Exercise 4.65.

Cy D. Fect, looking forward to the day when he will rise in the organization, gives a query to find all the wheels (using the `wheel` rule of section 4.4.1):

```
(wheel ?who)
```

To his surprise, the system responds

```
;;; Query results:
(wheel (Warbucks Oliver))
(wheel (Bitdiddle Ben))
(wheel (Warbucks Oliver))
(wheel (Warbucks Oliver))
(wheel (Warbucks Oliver))
```

Why is Oliver Warbucks listed four times?

Answer.

Oliver Warbucks is listed four times because the query system does not remove duplicates on query pattern before instantiation. Querying the data base with the body of the `wheel` rule, we see that Oliver Warbucks is successfully matched for four times with four different middle managers.

```
;;; Query input:
(and (supervisor ?middle-manager ?person)
     (supervisor ?x ?middle-manager))

;;; Query results:
(and (supervisor (scrooge eben) (warbucks oliver))
     (supervisor (cratchet robert) (scrooge eben)))

(and (supervisor (bitdiddle ben) (warbucks oliver))
     (supervisor (tweakit lem e) (bitdiddle ben)))

(and (supervisor (hacker alyssa p) (bitdiddle ben))
     (supervisor (reasoner louis) (hacker alyssa p)))

(and (supervisor (bitdiddle ben) (warbucks oliver))
     (supervisor (fect cy d) (bitdiddle ben)))

(and (supervisor (bitdiddle ben) (warbucks oliver))
     (supervisor (hacker alyssa p) (bitdiddle ben)))
```