PART 3 RA

Write a query that returns the "Subject" attribute of all subjects for which no book has been written by any author. The results should be sorted in ascending order.

$$\sigma_{SubjectId = SubjectID(AuthorID = 'NULL')(Books)}(Subjects)$$

Write a query that finds the ISBNs of all editions of books written by Agatha Christie.The Results should be sorted in descending order.

$$\sigma_{Book\ ID = \sigma_{(Auhtod\ ID = AuthotId(First\ Name = Agatha\ \ U\ \ lats\ Name = Chrostie)}(Books)}(Editions)$$

Write a query that finds the first and last names of all authors who have written at least one children's/young adult book (subject: "Children/YA") and at least one book of fiction (subject: "Fiction"). The results should be sorted first in ascending order by first name and then in ascending order by last name. Note: if there are multiple authors with the same first and last name, their names should appear multiple times in the result.

$$\sigma_{Subject = "Children/YA"\ AND\ Subject = "Fiction"}(Authors)$$

Write a query that finds the IDs, first names, and last names of all authors who have written at least one book in every subject for which J. K. Rowling has written at least one book, including J. K. Rowling. The results should be sorted in ascending order by the author's last name, with ties being broken in favor of the larger ID.

$$\sigma_{FirstName = Jk\ and\ LastName = Rowling}(Authors)$$

PART 4 NORMALIZATION

1.) Candidate keys: a.) id

b.) name, major

c.) name, gpa

d.) name, school

2.) Yes the relation is 3NF because looking at the functional dependencies we can see that id is a super key and then the prime attributes of this relationship are id, name, major, school, and gpa. Looking at the relationships, in form X -> Y in all of them X is either a candidate key or Y is a prime attribute meaning the relation is 3NF.

3.) No the relation is not BCNF because to be BCNF all functional dependencies of the form X->Y must have X as a candidate key. Looking at the functional dependencies both GPA and School are not candidate keys hence the relation is not BCNF

4.)GPA -> Major is violated in the table as Alice and David both have GPA's of 3.8 but have different majors. School -> Major is also violated multiple times as many people are in the same school with different majors.