COMP3311 23T3 Database Systems

Assignment 1
Data Models for BeerDB

Last updated: **Sunday 17th September 4:32pm**

Most recent changes are shown in red ... older changes are shown in brown.

[Assignment Spec] **[Database Design]**

Introduction

This gives both an overview and a detailed description of the beer database for this assignment. The overview is expressed as an ER diagram; the detail is give via an annotated SQL schema.

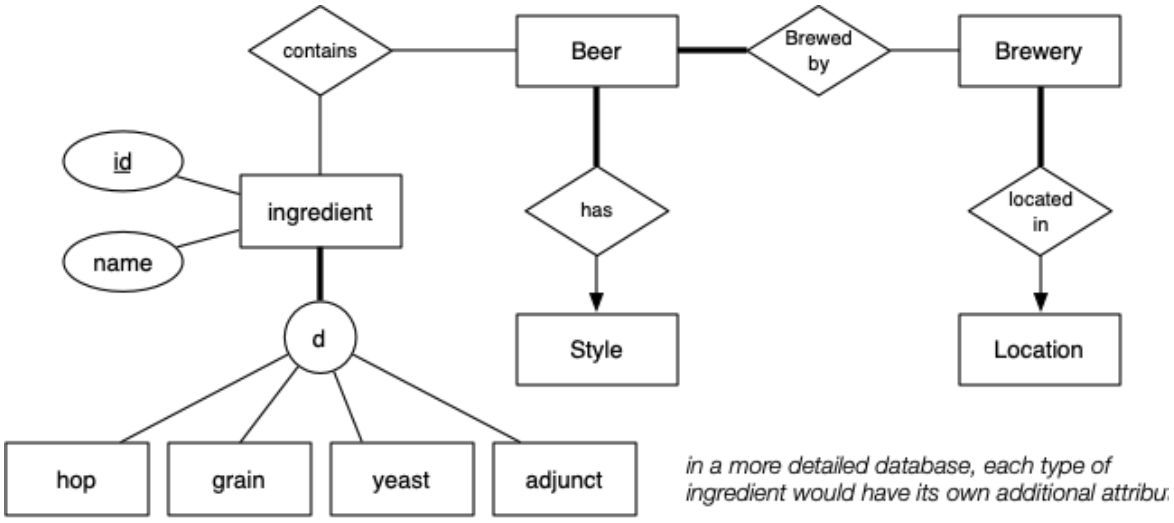
ER Model of BeerDB

Most entities have an ID field as the primary key. We wouldn't normally do this at the ER level, but none of the entities seemed to have obvious and compact primary keys.

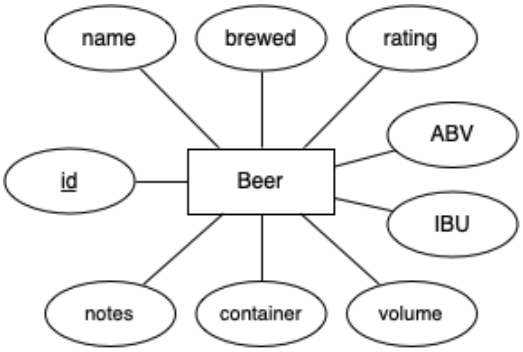
Relationships between entities

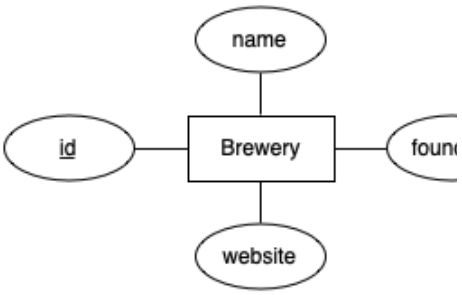
Notes:

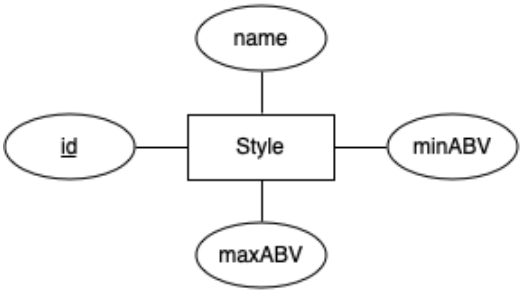
- every beer is brewed by some brewery
- several breweries may collaborate on one beer
- every beer is associated to a style
- sometimes we may not know the ingredients in a beer
- we know at least the country where each brewery is located

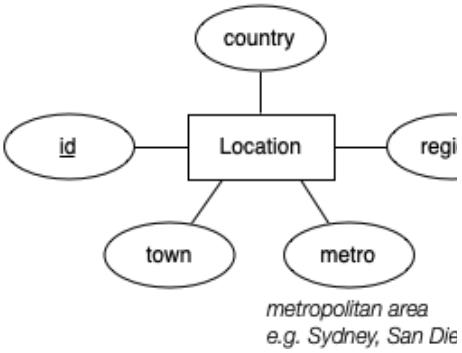


Attributes of entities









SQL Schema for BeerDB

Notes:

- n:m relationships are implemented by a new table
- 1:n relationships are implemented by a FK attribute
- the `Ingredients` class hierarchy is implemented by the single-table mapping
- new types and domains aim to provide more readable table definitions

schema.sql

```
-- BeerDB Schema
-- Original version: John Shepherd (Sept 2021)
-- Current version: John Shepherd (Sept 2023)
--
-- To keep the schema a little shorter, I have ignored my usu
-- convention of putting foreign key definitions at the end o
-- the table definition.
--
-- Some general naming principles:
--   max 10 chars in field names
--   all entity tables are named using plural nouns
--   for tables with unique numeric identifier, always call t
--   for cases where there's a long name and a short name for
--      use "name" for the short version of the name (typical
--      and use "longname" for the complete version of the na
--      typically be used in lists of items)
--   for foreign keys referring to an "id" field in the forei
--      use the singular-noun name of the relation as the fie
--      OR use the name of the relationship being represented
--
-- Null values:
```

```
--  for each relation, a collection of fields is identified a
--    compulsory (i.e. without them the data isn't really usa
--    they are all defined as NOT NULL
--  reminder: all of the primary keys (e.g. "id") are non-NUL
--  note also that fields that are allowed to be NULL will ne
--    handled specially whenever they are displayed e.g. in a
--    interface to this schema
--

-- Types/Domains

create type IngredientType as enum ('hop','grain','yeast','ad
create type ContainerType as enum ('bottle','can','growler','

create domain YearValue as integer check (value between 1000
create domain MilliLiters as integer check (value > 0);
create domain URLvalue as text check (value like '%.%');  --
create domain ABVvalue as real check (value between 0.0 and 1
create domain IBUvalue as integer check (value between 0 and

-- Tables

create table Locations (
        id          integer,  -- would normally use serial
        country     text not null,  -- must at least know cou
        region      text,  -- state or shire or ...
        metro       text,  -- metroploitan area (e.g. Sydney)
        town        text,  -- in metro area => suburb, outsid
        primary key (id)
);

create table Styles (
        id          integer,  -- would normally use serial
        name        text not null unique,  -- name of style (
        min_abv     ABVvalue not null,
        max_abv     ABVvalue not null,
        primary key (id),
        constraint minmax check (min_abv <= max_abv)
);

create table Ingredients (
        id          integer,  -- would normally use serial
        itype       IngredientType not null,
        name        text not null,
        primary key (id)
);

create table Breweries (
        id          integer,  -- would normally use serial
        name        text not null unique,
        founded     YearValue,
        website     URLvalue,
        located_in  integer not null references Locations(id)
        primary key (id)
);

create table Beers (
        id          integer,  -- would normally use serial
        name        text not null,
```

```
        brewed      YearValue,
        style       integer not null references Styles(id),
        ABV         ABVvalue not null,
        IBU         IBUvalue,
        sold_in     ContainerType,
        volume      MilliLiters,
        notes       text,
        rating      integer not null check (rating between 0
        primary key (id)
);

create table Contains (
        beer        integer references Beers(id),
        ingredient  integer references Ingredients(id),
        primary key (beer,ingredient)
);

create table Brewed_by (
        beer        integer references Beers(id),
        brewery     integer references Breweries(id),
        primary key (beer,brewery)
);
```