

# Mathematics for Computing

## Digraphs and Relations

### 1 Digraphs and Relations

Given a flock of chickens, between any two chickens one of them is dominant. A relation,  $R$ , is defined between chicken  $x$  and chicken  $y$  as  $xRy$  if  $x$  is dominant over  $y$ . This gives what is known as a pecking order to the flock. Home Farm has 5 chickens: Amy, Beth, Carol, Daisy and Eve, with the following relations:

- Amy is dominant over Beth and Carol
- Beth is dominant over Eve and Carol
- Carol is dominant over Eve and Daisy
- Daisy is dominant over Eve, Amy and Beth
- Eve is dominant over Amy.

Suppose  $A = \{1, 2, 3, 4\}$

Consider the following relation in  $A$

$$\{(1, 1), (2, 2), (2, 3), (3, 2), (4, 2), (4, 4)\}$$

Draw the direct graph of  $A$

Types of Relations

- Antisymmetric
- Symmetric
- Reflexive
- Transitive