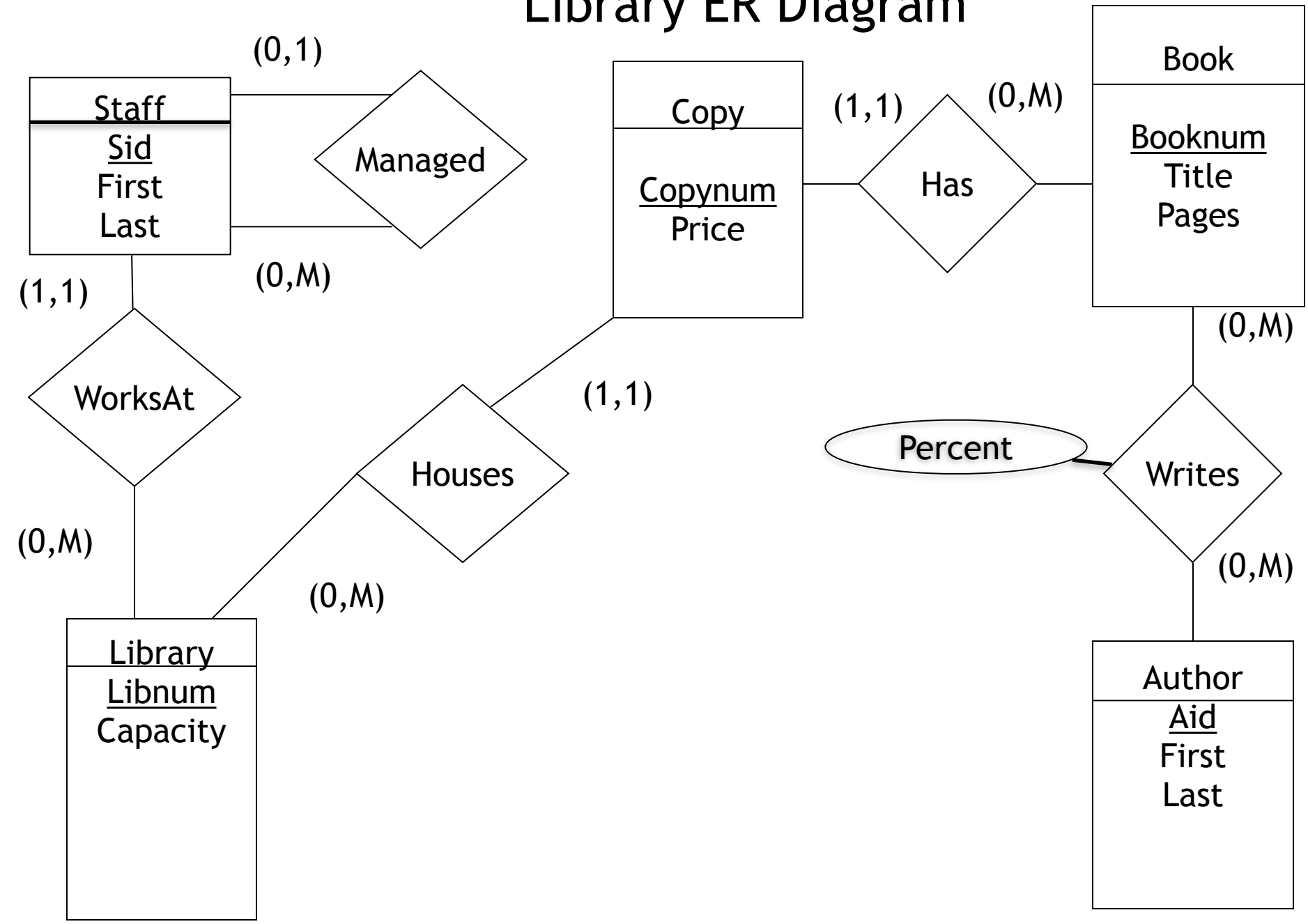
Postgres 3

Library ER Diagram



Create Tables

- CREATE TABLE Staff(**sid serial primary key**, first VARCHAR(30), last VARCHAR(30), libnum int not null, mid int, foreign key (libnum) references Library(libnum), foreign key (mid) references Staff(sid))

Meta Data

```
cs464lib2=# \d staff
                          Table "public.staff"
 Column |         Type          |                     Modifiers
--------+-----------------------+---------------------------------------------------
 sid    | integer               | not null default nextval('staff_sid_seq'::regclass)
 first  | character varying(30) |
 last   | character varying(30) |
 libnum | integer               | not null
 mid    | integer               |
Indexes:
    "staff_pkey" PRIMARY KEY, btree (sid)
Foreign-key constraints:
    "staff_libnum_fkey" FOREIGN KEY (libnum) REFERENCES library(libnum)
    "staff_mid_fkey" FOREIGN KEY (mid) REFERENCES staff(sid)
Referenced by:
    TABLE "staff" CONSTRAINT "staff_mid_fkey" FOREIGN KEY (mid) REFERENCES
staff(sid)
```

Insert Data into Staff

- Load data with sids from file
  - copy staff(sid,first, last, libnum, mid) from '/Users/gendreau/classes/spring21/cs464/SQLReview/staff.txt' with null ’*' delimiter '|';
- Reset starting sid for automatic assignment of sids
  - alter sequence staff_sid_seq restart 29;
- Insert a new row into the Staff table
  - Insert into Staff(first, last, libnum, mid) values (‘Jane’, ‘Doe’, 2, 16)
- Load data without sids from file
  - copy staff(first, last, libnum, mid) from ‘/Users/gendreau/classes/spring21/cs464/SQLReview/staff2.txt’ with null '*' delimiter '|';

Example Query problems

- Find the sid, first and last for staff who are managed by staff member 2
- Find sid, first and last for staff who have no manager
- Find the number of staff members managed by each staff member who manages at least one staff member. The result should be tuples of the form (sid, first, last, numEmployees);
- Find the library with the largest number of staff members
- Find libraries that have at least 10 staff members
- Find sid, first and last of staff who work in a library that has a copy of all books written by Anton Chekhov

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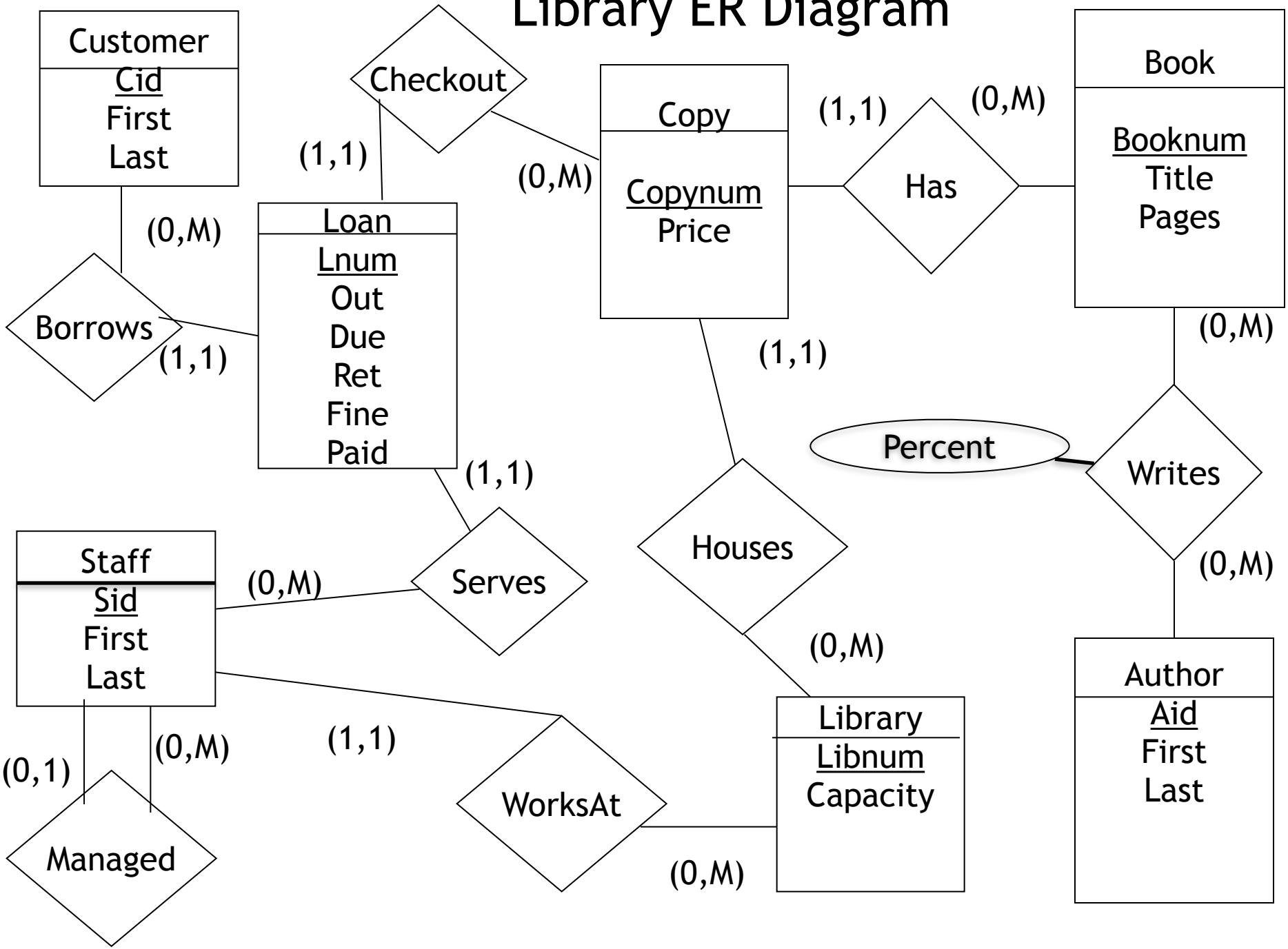

More Tables

CREATE TABLE Customer(cid int primary key, first VARCHAR(30), last VARCHAR(30));

CREATE TABLE Loan(loannum serial primary key, out date not null, due date not null, ret date, fine money default 0.0, paid boolean default true, copynum int not null, sid int not null, cid int not null, foreign key (copynum) references Copy(copynum),foreign key (sid) references Staff(sid), foreign key (cid) references Customer(cid));

Insert Copy

```
create or replace function insertcopy(bnum integer, name text, length integer,
cost money, lib integer)  returns integer AS $$
Declare
	bknum integer;
	cnum integer;
Begin
	select booknum into bknum from Book where booknum = bnum;
	if bknum is NULL then
		insert into Book (booknum, title, pages) values (bnum, name, length);
	end if;

	insert into copy (booknum, price, libnum) values (bnum, cost, lib)
	returning copynum into cnum;

	return cnum;
End;
$$ language plpgsql;
```

Make Loan

```
create or replace function makeLoan(cus integer, cpnum integer, snum integer)
returns integer AS $$
Declare
      sLib integer;
      cpLib integer;
      lnum integer;
Begin
      select libnum into sLib from staff where sid = snum;
      select libnum into cpLib from copy where copynum = cpnum;
      if sLib = cpLib then
            insert into Loan (out, due, copynum, sid, cid) values (current_date,
                                                                    current_date+21,
                                                                    cpnum, snum, cus)
            returning loannum into lnum;
      else
            lnum = NULL;
      end if;
      return lnum;
End;
$$ Language plpgsql;
```

numEmployees

```
create or replace function numEmployees(manager integer)
returns integer AS
$$
Declare
	num integer;
	empId integer;
Begin

	num := 0;
	for empID in select sid from Staff where mid = manager loop
		num = 1 + numEmployees(empID) + num;
	end loop;

	return num;
End;
$$ Language plpgsql;
```

One More Table

```
create table LibLog(logId serial primary key, oldCapacity integer, newCapacity integer, changeDate Date, libnum integer references Library(libnum));
```

Trigger Example

```
create or replace function logCapChange() returns trigger AS $$
Declare

Begin
      insert into LibLog (oldCapacity, newCapacity, changeDate, libnum)
      values (OLD.capacity, NEW.capacity, current_date, NEW.libnum);

      return NEW;
END;
$$ Language plpgsql;

create trigger capChange before update of capacity on Library
      for each row execute procedure logCapChange();
```

Trigger Example

```
create or replace function checkFine() returns trigger AS $$
Declare
	late integer;
Begin
	if OLD.ret is NULL then
		late = current_date - OLD.due;
		if late > 0 then
			NEW.fine = late * 0.25;
			NEW.paid = false;
		end if;
	else
		raise exception '% previously returned', NEW.loannum;
	end if;

	return NEW;
End;
$$ Language plpgsql;
create trigger returnCopy before update of ret on loan
	for each row execute procedure checkFine();
```

space_available

```
create or replace function space_available(lib integer)
returns integer AS $$
Declare
	cap integer;
	used integer;
	avail integer;
Begin
	select L.capacity into cap
	from library L
	where L.libnum = lib;

	select count(copynum) into used
	from copy C
	where C.libnum = lib;

	avail := cap - used;
	return avail;
End;
$$ Language plpgsql;
```

Out Parameter

```
create or replace function space_available2(lib integer,  avail OUT integer)
AS $$
Declare
      cap integer;
      used integer;
Begin
      select L.capacity into cap
      from library L
      where L.libnum = lib;

      select count(copynum) into used
      from copy C
      where C.libnum = lib;

      avail := cap - used;
End;
$$ Language plpgsql;
```