How to write the join queries?
There are 3 types of joins are there
1. Inner join
2. Left outer join
3. Right outer join

Let us understand these joins and how to write the queries by taking book & publisher tables as example:

book		
book_no	title	publisher_no
b1	let us c	p1
b2	perls in c	p2
b3	treasures in c	p1
b4	pointers in c	p3
b5	data structures and algorithms	p4
b6	operating system by taninbum	p2
b7	artificial intellijence	

publisher	
publisher_no	publisher_nm
p1	wrox
p2	pbp
p3	dreamworks
p4	pearson
p5	apress

q1) find all the books and their publisher name who has published that book
ans) goto book table pick one record after another record, and within this record pick the fk column value : p1, then goto publisher table, the identify the record whose pk (publisher_no) is p1, the corresponding fields of the data of that record are related to book b1

b1 let us c (p1: fk) -> publisher: (publisher_no: pk) (p1) => wrox

From the above we can understood we need to query the data from book and publisher, and match fk column value of the book table with pk column value of the publisher table to identify matching records between the tables.

Since we establish relationship between the tables using fk and pk, always while joining the data across the tables we need to match the records based on foreign key and primary key only.

cartesion product query:

select * from book, publisher
if we select the data from 2 tables without any join condition, then the query performs cartetion product of the records from these 2 tables and will be returned.

which means each record from left side table will be joined with each record of the right side table and will be returned even those are not related, because we didnt specified how to join these 2 tables.

if we have 10 records in book table and 7 records in publisher table, the above query returns a multiplication of 10 * 7 = 70 records as a result.

inner join query:

```
                              type              join condition (always it will be fk->pk)
                            --------              ----------------------------------
select b.*, p.* from book b inner join publisher p on b.publisher_no = p.publisher_no;
```

here we told perform an inner join based “on” [condition]: match book table publisher_no (fk) = with publisher table publisher_no (pk) and those matching records only return.

give me all the books that are published by ‘wrox’ publication.
```
select b.*, p.* from book b inner join publisher p on b.publisher_no = p.publisher_no where p.publisher_nm = ‘wrox’;
```

Left outer join:
select all the records from the left-side table and only the matching records from the right side table.

list all the books whose title is matching with given :title, along with publisher info if it exists.
For eg..: give me all the books matching with title: “%java%”

```
select b.*, p.* from book b left outer join publisher p on b.publisher_no = p.publisher_no where b.title like ‘%java%’;
```

Right outer join:
select all the records from right-side table and only the matching records from the left-side table.
For eg:
list all the publishers whose publisher_nm contains an letter ‘e’ along with their books they published. If the publisher has not published any books also, still return the publisher info.

```
select b.*, p.* from book b right outer join publisher p on b.publisher_no = p.publisher_no where p.publisher_nm like ‘%e%’;
```

Sub-queries:
nested queries, or query inside another query. Always the nested query or inner query will be evaluated first and based on the outcome of the innerquery is taken as an input and the outer query will be evaluated.

```
select count(publisher_no) from book group by publisher_no;
```

groupBy = is used for logically grouping the records of a table based on a column, so that we can apply aggregate functions on the each group of records.

```
                                    apply: count(publisher_no)
table records:                      groupBy(p1)
---------------                     b1 t1 p1
b1 t1 p1                            b4 t4 p1  ---------------3
b2 t2 p2                            b8 t8 p1
b3 t3 p3
b4 t4 p1  -> groupBy(publisher_no)  groupBy(p2)
b5 t5 p4                            b2 t2 p2 ---------------- 2
b6 t6 p3                            b7 t7 p2
b7 t7 p2
b8 t8 p1                            groupBy(p3)
                                    b6 t6 p3 ---------------- 2
                                    b3 t3 p3

                                    groupBy(p4) ---------------1
                                    b5 t5 p4
```

```
select * from book b where b.publisher_no in (
select publisher_no from book group by publisher_no having publisher_no is not null and count(publisher_no) >= 2);
```