2.1 and 2.4

In this project, the design I had chosen allows the user to become its own entity where they only have control on checking out the book and must be a registered member of the bookstore. The user and book depend on the checkout relation, where a book will not be checked out if a user does not place an order. A user is dependent on the book. A book's primary key would be the ISBN where a user can uniquely identify a book. Each book must be dependent on having a publisher, and a book cannot exist without a publisher, and we are assuming a publisher does not exist if they do not have at least 1 book. The bookstore contains books and shares a contains relationship, where a bookstore must have any number of books to become a bookstore. (A bookstore can still be a bookstore without any books, for reasons such as books being sold out etc.). A bookstore can be uniquely identified with a bookstore name which is a primary key. A bookstore must contain an order for it to become a bookstore as it requires an order and sales for it to become a bookstore. A bookstore would contain orders which has tracking information and the order number for when a user places an order. There can be multiple owners of the bookstore and have reports discussing the sales and expenditures where there is a report id to uniquely identify each report. There is also a computed salesVsX report where we can compute the salesVsExpenditures or any sales per genre and etc.

ASSUMPTIONS

Assume one bookstore can have many owners

Assume one publisher can have many books

Assume any number of owners can have any number of reports

Assume that a user can't checkout books without a registration ID

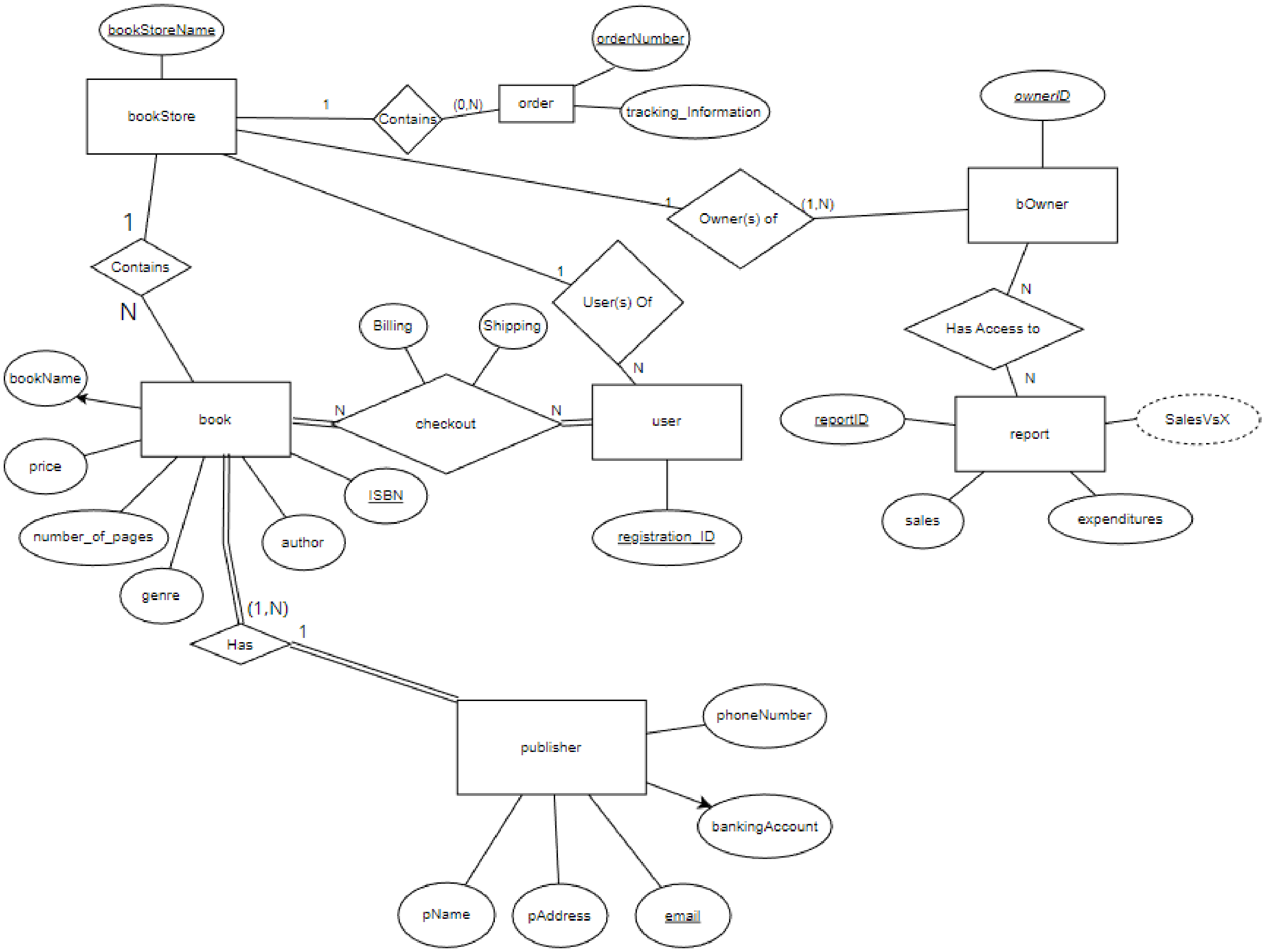
Assume that any report metric can be computed using other stored data

Assume that there is only one bookstore

Assume a book must have a publisher

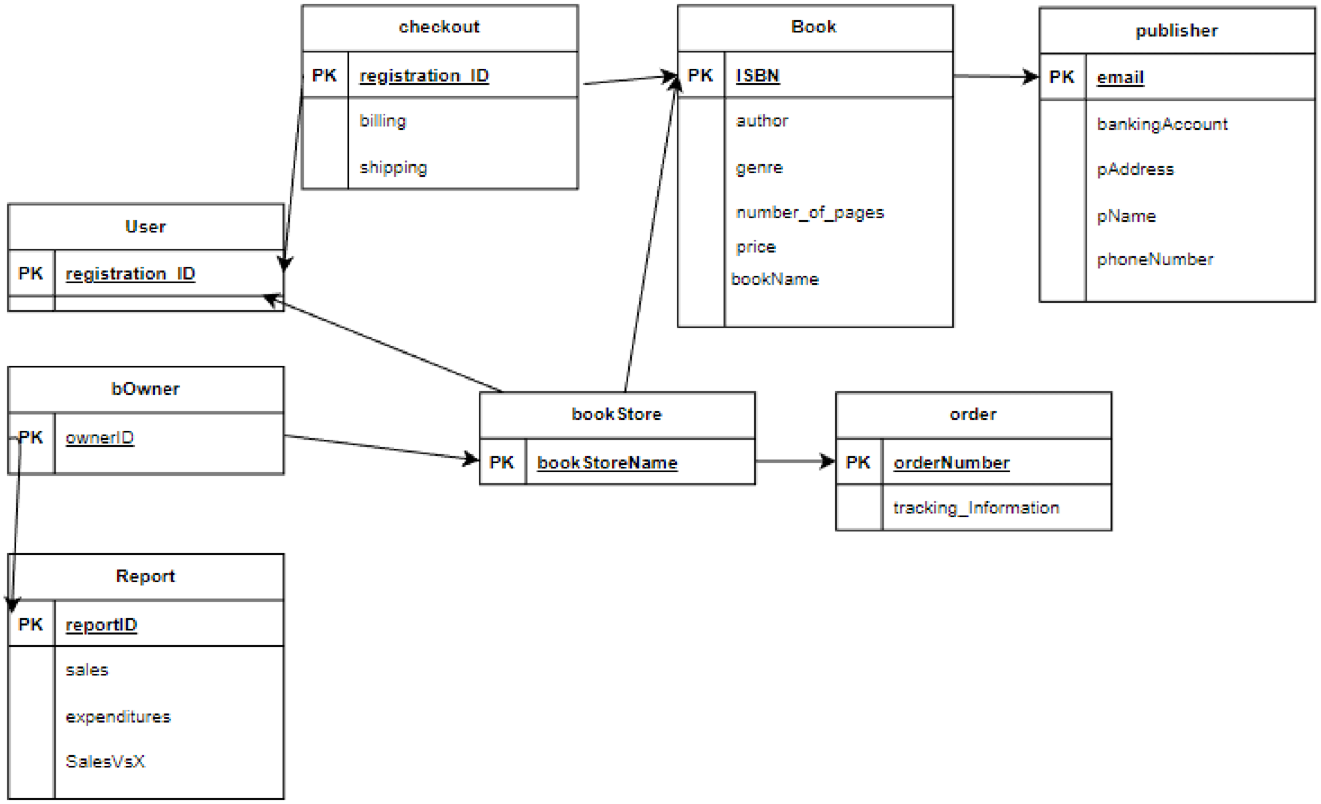
Assume a publisher must have at least one book in the system

Assume a book is always available to be checked out by a user and a registered user must checkout a book


bookStoreName
bookStore
1
Contains
(0,N)
order
orderNumber
tracking_Information
ownerID
1
Owner(s) of
(1,N)
bOwner
1
Contains
N
1
User(s) Of
N
N
Has Access to
N
Billing
Shipping
bookName
book
N
checkout
N
user
reportID
report
SalesVsX
price
ISBN
number_of_pages
author
registration_ID
sales
expenditures
genre
(1,N)
1
Has
publisher
phoneNumber
bankingAccount
pName
pAddress
email

2.2

RELATIONAL SCHEMA



Registration_ID = R

ownerID = O

reportID = P

ISBN = I

Email = E

orderNumber = D

bookStoreName = N

O->N,P

N->D,I,R

R->I

I->E

N->D

Decomposing (N->D is removed because it's redundant)

O->N

O->P

N->D

N->I

N->R

R->I

I->E

Removing N->I because N->R, and R->I so it becomes redundant

O->N

O->P

N->D

N->R

R->I

I->E

UNION RULE: A->B, A->C => A->B,C

O->N,P

N->D,R

R->I

I->E

This is the normalization of the relational schema. No dependencies were lost so it’s a lossless decomposition. Therefore, it is in good form.