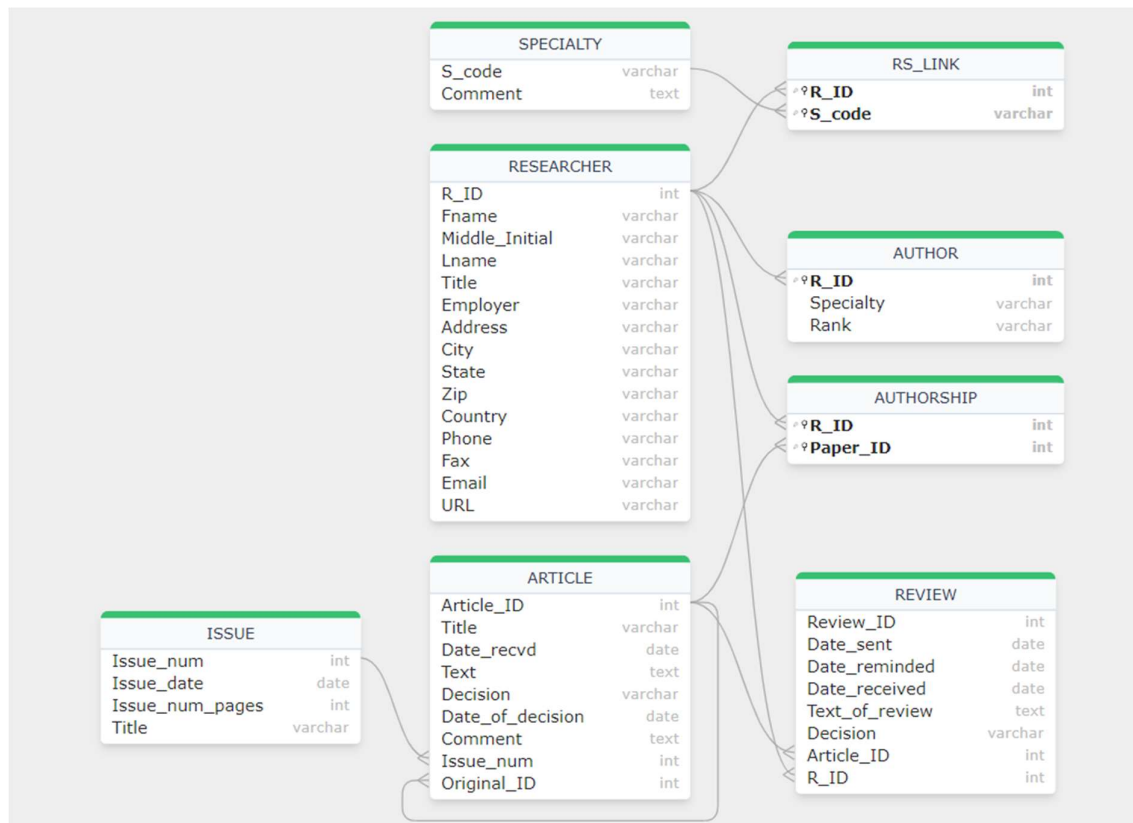


Part 1 : ER Diagram



Part 2: Database Implementation and Data Population

(35 points)

```

CREATE TABLE ARTICLE (
    Article_ID INT PRIMARY KEY,
    Title VARCHAR(255),
    Date_recvd DATE,
    Text TEXT,
    Decision VARCHAR(100),
    Date_of_decision DATE,
    comment TEXT,
    Issue_num INT,
    Original_ID INT,
    FOREIGN KEY (Issue_num) REFERENCES ISSUE(Issue_num),
    FOREIGN KEY (Original_ID) REFERENCES ARTICLE(Article_ID)
);

CREATE TABLE REVIEW (
    Review_ID INT PRIMARY KEY,
    Date_sent DATE,
    Date_reminded DATE,

```

```

    Date_received DATE,
    Text_of_review TEXT,
    Decision VARCHAR(100),
    Article_ID INT,
    R_ID INT,
    FOREIGN KEY (Article_ID) REFERENCES ARTICLE(Article_ID),
    FOREIGN KEY (R_ID) REFERENCES RESEARCHER(R_ID)
);

CREATE TABLE RESEARCHER (
    R_ID INT PRIMARY KEY,
    Fname VARCHAR(100),
    Middle_Initial CHAR(1),
    Lname VARCHAR(100),
    Title VARCHAR(100),
    Employer VARCHAR(255),
    Address VARCHAR(255),
    City VARCHAR(100),
    State VARCHAR(100),
    Zip VARCHAR(10),
    Country VARCHAR(100),
    Phone VARCHAR(15),
    Fax VARCHAR(15),
    Email VARCHAR(100),
    URL VARCHAR(255)
);

CREATE TABLE AUTHOR (
    R_ID INT PRIMARY KEY,
    Specialty VARCHAR(255),
    Rank VARCHAR(100),
    FOREIGN KEY (R_ID) REFERENCES RESEARCHER(R_ID)
);

CREATE TABLE ISSUE (
    Issue_num INT PRIMARY KEY,
    Issue_date DATE,
    Issue_num_pages INT,
    Title VARCHAR(255)
);

CREATE TABLE SPECIALTY (
    S_code INT PRIMARY KEY,
    comment TEXT
);

CREATE TABLE RS_LINK (
    R_ID INT,
    S_code INT,
    PRIMARY KEY (R_ID, S_code),
    FOREIGN KEY (R_ID) REFERENCES RESEARCHER(R_ID),

```

```

        FOREIGN KEY (S_code) REFERENCES SPECIALTY(S_code)
    );

CREATE TABLE AUTHORSHIP (
    R_ID INT,
    Paper_ID INT,
    PRIMARY KEY (R_ID, Paper_ID),
    FOREIGN KEY (R_ID) REFERENCES RESEARCHER(R_ID),
    FOREIGN KEY (Paper_ID) REFERENCES ARTICLE(Article_ID)
);

```

Output :

```
mysql> SELECT * FROM ARTICLE;
```

Article_ID	Title	Issue_num	Original_ID	Date_recvd	Text	Decision	Date_of_decision	comment
1	The Quantum Theory	1	NULL	2020-01-10	Text of the quantum theory paper...	Accepted	2020-04-01	Groundbreakin
2	Economics of Climate Change	2	NULL	2020-02-15	Text on climate economics...	Rejected	2020-05-10	Needs more da
3	Advances in AI	1	NULL	2020-03-12	Text on AI advancements...	Accepted	2020-06-15	Very informat
4	Biological Impacts of Pollution	2	NULL	2020-04-20	Text on pollution impacts...	Under Review	NULL	NULL
5	Quantum Computers: The Next Generation	1	1	2020-05-25	Text on next-gen quantum computers...	Accepted	2020-08-05	Excellent seq
6	The Future of Renewable Energy	2	NULL	2020-06-30	Text about renewable energy future...	Accepted	2020-09-20	Very promisin
7	Nanotechnology in Medicine	1	NULL	2020-07-15	Text about nanotech in medicine...	Under Review	NULL	NULL
8	Statistical Methods in Genetics	2	NULL	2020-08-10	Text on genetics and statistics...	Rejected	2020-11-01	Unconvincing
9	Astrophysics and Cosmology	1	NULL	2020-09-05	Text on astrophysics...	Accepted	2020-12-15	Adds to the f
10	Cybersecurity Trends	2	NULL	2020-10-20	Text on cybersecurity...	Under Review	NULL	NULL
11	Robotics and Automation	1	NULL	2020-11-25	Text on robotics...	Accepted	2021-01-10	Very detailed
12	Sociological Effects of Pandemics	2	NULL	2020-12-30	Text on pandemics...	Rejected	2021-02-20	Lacks depth
13	Quantum Mechanics and Reality	1	NULL	2021-01-15	Text on quantum mechanics...	Accepted	2021-03-01	Philosophical
14	The Psychology of Investing	2	NULL	2021-02-10	Text on investing psychology...	Under Review	NULL	NULL
15	Evolutionary Biology Today	1	NULL	2021-03-20	Text on evolutionary biology...	Accepted	2021-05-30	New insights

```
mysql> SELECT * FROM ISSUE;
```

Issue_num	Issue_date	Issue_num_pages	Title
1	2020-01-01	100	Issue 1 Title
2	2020-02-01	100	Issue 2 Title

2 rows in set (0.00 sec)

Part 3: SQL Queries (45 points)

1. List the titles of all articles received in 2023.

```
SELECT Title FROM ARTICLE WHERE YEAR(Date_recvd) = 2023;
```

Output :

```
mysql> SELECT Title FROM ARTICLE WHERE YEAR(Date_recvd) = 2023;
+-----+
| Title |
+-----+
| Future of Quantum Computing |
| AI in Healthcare            |
| Renewable Energy Sources   |
| Data Security in Cloud Computing |
| Robotic Automation Trends   |
+-----+
5 rows in set (0.00 sec)
```

2. Find the names of all researchers who have written an article about 'Database Systems'.

```
SELECT DISTINCT RESEARCHER.Fname, RESEARCHER.Lname
FROM RESEARCHER
JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
JOIN ARTICLE ON AUTHORSHIP.Paper_ID = ARTICLE.Article_ID
WHERE ARTICLE.Title LIKE '%Database Systems%';
```

```
mysql> SELECT DISTINCT RESEARCHER.Fname, RESEARCHER.Lname
-> FROM RESEARCHER
-> JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
-> JOIN ARTICLE ON AUTHORSHIP.Paper_ID = ARTICLE.Article_ID
-> WHERE ARTICLE.Title LIKE '%Database Systems%';
+-----+-----+
| Fname | Lname |
+-----+-----+
| Bob   | Johnson |
+-----+-----+
1 row in set (0.00 sec)
```

3. List the articles reviewed by 'John Doe'.

```
SELECT ARTICLE.Title
FROM ARTICLE
JOIN REVIEW ON ARTICLE.Article_ID = REVIEW.Article_ID
JOIN RESEARCHER ON REVIEW.R_ID = RESEARCHER.R_ID
WHERE RESEARCHER.Fname = 'John' AND RESEARCHER.Lname = 'Doe';
```

```
mysql> SELECT ARTICLE.Title
-> FROM ARTICLE
-> JOIN REVIEW ON ARTICLE.Article_ID = REVIEW.Article_ID
-> JOIN RESEARCHER ON REVIEW.R_ID = RESEARCHER.R_ID
-> WHERE RESEARCHER.Fname = 'John' AND RESEARCHER.Lname = 'Doe';
```

Title
Impact of Database Systems
Database Systems and Big Data

```
2 rows in set (0.01 sec)
```

4. Find the number of articles received by each issue.

```
SELECT Issue_num, COUNT(*) AS Articles_Count
FROM ARTICLE
GROUP BY Issue_num;
```

```
mysql> SELECT Issue_num, COUNT(*) AS Articles_Count
-> FROM ARTICLE
-> GROUP BY Issue_num;
```

Issue_num	Articles_Count
1	14
2	9

```
2 rows in set (0.01 sec)
```

5. List the authors who have written more than 5 articles.

```
SELECT RESEARCHER.Fname, RESEARCHER.Lname
FROM RESEARCHER
JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
GROUP BY RESEARCHER.R_ID
HAVING COUNT(AUTHORSHIP.Paper_ID) > 5;
```

```
mysql> SELECT RESEARCHER.Fname, RESEARCHER.Lname
-> FROM RESEARCHER
-> JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
-> GROUP BY RESEARCHER.R_ID
-> HAVING COUNT(AUTHORSHIP.Paper_ID) > 5;
+-----+-----+
| Fname | Lname |
+-----+-----+
| Emily | Clark |
| James | Watson |
+-----+-----+
2 rows in set (0.00 sec)
```

6. Find the most common specialty among authors.

```
SELECT Specialty, COUNT(*) AS Count
FROM AUTHOR
GROUP BY Specialty
ORDER BY Count DESC
LIMIT 1;
```

```
mysql> SELECT Specialty, COUNT(*) AS Count
-> FROM AUTHOR
-> GROUP BY Specialty
-> ORDER BY Count DESC
-> LIMIT 1;
+-----+-----+
| Specialty | Count |
+-----+-----+
| Data Science | 3 |
+-----+-----+
1 row in set (0.00 sec)
```

7. List the articles that have not yet been reviewed.

```
SELECT Title
FROM ARTICLE
WHERE Article_ID NOT IN (SELECT Article_ID FROM REVIEW);
```

```
mysql> SELECT Title
-> FROM ARTICLE
-> WHERE Article_ID NOT IN (SELECT Article_ID FROM REVIEW);
```

Title
The Quantum Theory
Economics of Climate Change
Advances in AI
Biological Impacts of Pollution
Quantum Computers: The Next Generation
The Future of Renewable Energy
Nanotechnology in Medicine
Statistical Methods in Genetics
Astrophysics and Cosmology
Cybersecurity Trends
Robotics and Automation
Sociological Effects of Pandemics
Quantum Mechanics and Reality
The Psychology of Investing
Evolutionary Biology Today
Future of Quantum Computing
AI in Healthcare
Renewable Energy Sources
Data Security in Cloud Computing
Robotic Automation Trends
Optimizing Performance in Database Systems

```
21 rows in set (0.01 sec)
```

8. Find the average number of pages per issue.

```
SELECT AVG(Issue_num_pages) AS Average_Pages
FROM ISSUE;
```

```
mysql> SELECT AVG(Issue_num_pages) AS Average_Pages
-> FROM ISSUE;
```

Average_Pages
100.0000

```
1 row in set (0.01 sec)
```

9. List the researchers who have both written and reviewed articles.

```
SELECT DISTINCT RESEARCHER.Fname, RESEARCHER.Lname
FROM RESEARCHER
JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
JOIN REVIEW ON RESEARCHER.R_ID = REVIEW.R_ID;
```

```
mysql> SELECT DISTINCT RESEARCHER.Fname, RESEARCHER.Lname
-> FROM RESEARCHER
-> JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
-> JOIN REVIEW ON RESEARCHER.R_ID = REVIEW.R_ID;
+-----+-----+
| Fname | Lname |
+-----+-----+
| Alice | Gordon |
+-----+-----+
1 row in set (0.00 sec)
```

10. Find the titles of articles that have been both accepted and rejected.

```
SELECT Title
FROM ARTICLE
WHERE Article_ID IN
    (SELECT Article_ID FROM ARTICLE WHERE Decision = 'Accepted')
AND Article_ID IN
    (SELECT Article_ID FROM ARTICLE WHERE Decision = 'Rejected');
```

```
mysql> SELECT Article_ID, Title, Decision, Date_of_decision FROM ARTICLE WHERE Title LIKE '%Innovative AI Techniques%';
+-----+-----+-----+-----+
| Article_ID | Title | Decision | Date_of_decision |
+-----+-----+-----+-----+
| 24 | Innovative AI Techniques | Rejected | 2022-02-15 |
| 25 | Innovative AI Techniques | Accepted | 2022-04-20 |
+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

11. List the researchers who have a specialty in 'Database Systems'.

```
SELECT RESEARCHER.Fname, RESEARCHER.Lname
FROM RESEARCHER
JOIN AUTHOR ON RESEARCHER.R_ID = AUTHOR.R_ID
WHERE AUTHOR.Specialty = 'Database Systems';
```

```
mysql> SELECT RESEARCHER.Fname, RESEARCHER.Lname
-> FROM RESEARCHER
-> JOIN AUTHOR ON RESEARCHER.R_ID = AUTHOR.R_ID
-> WHERE AUTHOR.Specialty = 'Database Systems';
+-----+-----+
| Fname | Lname |
+-----+-----+
| Bob | Johnson |
| John | Doe |
+-----+-----+
2 rows in set (0.00 sec)
```


12. Find the issues that have more than 50 pages.

```
SELECT Issue_num, Title
FROM ISSUE
WHERE Issue_num_pages > 50;
```

```
mysql> SELECT Issue_num, Title
-> FROM ISSUE
-> WHERE Issue_num_pages > 50;
+-----+-----+
| Issue_num | Title          |
+-----+-----+
|          1 | Issue 1 Title  |
|          2 | Issue 2 Title  |
+-----+-----+
2 rows in set (0.00 sec)
```

13. List the articles that have been reviewed more than twice

```
SELECT ARTICLE.Title
FROM ARTICLE
JOIN REVIEW ON ARTICLE.Article_ID = REVIEW.Article_ID
GROUP BY ARTICLE.Article_ID
HAVING COUNT(REVIEW.Review_ID) > 2;
```

```
mysql> SELECT ARTICLE.Title
-> FROM ARTICLE
-> JOIN REVIEW ON ARTICLE.Article_ID = REVIEW.Article_ID
-> GROUP BY ARTICLE.Article_ID
-> HAVING COUNT(REVIEW.Review_ID) > 2;
+-----+-----+
| Title          |
+-----+-----+
| Advanced Database Architectures |
+-----+-----+
1 row in set (0.00 sec)
```

14. Find the researcher with the most articles.

```
SELECT RESEARCHER.Fname, RESEARCHER.Lname
FROM RESEARCHER
JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
GROUP BY RESEARCHER.R_ID
ORDER BY COUNT(AUTHORSHIP.Paper_ID) DESC
LIMIT 1;
```

```
mysql> SELECT RESEARCHER.Fname, RESEARCHER.Lname
-> FROM RESEARCHER
-> JOIN AUTHORSHIP ON RESEARCHER.R_ID = AUTHORSHIP.R_ID
-> GROUP BY RESEARCHER.R_ID
-> ORDER BY COUNT(AUTHORSHIP.Paper_ID) DESC
-> LIMIT 1;
+-----+-----+
| Fname | Lname |
+-----+-----+
| Emily | Clark |
+-----+-----+
1 row in set (0.00 sec)
```

15. List the specialties that have more than 10 researchers.

```
SELECT Specialty, COUNT(*) AS Researcher_Count
FROM AUTHOR
GROUP BY Specialty
HAVING COUNT(*) > 10;
```

```
mysql> SELECT Specialty, COUNT(*) AS Researcher_Count
-> FROM AUTHOR
-> GROUP BY Specialty
-> HAVING COUNT(*) > 10;
+-----+-----+
| Specialty | Researcher_Count |
+-----+-----+
| Data Science | 14 |
+-----+-----+
1 row in set (0.00 sec)
```

```
mysql> SELECT * FROM RESEARCHER;
```

R_ID	Fname	Middle_Initial	Lname	Title	Employer	Address	City	State	Zip	Country	Phone
	Fax	Email			URL						
102	Bob	J	Johnson	Prof.	University of Data	101 Data Dr	Databurg	DB	10101	USA	321-654-
9987	321-654-9988	bob.johnson@unidata.edu			www.unidata.edu/bjohnson						
103	John	A	Doe	Dr.	Data Science Institute	123 Research Blvd	Sciencetown	SC	12345	USA	555-123-
4567	555-765-4321	john.doe@dsinstitute.edu			www.dsinstitute.edu/johndoe						
104	Emily	B	Clark	Prof.	Metropolitan University	456 University Ave	Metrocity	MC	45678	USA	555-678-
1234	555-876-4321	emily.clark@metrouni.edu			www.metrouni.edu/emilyclark						
105	James	C	Watson	Dr.	Historic College	789 College St	Oldtown	OT	78901	USA	555-789-
4561	555-964-7512	james.watson@histcoll.edu			www.histcoll.edu/jameswatson						
106	New	D	Researcher	Dr.	New University	123 New St	New City	NC	12345	USA	555-1010
	555-2020	new.researcher@nu.edu			www.nu.edu/new						
107	Another	E	Scientist	Prof.	Another University	234 Another St	Another City	AC	23456	USA	555-3030
	555-4040	another.scientist@au.edu			www.au.edu/another						
108	Grace	F	Hopper	Dr.	Tech Innovations	456 Innovation Pkwy	Tech City	TC	45678	USA	555-6789
	555-5780	grace.hopper@techinnovations.com			www.techinnovations.com/grace						
109	Alan	T	Turing	Prof.	Computational Sciences	789 Compute St	Compute City	CC	78910	USA	555-9876
	555-9870	alan.turing@compsciences.com			www.compsciences.com/alan						
110	Ada	L	Lovelace	Dr.	Algorithm Research	123 Algo Rd	Algorithm City	AC	12345	USA	555-1234
	555-1230	ada.lovelace@alгореsearch.com			www.alгореsearch.com/ada						
111	Alice	M	Gordon	Dr.	Unified Research	100 Unity Dr.	Unity City	UC	50000	USA	555-4000
	555-4001	alice.gordon@uresearch.com			www.uresearch.com/alice						
120	Alice	B	Johnson	Dr.	University of Data	101 Binary Ln	Data City	DC	10001	USA	555-0100
	555-0101	alice.johnson@unidata.edu			http://www.unidata.edu/alice						
121	Bob	C	Lee	Mr.	Data Analytics Inc.	102 Hex Blvd	Compute Town	CT	10002	USA	555-0200
	555-0201	bob.lee@analytics.com			http://www.analytics.com/bob						
122	Cara	D	Martin	Prof.	Tech Innovate	103 Circuit Rd	Tech City	TX	10003	USA	555-0300
	555-0301	cara.martin@techinnovate.com			http://www.techinnovate.com/cara						
123	Dave	E	Norris	Dr.	Big Data Lab	104 Data Dr	DataVille	DV	10004	USA	555-0400
	555-0401	dave.norris@bigdatalab.com			http://www.bighdatalab.com/dave						
124	Eva	F	Watson	Ms.	Data Solutions	105 Algorithm Ave	Data Town	DT	10005	USA	555-0500
	555-0501	eva.watson@datasolutions.com			http://www.datasolutions.com/eva						
125	Frank	G	Harris	Mr.	Cloud Services	106 Cloud St	Cloud City	CC	10006	USA	555-0600
	555-0601	frank.harris@cloudservices.com			http://www.cloudservices.com/frank						
126	Grace	H	Lee	Prof.	Machine Learning Inc.	107 Tensor Blvd	Compute City	CT	10007	USA	555-0700

```
mysql> SELECT * FROM AUTHOR;
```

R_ID	Specialty	Academic_Rank
102	Database Systems	Senior Researcher
103	Database Systems	Lead DB Analyst
104	Data Science	Senior
105	Machine Learning	Senior
106	Data Science	Junior
107	Quantum Computing	Senior
108	Data Science	Mid-Level
109	Cryptography	Senior
110	Machine Learning	Junior
120	Data Science	Junior
121	Data Science	Junior
122	Data Science	Junior
123	Data Science	Senior
124	Data Science	Senior
125	Data Science	Senior
126	Data Science	Mid-Level
127	Data Science	Mid-Level
128	Data Science	Mid-Level
129	Data Science	Lead
130	Data Science	Lead

20 rows in set (0.00 sec)

```
mysql> SELECT * FROM ARTICLE;
```

Article_ID	Title	Date_of_decision	comment	Date_recvd	Text	Issue_num	Original_ID	Decision
1	The Quantum Theory			2020-01-10	Text of the quantum theory paper...	1	NULL	Accept
2	Economics of Climate Change		Groundbreaking work	2020-02-15	Text on climate economics...	2	NULL	Reject
3	Advances in AI		Needs more data	2020-03-12	Text on AI advancements...	1	NULL	Accept
4	Biological Impacts of Pollution		Very informative	2020-04-20	Text on pollution impacts...	2	NULL	Under Review
5	Quantum Computers: The Next Generation		NULL	2020-05-25	Text on next-gen quantum computers...	1	NULL	Accept
6	The Future of Renewable Energy		Excellent sequel to prior works	2020-06-30	Text about renewable energy future...	2	NULL	Accept
7	Nanotechnology in Medicine		Very promising	2020-07-15	Text about nanotech in medicine...	1	NULL	Under Review
8	Statistical Methods in Genetics		NULL	2020-08-10	Text on genetics and statistics...	2	NULL	Reject
9	Astrophysics and Cosmology		Unconvincing arguments	2020-09-05	Text on astrophysics...	1	NULL	Accept
10	Cybersecurity Trends		Adds to the field significantly	2020-10-20	Text on cybersecurity...	1	NULL	Under Review

```
mysql> SELECT * FROM REVIEW;
```

Review_ID	Date_sent	Date_reminded	Date_received	Text_of_review	Decision	Article_ID	R_ID
1	2023-01-01	2023-01-15	2023-01-20	Detailed analysis provided.	Accepted	21	103
2	2023-02-01	2023-02-15	2023-02-20	Requires more data on the topic.	Rejected	22	103
10	2023-05-01	2023-05-15	2023-05-20	Excellent analysis and depth.	Accepted	21	111
11	2022-04-01	2022-04-10	2022-04-15	Needs more detail on scalability aspects.	Under Review	28	102
12	2022-04-16	2022-04-25	2022-04-30	Consider adding more case studies.	Under Review	28	103
13	2022-05-05	2022-05-15	2022-05-20	Well-written but requires updates on recent technologies.	Under Review	28	104

```
6 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM ISSUE;
```

Issue_num	Issue_date	Issue_num_pages	Title
1	2020-01-01	100	Issue 1 Title
2	2020-02-01	100	Issue 2 Title

```
2 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM AUTHORSHIP;
```

R_ID	Paper_ID
104	1
104	2
104	3
104	4
104	5
104	6
105	7
105	8
105	9
105	10
105	11
105	12
102	21
111	21
102	22
102	23

```
16 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM SPECIALTY;
```

S_code	comment
101	Data Science - The science of data analysis.
102	Machine Learning - Algorithms and statistical models.
103	Quantum Computing - Computing using quantum-mechanical phenomena.
104	Cryptography - The practice of secure communication.

```
4 rows in set (0.01 sec)
```