

HW 5

#2

	Δ	\uparrow	b
S	H, Δ , \rightarrow	A, Δ , \rightarrow	B, Δ , \rightarrow
A ₁	A ₂ , Δ , \leftarrow	A, a, \rightarrow	A, b, \rightarrow
A ₂		R, Δ , \leftarrow	Z, Δ , \rightarrow
B ₁	B ₂ , Δ , \leftarrow	B, a, \rightarrow	B, b, \rightarrow
B ₂		Z, Δ , \rightarrow	R, Δ , \leftarrow
R	S, Δ , \rightarrow	R, a, \leftarrow	R, b, \leftarrow
Z			
H			

ACCEPT

- S - pick next left char
- A₁ - skip to find \uparrow at end
- A₂ - find a at end
- B₁ - skip to find b at end
- B₂ - find b at end
- R - rewind to next char
- H - Accept
- Z - crash

#3

Input $\Delta \underbrace{11 \dots 1}_n \Delta \Delta \dots$

- 1) Given $\Delta 1^n \Delta$ on Tape 1,
write 1^n on Tape 2
- 2) Move T1 head before the first 1
- 3) If T1 sees 1
Copy T2 to the end of T3
else go to 5
- 4) Advance T1 + goto 3
- 5) Copy T3 to T1 as answer

#4 Run T1 on Tape 1 of T
leaving the result on Tape 1

Run T2 on Tape 2 of T,
leaving the result on Tape 2

Append Tape 2 to Tape 1

5) 2-way infinite simulated a new TM by filling in δ based on current cell, using all combinations of symbols for the left & right of current cell

$$\text{if } \delta(q, a) = (p, X, dir)$$

then

$$\forall l \forall r \quad \delta_N(q, [l a r]) = (p, [l X r], dir)$$

New TM simulated on 2-way infinite TM by encoding triples of symbols

$$\Gamma' = \Gamma^3$$

if new TM has move

$$\delta(q, [a b c]) = (p, [x y z], dir)$$

2-way TM uses $a' = \text{encoding of } [a b c]$
 $x' = \text{encoding of } [x y z]$

$$\delta(q, a') = (p, x', dir)$$