

TW:1 Solution

Exn:1

$$1) A_1 = \{1, 2, 3, 5, 7, 9\}, A_2 = \{0, 2, 4, 6, 8, 1, 3\}$$

$$A_3 = \{1, 3, 5, 7, 9, 2\}, A_4 = \{0, 1\}$$

2) We can generate These words $L = \{12, 13, 25, 33\}$
 but 25, 12 and 33 are not prime numbers
 also, $25, 33 > 23 \Rightarrow$ A set of alphabet
 can generate several languages, but one lge
 is generated by one and only one Alphabet set.

Exn:2

$$u = abcca, v = baac$$

$$1) u^0 = v^0 = \epsilon, u^2 = u \cdot u = abcca \cdot abcca$$

$$u \cdot u^2 = abcca \cdot abccaabcca, u^3 = u \cdot u \cdot u = abccaabccaab$$

$$\Rightarrow u^n = u \cdot u^{n-1} (n \geq 1)$$

$$2) u \cdot v = abcca \cdot baac, v \cdot u = baac \cdot abcca$$

$$\Rightarrow u \cdot v \neq v \cdot u$$

$$3) |u| = |abcca| = 5, |v| = |baac| = 4,$$

$$|u \cdot v| = |abccabac| = 9 \Rightarrow |u \cdot v| = |u| + |v|$$

$$4) \bar{u} = \overline{abcca} = accba, \bar{v} = \overline{baac} = caab$$

$$\overline{u \cdot v} = \overline{abccabac} = \underbrace{caab}_{\bar{v}} \underbrace{accba}_{\bar{u}}$$

$$\Rightarrow \overline{u \cdot v} = \bar{v} \cdot \bar{u}$$

$$5) |u|_a = |abcca|_a = 2, |u|_b = 1, |u|_c = 2, |u|_{cc} = 1$$

$$|u \cdot v|_{aa} = |abccabac|_{aa} = 1$$