A Database of State Parks and Trails

Designed by Deborah Sylvester

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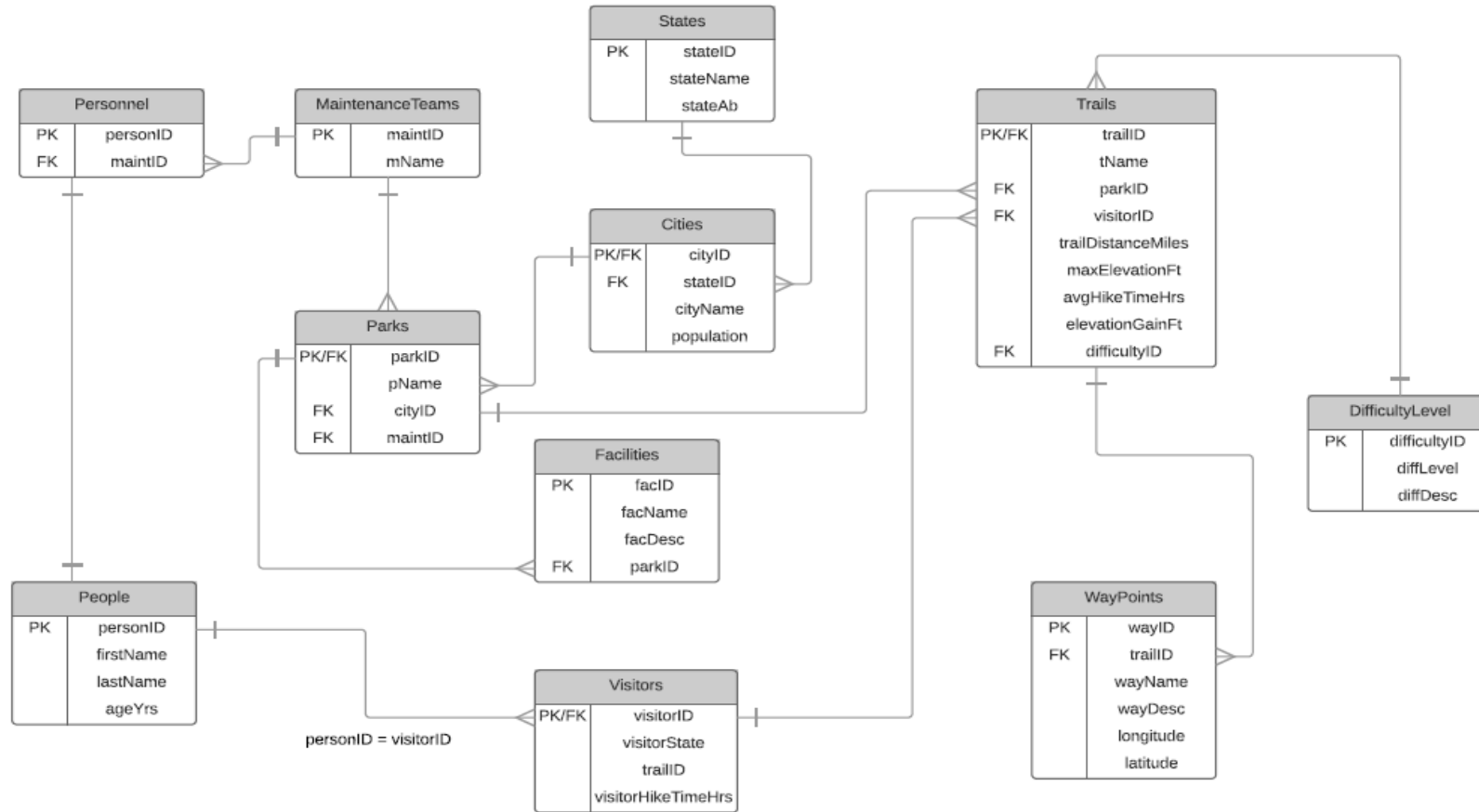
Executive Summary

The United States has many National Parks. Each park is unique with various levels of trails. Each park/trail offers magnificent views of our beautiful country. This database was designed to track visitors to the parks and the trails they hike. Waypoints with longitude and latitude are provided for GPS users. Trails can be searched by trail name, park name, difficulty level, city and state.

"Leave no trace. Take only memories"

Entity Relationship Diagram

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Tables

Personnel

Keeps track of personID and maintenanceID subtypes.

```
-- Personnel Table ----
CREATE TABLE Personnel (
    personID SERIAL UNIQUE NOT NULL,
    maintID TEXT NOT NULL, -- FK for maintenance teams
    primary key(personID)
);
```

Functional Dependencies:

personID → maintID

personid integer	maintid text
1	M01
2	M02
3	M03
4	M04
5	M05
6	M06

Tables

People

Keeps track of people. Main type.

```
-- People Table ---
CREATE TABLE People (
    personID SERIAL UNIQUE NOT NULL,
    firstName TEXT NOT NULL,
    lastName TEXT NOT NULL,
    ageYrs INT NOT NULL,
    PRIMARY KEY(personID)
);
```

Functional Dependencies:

personID → firstName, lastName, ageYrs

personid integer	firstname text	lastname text	ageyrs integer
1	John	Smith	34
2	Paul	Jones	40
3	Gary	Chernega	49
4	Lisa	Kelly	37
5	Xiaojin	Wei	40
6	Phil	Collins	38
7	Phil	Buchling	28
8	Denise	Roe	52
9	Marie	Zanck	55
10	Romeo	Sylvester	22
11	Nancy	Donahue	58
12	Janet	Duncan	57
13	Lem	Atkins	55
14	Phil	Sylvester	52
15	Linda	Bauer	63
16	Alan	Labouseur	43
17	Thomas	Bauer	64
18	Brian	Werneke	29
19	Cory	Vandeventer	32
20	Jacob	Porter	27
21	Amber	Monroe	29
22	Ying	Yu	45
23	Marcie	Gemza	62
24	Barbara	Torelli	42
25	Ronald	Consiglio	49

Tables

Maintenance Teams Table

They maintain the trails and lodges.

CREATE TABLE Maintenanceteams (
    maintID TEXT UNIQUE NOT NULL,
    mName TEXT NOT NULL,
    PRIMARY KEY(maintID)
);

Functional Dependencies:

maintID → maintName

maintid text	mname text
M01	Trail Repair Team
M02	Custodians
M03	Carpenters
M04	Plumbers
M05	Housekeeping
M06	Landscapers

Tables

Parks Table

Park name with city, park and maintenance keys.

```
-- Parks Table ---
CREATE TABLE Parks (
    parkID CHAR(3) UNIQUE NOT NULL,
    pName TEXT NOT NULL,
    cityID TEXT NOT NULL,   -- FK Cities
    maintID TEXT NOT NULL, -- FK Maintenance teams
    PRIMARY KEY (parkID)
);
```

Functional Dependencies:

parkID → parkName, cityID, maintID

parkid character (3)	pname text	cityid text	maintid text
P01	Grand Canyon National Park	C01	M01
P02	Crater Lake National Park	C02	M01
P03	Mt Rainer National Park	C03	M02
P04	Yellowstone National Park	C05	M01
P05	Arches National Park	C10	M01
P06	Yosemite National Park	C08	M06
P07	Mohonk Preserve	C04	M03
P08	Bushkill Falls	C06	M05
P09	Breakneck Mountain	C11	M04
P10	Mt Rainer National Park	C07	M01
P11	Mt Rainer National Park	C09	M01
P12	OqunquitPark	C09	M01

Tables

States Table

State name and state abbreviation of the parks locations.

```
-- States Table --
CREATE TABLE States (
    stateID TEXT UNIQUE NOT NULL,
    stateName TEXT NOT NULL,
    stateAb TEXT NOT NULL,
    PRIMARY KEY (stateID)
);
```

Functional Dependencies:

stateID → stateName, stateAb

stateid text	statename text	stateab text
S01	Arizona	AZ
S02	Oregon	OR
S03	Washington	WA
S04	Wyoming	WY
S05	New York	NY
S06	Maine	ME
S07	California	CA
S08	Utah	UT
S09	Pennsylvania	PA

Tables

Cities Table

City names with corresponding stateID and population.

```
-- Cities Table --
CREATE TABLE Cities (
    cityID TEXT UNIQUE NOT NULL,
    stateID TEXT NOT NULL, -- FK States
    cityName TEXT NOT NULL,
    population BIGINT NOT NULL,
    PRIMARY KEY (cityID)
 );
```

Functional Dependencies:

cityID → stateID, cityName, population

cityid text	stateid text	cityname text	population bigint
C01	S01	Flag Staff	100000000
C02	S02	Klamath Falls	20000000
C03	S03	Seattle	3521009873
C04	S05	Poughkeepsie	6321809321
C05	S04	Jackson Hole	43219897983
C06	S09	Bushkill	5421233
C07	S03	Ohanapecosh	5432134
C08	S07	Yosemite national Park	1234343
C09	S03	Ashford	435423
C10	S08	Moab	4313453
C11	S05	Cold Spring	24343
C12	S06	Ogunquit	892

Tables

Facilities Table

Facilities offered at the various parks.

```
-- Facilities Table --
CREATE TABLE Facilities (
    facID INT UNIQUE NOT NULL,
    facName TEXT NOT NULL,
    facDesc TEXT NOT NULL,
    parkID CHAR(3) NOT NULL, -- FK Parks
    PRIMARY KEY (facID)
 );
```

facid integer	facname text	facdesc text	parkid character (3)
1	Grand Canyon Lodge	Lodging, Restaurants	P01
2	Crater Lake Lodge	Lodging, Restaurant	P02
3	Paradise Inn	Lodging, Restaurant	P03
4	Mohonk Mountain House	Lodging Restaurant	P07
5	Fishking Bridge RV Park	Coin-op Laundry and showers	P04

Functional Dependencies:

facID → facName, facDesc, parkID

Tables

Trails Table

Trail details with keys to the parks and visitors.

```
-- Trails Table --
CREATE TABLE Trails (
    trailID CHAR(3) UNIQUE NOT NULL,
    tName TEXT NOT NULL,
    parkID CHAR(3) NOT NULL, -- FK Parks
    visitorID INT NOT NULL,   -- FK Visitors
    trailDistanceMiles DECIMAL (5,2) NOT NULL,
    maxElevationFt INT NOT NULL,
    avgHikeTimeHrs DECIMAL (5,1) NOT NULL,
    elevationGainFt INT NOT NULL,
    difficultyID INT NOT NULL, -- FK DifficultyLevel
    PRIMARY KEY (trailID)
);
```

Functional Dependencies:

trailID → tName, parkID, visitorID, trailDistanceMiles, maxElevationFt, avgHikeTimeHrs, elevationGainFt, difficultyID

Tables

Trails Table

trailid character (3)	tname text	parkid character (3)	visitorid integer	traildista... numeric (...	maxeleva... integer	avghiketi... numeric (...	elevation... integer	difficultyid integer
T01	Labyrinth and Lemon Squeeze	P05	2	3.70	1617	3.1	973	9
T02	South Kaibab	P01	3	6.80	2480	8.0	-4780	9
T03	Garfield Creek	P02	1	3.60	8054	2.5	1010	8
T04	Breakneck Ridge	P09	13	3.70	1207	4.0	1442	10
T05	Half Dome Trail	P06	8	16.40	8800	12.0	4800	9
T06	Grove Of The Patriarchs	P10	10	1.50	2200	1.0	50	2
T07	Wizard Summit	P02	11	2.20	6940	1.5	760	4
T08	Red Trail	P08	4	2.00	1020	2.0	150	7
T09	Yellow Trail	P08	14	1.00	1020	0.8	150	4
T10	Bonticou Crag and Table Rocks	P07	16	6.00	1195	4.0	1215	8
T11	Lake Trail Loop	P03	11	5.00	4854	4.0	1300	6
T12	Skyline Loop	P11	19	5.50	6800	4.5	1700	9
T13	Nisqually Vista Trail	P11	20	1.20	5220	0.8	200	2
T14	Bright Angel Trail	P01	11	9.30	6860	10.0	-4380	8
T15	Bright Angel Trail	P01	7	6.10	3740	5.0	-3120	7
T16	Bright Angel Trail	P01	8	4.60	3800	5.0	-3060	7
T17	Bright Angel Trail	P01	9	9.60	3800	7.0	-3060	7
T18	Delicate Arch Trail	P05	17	3.00	4800	2.5	480	7
T19	Landscape Arch Trail	P05	21	1.60	5254	0.9	50	2
T20	Vernal Fall and Nevada Fall Trails	P06	18	1.60	6000	6.0	2000	9
T21	Old Faithful	P04	12	16.00	7349	2.2	160	6
T22	Beaver Ponds Loop	P04	4	5.60	6370	2.5	823	3
T23	Marginal Way	P12	15	3.30	57	1.0	199	2

Tables

WayPoints Table

Waypoints along the hikes with descriptions.

```
-- WayPoints Table ---
CREATE TABLE WayPoints (
    wayID SERIAL UNIQUE NOT NULL,
    trailID CHAR(3) NOT NULL, -- FK Trails
    wayName TEXT NOT NULL,
    wayDesc TEXT NOT NULL,
    longitude TEXT NOT NULL,
    latitude TEXT NOT NULL,
    PRIMARY KEY (wayID)
  );
```

Functional Dependencies:

wayID → trailID, wayName, wayDesc, longitude, latitude

Tables

WayPoints Table

wayid integer	trailid character (3)	wayname text	waydesc text	longitude text	latitude text
1	T01	Sky Top Tower	Great Views of the Hudson Valley.	41.763582	-74.156007
2	T02	Cedar Ridge	Breath taking views of the canyon.	36.064085	-112.089394
3	T03	Garfield Peak	View from the island, wildflowers on top.	42.904018	-122.123083
4	T04	Breakneck Ridge	Insane views of the Hudson Valley.	41.467080	-73.95477
5	T05	Half Dome Summit	Panoramic views of Yosemite Valley and the High Sierra.	37.745919	-119.533199
6	T06	Grove of the Patriarchs	Suspension bridge, 1000 yr old Douglas Firs, Red Cedars, Western Hemlocks.	46.758148	-121.557523
7	T07	Wizard Summit	View from the island, crater on top.	42.939489	-122.149229
8	T08	Bridal Veil Falls	Good view of the falls. 8 falls along the way.	41.116457	-75.011966
9	T09	Main Falls	Good view of the main falls. Lower gorge and upper canyon.	41.120482	-75.008075
10	T10	Crag View	Good view of Valley and table rocks.	41.788075	-74.118835
11	T11	Reflection Lake	Beautiful view of Mt Rainier in the still water.	46.769692	-121.730220
12	T12	Panorma Point	Beautiful views of Mt Adams, Mt St. Helens, Mount Hood, Pinnacle Peak.	46.802175	- 121.728730
13	T13	Nisqually Glacier	Beautiful view of the Nisqually Glacier up close and personal.	46.786582	- 121.744790
14	T14	Colorado River	Beautiful view at the bottom of the Grand Canyon!! Phantom Ranch is here.	36.069168	- 112.132697
15	T15	Plateu Point	Nice view of the colorado river. Look for the Condors flying around!!	36.092854	- 112.117010
16	T16	Indian Garden	Rest area. Close to Plateau Point. Donkey"s kept here!!	36.092854	-112.117010
17	T17	Phantom Ranch	Campground, cabins, restrooms/showers on the colorado river.!!	36.105708	-112.094772
18	T18	Delicate Arch	The arch is 64 feet high and 45 feet wide, making it the largest free-standing arch in the park!!	38.735653,	-109.520592
19	T19	Landscape Arch	Rest area. Close to Plateau Point. Donkey"s kept here!!	38.782709	-109.595107
20	T20	Vernal and Nevada F...	Views of the Vernal and Nevada Falls.	37.724819	-119.533301
21	T21	Old Faithful	Views of the most famous geyser that erupts every 74 mins. Super volcano Park.	44.459054	- 110.822318
22	T22	Beaver Ponds	Forest and meadows. Near Mammoth Hot Springs	44.986003	-110.713942
23	T23	Perkins Cove	Beautiful view of the cove.	43.241607	-70.588814

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Tables

Difficulty Table

Difficulty of the trails with descriptions.

```
-- DifficultyLevel Table --
CREATE TABLE DifficultyLevel (
    difficultyID INT UNIQUE NOT NULL,
    diffLevel TEXT NOT NULL,
    diffDesc TEXT NOT NULL,
    PRIMARY KEY (difficultyID)
);
```

Functional Dependencies:

difficultyID → diffLevel, diffDesc

difficultyid integer	difflevel text	diffdesc text
1	Level 1	Similar to the walk from the couch to the fridge.
2	Level 2	Tingly sensation spreads across the lips. Wait, no, that's 2 peppers on a Thai menu.
3	Level 3	Okay, this is starting to feel like a hike now.
4	Level 4	Last safe number on which to bring friends who don't like hiking. Starting to feel a lot like exercise.
5	Level 5	If you don't break a sweat, you might be a cyborg and not even realize it. Yet.
6	Level 6	You owe yourself at least three slices of pizza after this.
7	Level 7	This might hurt tomorrow.
8	Level 8	Very hard.
9	Level 9	Rough
10	Level 10	Extreme

Tables

Visitor Table

VisitorID, state of origin, trailID and hike time.

```
-- Visitors Table  --
CREATE TABLE Visitors (
    visitorID INT NOT NULL REFERENCES people(personID),
    visitorState TEXT NOT NULL,
    trailID CHAR(3) NOT NULL,
    visitorHikeTimeHrs DECIMAL(5,1) NOT NULL,
    PRIMARY KEY (visitorID, trailID)
);
```

Functional Dependencies:

visitorID → visitorState, trailID, visitorHikeTimeHrs

visitorid integer	visitorstate text	trailid character (3)	visitorhik... numeric (...
4	New York	T09	3.0
3	New York	T14	3.2
23	Arizona	T15	6.3
13	California	T05	3.0
11	New Jersey	T07	7.0
7	Washington	T04	9.0
5	Oregon	T14	10.2
2	Maine	T10	2.0
1	Wyoming	T21	4.0
16	Texas	T18	1.5
18	Arizona	T03	5.0
20	Washington	T13	4.0
21	Utah	T18	5.0
14	California	T12	3.7
12	Pennsylvania	T08	1.3
21	Utah	T11	5.3

View Definitions

List of trails, waypoints, locations etc.

```
SELECT pk.pName as "Park Name", t.tName as "Trail Name",  t.trailDistanceMiles as "Trail
Distance(miles)", df.diffLevel as "Difficulty Level",
w.wayName as "WayPoint", w.wayDesc as "WayPoint Desc", c.cityName as "City", s.stateName as
"State"
FROM Trails t
INNER JOIN Parks pk ON t.parkID = pk.parkID
INNER JOIN Cities c ON pk.cityID = c.cityID
INNER JOIN States s ON s.stateID = c.stateID
INNER JOIN WayPoints w ON w.trailID = t.trailID
INNER JOIN DifficultyLevel df ON df.difficultyID = t.difficultyID
ORDER BY pk.pName
;
```

View Definitions

List of trails, waypoints, locations etc.

Park Name text	Trail Name text	Trail Dista... numeric (...	Difficulty Level text	WayPoint text	WayPoint Desc text	City text	State text
Arches National Park	Landscape Arch Trail	1.60	Level 2	Landscape Arch	Rest area. Close to Plateau Point. Donkey"...	Moab	Utah
Arches National Park	Delicate Arch Trail	3.00	Level 7	Delicate Arch	The arch is 64 feet high and 45 feet wide, ...	Moab	Utah
Arches National Park	Labyrinth and Lemon Squeeze	3.70	Level 9	Sky Top Tower	Great Views of the Hudson Valley.	Moab	Utah
Breakneck Mountain	Breakneck Ridge	3.70	Level 10	Breakneck Ridge	Insane views of the Hudson Valley.	Cold Spring	New York
Bushkill Falls	Red Trail	2.00	Level 7	Bridal Veil Falls	Good view of the falls. 8 falls along the way.	Bushkill	Pennsylvania
Bushkill Falls	Yellow Trail	1.00	Level 4	Main Falls	Good view of the main falls. Lower gorge a...	Bushkill	Pennsylvania
Crater Lake National Park	Wizard Summit	2.20	Level 4	Wizard Summit	View from the island, crater on top.	Klamath Falls	Oregon
Crater Lake National Park	Garfield Creek	3.60	Level 8	Garfield Peak	View from the island, wildflowers on top.	Klamath Falls	Oregon
Grand Canyon National Park	Bright Angel Trail	9.30	Level 8	Colorado River	Beautiful view at the bottom of the Grand ...	Flag Staff	Arizona
Grand Canyon National Park	Bright Angel Trail	4.60	Level 7	Indian Garden	Rest area. Close to Plateau Point. Donkey"...	Flag Staff	Arizona
Grand Canyon National Park	Bright Angel Trail	9.60	Level 7	Phantom Ranch	Campground, cabins, restrooms/showers o...	Flag Staff	Arizona
Grand Canyon National Park	South Kaibab	6.80	Level 9	Cedar Ridge	Breath taking views of the canyon.	Flag Staff	Arizona
Grand Canyon National Park	Bright Angel Trail	6.10	Level 7	Plateu Point	Nice view of the colorado river. Look for th...	Flag Staff	Arizona
Mohonk Preserve	Bonticou Crag and Table Rocks	6.00	Level 8	Crag View	Good view of Valley and table rocks.	Poughkeepsie	New York
Mt Rainer National Park	Skyline Loop	5.50	Level 9	Panorma Point	Beautiful views of Mt Adams, Mt St. Helens,...	Ashford	Washington
Mt Rainer National Park	Grove Of The Patriarchs	1.50	Level 2	Grove of the Patriarchs	Suspension bridge, 1000 yr old Douglas Fir...	Ohanapecosh	Washington
Mt Rainer National Park	Lake Trail Loop	5.00	Level 6	Reflection Lake	Beautiful view of Mt Rainier in the still water.	Seattle	Washington
Mt Rainer National Park	Nisqually Vista Trail	1.20	Level 2	Nisqually Glacier	Beautiful view of the Nisqually Glacier up cl...	Ashford	Washington
OqunquitPark	Marginal Way	3.30	Level 2	Perkins Cove	Beautiful view of the cove.	Ashford	Washington
Yellowstone National Park	Old Faithful	16.00	Level 6	Old Faithful	Views of the most famous geyser that eru...	Jackson Hole	Wyoming
Yellowstone National Park	Beaver Ponds Loop	5.60	Level 3	Beaver Ponds	Forest and meadows. Near Mammoth Hot ...	Jackson Hole	Wyoming
Yosemite National Park	Half Dome Trail	16.40	Level 9	Half Dome Summit	Panoramic views of Yosemite Valley and th...	Yosemite nation...	California
Yosemite National Park	Vernal Fall and Nevada Fall Trails	1.60	Level 9	Vernal and Nevada Falls	Views of the Vernal and Nevada Falls.	Yosemite nation...	California

View Definitions

Trail Name and Difficulty Level

```
CREATE OR REPLACE VIEW TrailDifficulty AS
select t.tName as "Trail Name", df.diffLevel as "Difficulty Level", df.diffDesc as "Difficulty Descripiton"
FROM Trails t
INNER JOIN DifficultyLevel df ON df.difficultyID = T.difficultyID
;



-- Query --
Select *
FROM TrailDifficulty
order by "Trail Name" ASC;
```

View Definitions

Trail Name and Difficulty Level

Trail Name text	Difficulty Level text	Difficulty Descripiton text
Beaver Ponds Loop	Level 3	Okay, this is starting to feel like a hike now.
Bonticou Crag and Table Rocks	Level 8	Very hard.
Breakneck Ridge	Level 10	Extreme
Bright Angel Trail	Level 7	This might hurt tomorrow.
Bright Angel Trail	Level 7	This might hurt tomorrow.
Bright Angel Trail	Level 7	This might hurt tomorrow.
Bright Angel Trail	Level 8	Very hard.
Delicate Arch Trail	Level 7	This might hurt tomorrow.
Garfield Creek	Level 8	Very hard.
Grove Of The Patriarchs	Level 2	Tingly sensation spreads across the lips. Wait, no, that's 2 peppers on a Thai menu.
Half Dome Trail	Level 9	Rough
Labyrinth and Lemon Squeeze	Level 9	Rough
Lake Trail Loop	Level 6	You owe yourself at least three slices of pizza after this.
Landscape Arch Trail	Level 2	Tingly sensation spreads across the lips. Wait, no, that's 2 peppers on a Thai menu.
Marginal Way	Level 2	Tingly sensation spreads across the lips. Wait, no, that's 2 peppers on a Thai menu.
Nisqually Vista Trail	Level 2	Tingly sensation spreads across the lips. Wait, no, that's 2 peppers on a Thai menu.
Old Faithful	Level 6	You owe yourself at least three slices of pizza after this.
Red Trail	Level 7	This might hurt tomorrow.
Skyline Loop	Level 9	Rough
South Kaibab	Level 9	Rough
Vernal Fall and Nevada Fall Trails	Level 9	Rough
Wizard Summit	Level 4	Last safe number on which to bring friends who don't like hiking. Starting to feel a lot like exercise.
Yellow Trail	Level 4	Last safe number on which to bring friends who don't like hiking. Starting to feel a lot like exercise.

View Definitions

Out of State Visitors and Trails Hiked

CREATE OR REPLACE VIEW OutofStateVisitors AS
SELECT s.stateName as "State Of Park", v.visitorState as "Visitors State", pk.pName as "Park Name", t.tName as "Trail Name", t.trailDistanceMiles as "Trail Distance(Miles)", p.lastName as "Last Name", p.firstName as "First Name", p.ageYrs as "Age(Years)"
FROM Trails t
INNER JOIN Parks pk ON t.parkID = pk.parkID
INNER JOIN Cities c ON pk.cityID = c.cityID
INNER JOIN States s ON s.stateID = c.stateID
INNER JOIN WayPoints w ON w.trailID = t.trailID
INNER JOIN People p ON p.personID = t.visitorID
INNER JOIN Visitors v ON v.trailID =   t.trailID
where s.stateName != v.visitorstate
;

View Definitions

Out of State Visitors and Trails Hiked

-- Query --

Select *
from OutofStateVisitors
order by "State of Park" ASC;

State Of Park text	Visitors State text	Park Name text	Trail Name text	Trail Dista... numeric (...	Last Name text	First Name text	Age(Years) integer
Arizona	New York	Grand Canyon National Park	Bright Angel Trail	9.30	Donahue	Nancy	58
Arizona	Oregon	Grand Canyon National Park	Bright Angel Trail	9.30	Donahue	Nancy	58
New York	Washington	Breakneck Mountain	Breakneck Ridge	3.70	Atkins	Lem	55
New York	Maine	Mohonk Preserve	Bonticou Crag and Table Rocks	6.00	Labouseur	Alan	43
Oregon	New Jersey	Crater Lake National Park	Wizard Summit	2.20	Donahue	Nancy	58
Oregon	Arizona	Crater Lake National Park	Garfield Creek	3.60	Smith	John	34
Pennsylvania	New York	Bushkill Falls	Yellow Trail	1.00	Sylvester	Phil	52
Utah	Texas	Arches National Park	Delicate Arch Trail	3.00	Bauer	Thomas	64
Washington	California	Mt Rainer National Park	Skyline Loop	5.50	Vandeventer	Cory	32
Washington	Utah	Mt Rainer National Park	Lake Trail Loop	5.00	Donahue	Nancy	58

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View Definitions

In State Visitors and Trails Hiked

```
CREATE OR REPLACE VIEW InStateVisitors AS
SELECT s.stateName as "State Of Park", v.visitorState as "Visitors State", pk.pName as "Park Name", t.tName as
"Trail Name",
t.trailDistanceMiles as "Trail Distance(Miles)", p.lastName as "Last Name",   p.firstName as "First Name",
p.ageYrs as "Age(Years)"
FROM Trails t
INNER JOIN Parks pk ON t.parkID = pk.parkID
INNER JOIN Cities c ON pk.cityID = c.cityID
INNER JOIN States s ON s.stateID = c.stateID
INNER JOIN WayPoints w ON w.trailID = t.trailID
INNER JOIN People p ON p.personID = t.visitorID
INNER JOIN Visitors v ON v.trailID =   t.trailID
where s.stateName = v.visitorstate
;
```

View Definitions

In State Visitors and Trails Hiked

-- Query --

Select *
from InStateVisitors
order by "State of Park" ASC;

State Of Park text	Visitors State text	Park Name text	Trail Name text	Trail Dista... numeric (...	Last Name text	First Name text	Age(Years) integer
Arizona	Arizona	Grand Canyon National Park	Bright Angel Trail	6.10	Buchling	Phil	28
California	California	Yosemite National Park	Half Dome Trail	16.40	Roe	Denise	52
Pennsylvania	Pennsylvania	Bushkill Falls	Red Trail	2.00	Kelly	Lisa	37
Utah	Utah	Arches National Park	Delicate Arch Trail	3.00	Bauer	Thomas	64
Washington	Washington	Mt Rainer National Park	Nisqually Vista Trail	1.20	Porter	Jacob	27
Wyoming	Wyoming	Yellowstone National Park	Old Faithful	16.00	Duncan	Janet	57

Reports
Hikers over the age of 30

SELECT pk.pName as "Park Name", t.tName as "Trail Name", t.trailDistanceMiles as "Trail Distance(Miles)", p.firstName as "First Name",
p.lastName as "Last Name", p.ageYrs as "Age(Yrs)"
FROM Trails t
INNER JOIN People p ON t.visitorID = p.personID
INNER JOIN Parks pk ON t.parkID = pk.parkID
INNER JOIN WayPoints w ON w.trailID = t.trailID
where p.ageYrs >=30
;

Reports

Hikers over the age of 30

Park Name text	Trail Name text	Trail Dista... numeric (...	First Name text	Last Name text	Age(Yrs) integer
Arches National Park	Labyrinth and Lemon Squeeze	3.70	Paul	Jones	40
Grand Canyon National Park	South Kaibab	6.80	Gary	Chernega	49
Crater Lake National Park	Garfield Creek	3.60	John	Smith	34
Breakneck Mountain	Breakneck Ridge	3.70	Lem	Atkins	55
Yosemite National Park	Half Dome Trail	16.40	Denise	Roe	52
Crater Lake National Park	Wizard Summit	2.20	Nancy	Donahue	58
Bushkill Falls	Red Trail	2.00	Lisa	Kelly	37
Bushkill Falls	Yellow Trail	1.00	Phil	Sylvester	52
Mohonk Preserve	Bonticou Crag and Table Rocks	6.00	Alan	Labouseur	43
Mt Rainer National Park	Lake Trail Loop	5.00	Nancy	Donahue	58
Mt Rainer National Park	Skyline Loop	5.50	Cory	Vandeventer	32
Grand Canyon National Park	Bright Angel Trail	9.30	Nancy	Donahue	58
Grand Canyon National Park	Bright Angel Trail	4.60	Denise	Roe	52
Grand Canyon National Park	Bright Angel Trail	9.60	Marie	Zanck	55
Arches National Park	Delicate Arch Trail	3.00	Thomas	Bauer	64
Yellowstone National Park	Old Faithful	16.00	Janet	Duncan	57
Yellowstone National Park	Beaver Ponds Loop	5.60	Lisa	Kelly	37
OqunquitPark	Marginal Way	3.30	Linda	Bauer	63

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Reports

How many people hiked each trail

select pk.pName as "Park Name", t.tName as "Trail Name", count(*)
FROM Visitors v
INNER JOIN Trails t ON v.trailID = t.trailID
INNER JOIN People p ON p.personID = t.visitorID
INNER JOIN Parks pk ON pk.parKID = t.parkID
group by pk.pName, t.tName
order by "Park Name" ASC
;

Reports

How many people hiked each trail

Park Name text	Trail Name text	count bigint
Arches National Park	Delicate Arch Trail	2
Breakneck Mountain	Breakneck Ridge	1
Bushkill Falls	Red Trail	1
Bushkill Falls	Yellow Trail	1
Crater Lake National Park	Garfield Creek	1
Crater Lake National Park	Wizard Summit	1
Grand Canyon National Park	Bright Angel Trail	3
Mohonk Preserve	Bonticou Crag and Table Rocks	1
Mt Rainer National Park	Lake Trail Loop	1
Mt Rainer National Park	Nisqually Vista Trail	1
Mt Rainer National Park	Skyline Loop	1
Yellowstone National Park	Old Faithful	1
Yosemite National Park	Half Dome Trail	1

Reports

Trail difficulties and their descriptions

select pk.pName as "Park Name", t.tName as "Trail Name", df.diffLevel as
"Difficulty Level", df.diffDesc as "Difficulty Descripiton"
FROM Trails t
INNER JOIN DifficultyLevel df ON df.difficultyID = T.difficultyID
INNER JOIN Parks pk ON pk.parkID = t.parkID
ORDER BY pk.pName ASC
;

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Reports

Trail Name versus difficulty

Park Name text	Trail Name text	Difficulty Level text	Difficulty Descripiton text
Arches National Park	Landscape Arch Trail	Level 2	Tingly sensation spreads across the lips. …
Arches National Park	Delicate Arch Trail	Level 7	This might hurt tomorrow.
Arches National Park	Labyrinth and Lemon Squeeze	Level 9	Rough
Breakneck Mountain	Breakneck Ridge	Level 10	Extreme
Bushkill Falls	Red Trail	Level 7	This might hurt tomorrow.
Bushkill Falls	Yellow Trail	Level 4	Last safe number on which to bring friends…
Crater Lake National Park	Wizard Summit	Level 4	Last safe number on which to bring friends…
Crater Lake National Park	Garfield Creek	Level 8	Very hard.
Grand Canyon National Park	Bright Angel Trail	Level 8	Very hard.
Grand Canyon National Park	Bright Angel Trail	Level 7	This might hurt tomorrow.
Grand Canyon National Park	Bright Angel Trail	Level 7	This might hurt tomorrow.
Grand Canyon National Park	South Kaibab	Level 9	Rough
Grand Canyon National Park	Bright Angel Trail	Level 7	This might hurt tomorrow.
Mohonk Preserve	Bonticou Crag and Table Rocks	Level 8	Very hard.
Mt Rainer National Park	Skyline Loop	Level 9	Rough
Mt Rainer National Park	Grove Of The Patriarchs	Level 2	Tingly sensation spreads across the lips. …
Mt Rainer National Park	Lake Trail Loop	Level 6	You owe yourself at least three slices of pi…
Mt Rainer National Park	Nisqually Vista Trail	Level 2	Tingly sensation spreads across the lips. …
OqunquitPark	Marginal Way	Level 2	Tingly sensation spreads across the lips. …
Yellowstone National Park	Old Faithful	Level 6	You owe yourself at least three slices of pi…
Yellowstone National Park	Beaver Ponds Loop	Level 3	Okay, this is starting to feel like a hike now.
Yosemite National Park	Half Dome Trail	Level 9	Rough
Yosemite National Park	Vernal Fall and Nevada Fall Trails	Level 9	Rough

Stored Procedure

Procedure to calculate the average age of visitors

```
DROP FUNCTION averageAgeOfVisitors(refcursor);
CREATE OR REPLACE FUNCTION averageAgeOfVisitors (REFCURSOR) returns refcursor AS
$$
DECLARE
        resultset REFCURSOR := $1;
BEGIN
    OPEN resultset for
        select avg(p.ageYrs) as "average age"
        from people p
        ;


    return resultset;
END;
$$
LANGUAGE PLPGSQL;

select averageAgeOfVisitors('results');
fetch all from results;
```

average age numeric
44.080000000000000

Stored Procedure with a Trigger

Procedure to check trail distance is not NULL. Triggers an exception

```
CREATE OR REPLACE FUNCTION ValidTrailData() returns TRIGGER AS
$$

BEGIN
    IF NEW.trailDistanceMiles IS NULL THEN
                        RAISE EXCEPTION 'DANGER WILL ROBINSON!!!   Trail Distance cannot be
NULL.  Please try again.';
    END if;
    RETURN NEW;

END;
$$
LANGUAGE PLPGSQL;

-- Runs the Trigger
CREATE TRIGGER ValidTrailData
BEFORE INSERT OR UPDATE ON Trails
FOR EACH ROW
EXECUTE PROCEDURE ValidTrailData();
```

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Stored Procedure with a Trigger

Test of the Stored Procedure

INSERT INTO Trails(trailID, parkID, visitorID, maxElevationFt, elevationGainFt, avgHikeTimeHrs, difficultyID)
VALUES('T04','P05', 2, 1617, 973, 3.1, 9);

Data Output   Explain   **Messages**   History

ERROR: DANGER WILL ROBINSON!!!   Trail Distance cannot be NULL. Please try again.
CONTEXT: PL/pgSQL function validtraildata() line 5 at RAISE
********** Error **********

ERROR: DANGER WILL ROBINSON!!!   Trail Distance cannot be NULL. Please try again.
SQL state: P0001
Context: PL/pgSQL function validtraildata() line 5 at RAISE

Security

Trail Administrators have full access to the database.

CREATE ROLE TrailAdmin;
GRANT SELECT INSERT UPDATE DELETE ON ALL TABLES IN SCHEMA PUBLIC
TO TrailAdmin;

Visitors only need access to update their hiking data.

CREATE ROLE Visitor;
GRANT SELECT INSERT UPDATE ON Visitors, People IN SCHEMA PUBLIC
TO Visitor;

Implementation Notes:

Almost all data (except population) is real. Trail names, parks and waypoints were all researched. Due to time constraints, many awesome trails are not listed.

Known Problems:

Foreign keys gives an error when I add the constraint. More information is needed for the facilities table.

Future Enhancements:

Build up the Trails, Waypoints and facilities table. Include actual GPS coordinates. Track park / trail usage by time of year.