



**SECI1013: DISCRETE STRUCTURE  
QUIZ (2)**

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|       |
|-------|
| Marks |
| 10    |

1. Let  $R$  is relation on  $A = \{2, 4, 6, 8, 10\}$  and defined by  $R = \{(a, b) \mid |a - b| \geq 4, a \in A, b \in A\}$

a. Find  $R$

$$\{(6, 2), (8, 2), (10, 2), (8, 4), (10, 4), (10, 6)\}$$

b. Find the domain and range.

$$\text{domain} : \{6, 8, 10\}$$

$$\text{range} : \{2, 4, 6\}$$

2. Let relation  $P = \{(3, 3), (3, 9), (5, 3), (5, 5), (5, 7), (5, 9), (7, 7), (7, 9), (9, 9)\}$  on  $\{3, 5, 7, 9\}$

a. Construct the matrix of relation,  $M_P$ .

$$\begin{matrix} & \begin{matrix} 3 & 5 & 7 & 9 \end{matrix} \\ \begin{matrix} 3 \\ 5 \\ 7 \\ 9 \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \end{matrix}$$

b. Find the in-degree and out-degree for each vertex.

$$\begin{matrix} & \begin{matrix} 3 & 5 & 7 & 9 \end{matrix} \\ \text{in degree} & \begin{matrix} 2 & 1 & 2 & 4 \end{matrix} \\ \text{out degree} & \begin{matrix} 2 & 4 & 2 & 1 \end{matrix} \end{matrix}$$

c. Identify whether  $P$  is a partial order relation. Justify your answer.

$$P = \{3, 5, 7, 9\}$$

Reflexive :

since for each  $x \in P$ ,  $(x, x) \in R$ , thus  
is a reflexive relation

Antisymmetric :

since for all  $a, b \in P$ ,  $(a, b) \in R$  and  $a \neq b$   
then  $(b, a) \notin R$ , thus is a antisymmetric

Transitive :

since  $M_P \otimes M_P = M_P$   
thus is a transitive.

$\therefore$  So,  $P$  is a partial order relation