

1. Find all books.

Answer: publication id, title, publisher, and year.

Query:

$$\{(i, t, p, y) \mid \text{book}(i, p, y) \wedge \text{publication}(i, t)\}$$

2. Find all articles that have appeared in proceedings entitled “LNCS 1234”.

Answer: publication id, title, and page numbers.

Query:

$$\{(i, t, s, e) \mid \exists c, y. \text{publication}(c, \text{”LNCS 1234”}) \wedge \text{proceedings}(c, y) \wedge \text{article}(i, c, s, e) \wedge \text{publication}(i, t)\}$$

3. Is there any publication that is simultaneously a book and an article?

Answer: publication id and title.

Query:

$$\{(i, t) \mid \exists p, y, c, s, e. \text{publication}(i, t) \wedge \text{book}(i, p, y) \wedge \text{article}(i, c, s, e)\}$$

4. Find all articles that have appeared in two (or more) proceedings.

Answer: publication id of the article, publication id of proceedings #1, and publication id of proceedings #2.

Query:

$$\{(i, c_1, c_2) \mid \exists s_1, e_1, s_2, e_2, y_1, y_2. \text{article}(i, c_1, s_1, e_1) \wedge \text{article}(i, c_2, s_2, e_2) \wedge \text{proceedings}(c_1, y_1) \wedge \text{proceedings}(c_2, y_2) \wedge \neg(c_1 = c_2)\}$$

5. Find all articles and the year in which they appeared.

Answer: pubid, title, and year.

Query:

$$\{(i, t, y) \mid (\exists c, s, e, p, t_1. \text{article}(i, c, s, e) \wedge \text{publication}(i, t) \wedge \text{book}(c, p, y) \wedge \text{publication}(c, t_1)) \vee (\exists c, s, e, v, n, t_2. \text{article}(i, c, s, e) \wedge \text{publication}(i, t) \wedge \text{journal}(c, v, n, y) \wedge \text{publication}(c, t_2)) \vee (\exists c, s, e, t_3. \text{article}(i, c, s, e) \wedge \text{publication}(i, t) \wedge \text{proceedings}(c, y) \wedge \text{publication}(c, t_3))\}$$

6. Find all authors who have written a book or are editors of a journal.

Answer: author id and title of the book or name of the journal (there may be multiple answers for a single author listing all her books/journals).

Query:

$$\{(a, t) \mid (\exists na, u, i, p, y). \text{author}(a, na, u) \wedge \text{wrote}(a, i) \wedge \text{publication}(i, t) \wedge \text{book}(i, p, y)) \vee (\exists na, u, i, v, n, y). \text{author}(a, na, u) \wedge \text{wrote}(a, i) \wedge \text{publication}(i, t) \wedge \text{journal}(i, v, n, y))\}$$

7. Find all articles that haven't appeared in a book.

Answer: publication id and title.

Query:

$$\{(i, t) \mid \exists c, s, e. \text{article}(i, c, s, e) \wedge \text{publication}(i, t) \wedge \neg \exists p, y. \text{book}(c, p, y)\}$$

8. Is every publication a book, journal, proceedings, or an article? Answer: yes/no

Query:

$$\forall i, t. \text{publication}(i, t) \rightarrow \exists p, y_1. \text{book}(i, p, y_1) \vee \exists v, n, y_2. \text{journal}(i, v, n, y_2) \vee \exists y_3. \text{proceedings}(i, y_3) \vee \exists c, s, e. \text{article}(i, c, s, e)$$

9. Find all authors who are editors of a journal and have an article appearing in that journal.

Answer: author id and title of the article and name of the journal (again, there may be multiple answers)

Query:

$$\{(a, t_a, t_j) \mid \exists na, u, a_i, j_i, v, n, y, t_j, s, e. \text{journal}(j_i, v, n, y) \wedge \text{publication}(j_i, t_j) \wedge \text{author}(a, na, u) \wedge \text{wrote}(a, j_i) \wedge \text{article}(a_i, j_i, s, e) \wedge \text{publication}(a_i, t_a) \wedge \text{wrote}(a, a_i)\}$$

10. Find all books that do not contain any articles.

Answer: publication id and title.

Query:

$$\{(i, t) \mid \exists y. \text{publication}(i, t) \wedge \text{book}(i, p, y) \wedge \forall i', j, s, e. (\text{article}(i', j, s, e) \rightarrow i \neq j)\}$$

11. Find all journals that do not contain an article with more than 50 pages

Answer: journal name, volume, number, and year.

Query:

$$\{(t, v, n, y) \mid \exists i. \text{journal}(i, v, n, y) \wedge \text{publication}(i, t) \wedge \neg \exists i', s, e. \text{article}(i', i, s, e) \wedge (e - s) > 50\}$$

12. Find all articles that have appeared in conference proceedings and later in a journal.

Answer: article title, proceedings title, journal name

Note: you can compare years using “<”, i.e., $x < y$ is true when the value assigned to x is smaller than the one assigned to y .

Query:

$$\{(t_a, t_p, t_j) \mid \exists i_a, i_j, i_p, y_j, y_p, v, n, s, e. \text{journal}(i_j, v, n, y_j) \wedge \text{proceedings}(i_p, y_p) \wedge (y_j > y_p) \wedge \text{article}(i_a, i_j, s, e) \wedge \text{article}(i_a, i_p, s, e) \wedge \text{publication}(i_a, t_a) \wedge \text{publication}(i_p, t_p) \wedge \text{publication}(i_j, t_j)\}$$

13. Find all authors whose publications are solely articles.

Answer: author id and name.

Query:

$$\{(a, n) \mid \exists u. \text{author}(a, n, u) \wedge (\forall i. \text{wrote}(a, i) \rightarrow \exists j, s, e. \text{article}(i, j, s, e))\}$$

14. Find proceedings that contain exactly one article.

Answer: proceedings' publication id and title.

Query:

$$\{(i, t) \mid \text{publication}(i, t) \wedge \exists y. \text{proceedings}(i, y) \wedge (\forall j, j', s, s', e, e'. \text{article}(j, i, s, e) \wedge \text{article}(j', i, s', e') \rightarrow j = j')\}$$

15. Find all pairs of authors who always publish together.

Answer: author ids and names of both authors.

Query:

$$\{(a_1, n_1, a_2, n_2) \mid \exists u_1, u_2. \text{author}(a_1, n_1, u_1) \wedge \text{author}(a_2, n_2, u_2) \wedge (\forall p, t. \text{publication}(p, t) \rightarrow (\text{wrote}(a_1, p) \leftrightarrow \text{wrote}(a_2, p)))\}$$