MacDonald Designs:
The Robert Addison
Library Project
Database Design

A report on the design of the RAL Web online
catalogue DBMS (revised edition).

Neil MacDonald
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Introduction

This report documents the final design, process, and decisions of the database for the Robert Addison Library Web Catalogue. For a detailed explanation of the design process with commentary on each iteration, please visit the project design blog: www.neil-macdonald.com/RAL_project/.

Included in this report are a process description, assumptions and limitations, business rules, a sample of pre-normalized data, normalization with end-user's relational schema, a complete entity relationship diagram, entity-attribute tables, sample data, and sample reports.

The purpose of this report is to explain the final design decisions and show the structure of the database, so that users can better understand how the catalogue works and to provide a blueprint should anyone wish to expand upon or update the database in the future.

Process Description

To begin this design, I reviewed the original print catalogue and the Excel spreadsheet with expanded notes on which Donald Combe, Peter Babcock, and I worked. This gave me a clear idea of what data is available to work with. Earlier in the project process, I had already conducted end-user UX design and information architecture[1] so I had already assessed the types of data users wished to access and how.

From this review, I created a table of all available data and fields. This table then went through a few iterations as I removed repeating, redundant, and/or unnecessary data. Eventually, I had a table which was sufficient to work from.

I then proceeded to write the business rules. Based on the user needs assessments conducted in the original UX design work and the recently created table, I was able to create a set of business rules. During the design, the business rules were edited or modified slightly as I determined some things were unnecessary or would require a re-cataloguing of the collection. For notes on these decision, please see the business rules.

While many entities and their related attributes were identified during the initial data review, the business rules helped me identify relationships and constraints among the entities and attributes.

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[1] See The Robert Addison Design Project Parts 1& 2.

The normalization process came next. Moving through 1NF to 3NF, I was able to identify many-to-many relationships and create the necessary bridging entities. During the normalization process, I identified and created (auto-generated serial numbers) primary keys, foreign keys, and removed more redundancies.

The entity relationship diagram (ERD) went through six iterations before I arrived at the ERD shown in this report. I spent more time developing the ERD than I had originally budgeted, but I felt that the extra investment of time at this stage was crucial and would make the rest of my work run more smoothly.

Once the ERD had been finalized, I used the original table to create a small set of sample data (23 titles) and entity-attribute tables. The entity-attribute tables appear before the sample data in this report to aid readers in understanding the sample data.

Sample data was then used to create sample reports illustrating what a user may be able to find when conducting specified searches.

After building the database, inserting sample data, and running a series of test queries, some improvements in the design presented themselves. The database was then redesigned and I began putting together a larger set of sample data (500 titles). While creating this larger sample set, I discovered some new data types and relationships, which prompted another redesign. This report has been updated to reflect those changes.

Assumptions and Limitations

A number of entities and attributes could have been included in the main Title table, but due to the large number of null values this would create, it made sense in the name of efficiency to split these attributes off from the main table and make them entities of their own.

Alternate_Catalogues is one such entity. The titles in the catalogue have been catalogued and assigned catalogue numbers by others. The other catalogues referenced in the original Robert Addison Library Catalogue are:
- STC or Short Title Catalogue
  - A list of books printed in England, Scotland, and Ireland from 1475-1640
- WING (created by Donald Wing)
  - A list of books printed in England, Scotland, Wales, Ireland, and British America from 1641 to 1700
- C&C (created by William J. Cameron and Diana J. Carrol)
  - A list of English books printed in the British Isles and colonies from 1701-1800
- Madan (created by Falconer Madan)
  - A list of books printed in or related to the University and town of Oxford (1468-1680)
- Willems (created by Alphonse Willem)
  - A list of titles printed by the Elzevier family, a famous Dutch family which ran a print company from the early 17th though 18th centuries

Many books in the Robert Addison Library have no corresponding STC, WING, C&C, Madan, or Willems number; however, many do and while STC, WING, C&C and Willems are mutually exclusive, some titles have a Madan number and an STC, WING, or C&C number.

In order to improve the efficiency of the database, these attributes were put under their own entity: Alternate_Catalogues.

The STC (Short Title Catalogue), WING, and C&C cataloguing systems have been superseded by the ESTC (English Short Title Catalogue), which was begun in 1976. The original cataloguing of the Robert Addison Library was done in 1967 before ESTC had even been conceived. I decided during the designing of the database, to not include ESTC as the time commitment to do the research required for this would delay the project too long.

While it would be preferable to include this data in the catalogue from the outset, I am willing to return to this project in the future and update the database with ESTC numbers if and when they have been determined for each book in the collection. I cannot allow perfect to be the enemy of good.

The Images and Notes entities were also created to eliminate null cells in the Title entity.

(Subject) Headings could have been put in a separate table and some early designs had headings separated for the sake of efficiency and to reduce the chance of a human data entry error in the creation of the database. However, a heading had already been entered into the original Excel table for each title, so putting the headings in the title table turned out to be the most efficient design.

The Printers and Printers_Titles entities was created because not every title has a known printer and some printers have printed multiple titles in the collection. This is not a many-to-many relationship and does not require a bridge entity, but without a bridge entity, I would have to re-type a printer's name for each title and this increases the chance of a data input error. By creating separate tables for printer names and printer-title relationships, I am able to reduce the risk of error.

Translators and Editors share zero-to-many relationships with Titles and were separated with bridge entities for the same reasons as Printers and Printers_Titles.

The Authors and Provenance tables shared many-to-many relationships with the Title table and required bridge entities.

Pre-normalized Data

The following image is the final version of the pre-normalized data taken from an Excel spreadsheet. The data went through a few tables and spreadsheets before this representation was chosen to work with.

Figure 1 a sample of the catalogue data in an Excel spreadsheet

As is immediately visible, there are many cells with null data. Further iterations of the design eliminated these.

Business Rules

"Title" refers to the title of a book and each title will represent one record in the database.

- Identifiers
    - Each title has a unique identifier
    - Each title has an Addison Library number (AL No.)
    - Each title was either purchased in England or not (original AL No. or not)
    - Each title has zero-to-one STC code (Short Title Catalogue)
    - Each title may have zero-to-one WING numbers
    - Each title may have zero-to-one C&C numbers
    - Each title may have zero-to-one Madan numbers
    - Each title may have zero-to-one Willems numbers
- Authors
    - Each title has one or more authors
        - "anonymous" is used if a title's author is unknown
    - Each author has one or more titles
    - Some authors have titles/honorifics (e.g. Bishop, Duke, Saint, etc.)
    - Some authors have middle names
- Books
    - Each title will have a book
    - Each book will have one-to-many titles
    - Some titles are bound with other titles
    - All books are shelved under an AL No.
    - Books containing multiple titles are shelved under the first AL No. to appear in the book
    - Each title has one measurement for width and one for height
    - Each title can have zero-to-many associated images
- Printing
    - Each title has zero-to-one printer/publisher
        - The printer/publisher is not identified in all books published during this period
    - Each printer has one-to-many titles
    - Each printer has zero-to-one address
    - Each title has a publication date
    - Each title has a printing method
        - 4o quarto, 80 octavo, 12o duodecimo, 16o sextodecimo, fol(io)
    - most titles have an imprint detailing the title's production history

- History
    - Each title has zero-to-many provenance entries
    - Provenance entries have zero-to-one date
    - Provenance entries have one-to-many titles

- o Each title has zero-to-many notes
    - ▪ Notes describe things that are unique to an individual copy of a book (e.g. damage to the book, date and location of purchase, provenance, etc.)
- o Each note corresponds to one title
- Subject
    - o Each title has one subject heading
    - o Subject headings have one-to-many titles
- Images
    - o Most titles have at least one image of the title page
    - o Some titles have multiple images
- Translators
    - o Some titles have been translated into English and the translator is known
    - o Some translators have translated more than one title
- Editors
    - o Some titles have been edited and the editor is known
    - o Some editors have edited more than one title

Entity-Attribute Tables

The following entity-attribute tables are intended to provide an explanation as to the different types of data in each table so that users and any designers who do work on this database in the future will be able to understand the nature of the data and why it has been organized this way when looking at the normalization process and ERD.

Alternate_Catalogues		
Key	Attribute	Description
PK	AC_ID	This is a unique auto-generated number assigned to each entry instance of alternate catalogue entry
	AC_Type	This refers to one of five alternate cataloguing systems (STC, WING, C&C, Madans, and Willems)
	AC_Num	This is the unique catalogue number of the title in the corresponding system
FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Authors		
Key	Attribute	Description
PK	Au_ID	This is a unique auto-generated number assigned to each author
	Au_Lname	This is the author's last name
	Au_Fname	This is the author's first name (middle names can also be recorded here
	Au_Honorific	A title (e.g. Saint, Bishop, Duke, etc.) can be recorded here

Authors_Titles		
Key	Attribute	Description
PK, FK	Au_ID	This is a unique auto-generated number assigned to each author
PK, FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Editors		
Key	Attribute	Description
PK	Ed_ID	This is a unique auto-generated number assigned to each editor
	Ed_Name	This is the first and last name of an editor
FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Editors_Titles		
Key	Attribute	Description
PK, FK	Ed_ID	This is a unique auto-generated number assigned to each editor
PK, FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Images		
Key	Attribute	Description
PK	Img_ID	This is a unique auto-generated number assigned to each image
	Img_Num	This is the file name associated with each image file and is derived from the AL No.
FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Notes		
Key	Attribute	Description
PK	Note_ID	This is a unique auto-generated number assigned to each note
	Note_Detail	This is data recorded about a particular title, such as damage, duplicate copies, or messages written in the book
FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Printers_Titles		
Key	Attribute	Description
PK, FK	Pr_ID	This is a unique auto-generated number assigned to each printer/book publisher
PK, FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Printers		
Key	Attribute	Description
PK	Pr_ID	This is a unique auto-generated number assigned to each printer/book publisher
	Pr_Name	This is the name of the printer as it appears on the corresponding title page

Provenance		
Key	Attribute	Description
PK	Prov_ID	This is a unique auto-generated number assigned to each past owner of a title
	Prov_Name	This is the first and last name of a previous owner of a title

Provenance_Titles		
Key	Attribute	Description
PK, FK	Prov_ID	This is a unique auto-generated number assigned to each past owner of a title
PK, FK	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Titles		
Key	Attribute	Description
PK	T_AL_Num	This is a unique number assigned to each title in the original catalogue
	T_Name	This is the name or book title
	T_Imprint	This is text from the title page detailing the production history of the title
	T_Pubdate	This is the year in which the book was published
	T_Format	This is the format in which the book was printed (4o quarto, 80 octavo, 12o duodecimo, 16o sextodecimo, fol folio)
	T_Heading	This is a heading used to categorize the contents of each title
	T_Shelf_Num	This is the AL No. under which the book is shelved
	T_Collection	This is a Y/N value indicating whether the title is bound with other titles or not

Translators		
Key	Attribute	Description
PK	Tr_ID	This is a unique auto-generated number assigned to each translator
	Tr_Name	This is the first and last name of a translator

Translators_Titles		
Key	Attribute	Description
PK **FK**	Tr_ID	This is a unique auto-generated number assigned to each translator
PK **FK**	T_AL_Num	This is a unique number assigned to each title in the original catalogue

Normalization

End-User's Views with Relational Schema

The following diagrams show the end-user's perspective of all relations in 3NF.
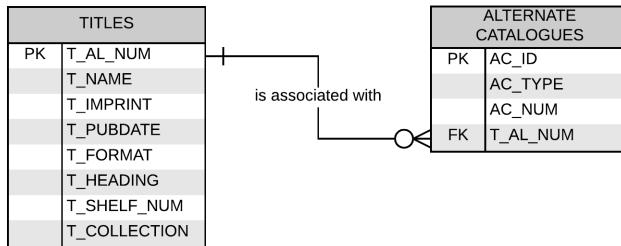
Figure 1 Alternate_Catalogues in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Alternate_Catalogues(Ac_ID, Ac_Type, Ac_Num, T_AL_Num)

Figure 2 Authors_Titles in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Authors(Au_Num, Au_Lname, Au_Fname, Au_Honorific)

Authors_Titles(Au_Num, T_Al_Num)

14
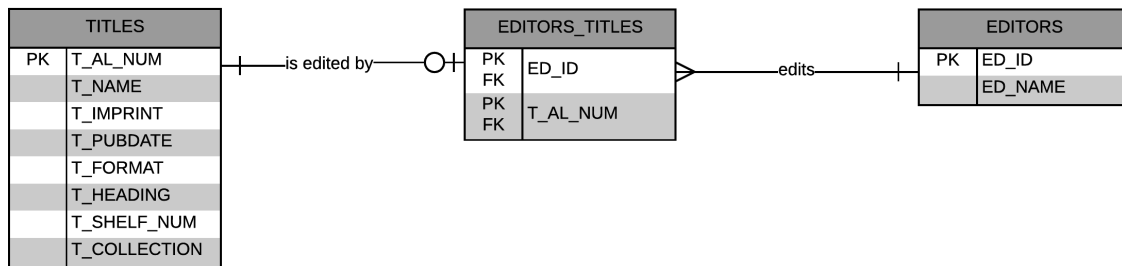
Figure 3 Editors_Titles in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Editors_Titles(Ed_ID, T_Al_Num)

Editors(Ed_ID, Ed_Name)
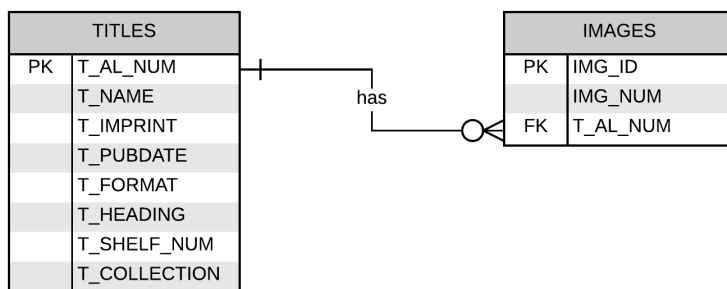
Figure 4 Images in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Images(Img_ID, Img_Num, T_AL_Num)
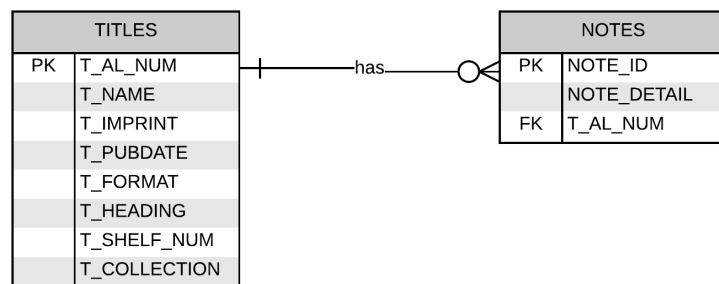
Figure 5 Notes in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Notes(Note_ID, Note_Detail, T_AL_Num)

TITLES	
PK	T_AL_NUM
	T_NAME
	T_IMPRINT
	T_PUBDATE
	T_FORMAT
	T_HEADING
	T_SHELF_NUM
	T_COLLECTION

is produced by

PRINTERS_TITLES	
PK FK	PR_ID
PK FK	T_AL_NUM

produces

PRINTERS	
PK	PR_ID
	PR_NAME
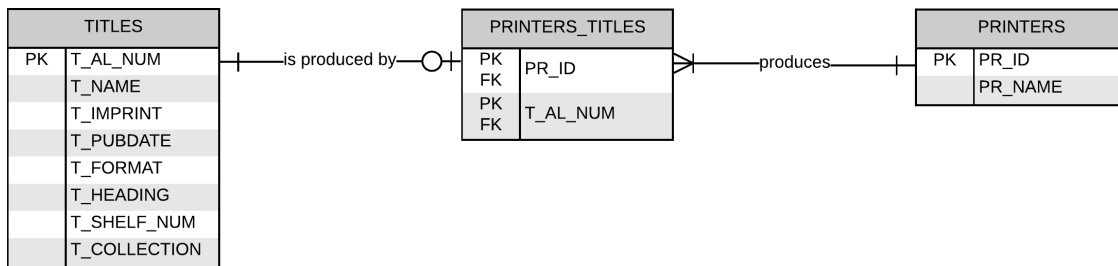
Figure 6 Printers_Titles in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Printers_Titles(Pr_ID, T_Al_Num)

Printers(Pr_ID, Pr_Name)

TITLES	
PK	T_AL_NUM
	T_NAME
	T_IMPRINT
	T_PUBDATE
	T_FORMAT
	T_HEADING
	T_SHELF_NUM
	T_COLLECTION

was owned by

PROVENANCE_TITLES	
PK FK	PROV_ID
PK FK	T_AL_NUM

is related to

PROVENANCE	
PK	PROV_ID
	PROV_NAME
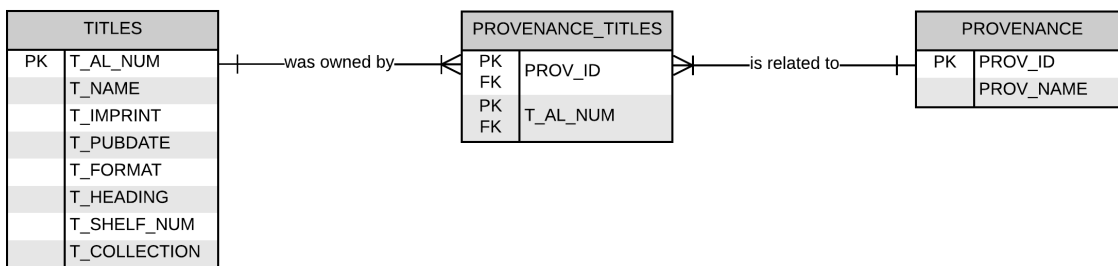
Figure 7 Prov_Titles

Provenance(Prov_ID, Prov_Name)

Provenance_Titles(Prov_ID, T_Al_Num)

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

TITLES	
PK	T_AL_NUM
	T_NAME
	T_IMPRINT
	T_PUBDATE
	T_FORMAT
	T_HEADING
	T_SHELF_NUM
	T_COLLECTION

is translated by

TRANSLATORS_TITLES	
PK FK	TR_ID
PK FK	T_AL_NUM

translates

TRANSLATORS	
PK	TR_ID
	PR_NAME
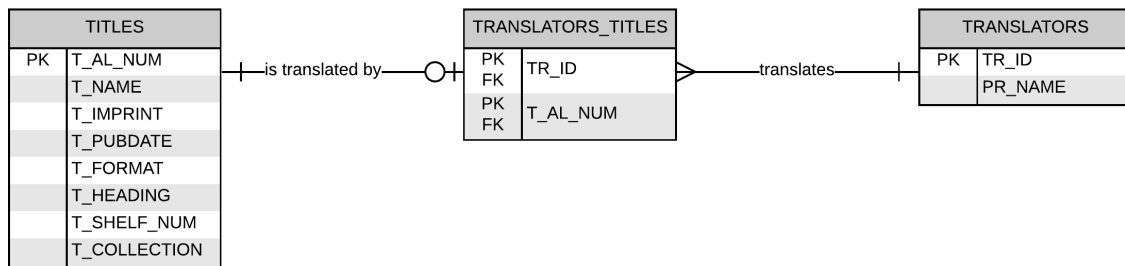
Figure 8 Tranlators_Titles in 3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Translators_Titles(Tr_ID, T_Al_Num)

Translators(Tr_ID, Tr_Name)

Relational Schema: Complete design in3NF

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

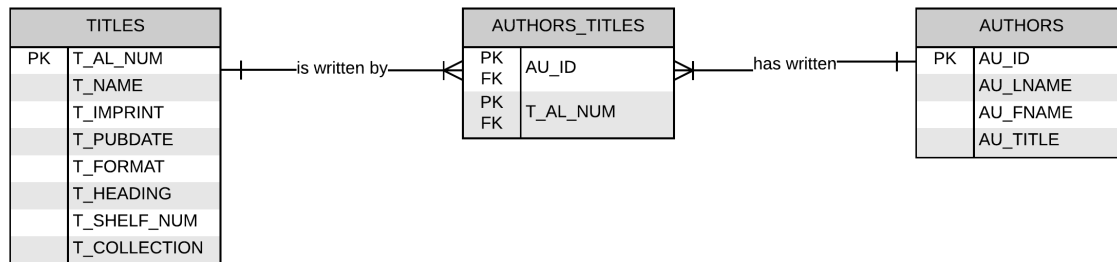Alternate_Catalogues(Ac_ID, Ac_Type, Ac_Num, T_AL_Num)

Authors(Au_Num, Au_Lname, Au_Fname, Au_Honorific)

Authors_Titles(Au_Num, T_Al_Num)

Editors_Titles(Ed_ID, T_Al_Num)

Editors(Ed_ID, Ed_Name)

Images(Img_ID, Img_Num, T_AL_Num)

Notes(Note_ID, Note_Detail, T_AL_Num)

Printers_Titles(Pr_ID, T_Al_Num)

Printers(Pr_ID, Pr_Name)

Provenance(Prov_ID, Prov_Name)

Provenance_Titles(Prov_ID, T_Al_Num)

Translators_Titles(Tr_ID, T_Al_Num)

Translators(Tr_ID, Tr_Name)

Designer's View Entity Relationship Diagram

The following diagram is the sixth and final ERD for this project.

Figure 9 Designer's View ERD, version 6

Sample Data

Titles

T_AL_Num (PK)	T_Name	T_Imprint	T_Pubdate	T_Format	T_Heading	T_Shelf_Num	T_Collection
81	Acquaintance with God the Best Support Under Afflictions, An	Printed and sold by H. Hills. 1708.	1708	8	Religion	63	Y
87	History of the Revolutions in Sweden, The	For A.S. and T.C. and sold by R. Parker. 1697.	1697	8	History	87	N
90	St. Augustine, of the City of God	[London] By George Eld. 1610.	1610	Fol	Theology	90	N
99	Apology, An, 9th edn.	Philadelphia: printed and sold by Joseph Crukshank. 1775.	1775	8	Philosophy	99	N
292	Essays Upon Several Moral Subjects. 5th edn. 4 vols. vol.III	By W.B. for H. Rhodes; and T. Newborough. 1705.	1705	8	Essay	292	N
478	Hvgonis Grotii Epistolae ad Gallos	Lvgd. Batav. Ex officina Elziviriorum. 1648.	1648	12	Theology	478	N
779	Political Reflections Upon the Government of the Tvrks. 3rd edn.	Oxford. By Hen: Hall, for Tho: Robinson 1662.	1662	12	Politics	779	N

Titles(T_Al_Num, T_Name, T_Imprint, T_Pubdate, T_Format, T_Heading, T_Shelf_Num, T_Collection)

Alternate_Catalogues

AC_ID (PK)	AC_Type	AC_Num	T_AL_Num (FK)
1	STC	916	90
2	WING	V2738	87
3	C&C	2823	292
4	Madan	2603	779
5	Willems	639	478

Alternate_Catalogues(AC_ID, AC_Type, AC_Num, T_AL_Num)

Authors

Au_ID (PK)	Au_Lname	Au_Fname	Au_Honorific
AU0001	Atterbury	Francis	(null)
AU0002	Aubert De Vertot	Renee	(null)
AU0003	Augustine	(null)	Saint
AU0004	Barclay	Robert	(null)
AU0005	Collier	Jeremy	(null)
AU0006	Grotius	Hugo	(null)
AU0007	Osborn	Francis	(null)

Authors(Au_ID, Au_Lname, Au_Fname, Au_Honorific)

Authors_Titles

Au_ID (PK, FK)	T_AL_Num (PK, FK)
AU0001	81
AU0002	87
AU0003	90
AU0004	99
AU0005	292
AU0006	478
AU0007	779

Authors_Titles(Au_ID, T_AL_Num)

Editors

ED_ID (PK, FK)	T_AL_Num (PK, FK)
ED001	81
ED002	87
ED003	90
ED004	99
ED005	292
ED006	478
ED007	779

Editors_Titles(Ed_ID, T_Al_Num)

Editors

ED_ID (PK)	ED_NAME
ED001	Bertius, Peter
ED002	Brown, Joseph
ED003	Carte, Thomas
ED004	Clarke, John
ED005	Conybeare, Jemima
ED006	Cracanthorp, George
ED007	Durand, David

Editors(Ed_ID, Ed_Name)

Images

Img_ID (PK)	Img_Num	T_AL_Num (FK)
1	AL0081	81
2	AL0087a	87
3	AL0087b	87
4	AL0090a	90
5	AL0090b	90
6	AL0090c	90
7	AL0090d	90
8	AL0090e	90
9	AL0090f	90
10	AL0090g	90
11	AL0099a	99
12	AL0099b	99
13	AL0292	292
14	AL0478	478
15	AL0779	779

Images(Img_ID, Img_Num, T_AL_Num)

Notes

Note_ID (PK)	Note_Detail	T_AL_Num (FK)
N001	inscription: This book belongs to the Darby Monthly Meeting	99

Notes(Note_ID, Note_Detail, T_AL_Num)

Printers_Titles

Pr_ID (PK)	T_AL_Num (FK)
1	81
2	99
3	292
4	779

Printers_Titles(Pr_ID, T_AL_Num)

Printers

Pr_ID (PK)	Pr_Name
1	H. Hills
2	Joseph Crukshank
3	W.B.
4	Hen. Hall

Printers(Pr_ID, Pr_Name)

Provenance

Prov_ID (PK)	Prov_Name
1	Thomas Topping
2	Darby Monthly Meeting

Provenance(Prov_ID, Prov_Name)

Provenance_Titles

Prov_ID (PK, FK)	T_AL_Num (PK, FK)
1	90
2	99

Provenance_Titles(Prov_ID, T_AL_Num)

Translators_Titles

TR_ID (PK, FK)	T_AL_Num (PK, FK)
TR001	Cockman, Thomas
TR002	Davall, Peter
TR003	de Saint-Martin, F. Filleau
TR004	Dennis, John
TR005	Farneworth, Ellis
TR006	Fenton, Geoffray
TR007	G[ ], W[ ]

Translators_Titles(Tr_ID, T_Al_Num)

Translators

TR_ID (PK)	ER_NAME
TR001	Bertius, Peter
TR002	Brown, Joseph
TR003	Carte, Thomas
TR004	Clarke, John
TR005	Conybeare, Jemima
TR006	Cracanthorp, George
TR007	Durand, David

Translators(Tr_ID, Tr_Name)

Sample Search Results

The following are examples of searches which users could conduct in the Robert Addison Library Catalogue database.

Subject Headings

95 results found for the query "subject headings."

Biblical Reference	Medicine	Religious Critique
Biography	Memoir	Religious Essay
Biology	Memorial	Religious History
Cartography	Military	Religious Thesaurus
Church Affairs	Miscellaneous	Review
Church Affairs/Politics	Missing	Rhetoric
Classics	Morality	Satire
Critique	Morality/Politics	Science
Debate	Morality/Theology	Self-Help Guide
Dedication	Music	Sermon
Dialogue	Mythology	Social Commentery
Dictionary	Nature	Social History
Dictionary	Periodical Essay	Sociology
Discourse	Philosophical Critique	Songs
Discourse/Poetry	Philosophical Essay	Songs/Poetry
Drama	Philosophy	Speech
Economics	Philosophy/Politics	Subject
Education	Play	Theatre
Essay	Plays	Theology
Fable	Poetry	Theology
Gardening	Political Philosophy	Thesaurus
Geography	Politics	Topical Issues
Grammar	Politics/Law	Travel
Greek Grammar	Politics/Religion	
History	Politics/Religion	
History/Geography	Politics/Theology	
Index	Practical Discourse	
Inquiry	Printing	
Law	Proverbs	
Learning	Religion	
Learning/Travel	Religion/Church Affairs	
Letter	Religion/Church Affairs	
Letter	Religion/Philosophy	
Letters	Religion/Politics	
Library	Religion/Rationality	
Literature	Religion/Sermons	

Process: These results were generated by querying the Subject table and displaying only data in the Sub_Heading field. The number of results returned is also displayed at the top of the list.

Subject Heading: Biography

32 results were returned for "Biography."

Author	Title
Anonymous	
Anonymous	Life of our Blessed Lord and Saviour, The
Barwick, Peter	Vita Johannis Barwick, S.T.P.
Beccatelli, Lodovico	Life of Cardinal Reginald Pole, The
Bernard, Nicholas	Life & Death of James Usher, The
Birch, Thomas	Life of the Most Reverend Dr. John Tillotson, The
Blackwell, Thomas	Enquiry into the Life and Writings of Homer, An
Brokesby, Francis	Life of Mr. Henry Dodwell, The
Browne, Thomas	Story of the Ordination of our First Bishop, The
Burnet, Gilbert	Royal Martyr Lamented, The
Cardano, Girolamo	Hieronymi Cardani, Mediolanensis, Proxeneta
Carte, Thomas	History of the Life of James Duke of Ormonde, An, 2 vols. vol. I
Carte, Thomas	History of the Life of James Duke of Ormonde, An, 2 vols. vol. II
Cave, William	Antiquitates Apostolicae: or, the Lives
Cibber, Theophilus	Lives of the Poets, The, 4 vols. Vols. I-II.
Fiddes, Richard	Life of Cardinal Wolsey, The
Goldsmith, Oliver	Life of Richard Nash, The
Grove, Joseph	History of the Life and Times of Cardinal Wolsey, The, [4 vols.] vol.I
Grove, Joseph	History of the Life and Times of Cardinal Wolsey, The, [4 vols.] vol. II
Grove, Joseph	History of the Life and Times of Cardinal Wolsey, The, [4 vols.] vol. III
Grove, Joseph	History of the Life and Times of Cardinal Wolsey, The, [4 vols.] vol. IV
Henderson, Andrew	Life of William Augustus Duke of Cumberland, The
Johnson, Samuel	Account of the Life of Mr. Richard Savage, An, 2nd edn.
Knight, Samuel	Life of Dr. John Colet, The
Le Neve, John	Lives and Characters, Deaths of all the Protestant Bishops, The, Vol. I. Parts I and II
Marguetel de Saint-Denis, Charles	Works, The, Vol.III
Marguetel de Saint-Denis, Charles	Works, The, Vol. II
Porteus, Beilby	Character of David King of Israel, The
Ruffhead, Owen	Life of Alexander Pope, The
Stewart, David	Account of the Life, Writings, and Inventions of John Napier, An
Walton, Izaak	Life of Dr. Sanderson, The
Xenophon	Expedition of Cyrus, The, 2 vols.

Process: These results were generated by querying the database for titles with a Sub_Heading of "biography" and then displaying the Au_Lame, Au_Fname, Au_Title, and T_Name. The number of results returned is also displayed at the top of the list.

Publication Date

6 Results were returned for titles published between 1701 and 1710.

Author	Title	Publication Date
Collier, Jeremy	Essays Upon Several Moral Subjects. 5th edn. 4 vols. vol.III	1705
Atterbury, Francis	Sermon Preach'd August 30, 1706, A	1707
Atterbury, Francis	Acquaintance with God the Best Support Under Afflictions, An	1708
Atterbury, Francis	Power of Charity to Cover Sin, The	1708
Atterbury, Francis	Rule of Doing as we Would be Done Unto, Explain'd, The	1709
Atterbury, Francis	Sermon Preach'd April 26, 1709, A	1709

Process: These results were generated by querying T_Pubdate equal to or greater than 1701 and equal to or less than 1710 and displaying the Au_Lame, Au_Fname, Au_Title, T_Name, and T_Pubdate corresponding to the results.

Title

The following title was found.

Title:	Francisci Baconi Eqvitis Avrati de Sapienta Vetervm
Author:	Bacon, Francis
AL No.:	92
STC No.:	1128
Published:	1617
Format:	12o duodecimo
Subject:	Essay
Provenance:	Thomas Topping, Franciscus Underwood
Shelf No.:	92
Bound with other titles:	N
Associated image files:	AL0092a, AL0092b, AL0092c

Process: This particular result could have been achieved in many different ways. First, by querying T_Name for this specific title. Secondly, by querying T_AL_Num for this specific number. Thirdly, by querying Alternate Catalogue for Ac_Type STC and Ac_Num for 1128. Fourthly, there are many combinations of search criteria that could have yielded this result, such as Au_Lname and T_Pubdate.

Note: It is the intention of the Robert Addison Library Web Catalogue to be able to display images of the titles, but since that is not a feature of the database itself, I chose to represent the query result as it would appear in the database, not through a web interface.

Conclusions

This database represents the data collected in the original Robert Addison Library short title catalogue produced in 1967 by William J. Cameron, George McKnight, and Michaele-Sue Goldblatt as well as additional research done by Donald Combe, Peter Babcock, and Neil MacDonald.

By following process-centered DBMS development and design standards, I have produced a functional 3NF database design and the corresponding professional documentation.

It is my hope that further research will be done on the library's collection and that this report will be of use to any future expansion of the Robert Addison Library Web Catalogue.