

## 9.4 Closure of Relations

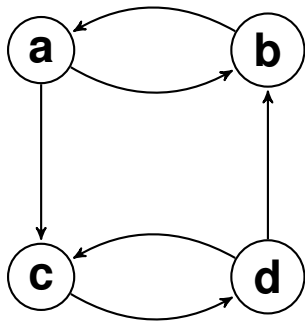
### 9.4 pg. 607 # 1

Let  $R$  be the relation on the set  $\{0, 1, 2, 3\}$  containing the ordered pairs  $(0, 1), (1, 1), (1, 2), (2, 0), (2, 2), (3, 0)$ . Find the

- reflexive closure of  $R$
- symmetric closure of  $R$

### 9.4 pg. 607 # 5

For the directed graph shown



- Find the reflexive closure
- Find the symmetric closure

### 9.4 pg. 608 # 25

Use Algorithm 1 to find the transitive closure of these relations on  $\{1, 2, 3, 4\}$ .

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

### 9.4 pg. 608 # 27

Use Warshall's algorithm to find the transitive closure of these relations on  $\{1, 2, 3, 4\}$ .

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