CS 3311
Dec 3, 2012
Monday (1)

Homework 11 preston 2.

M_2

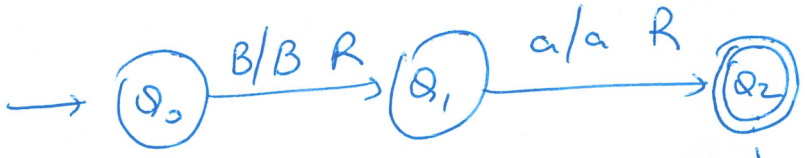
state	a	b	λ-closure
q_1	$\emptyset$	$\emptyset$	$\{q_1, q_2, q_5\}$
q_2	q_3		
q_3			$\{$
q_5	q_5		
q_7			

	a	b
$\{q_1, q_2, q_5\}$	$\{q_3, q_5\}$	$\{q_3, q_5\}$
$\{q_3, q_5\}$		
$\{q_i, q_j\}$	$\{q_i, q_j\}$	$\{q_i, q_j\}$

Last time: Turing machines copy $a^i b^i c^i$

Example L is all strings that begin with an a. $\{a, b\}$

B	a/b/b	B



stops "normally"

accepts

Note a TM does not have to read the entire input string.

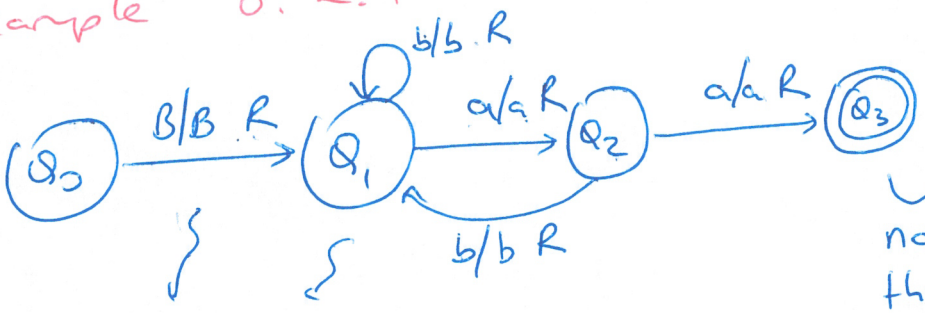
← this machine will never stop if it will not be able to accept valid input.

Any string that causes an infinite loop on a TM is said to be rejected.

What can happen to a TM on an input string w

- stops
  - normally
    - at an accepting state → accepts string w
    - at a non-accepting state → rejects string w
  - abnormally (trying to go left from the leftmost position) → reject string w
- loops forever → reject string w

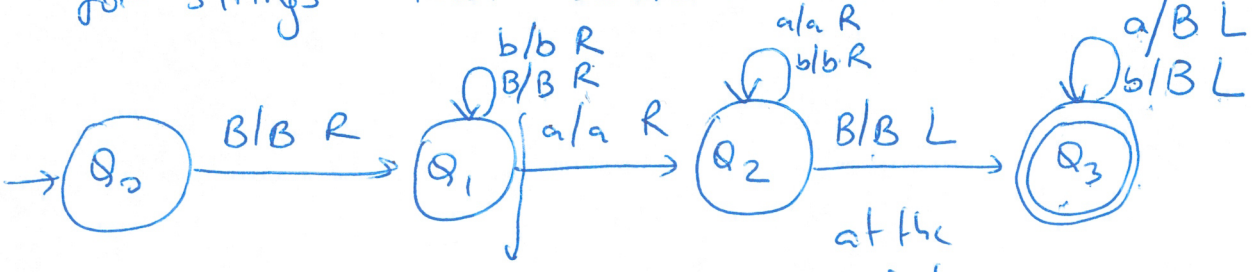
Example 8.2.1 $(a \cup b)^* a a (a \cup b)^*$ $\Sigma = \{a, b\}$



similar to a DFA: does not change the input and goes right all the time.

notice again that the TM does not have to read the entire input. (it may)

for strings that contain an a



will cause the machine to loop forever

at the end of the input

$$f(u) = \begin{cases} 1 & \text{if the input contains an a} \\ \uparrow & \text{otherwise} \end{cases}$$

$f(u)$ — The function computed by the TM on input u

This TM is computing a partial function.

Question: Does every TM represent a total function?

No. It might reject by looping.

By examining a TM can we determine if it represents a total function or not?

2^{12} $\quad$ $2^{(2^{12})}$

Does every statement have a truth value?

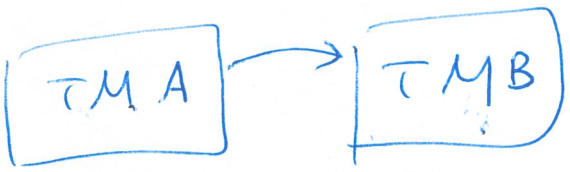
T F

stmt	
This pen writes in blue	T
Today is Friday	F
This is the CS3311 class	T
It will snow tomorrow at 1:45pm	T 67% / F 33%

5' 6" is tall — T for some, F for some

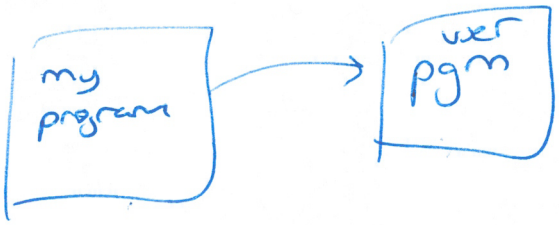
This statement is false — T F / F T

"self reference problem"



TM A monitors TM B and tells whether there is an input that will cause TM B to loop.

"halting problem"



It is not possible to tell whether a TM will stop or not, in general.