Answer Sets: Problems

Exercises from *Foundations of Logic Programming*: Problems 2.3, 2.5 and 3.1 (pages 9 and 24).

Problem 21. Find all sets of literals supported by the program

$$\begin{aligned} &p \leftarrow q, \\ &q \leftarrow p. \end{aligned}$$

Problem 22. Prove Proposition 3.1 from *Foundations of Logic Programming* (page 24).

Problem 23. Find all answer sets for each of the following two programs:
(a)

$$\begin{aligned} &Prime(2), \\ &Prime(3), \\ &Prime(5), \\ &Prime(7), \\ &\neg Prime(x) \leftarrow not\ Prime(x) \qquad (1 \le x \le 10), \end{aligned}$$

(b)

$$\begin{aligned} &\neg Prime(1), \\ &\neg Prime(4), \\ &\neg Prime(6), \\ &\neg Prime(8), \\ &\neg Prime(9), \\ &\neg Prime(10), \\ &Prime(x) \leftarrow not\ \neg Prime(x) \qquad (1 \le x \le 10). \end{aligned}$$

Problem 24. Find all answer sets for the program

$$\begin{aligned} &p \leftarrow not\ \neg p, \\ &\neg p \leftarrow not\ p, \\ &q \leftarrow not\ \neg q, \\ &\neg q \leftarrow not\ q, \\ &r \leftarrow q. \end{aligned}$$

Problem 25. Find all answer sets for the program consisting of the rules

$$e(1,2),\ e(2,3),\ e(3,4),\ e(1,5),\ e(2,6),\ e(5,6) \tag{1}$$

and

$$\begin{array}{l} nt(x) \leftarrow e(x,y), \\ t(x) \leftarrow not\ nt(x) \end{array}$$

$(1 \leq x, y \leq 6)$.

Problem 26. Find all answer sets for the program consisting of rules (1) and

$$w(x) \leftarrow e(x,y), not\ w(y)$$

$(1 \leq x, y \leq 6)$.