

1. Find all books.

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

Query:

```
select distinct book.pubid, title, publisher, year
from book, publication
where book.pubid = publication.pubid
```

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

Answer: publication id, title, and page numbers.

Query:

```
select distinct p1.pubid, p1.title, startpage, endpage
from article, proceedings, publication p1, publication p2
where article.pubid = p1.pubid
      and article.crossref = proceedings.pubid
      and proceedings.pubid = p2.pubid
      and p2.title = "LNCS 1234"
```

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

Answer: publication id and title.

Query:

```
select distinct publication.pubid, title
from book, publication, article
where book.pubid = article.pubid
      and article.pubid = publication.pubid
```

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:

```

select distinct a1.pubid, p1.pubid, p2.pubid
from article a1, article a2, proceedings p1, proceedings p2
where a1.crossref = p1.pubid
      and a2.crossref = p2.pubid
      and p2.pubid != p1.pubid
      and a1.pubid = a2.pubid

```

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

Answer: pubid, title, and year.

Query:

```

select distinct article.pubid, title, year
from article, publication,
      ((select pubid, year from book)
       union
       (select pubid, year from journal)
       union
       (select pubid, year from proceedings)) as pubyear
where crossref = pubyear.pubid
      and article.pubid = publication.pubid

```

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:

```

select distinct author, title
from ((select author, pubid
       from wrote, book
       where wrote.publication = book.pubid)
      union
      (select author, pubid

```

```

        from wrote, journal
        where wrote.publication = journal.pubid)) as bj,
        publication
    where bj.pubid = publication.pubid

```

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

Answer: publication id and title.

Query:

```

select distinct article.pubid, title
from article, publication
where article.pubid not in ( select article.pubid
                             from article, book
                             where article.crossref = book.pubid
                             and article.pubid = publication.pubid

```

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

Query:

```

select distinct "No" as answer
from publication
where pubid not in (
    (select pubid from book)
    union
    (select pubid from journal)
    union
    (select pubid from proceedings)
    union
    (select pubid from article))

```

(technically, one needs one more query that answers **Yes** in the other case.)

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

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

Query:

```
select w1.author, p1.title, p2.title
from article a, journal j, wrote w1, wrote w2,
      publication p1, publication p2
where w1.author = w2.author
      and w1.publication = a.pubid and w2.publication = j.pubid
      and w1.publication = p1.pubid and w2.publication = p2.pubid
      and a.crossref = j.pubid
```

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

Answer: publication id and title.

Query:

```
select book.pubid, title
from book, publication
where book.pubid not in
      (select crossref from article)
      and book.pubid = publication.pubid
```

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

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

Query:

```
select title, volume, no, year
from journal, publication
where journal.pubid not in
      (select distinct crossref
```

```
from article
where startpage-endpage > 50)
and journal.pubid = publication.pubid
```

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:

```
select publication.title, pa.title, ja.title
from (select article.pubid, year, title
      from article, proceedings, publication
      where crossref = proceedings.pubid
       and publication.pubid = proceedings.pubid) as pa,
      (select article.pubid, year, title
      from article, journal, publication
      where crossref = journal.pubid
       and publication.pubid = journal.pubid) as ja,
publication
where pa.pubid = ja.pubid
      and pa.year < ja.year
      and publication.pubid = pa.pubid
```

13. Find all authors whose publications are solely articles.

Answer: author id and name.

Query:

```
select distinct aid, name
from author
where aid not in
  ( select author
    from wrote
    where publication not in
      ( select pubid
        from article ) )
```

14. Find proceedings that contain exactly one article.

Answer: proceedings' publication id and title.

Query:

```
select proceedings.pubid, title
from publication, proceedings, article
where proceedings.pubid = article.crossref
  and proceedings.pubid = publication.pubid
  and not exists ( select *
                  from article a1, article a2
                  where a1.crossref = a2.crossref
                    and a1.crossref = proceedings.pubid
                    and a1.pubid != a2.pubid)
```

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

Answer: author ids and names of both authors.

Query:

```
select a1.aid, a1.name, a2.aid, a2.name
from author a1, author a2
where not exists (
    select *
    from publication p, wrote w1
    where p.pubid = w1.publication
        and a1.aid = w1.author
        and a2.aid not in (
            select author
            from wrote
            where publication = p.pubid
                and author <> a1.aid)
and not exists(
select *
from publication p, wrote w2
where p.pubid = w2.publication
    and a2.aid = w2.author
    and a1.aid not in (
        select author
        from wrote
        where publication = p.pubid
            and author <> a2.aid)))
```

16. How many authors have written a book?

Answer: Number of authors (name of output attribute A#)

Query:

```
select count(distinct author) as A#
from book, wrote
where pubid = publication
```

or, more verbose:

```
select count(aid) as 'A#'
from (select distinct aid
      from book, wrote
      where pubid = publication ) ab
```

NOTE: there is no `group by` clause as the list of *grouping attributes* is empty (i.e., there is only one group).

17. How many articles are there with at least 4 authors?

Answer: Number of articles (name of output attribute A#)

Query:

```
select count(pub) as A#
from (select distinct publication as pub
      from wrote, article
      where publication = pubid
      group by publication
      having count(author) >= 4) p4
```


18. For all proceedings find the number of articles that have appeared in the proceedings.

Answer: Proceedings id and title, and the number of articles (name of output attributes pubid, title, and A#)

Query:

```
select pubid, title, cnt as A#
from proceedings, publication,
    ( select crossref as crossref, count(pubid) as cnt
      from article
      group by crossref ) nos
where proceedings.pubid = publication.pubid
and proceedings.pubid = nos.crossref
```

19. For all authors list the number of conference papers, the number of journal articles, the number of other articles, and the total of all articles.

Answer: author id, author name, #conference, #journal, #other, and #total of papers (name the output attributes "ID", "NAME", "C#", "J#", "O#", and "T#", respectively).

Query:

```
select aid as ID, name, cs as 'C#', js as 'J#',
       os as 'O#', cs+js+os as 'T#'
from   author a,
      ( select author as aid, count(publication) as cs
        from   wrote
        where  publication in
              ( select pubid
                from   article
                where  crossref in
                    ( select pubid
                      from   proceedings ) ) ) confs
      ( select author as aid, count(publication) as js
        from   wrote
        where  publication in
              ( select pubid
                from   article
                where  crossref in
                    ( select pubid
                      from   journal ) ) ) journals
      ( select author as aid, count(publication) as os
        from   wrote
        where  publication in
              ( select pubid
                from   article
                where  crossref not in
                    ( select pubid from proceedings )
```

```

                and crossref not in
                    ( select pubid from journal ) ) ) others
where a.aid = confs.aid and a.aid = journals.aid
    and a.aid = others.aid

```

20. For every author list how many times he/she published with exactly k coauthors (for all k for which there is at least one publication with this many coauthors).

Answer: Author id and name, number of coauthors ("C#"), number of publications ("P#")

Query:

```

select a.aid, a.name, noc.c-1 as 'C#', count(noc.p) as '#P'
from   author a
      ( select w1.author as a, w1.publication as p,
            count(w2.author) as c
        from   wrote w1, wrote w2
        where  w1.publication = w2.publication
        group by w1.author, w1.publication ) noc
where a.aid = noc.a
group by a.aid, a.name, noc.c

```