

17-1/

CFPP(A) :=

$\exists p \in \mathbb{N}. (p = 2^{i^{i+1}})$

$\forall (s \in A \mid |s| \geq p)$

$\exists (u, v, x, y, z \in \Sigma^* \mid$
 $s = uvxyz \wedge |vy| > 0$

$\wedge |vxy| < p)$

$\forall i \in \mathbb{N}.$

$u^i x y^i z \in A.$

$\neg \text{CFPP}(A) :=$

$\forall p \in \mathbb{N}.$

$\exists (s \in A \mid |s| \geq p)$

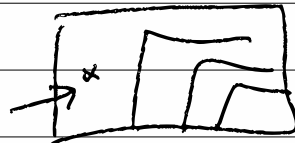
$\forall (u, v, x, y, z \in \Sigma^* \mid$
 $s = uvxyz \wedge$

$|vy| > 0 \wedge |vxy|$

$\exists i \in \mathbb{N}.$

$u^i x y^i z \notin A$

$\neg \text{CPA}(x) \Rightarrow \text{ALL} \neq \text{CFL}$



$$17-2/ \quad a^n b^n c^n = A$$

given p

$$S = a^p b^p c^p$$

given $u, v, x, y, z \quad |vy| > 0 \quad |vxy| < p$

$$a^p b^p c^p \rightarrow vxy \text{ contains } \emptyset \Rightarrow = \epsilon \neq |y| > 0$$

$$\rightarrow vxy \text{ contains } 2 \Rightarrow \text{impossible}$$

$$\rightarrow vxy \text{ contains } 3 \Rightarrow vxy = a b^p c$$

$$|l| = p+2$$

$$\rightarrow vxy \text{ contains } 1 \Rightarrow \text{assume it has 'a's}$$

$$i=0 \Rightarrow a^{p-k} b^p c^p$$

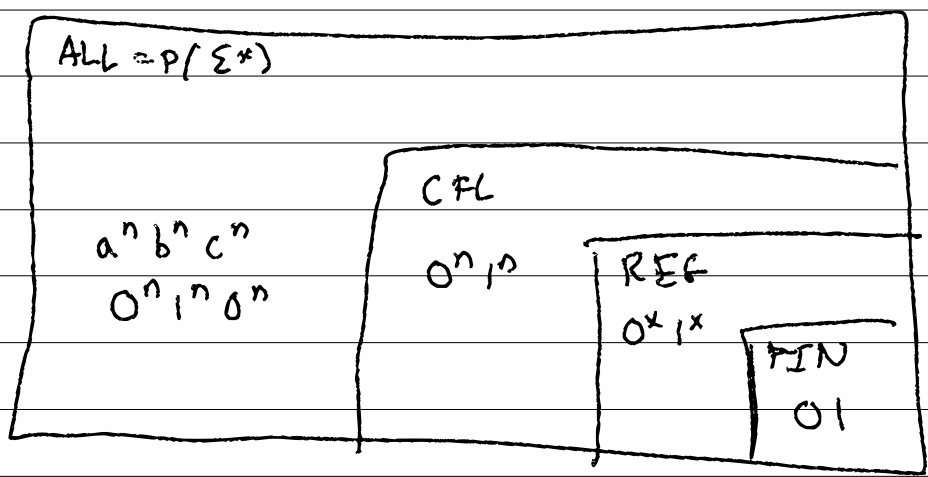
$$\rightarrow vxy \text{ contains } 2 \text{ sym} \Rightarrow a c \Rightarrow vxy = a b^p c^k$$

ab or bc

$$vxy = a^k b^j \quad i=0 \Rightarrow a^f b^g c^p \text{ where}$$

$$f < p \text{ or } g < p$$

17-3/



$$O^a | O^b | O^{a+b}$$
$$a + b = a + b$$

$$O^p | O^p | O^{2p}$$