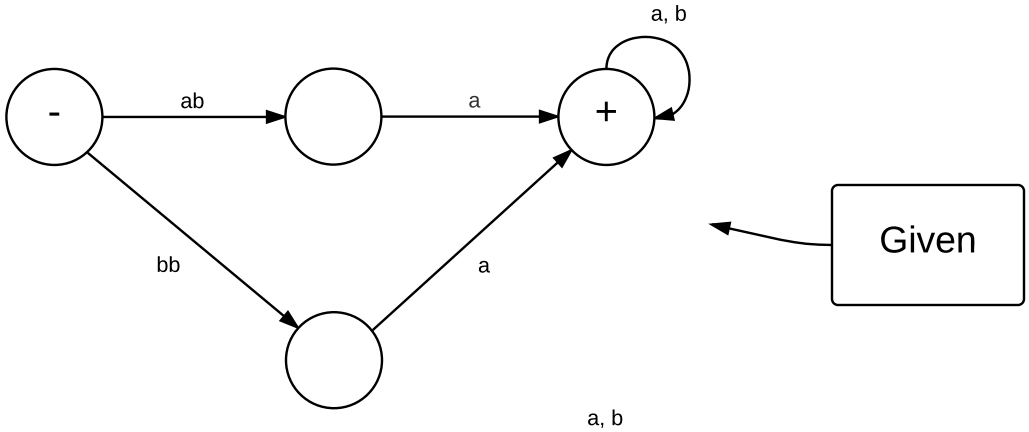
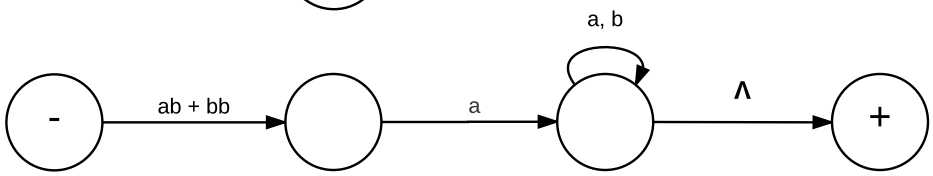
Nathan Brooks
CS4110
Homework 3
Due September 21

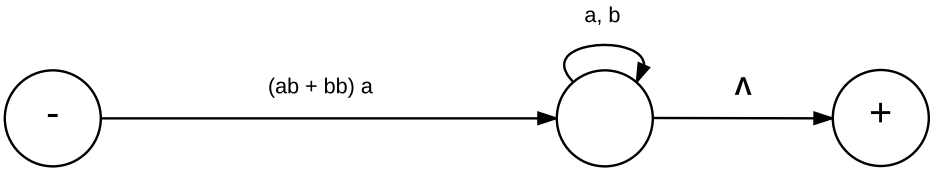
P01. Kleene's Theorem Part 2

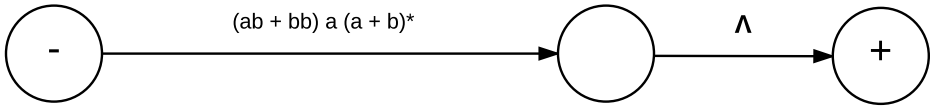
Convert the following TG into a regular expression.



Given



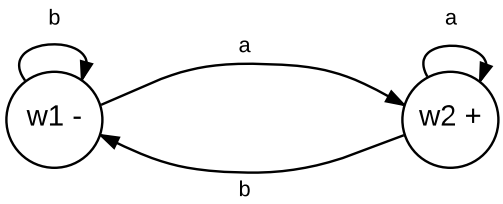




Answer: (ab + bb) a (a + b)*

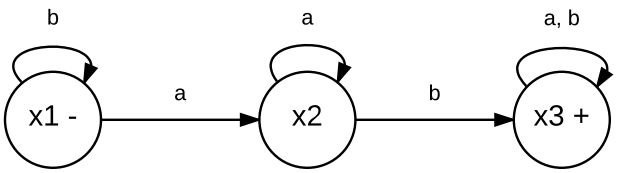
P02. Kleene's Theorem Part 3

Using the algorithm of Kleene's theorem, construct a FA for the union language: FA1 + FA2,
Where FA1 and FA2 are given below:



FA1

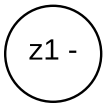
all strings ending in a



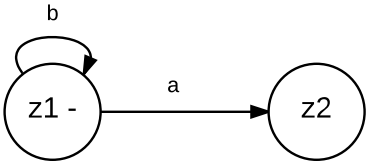
FA2

Must have at least 1 a and have at least 1 b after it

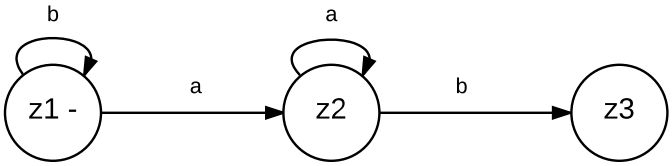
(1) Start State: (**z1**) = (w1) or (x1) (-)



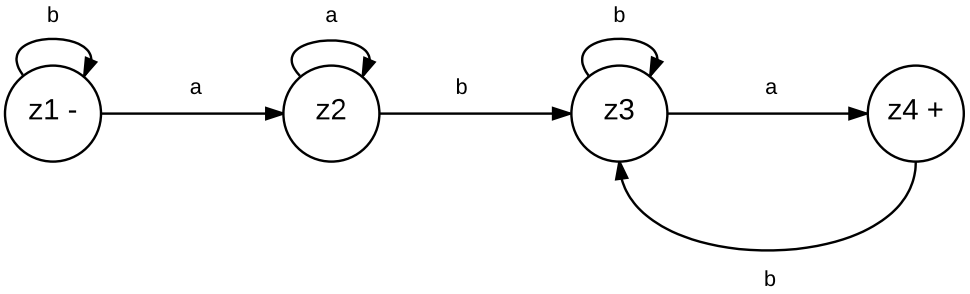
(2) At state (**z1**)
if reading a, FA1->(w2) and FA2->(x2), so (**z2**) = (w2) or (x2)
if reading b, FA1->(w1) and FA2->(x1), so (**z1**) = (w1) or (x1) (not new)
- stays at the same state, both loop when accepting a **b**



(3) at state (**z2**)
if reading a, FA1->(w2) and FA2->(x2), so (**z2**) = (w2) or (x2) (not new)
if reading b, FA1->(w1) and FA2->(x3), so (**z3**) = (w1) or (x3)



(4) at state (**z3**)
if reading a, FA1->(w2) and FA2->(x3), so (**z4**) = (w2) and (x3) (+)
- is different because these are both now end states
if reading b, FA1->(w1) and FA2->(x3), so back to (**z3**)



(5) at state (**z4**)
if reading a, FA1->(w2) and FA2->(x3), so (**z4**) (+) (not new)
if reading b, FA1->(w1) and FA2->(x3), so (**z3**) (not new)

NO NEW STATES