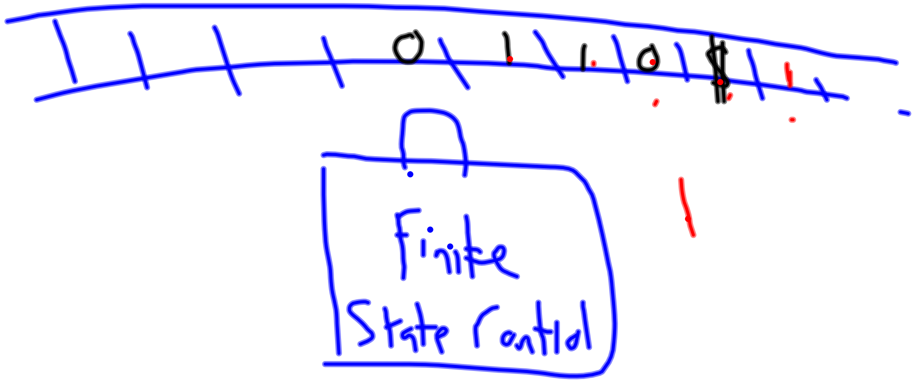
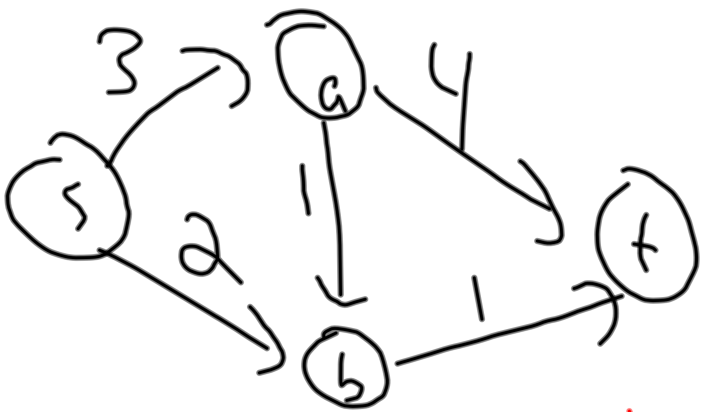

0 1 1 0 $
Finite State Control

Poly time on a TM

= poly time on any digital computer

G



$b = 3$

$S: ((s,b),(b,t))$ Yes

$S: ((s,a),(a,t))$ No

$S: ((s,a),(b,t))$ No

You can verify Longest Path
in Polynomial time.

SAT CNF (and of ors)

$$\phi = \overset{T}{(x_1} \vee \overset{F}{x_2}) \wedge (\overset{F}{\bar{x}_1} \vee \overset{T}{x_3} \vee \overset{T}{\bar{x}_4}) \wedge (\overset{T}{\bar{x}_2} \vee \overset{T}{\bar{x}_4})$$

Is there a setting of the variables that makes ϕ true TFTF

Yes

$$\phi = (x_1 \vee x_2) \wedge (\bar{x}_1 \vee x_2) \wedge (x_1 \vee \bar{x}_2) \wedge (\bar{x}_1 \vee \bar{x}_2)$$

No

SAT is verifiable in poly-time. ∴ SAT ∈ NP

Are there problems that can be verifed in poly time, but cannot be solved in poly time?

Unanswered

Y subtraction of 2 ints

X addition of 2 ints

input y to Y (6,4)

$f(y) = (6, -4)$

$f(y)$ input to addition $\rightarrow$ $6 + -4 = 2$

If $Y \le X$ then $X \in P \Rightarrow Y \in P$

Pf

$Y \notin P \Rightarrow X \notin P$