Group 53: Project Step 3

http://Flip3.ENGR.OregonState.edu:1991 (Tested in Google Chrome)
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Executive Summary

This database app archives research publications and its citations and academic authors. To fit the scope of a quarter semester, some constraints, like a foreign `authors_id` key for `Institutions`, were omitted.

Some feedback asked about many-to-many relationships, which we limited to `Citations` and `Research_Papers_has_Authors`. `Citations` used to be one-to-many. We removed `author_id` and `citation_id` from `Research_Papers`, as they weren't needed to capture the many-to-many nature. Junction table operations don't cascade to parent tables because there's nothing to cascade — only the junction tables manage the many-to-many relationships.

On the data relationships, there can be many research papers with citations and vice-versa, but there don't necessarily have to be any citations for a research paper in the database. Therefore, the relationship would be many (optional)-to-many (mandatory), `Research_Papers` to `Citations`, respectively, because a `Citations` entry can't exist without a citation.

One concern was transitive dependencies. Some feedback said the `country` and `address` constraints in `Institutions` could cause data anomalies. However, our schema wasn't threatened by anomalies with geography, and again, scope has to be considered in a quarter semester. We're not entirely sure it could cause an anomaly to begin with and think the terms' logical associations were mistaken for dependencies.

Several smaller changes were made:

- Tables `Research_Papers` and `Research_Papers_has_Authors` had duplicate constraint names, causing issues with SQL queries.
- Some text wasn't geared for laymen, so we improved that while building the website. However, we chose to keep the `doi` constraint — Digital Object Identifier, a code used to find academic papers in many other databases — for brevity.
- Our outline and SQL code had different character restraints for the same constraints — e.g., inputting countries in Institutions had a 100-character restraint that we shortened to 20.
- Our SQL file needed more work to make it cleanly importable; we rewrote it by hand, since earlier steps allowed imported SQL.
- Some who tested our initial site found edge cases we hadn't considered, like adding attributes not `NULL` but simply empty strings. We've prevented that with "required" HTML tags.

Project Outline

This application indexes research papers and their academic citations. The relational database could, with expansion, streamline direct access to source data for verification.

Published papers have risen exponentially since the 1940s, from some 200,000 to three million in 2000. Before 2020, there were over seven million. Self-citation isn't always unethical, but a paper's average amount of self-citations has also risen — 0.3 in 1950 and 2.2 by 2020. Poor citation, not just self-citing, can spread academic myths. With direct access to literature and its citations, misinformation is less likely to occur.

In this database, a `Citations` entity visualizes a research paper's citations and vice-versa, with the papers in a `Research_Papers` entity. An `Authors` entity archives authorial information, while `Institutions` stores similar data on publishing organizations. `Disciplines` logs the papers by subject.

The project's scope is constrained to enough research papers and authors to show appropriate data relationships. We can assume each research paper cites one other research paper. Not every paper is necessarily cited.

Database Outline

`Research_Papers` — Academic research publications

- Constraints
  - `research_paper_id: int, auto_increment, not NULL` (Primary Key)
  - `title: varchar(100), not NULL`
  - `date_published: date, not NULL`
  - `doi: varchar(100)`
    - `doi` means Digital Object Identifier, a common code to find publications.
  - `institution_id: int` (Foreign Key)
  - `discipline_id: int, not NULL` (Foreign Key)
- Relationships
  - many-to-many (`Research_Papers` to `Citations`)
    - Publications can have many citations, and citations can involve many research papers.
  - many-to-many (`Research_Papers` to `Authors`)
    - Publications can have many authors, and researchers can write many papers.
  - one (optional)-to-many (`Research_Papers` to `Institutions`)
    - Publications can have one publishing organization but don't need one, since some researchers are independent. An institution can back many research papers.
  - one (mandatory)-to-many (`Research_Papers` to `Disciplines`)
    - A publication must belong to an academic field, but that field can have many publications.

`Citations` — Which publications cite or are cited by other research papers

- Constraints
  - `citation_id: int, auto_increment, not NULL` (Primary Key)
  - `citing_paper_id: int, not NULL` (Foreign Key)
  - `cited_paper_id: int, not NULL` (Foreign Key)
- Relationships
  - many-to-many (`Citations` to `Research_Papers`)
    - Citations can have many research papers and vice-versa.

`Authors` — Who has written what

- Constraints
  - `author_id: int, auto_increment, not NULL` (Primary Key)
  - `first_name: varchar(20), not NULL`
    `last_name: varchar(20), not NULL`
- Relationships (`Authors` to `Research_Papers`)
  - many-to-many (`Authors` to `Research_Papers`)
    - Researchers can write many papers; publications can have many authors.

`Research_Papers_has_Authors` — Links several authors to research papers, if needed

- Constraints
  - `research_paper_author_id: int, auto-increment, not NULL`
  - `paper_id: int, not NULL` (Foreign Key)
  - `name_id: int, not NULL` (Foreign Key)
- Relationships
  - many-to-one (`Research_Papers_has_Authors` to `Research_Papers`)
    - Can log one research paper many times.
  - many-to-one (`Research_Papers_has_Authors` to `Authors`)
    - Can log one author many times.

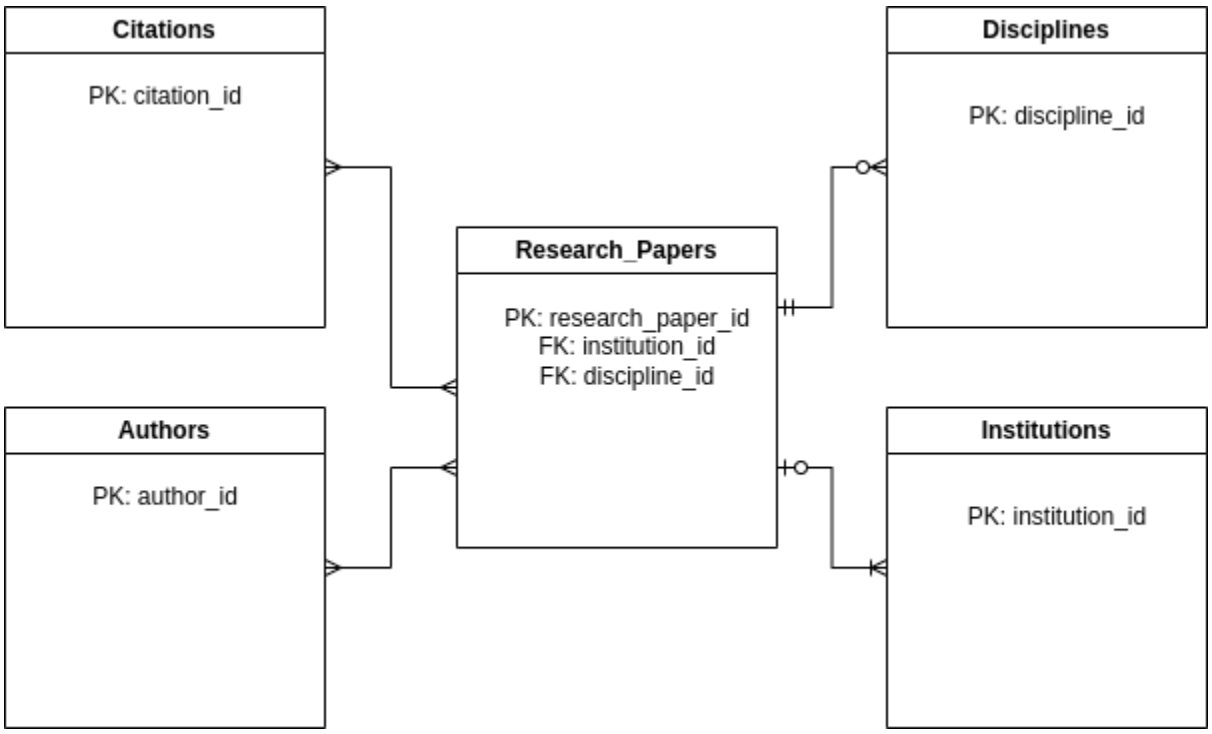
`Institutions` — Publishing organizations

- Constraints
  - `institution_id: int, auto_increment, not NULL` (Primary Key)
  - `name: varchar(50), not NULL`
  - `address: varchar(50), not NULL`
  - `country: varchar(100), not NULL`
  - `website: varchar(100), not NULL`
- Relationships:
  - many-to-one (optional) (`Institutions` to `Research_Papers`)
    - Organizations can publish many research papers, but publications can exist without an institution.

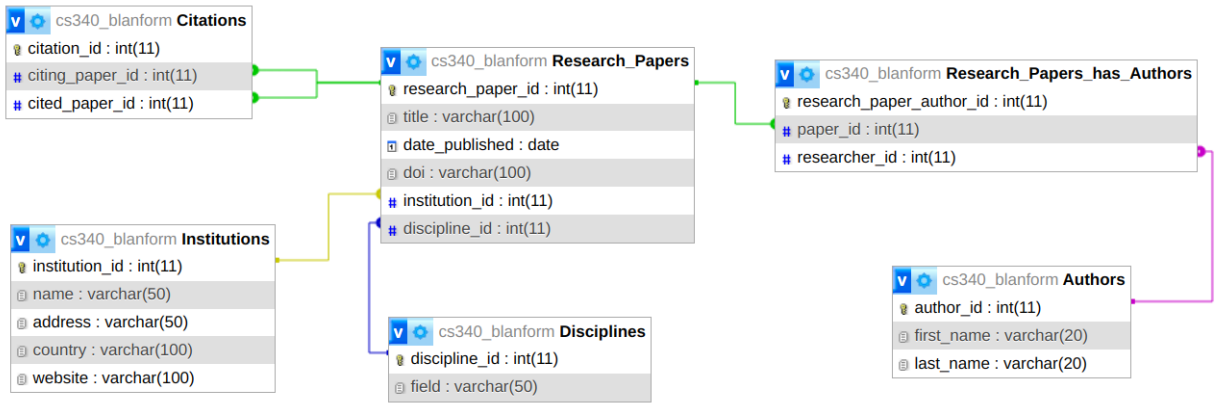
`Disciplines` – Research fields

- Constraints:
  - `discipline_id: int, auto_increment, not NULL` (Primary Key)
  - `field: varchar(50), not NULL`
- Relationships:
  - many-to-one (mandatory) (`Disciplines` to `Research_Papers`)
    - Research fields have many publications, and every research paper belongs to a discipline.

Entity-Relationship Diagram



Schema



Example Data

Research_Papers					
research_paper_id	**title**	**date_published**	**doi**	**institution_id**	**discipline_id**
1	Grapefruit Juice Interactions with Antipsychotic Medicine	1980-10-29	10.1991/1123	2	1
2	Celtic Tradition in Beowulf	1999-01-03	10.9932/1939	3	2
3	Schizophrenia Treatment Models	1997-04-09	10.0001/9634	1	4
4	An Overview of Antipsychotic Drug Kinetics	1978-05-13	10.0193/9294	NULL	1
5	Anglo-Saxon Class Dynamics and Migration	1991-07-21	10.1111/2345	3	3

Citations		
citation_id	**citing_paper_id**	**cited_paper_id**
1	1	4
2	2	5
3	3	4

Authors

author_id	first_name	last_name
1	Nina	Faulkner
2	Robert	Ball
3	John	Smith
4	Sandra	Smith
5	Maria	Thompson

Research_Papers_has_Authors		
research_paper_author_id	**paper_id**	**researcher_id**
1	1	1
2	1	2
3	2	1
4	3	3
5	4	4
6	5	1

Institutions				
institution_id	**name**	**address**	**country**	**website**
1	Samoa University	2370 Clover Drive, Colorado Springs, Colorado	United States	samoa.edu
2	Weston Biological Institute	1671 Johnstown Road, Winnetka, New York	United States	westonbio.edu
3	Smith and Harper College	4628 Hazelwood Avenue, London	United Kingdom	shcollege.edu

Disciplines

discipline_id	field
1	Biology
2	Literature
3	History
4	Psychology

UI Screenshots

Research_Papers CRUD

ResearchPaperId	Title	DatePublished	DOI	Institution	Discipline	
1	Grapefruit Juice Interactions with Antipsychotic Medicine	Oct. 29, 1980	10.1991/1123	Weston Biological Institute	Biology	Delete
2	Celtic Tradition in Beowulf	Jan. 3, 1999	10.9932/1939	Smith and Harper College	Literature	Delete
3	Schizophrenia Treatment Models	Apr. 9, 1997	10.0001/9634	Samoa University	Psychology	Delete
4	An Overview of Antipsychotic Drug Kinetics	May. 13, 1978	10.0193/9294		Biology	Delete
5	Anglo-Saxon Class Dynamics and Migration	Jul. 21, 1991	10.1111/2345	Smith and Harper College	History	Delete

Add Research Paper

Finish the forms below.

Title:

Date Published: mm / dd / yyyy

DOI:

Institution: Select

Discipline: Select

Submit

Update Research Paper

Choose an existing publication.

Existing Title: Select

New Title:

Date Published: mm / dd / yyyy

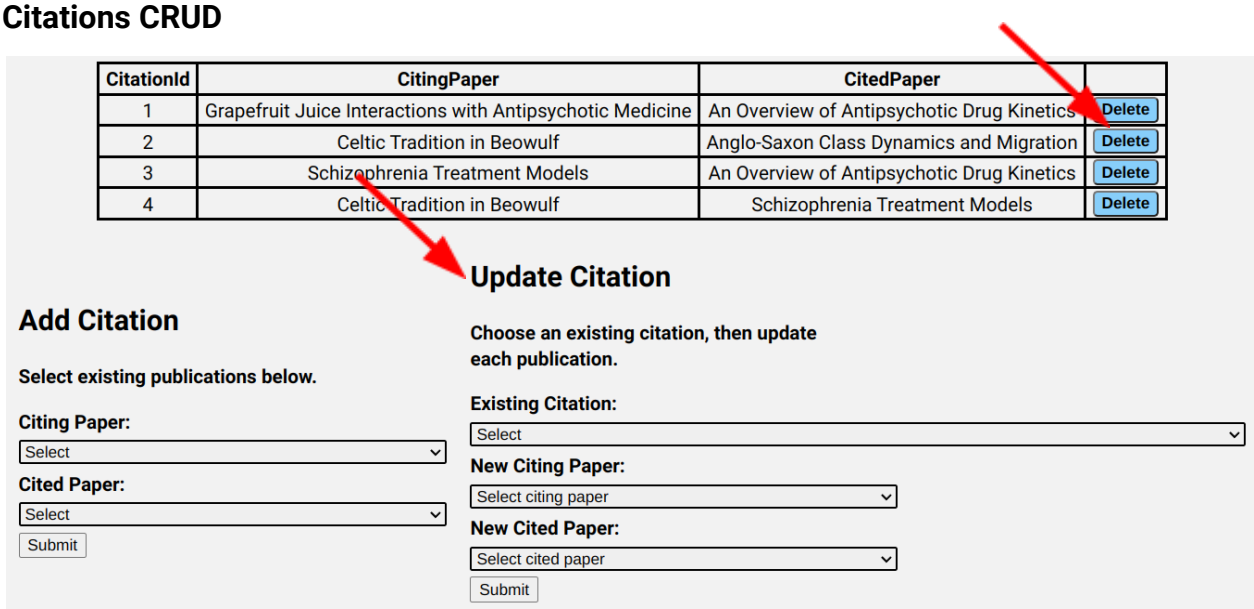
DOI:

Institution: Select institution

Discipline Select discipline

Submit

Citations CRUD



CitationId	CitingPaper	CitedPaper	
1	Grapefruit Juice Interactions with Antipsychotic Medicine	An Overview of Antipsychotic Drug Kinetics	Delete
2	Celtic Tradition in Beowulf	Anglo-Saxon Class Dynamics and Migration	Delete
3	Schizophrenia Treatment Models	An Overview of Antipsychotic Drug Kinetics	Delete
4	Celtic Tradition in Beowulf	Schizophrenia Treatment Models	Delete

Add Citation

Select existing publications below.

Citing Paper:

Select

Cited Paper:

Select

Submit

Update Citation

Choose an existing citation, then update each publication.

Existing Citation:

Select

New Citing Paper:

Select citing paper

New Cited Paper:

Select cited paper

Submit

Authors CRUD

AuthorId	FirstName	LastName	
1	Nina	Faulkner	Delete
2	Robert	Ball	Delete
3	John	Smith	Delete
4	Sandra	Smith	Delete
5	Maria	Thompson	Delete

Add

Submit the author's name below.

First Name:

Last Name:

Submit

Update Author

Select an existing full name.

Author:

Select one

First Name:

Last Name:

Submit

Research_Papers_has_Authors CRUD

PublisherId	ResearchPaper	AuthorName	
1	Grapefruit Juice Interactions with Antipsychotic Medicine	Nina Faulkner	Delete
2	Grapefruit Juice Interactions with Antipsychotic Medicine	Robert Ball	Delete
3	Celtic Tradition in Beowulf	Nina Faulkner	Delete
4	Schizophrenia Treatment Models	John Smith	Delete
5	An Overview of Antipsychotic Drug Kinetics	Sandra Smith	Delete
6	Anglo-Saxon Class Dynamics and Migration	Nina Faulkner	Delete

Add Author Publication

Select the author and academic title.

Research Paper:

Select

Author:

Select

Submit

Update Author Publication

Choose an existing publication to update it.

Existing Title:

Select

Select

Select

Submit

Institutions CRUD

InstitutionId	Name	Address	Country	Website	
1	Samoa University	2370 Clover Drive, Colorado Springs, Colorado	United States	samoa.edu	Delete
2	Weston Biological Institute	1671 Johnstown Road, Winnetka, New York	United States	westonbio.edu	Delete
3	Smith and Harper College	4628 Hazelwood Avenue, London	United Kingdom	shcollege.edu	Delete

Add Institution

Complete the forms below.

Name:

Address:

Country:

Website:

Submit

Update Institution

Choose an existing institution.

Institution:

Select an Institution

Name:

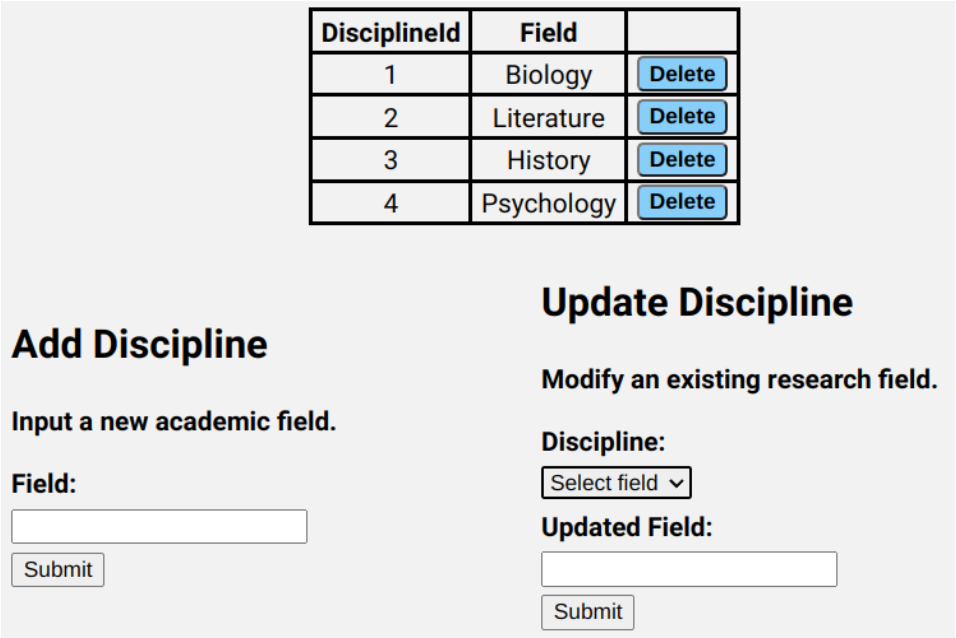
Address:

Country:

Website:

Submit

Disciplines CRUD



DisciplineId	Field	
1	Biology	Delete
2	Literature	Delete
3	History	Delete
4	Psychology	Delete

Add Discipline

Input a new academic field.

Field:

Submit

Update Discipline

Modify an existing research field.

Discipline:

Select field

Updated Field:

Submit