

Friday, November 18, 2004

Name (and cornell.edu login)_____

1. Consider the following TM M with input alphabet $\{a, b\}$, left endmarker \vdash , blank symbol \sqcup , start state s , accept state f , and reject state r .

	\vdash	a	b	\sqcup
s	s, \vdash, R	s, b, R	r, a, L	f, \sqcup, L
f	f, \vdash, R	f, b, L	f, a, L	f, \sqcup, L
r	r, \vdash, R	r, b, L	r, a, L	r, \sqcup, L

What is $L(M)$?

Solution. $L = L(a^*)$.

2. Recall: *total* = halts on all inputs; *r.e. set* = set accepted by a TM; *recursive set* = set accepted by a total TM. True or false:

true *false*

- Every CFL is recursive.
- There exists a recursive set that is not a CFL.
- All recursive sets are r.e.
- All r.e. sets are recursive
- TMs with two tapes accept more sets than TMs with one tape.
- It is decidable for a given TM M and string x whether M accepts x .