(google images)

Game of Thrones TV Guide

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CMPT 308L – 111

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Executive Summary

Game of Thrones, the popular series by George R.R Martin, and a giant television franchise, has fans and viewers searching for easy-to-reach places to review their basic knowledge of Game of Thrones. The books and shows are extremely complex, with a lot of characters, locations, civilizations, creatures, relationships, deaths, marriages, among a whole assortment of information of which to remember. Wouldn't it be nice if much of the basic information were in one convenient *electronic* location, avoiding the need to flip through pages of guides and documentation?

This database contains a collection of tables that promises quick access to basic character information, their associated actors and actresses, their royal families in the show, any religions they follow, any relationships in which they are involved, among other interesting facts. In this documentation, reports are produced, with a focus on generating tabular data sets of locations and cities that the characters have lived in or visited. Please note that there is a lot more information that may be extracted using creative queries, as the curious fan or database tester would desire based on his/her database experience.

It is the hope that this database and guide will serve as a handy resource as season four of the epic HBO series gets under way.

Disclaimer: Before reading any further, be warned that this database might contain spoilers of characters, locations, relationships, deaths, among other details. Query at your own risk!

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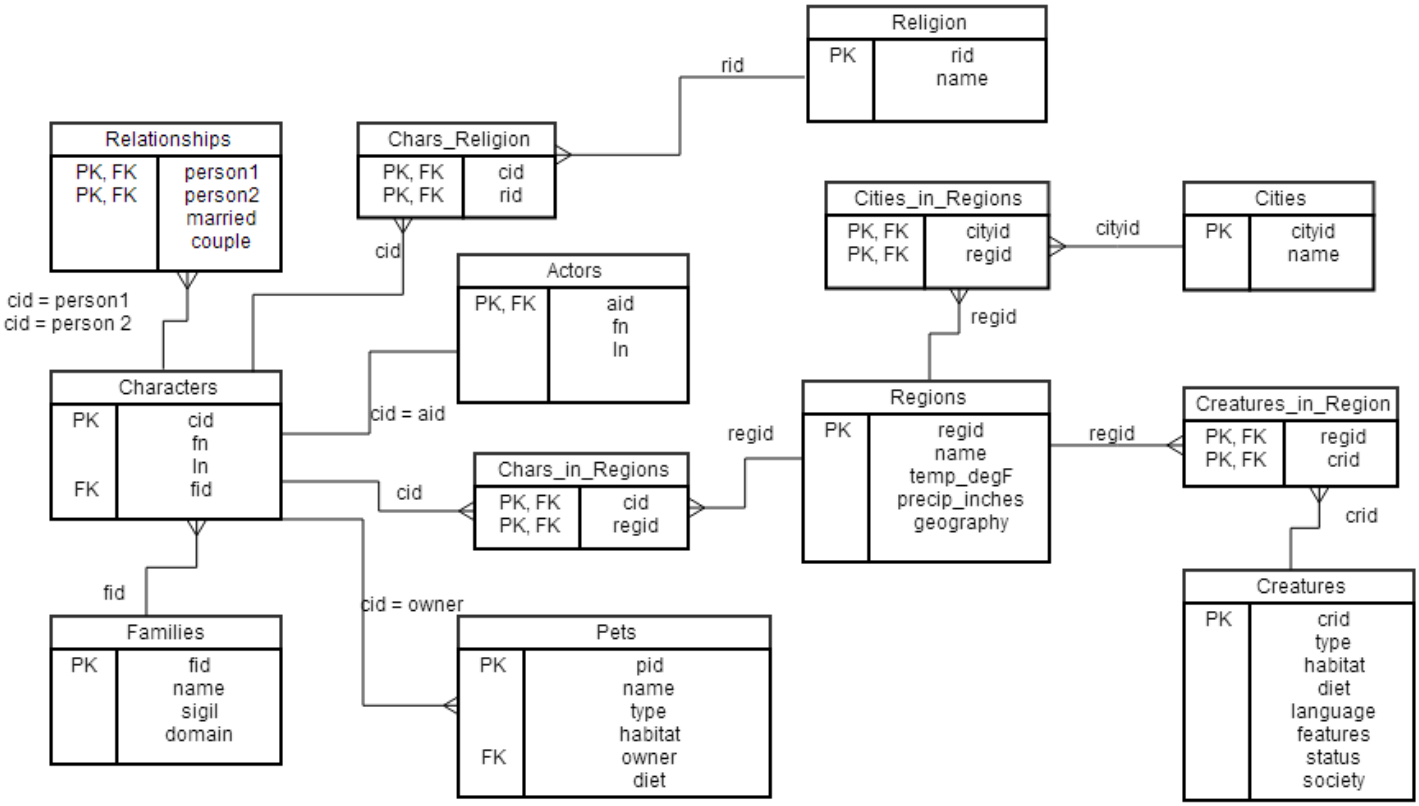
Entity-Relationship Diagram



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Tables Definitions:

Characters Table

Displays the ID number, first name, last name and family ID number of each character.

Create Statement

```
create table if not exists characters(

  cid varchar(5) primary key
, fn text not null unique
, ln text default 'Not Applicable'
, fid varchar(5) not null references families(fid)
);
```

Functional Dependencies

cid → fn, ln, fid

Sample Data

	cid character varying(5)	fn text	ln text	fid character varying(5)
1	c1	Eddard	Stark	f1
2	c2	Tyrion	Lannister	f2
3	c3	Cersei	Lannister	f2
4	c4	Robert	Baratheon	f4
5	c5	Daenerys	Targaryen	f3
6	c6	Robb	Stark	f1
7	c7	Arya	Stark	f1
8	c8	Sansa	Stark	f1
9	c9	Catelyn	Stark	f1
10	c10	Jaime	Lannister	f2
11	c11	Joffrey	Baratheon	f4
12	c12	Stannis	Baratheon	f4
13	c13	Theon	Greyjoy	f5
14	c14	Jon	Snow	f6
15	c15	Tywin	Lannister	f2
16	c16	Hodor	Not Applicable	f1
17	c17	Walder	Frey	f7
18	c18	Margaery	Tyrell	f8
19	c19	Roose	Bolton	f9
20	c20	Gregor	Clegane	f10
21	c21	Melisandre	Not Applicable	f4
22	c22	Drogo	Not Applicable	f3
23	c23	Shae	Not Applicable	f2
24	c24	Osha	Not Applicable	f1
25	c25	Ygritte	Not Applicable	f15
26	c26	Samwell	Tarly	f15
27	c27	Petyr 'Littlefin	Baelish	f14
28	c28	Talisa	Stark	f1
29	c29	Gilly	Not Applicable	f15

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Actors Table

Displays the ID number, first name, and last name of each actor/actress corresponding to their respective characters. Links tables Actors and Characters through foreign key, aid.

Create Statement

```
create table if not exists actors(

  aid varchar(5) not null unique references characters(cid)
, fn text not null
, ln text not null
, primary key(aid)
);
```

Functional Dependencies

aid → fn, ln

Sample Data

	aid character varying(5)	fn text	ln text
1	c1	Sean	Bean
2	c2	Peter	Dinklage
3	c3	Lena	Headey
4	c4	Mark	Addy
5	c5	Emilia	Clarke
6	c6	Richard	Madden
7	c7	Maisie	Williams
8	c8	Sophie	Turner
9	c9	Michelle	Fairley
10	c10	Nikolaj	Coster-Waldau
11	c11	Jack	Gleeson
12	c12	Stephen	Dillane
13	c13	Alfie	Allen
14	c14	Kit	Harington
15	c15	Charles	Dance
16	c16	Kristian	Nairn
17	c17	David	Bradley
18	c18	Natalie	Dormer
19	c19	Michael	McElhatton
20	c20	Conan	Stevens
21	c21	Carice	Van Houten
22	c22	Jason	Momoa
23	c23	Sibel	Kekilli
24	c24	Natalie	Tena
25	c25	Rose	Leslie
26	c26	John	Stevens
27	c27	Aiden	Gillen
28	c28	Oona	Chaplin
29	c29	Hannah	Murray

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Families Table

Displays the ID number, name, sigil (or mascot), and governing domain of each royal family.

Create Statement

```
create table if not exists families(

  fid varchar(5) primary key
, name text not null unique
, sigil text default 'Not applicable'
, domain text default 'Not applicable'
);
```

Functional Dependencies

fid → name, sigil, domain

Sample Data

	fid character varying(5)	name text	sigil text	domain text
1	f1	Stark	Direwolf	North (Exiled)
2	f2	Lannister	Lion	Westerlands
3	f3	Targaryen	Three-Headed Dragon	Essos
4	f4	Baratheon	Stag	Stormlands; Crownlands
5	f5	Greyjoy	Golden Kraken	Iron Islands
6	f6	Night's Watch	Black	The Wall
7	f7	Frey	Two Towers and Bridge	Riverlands
8	f8	Tyrell	Golden Rose/Green Field	Reach
9	f9	Bolton	Red, upside down flayed man	North
10	f10	Clegane	Three Black Dogs/Yellow Background	Westerlands
11	f11	Tully	Silver Trout	Riverlands (Exiled)
12	f12	Martell	Red Sun/Golden Spear	Dorne
13	f13	Arryn	Moon-and-Falcon	Vale of Arryn
14	f14	Baelish	Head of the Titan of Braavos	Riverlands; Vale of Arryn
15	f15	Free Folk (Wildlings)	Not applicable	North of the Wall

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Cities Table

Displays the ID number and name of each city.

Create Statement

```
create table if not exists cities(

  cityid varchar(10) primary key
, name text not null
);
```

Functional Dependencies

cityid → name

Sample Data

	cityid character varying(10)	name text
1	city1	Winterfell
2	city2	Westerlands
3	city3	The Stormlands
4	city4	The Realm
5	city5	Dragonstone
6	city6	Iron Islands
7	city7	The Wall
8	city8	Casterly Rock
9	city9	The Crossing
10	city10	The Reach
11	city11	Dreadfort
12	city12	Asshai
13	city13	Dothraki Sea
14	city14	Lorath
15	city15	North of the Wall
16	city16	King's Landing
17	city17	Volantis

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Regions Table

Displays the ID number, name, temperature (in °F), precipitation (in inches), and geography of all the locations. As a future enhancement, the details of the final three attributes may be added as desired.

Create Statement

```
create table if not exists regions(

  regid varchar(10) primary key
, name text not null default 'Not applicable'
, temp_degF text not null default 'Not applicable'
, precip_inches text not null default 'Not applicable'
, geography text not null default 'Not applicable'
);
```

Functional Dependencies

regid → name, temp_degF, precip_inches, geography

Sample Data

	regid character varying(10)	name text	temp_degf text	precip_inches text	geography text
1	reg1	Westeros	Not applicable	Not applicable	Not applicable
2	reg2	Riverlands	Not applicable	Not applicable	Not applicable
3	reg3	The North	Not applicable	Not applicable	Not applicable
4	reg4	Essos	Not applicable	Not applicable	Not applicable
5	reg5	Dothraki	Not applicable	Not applicable	Not applicable
6	reg6	Craster's Keep	Not applicable	Not applicable	Not applicable

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Cities_in_Regions Table

Displays the city ID number and the region ID number. Links the tables Cities and Regions together.

Create Statement

```
create table if not exists cities_in_regions(

  cityid varchar(10) not null references cities(cityid)
, regid varchar(10) not null references regions(regid)
, primary key(cityid,regid)
);
```

Functional Dependencies

cityid, regid →

Sample Data

	cityid character varying(10)	regid character varying(10)
1	city1	reg1
2	city2	reg1
3	city3	reg1
4	city4	reg1
5	city5	reg1
6	city6	reg1
7	city7	reg1
8	city8	reg1
9	city9	reg2
10	city10	reg1
11	city11	reg3
12	city12	reg4
13	city13	reg5
14	city14	reg1
15	city15	reg1
16	city15	reg6
17	city16	reg1
18	city17	reg1

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Chars_in_Regions

Displays the character ID number and region ID number. Links tables Characters and Regions together.

Create Statement

```
create table if not exists chars_in_regions(

  cid varchar(5) not null references characters(cid)
, regid varchar(10) not null references regions(regid)
, primary key(cid,regid)
);
```

Functional Dependencies

cid, regid →

Sample Data

	cid character varying(5)	regid character varying(10)
1	c1	reg1
2	c6	reg1
3	c7	reg1
4	c8	reg1
5	c9	reg1
6	c2	reg1
7	c3	reg1
8	c10	reg1
9	c4	reg1
10	c11	reg1
11	c12	reg1
12	c5	reg1
13	c13	reg1
14	c14	reg1
15	c15	reg1
16	c16	reg1
17	c17	reg2
18	c18	reg1
19	c19	reg3
20	c20	reg1
21	c21	reg4
22	c22	reg5
23	c23	reg1
24	c24	reg1
25	c25	reg1
26	c26	reg6
27	c27	reg1
28	c28	reg1
29	c29	reg6

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Pets Table

Displays the ID number, name, type, habitat, owner, and diet of pets that characters own. Pets is linked to table Characters by foreign key "owner".

Create Statement

```
create table if not exists pets(

  pid varchar(10) primary key
, name text not null default 'Not applicable'
, type text not null default 'Not applicable'
, habitat text not null default 'Not applicable'
, owner varchar(5) not null references characters(cid)
, diet text check(upper(diet) in
('OMNIVORE','CARNIVORE','HERBIVORE')) not null default 'Not
applicable'
);
```

Functional Dependencies

pid → name, type, habitat, diet, owner

Sample Data

	pid character varying(10)	name text	type text	habitat text	owner character varying(5)	diet text
1	p1	Drogon	dragon	Volcanic Mountains	c5	Carnivore
2	p2	Viserion	dragon	Volcanic Mountains	c5	Carnivore
3	p3	Rhaegal	dragon	Volcanic Mountains	c5	Carnivore
4	p4	Grey Wind	Direwolf	Forests,Mountains	c6	Carnivore
5	p5	Lady	Direwolf	Forests,Mountains	c8	Carnivore
6	p6	Nymeria	Direwolf	Forests,Mountains	c7	Carnivore
7	p7	Summer	Direwolf	Forests,Mountains	c9	Carnivore
8	p8	Ghost	Direwolf	Forests,Mountains	c15	Carnivore
9	p9	The Silver	Dothrak Horse	Plains	c5	Herbivore

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Creatures Table

Displays the ID number, type, habitat, diet, language, features, status (whether extinct, living, etc.), and societal living unit (clan-based, pack-based, etc.) of creatures. Additional details may be filled in at the administrator's or editor's discretion (see "Security" section).

Create Statement

```
create table if not exists creatures(

  crid varchar(10) primary key
, type text not null
, habitat text not null default 'Not applicable'
, diet text check(upper(diet) in
('OMNIVORE','CARNIVORE','HERBIVORE','NOT APPLICABLE')) not null
default 'Not applicable'
, language text not null default 'Not applicable'
, features text not null default 'Not applicable'
, status text not null default 'Not applicable'
, society text not null default 'Not applicable'
);
```

Functional Dependencies

crid → type, habitat, diet, language, features, status, society

Sample Data

	crid character varying(10)	type text	habitat text	diet text	language text	features text	status text	society text
1	cr1	Manticore	Jade Sea-Essos	Carnivore	Not applicable	Not applicabl	Not applic	Not applicab
2	cr2	Raven	Forests,Plains,Wes	Omnivore	Not applicable	Not applicabl	Active	Not applicab
3	cr3	Wight	Beyond the Wall,We	Not applicab	Not applicable	Glowing Blue	Active	Not applicab
4	cr4	White Walkers	Lands of Always Wi	Not applicab	Not applicable	Glowing blue	Active	Not applicab
5	cr5	Giant	Beyond the Wall,We	Not applicab	Not applicable	Twice human h	Active	Clan-based
6	cr6	Children of the F	Westeros	Not applicab	Not applicable	human child h	Active	Clan-based

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Creatures_in_Region Table

Displays the creature ID number and region ID number. Links tables Creatures and Regions together through foreign keys, crid and regid.

Create Statement

```
create table if not exists creatures_in_region(

  crid varchar(10) not null references creatures(crid)
, regid varchar(10) not null references regions(regid)
, primary key(crid,regid)
);
```

Functional Dependencies

crid, regid →

Sample Data

	crid character varying(10)	regid character varying(10)
1	cr1	reg4
2	cr2	reg1
3	cr3	reg3
4	cr4	reg3
5	cr5	reg3
6	cr6	reg2

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Relationships Table

Displays the ID number of the first person, ID number of the second person, whether the two individuals are married, or together in a relationship. Links tables Characters and Relationships through foreign keys, person1 and person2.

Create Statement

```
create table if not exists relationships(

  person1 varchar(5) not null references characters(cid)
, person2 varchar(5) not null references characters(cid)
, married text check(upper(married) in ('YES','NO')) default
'Not applicable'
, couple text check(upper(couple) in ('YES','NO')) default 'Not
applicable'
, primary key(person1,person2)
);
```

Functional Dependencies

person1, person2 → married, couple

Sample Data

	person1 character varying(5)	person2 character varying(5)	married text	couple text
1	c1	c9	yes	no
2	c6	c28	yes	no
3	c5	c22	yes	no
4	c14	c25	no	yes
5	c26	c29	no	yes
6	c2	c8	yes	no

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Religion Table

Displays the ID number and name of each religion.

Create Statement

```
create table if not exists religion(

  rid varchar(5) primary key
, name text not null
);
```

Functional Dependencies

rid → name

Sample Data

	rid character varying(5)	name text
1	r1	Night's Watch Vows
2	r2	Seven Pointed Star
3	r3	Drowned God
4	r4	Fiery Heart of the Lord Light
5	r5	Titan of Braavos
6	r6	Good Masters
7	r7	Old Gods of the Forest

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Chars_Religion Table

Displays the character ID number and religion ID number. Links the tables Characters and Religion together to indicate religions that certain characters practice.

Create Statement

```
create table if not exists chars_religion(

  cid varchar(5) not null references characters(cid)
, rid varchar(5) not null references religion(rid)
, primary key(cid,rid)
);
```

Functional Dependencies

cid, rid →

Sample Data

	cid character varying(5)	rid character varying(5)
1	c14	r1
2	c26	r1
3	c21	r4

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View Definitions:

Characters_in_families View

Displays the first name, last name, and family name of every character.

Create Statement

```
create or replace view characters_in_families
as
select c.fn, c.ln, f.name
from characters c,
     families f
where c.fid = f.fid;
```

Sample Output

	fn text	ln text	name text
1	Eddard	Stark	Stark
2	Tyrion	Lannister	Lannister
3	Cersei	Lannister	Lannister
4	Robert	Baratheon	Baratheon
5	Daenerys	Targaryen	Targaryen
6	Robb	Stark	Stark
7	Arya	Stark	Stark
8	Sansa	Stark	Stark
9	Catelyn	Stark	Stark
10	Jaime	Lannister	Lannister
11	Joffrey	Baratheon	Baratheon
12	Stannis	Baratheon	Baratheon
13	Theon	Greyjoy	Greyjoy
14	Jon	Snow	Night's Watch
15	Tywin	Lannister	Lannister
16	Hodor	Not Applicable	Stark
17	Walder	Frey	Frey
18	Margaery	Tyrell	Tyrell
19	Roose	Bolton	Bolton
20	Gregor	Clegane	Clegane
21	Melisandre	Not Applicable	Baratheon
22	Drogo	Not Applicable	Targaryen
23	Shae	Not Applicable	Lannister
24	Osha	Not Applicable	Stark
25	Ygritte	Not Applicable	Free Folk (Wildlings)
26	Samwell	Tarly	Free Folk (Wildlings)
27	Petyr 'Littlefinger'	Baelish	Baelish
28	Talisa	Stark	Stark
29	Gilly	Not Applicable	Free Folk (Wildlings)

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Owned_pets View

Displays the first name, last name, pet name, and pet type of characters.

Create Statement

```
create or replace view owned_pets
as
select c.fn "owner first name", c.ln "owner last name", p.name
"pet name", p.type "pet type"
from characters c
   , pets p
where c.cid = p.owner;
```

Sample Output

	owner first name text	owner last name text	pet name text	pet type text
1	Daenerys	Targaryen	Drogon	dragon
2	Daenerys	Targaryen	Viserion	dragon
3	Daenerys	Targaryen	Rhaegal	dragon
4	Robb	Stark	Grey Wind	Direwolf
5	Sansa	Stark	Lady	Direwolf
6	Arya	Stark	Nymeria	Direwolf
7	Catelyn	Stark	Summer	Direwolf
8	Tywin	Lannister	Ghost	Direwolf
9	Daenerys	Targaryen	The Silver	Dothrak Horse

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Characters_around_creatures View

Displays the character first name, character last name, and creature type of any characters who are around any creatures.

Create Statement

```
create or replace view characters_around_creatures
as
select distinct ch.fn "first name", ch.ln "last name", cr.type
"creature type", r.name "region"
from characters ch
   , chars_in_regions ch_r
   , regions r
   , creatures_in_region cr_r
   , creatures cr
where ch.cid = ch_r.cid
  and ch_r.regid = r.regid
  and r.regid = cr_r.regid
  and cr_r.crid = cr.crid
  and r.name = 'Essos';
```

Sample Output

	first name text	last name text	creature type text	region text
1	Melisandre	Not Applicable	Manticore	Essos

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Reports:

Relations Report

Displays the first person's first and last name, the second persons first and last name, and whether they are married or in a relationship.

Create Statement

```
create or replace view relations
as
(
select c1.fn as person1first, c1.ln as person1last, c2.fn as
person2first, c2.ln as person2last, married, couple
from characters c1
   , characters c2
   , relationships r
where c1.cid = r.person1
  and c2.cid = r.person2
);
```

Sample Output

	person1first text	person1last text	person2first text	person2last text	married text	couple text
1	Eddard	Stark	Catelyn	Stark	yes	no
2	Robb	Stark	Talisa	Stark	yes	no
3	Daenerys	Targaryen	Drogo	Not Applicable	yes	no
4	Jon	Snow	Ygritte	Not Applicable	no	yes
5	Samwell	Tarly	Gilly	Not Applicable	no	yes
6	Tyrion	Lannister	Sansa	Stark	yes	no

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Inhabitants_Casterly_Rock Report

Displays the character ID number, character first name, character last name, and the city name.

Specifically, the report compiles all the inhabitants of city Casterly Rock.

Create Statement

```
create or replace view inhabitants_Casterly_Rock
as
select distinct ch.cid, ch.fn, ch.ln, ci.name as "City Name"
from characters ch
   , chars_in_regions ch_reg
   , cities_in_regions ci_reg
   , regions reg
   , cities ci
where ch.cid = ch_reg.cid
  and ch_reg.regid = reg.regid
  and reg.regid = ci_reg.regid
  and ci_reg.cityid = ci.cityid
  and ci.name = 'Casterly Rock';
```

Sample Output

	cid character varying(5)	fn text	ln text	City Name text
1	c14	Jon	Snow	Casterly Rock
2	c2	Tyrion	Lannister	Casterly Rock
3	c11	Joffrey	Baratheon	Casterly Rock
4	c13	Theon	Greyjoy	Casterly Rock
5	c10	Jaime	Lannister	Casterly Rock
6	c7	Arya	Stark	Casterly Rock
7	c5	Daenerys	Targaryen	Casterly Rock
8	c18	Margaery	Tyrell	Casterly Rock
9	c12	Stannis	Baratheon	Casterly Rock
10	c27	Petyr 'Littlefinger'	Baelish	Casterly Rock
11	c1	Eddard	Stark	Casterly Rock
12	c8	Sansa	Stark	Casterly Rock
13	c25	Ygritte	Not Applicable	Casterly Rock
14	c15	Tywin	Lannister	Casterly Rock
15	c28	Talisa	Stark	Casterly Rock
16	c3	Cersei	Lannister	Casterly Rock
17	c24	Osha	Not Applicable	Casterly Rock
18	c4	Robert	Baratheon	Casterly Rock
19	c9	Catelyn	Stark	Casterly Rock
20	c6	Robb	Stark	Casterly Rock
21	c20	Gregor	Clegane	Casterly Rock
22	c16	Hodor	Not Applicable	Casterly Rock
23	c23	Shae	Not Applicable	Casterly Rock

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Number_inhabitants Report

Displays the domain and the corresponding number of inhabitants.

Create Statement

```
create or replace view number_inhabitants
as
select f.domain, count(c.cid) "number of inhabitants"
from characters c
   , families f
where c.fid = f.fid
group by f.domain
order by "number of inhabitants" desc;
```

Sample Output

	domain text	number of inhabitants bigint
1	North (Exiled)	8
2	Westerlands	6
3	Stormlands; Crownlands	4
4	North of the Wall	3
5	Essos	2
6	Riverlands	1
7	Iron Islands	1
8	Riverlands; Vale of Arryn	1
9	The Wall	1
10	North	1
11	Reach	1

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Stored Procedures:

getCharInfo() function

This function that takes a character ID as input and returns his/her family information, *contingent* on the fact that they have an official relationship. In other words, if the character is not in the relationships table, then an empty relation is returned.

Create Statement

```
create or replace function getCharInfo(varchar,refcursor)
returns refcursor as
$$
declare
     char_id varchar := $1;
     resultset refcursor := $2;

begin
     open resultset for
          select ch1.fn as "Character FN", ch1.ln as "Character
LN", famil.name as "Family Name", famil.sigil "Family Mascot",
famil.domain "Family Domain",
               relat.married "Married?", relat.couple "Couple?",
ch2.fn "Partner's FN", ch2.ln "Partner's LN"
          from characters ch1
             , characters ch2
             , actors act
             , relationships relat
             , families famil
          where ch1.cid = act.aid
            and ch1.fid = famil.fid
            and ch1.cid = relat.person1
            and ch2.cid = relat.person2
            and ch1.cid = char_id;
     return resultset;
end;
$$
language plpgsql;
```

Sample Output

```
select getCharInfo('c1','results');
fetch all from results;
```

	Character FN text	Character LN text	Family Name text	Family Mascot text	Family Domain text	Married? text	Couple? text	Partner's FN text	Partner's LN text
1	Eddard	Stark	Stark	Direwolf	North (Exile	yes	no	Catelyn	Stark

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getCharsFromCity() function

This function takes as input a city from the cities table, and returns all the characters from that particular city.

Create Statement

```
create or replace function getCharsFromCity(varchar,refcursor)
returns refcursor as
$$
declare
     city_input varchar := $1;
     resultset refcursor := $2;
begin
     open resultset for
          select distinct ch.fn, ch.ln, cit.name "City Name"
          from      cities cit
                , regions reg
                , chars_in_regions ch_reg
                , cities_in_regions ci_reg
                , characters ch
          where ch.cid = ch_reg.cid
            and ch_reg.regid = reg.regid
            and reg.regid = ci_reg.regid
            and ci_reg.cityid = cit.cityid
            and cit.name = city_input;
     return resultset;
end;
$$
language plpgsql;
```

Sample Output

```
select getCharsFromCity('The Stormlands','results');
fetch all from results;
```

	fn text	ln text	City Name text
1	Shae	Not Applicable	The Stormlands
2	Gregor	Clegane	The Stormlands
3	Jaime	Lannister	The Stormlands
4	Tywin	Lannister	The Stormlands
5	Arya	Stark	The Stormlands
6	Osha	Not Applicable	The Stormlands
7	Robb	Stark	The Stormlands
8	Theon	Greyjoy	The Stormlands
9	Hodor	Not Applicable	The Stormlands
10	Eddard	Stark	The Stormlands
11	Stannis	Baratheon	The Stormlands
12	Margaery	Tyrell	The Stormlands
13	Sansa	Stark	The Stormlands
14	Talisa	Stark	The Stormlands
15	Catelyn	Stark	The Stormlands
16	Tyrion	Lannister	The Stormlands
17	Ygritte	Not Applicable	The Stormlands
18	Joffrey	Baratheon	The Stormlands
19	Petyr 'Littlefinger'	Baelish	The Stormlands
20	Jon	Snow	The Stormlands
21	Robert	Baratheon	The Stormlands
22	Daenerys	Targaryen	The Stormlands
23	Cersei	Lannister	The Stormlands

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Triggers:

check_characters trigger

The below trigger definition corresponds to the `getCharInfo()` function. It is supposed to check, after insertion into the characters table that there are invalid entries, or as specified in the parameter list, that there must be a cid value.

Create Statement

```
create trigger check_characters after insert on characters
for each row execute procedure getCharInfo(varchar,refcursor);
```

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check_cities trigger

The below trigger definition corresponds to the `getCharsFromCity()` function. It is supposed to check, after an update of the cities table, for null values in the city ID and name value. If nulls are found, then the update should not occur.

Create Statement

```
create trigger check_cities after update on cities for each row
execute procedure getCharsFromCity(varchar,refcursor);
```

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Security:

The three levels of access are assigned and implemented as follows.

Admin Role

```
create role admin;
grant all privileges
on all tables in schema public
to admin;
```

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Editor Role

```
drop role editor;
create role editor;
grant select, insert, update
on all tables in schema public
to editor;
```

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Viewer Role

```
drop role viewer;
create role viewer;
grant select
on all tables in schema public
to viewer;
```

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Implementation Notes and Known Problems:

For the most part, implementation was not difficult. Basic planning and scrapwork was done using MS Paint software to draw the E-R diagrams. Microsoft Excel was then used to plan out the tables, allowing for easy reconstruction of table according to normalization rules. Once all of my sample data and primary and foreign keys were drawn up, the tables were then coded into PostgreSQL. An observation I witnessed many times is that referential integrity assures you of so much; as I inserted test data, foreign key-primary key relationships ensured that no data was erroneous nor inconsistent.

The one struggle that I faced was creating triggers based on my stored procedures. Since we had not done an example of writing a trigger in class in *Postgres*, I was unsure of the syntax. However, I utilized the PostgreSQL documentation on the website and wrote my triggers as best as they can. In fact, the triggers compiled almost completely, generating one error message saying the function (in both triggers) could not be recognized. I could not see how I had gone wrong, after successfully running both functions again and again.

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Future Enhancements:

The most major upgrade that may occur in the future is plentiful additions to the database to include even more information about characters, more locations, and more attributes about characters. Immediate upgrades though that I would have liked to add would be a complete infusion of all the episodes aired to date, with their air date, season number, and episode number in the series. In addition, I might also consider attaching character foreign keys to episodes so that I can query exactly which episodes contained which characters. Likewise, the locations table can also be linked to the episodes so that I would be able to query which locations were visited in each episode.

I would also include a partnerships table of some sort, to show the alliances that form throughout the show, such as the bond between Arya Stark and the Hound, who offers Arya's protection.

Ultimately, though, I hope that I have developed a clear enough database as to allow future programmers to take full charge and full comprehension of the database in order to be able to go forth seamlessly, independently, and confidently and make any improvements to my work.

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Revision 1 – Made May 19, 2014:

1. Changed the relationship between Families and Characters to 1 to Many. This makes more sense since one family could have many characters, but 1 character has only one family.
2. Relabeled relationship between Characters and Relationships to refer to both foreign keys: 'cid=person1' and 'cid=person2'.
3. In create table statements, removed keywords "not null" and "unique from primary key declarations since primary keys already have an inherent uniqueness and not-null quality; to mention otherwise is redundant.
4. In create table statements, I added some check constraints to add additional data integrity and to eliminate explicit "null" values from displaying.
5. In create table statements, I changed some varchar data type fields to text data types.

Regarding Professor Labouseur's comments:

6. I changed the label between Characters and Actors tables in the ER Diagram to be "cid = aid".
7. I revamped the ER diagram using Gliffy.
8. I changed the functional dependencies accordingly.
9. Declared primary keys in all of my association tables for the following tables: Relationships, Actors, Chars_Religion, Chars_in_Regions, Cities_in_Regions, Creatures_in_Region.

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