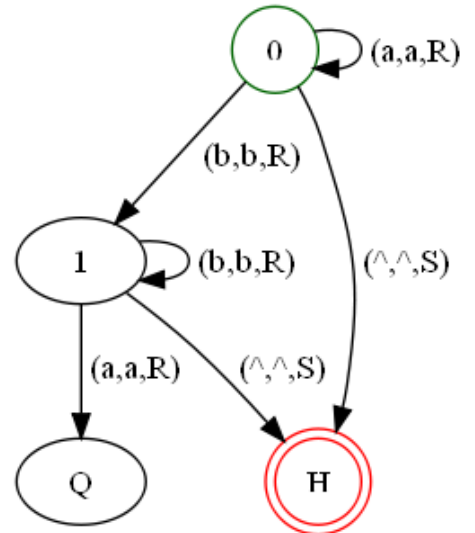


CS581 Worksheet # 6

Due by midnight, Thursday, May 9th, Submit via D2L

1. Consider the Turing machine below

TM	Q	{0, 1, H, Q}
	Sigma	{a, b}
	Gamma	{a, b, ^}
	Delta	0 ^ -> (^, S, H)
		0 a -> (a, R, 0)
		0 b -> (b, R, 1)
		1 b -> (b, R, 1)
		1 ^ -> (^, S, H)
		1 a -> (a, R, Q)
	q0	0
	Accept	H
	Reject	Q
	Blank	^



- A. Describe in English the language accepted
- B. Give the initial configuration
- C. Pick a string not in the language and show that either a sequence of related configurations gets stuck, or ends in the reject state.
- D. Pick a string in the language and show that a sequence of related configurations ends in the accept state.

2. Give a Turing machine for the english language descriptions below over the alphabet {0,1}

- A. { w | w contains an equal number of 1's and 0's }
- B. { w | w contains twice as many 0's as 1's }

3. Describe a construction that shows that the Turing-recognizable languages are closed under union.