P = P ( ) Words (P) - Words (P) - Words (P)  $\Box (\Psi_{\Lambda} \Psi) = \Box \Psi \wedge \Box \Psi ( \checkmark )$ (of 4 5) of 4 0(444) 990 Words (4) = { 0 = (2Agw/0 = 4)} 144 DYDAPO 14 14 OF DRAY) ( for all i = 0: 0= i = 9x4 ( for all izo ozi = 4 and ozi =4 € for all i=0: o=i F4 forallizo: oziF4 € OF FIGN DY 27. 0(4,4) = 09,04 (x) ip OPNOY -> O(PNY) is not valid. 04 04 DENT 004 = 004 (v) iff. 0=1 =04 0 F004 iff oziFq for some i=1
iff ozim Fq for some i=0 oziFoy forsome iz 0 OFDOY Extending Thor's Solution. (ais, viais) , (icris, viaris,) = rais, viaris, (ail, Arailz) v7 ail, (city ATCritz) V (T crity, A (aid, V critz)) (crity No critz) V (crity , a critz) V (crity No critz) ToriA, V ToriAz = 7 (oriA, NoriAz)

Exercise: (a) define "infini tely often"4
(b) define "eventually forever" ?"
(en) 4:= DOY. For all Diaces/words of E (2AP)W.
OF JOY iff for all izo: 521 FDY
iff for all i=0 there is j=i sule that o=1 = 9
iff $\forall i \geq 0 \exists j \geq i  \sigma \geq 0 \neq \varphi$ iff $\forall i \geq 0 \exists j \geq i  \sigma \geq 0 \neq \varphi$ iff $\exists j \geq 0 :  \sigma \geq 0 \neq \varphi$ for instructed many  (b) $\forall 2 := \Diamond \Box \varphi$ . For all shares/words $\sigma \in (2AP)^{U}$ .
iff there exists i=0 such that of all j=i
A Social State of the Alexander of the state
The state of the s
2-9 E +
iff #1=0: 0=0 = 9 = 4.
for all but Linidely mary
= evendually Lorevor
elevance for fairness modions:

Relevance for fairwss nothings:

Execution  $g: S_0 \xrightarrow{A_1} S_1 \xrightarrow{A_2} S_2 \xrightarrow{A_3} S_3 \xrightarrow{A_4} S_4$ Execution  $g: S_0 \xrightarrow{A_1} S_1 \xrightarrow{A_2} S_2 \xrightarrow{A_3} S_3 \xrightarrow{A_4} S_4$ Sis bucouditionally fair:

Sis strongly A-fair:

Signally A-fair:

A3j>o: djEA

⇒ O□ taken (A)