Database System Project

Fishes database System

Phase 4 & 5

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Phase 4: DDL (Data definition language):

Defining schema and applying constraints

Fishes Schema:

```
Drop database if exists fishes_database;
Create database if not exists fishes_database;
USE fishes_database;
SET FOREIGN_KEY_CHECKS=0;
Create table fish
(
fish_id int primary key Not NULL,
fname char(40),
fweight float,
flength float,
fcolor varchar(60),
alive_age float,
species_no int,
foreign key (species_no) references location(species_no) ON DELETE SET NULL ON UPDATE CASCADE
);
Create table disease
(
        disease_id int primary key Not Null,
 d_name char(40),
   d_type char(30),
  d_cause varchar(30),
   d_time date
);

Create table food(
food_id int primary key Not Null,
food_desc varchar(80),
food_type varchar(80),
food_name char(40)
);
Create table location(
species_no int primary key Not Null,
fish_population int,
country char(20),
city char(10),
continent char(20)
);
Create table by_product(
product_num int primary key Not Null,
product_name char(40),
expiry_date date,
manufacture_date date
```

```
);
Create table family(
fish_id int,
Sci_name varchar(60),
family_name char(60),
foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE
);
create table jawless_fish(
fish_id int,
fgroup char(20),
foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE
);
create table bony_fish(
fish_id int,
fgroup char(20),
foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE
);
create table cartilaginious_fish(
fish_id int,
fgroup char(20),
cover_structure char(50),
breadth_type varchar(40),
foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE

);

create table possesses(

fish_id int,

disease_id int,

foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE,

foreign key (disease_id) references disease(disease_id) ON DELETE SET NULL ON UPDATE CASCADE

);

create table eats(

fish_id int,

food_id int,

foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE,

foreign key (food_id) references food(food_id) ON DELETE SET NULL ON UPDATE CASCADE

);

create table found_at(

fish_id int,

species_no int,

foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL,

foreign key (species_no) references location(species_no) ON DELETE SET NULL

);
```

```
create table use_in(
fish_id int,
product_num int,
foreign key (fish_id) references fish(fish_id) ON DELETE SET NULL ON UPDATE CASCADE,
foreign key (product_num) references by_product(product_num) ON DELETE SET NULL ON UPDATE CASCADE
);
```

Changing in constrains between fish and location tables:

In this database we are dealing with those fishes with their unique identity so taking the concept that each fish can exist uniquely at a single place we have insert data that tells us the current unique position of that fish. That’s why we have made such constrains that fish have one location only but the location may have many fishes.

Phase 5: DML (Data Manipulation language):

SQL queries for insertion, modification and deletion of data in the tables

Data Insertion:

Fish Table:

```
insert into fish(fish_id,fname,fcolor,flength_metre,alive_age,fweight_kg,species_no)values
```

```
(1,'White Shark','Gray',5.4,70,950,901),
        (2,'Whale Shark','bluish gray,brown black',12.65,70,19000,902),
        (3,'Stingray','Murky',2.23,25,318,903),
        (4,'TigerShark','Gray',5.5,15,635,904),
        (5,'Manta Ray','dark brown, grayish blue',7.0,20,1600,905),
        (6,'Blue Shark','Gray',2.4,12,130,906),
        (7,'Hammerhead Shark','Olive green, dark gray brown',6.1,35,170,907),
        (8,'Goblin Shark','bubblegum pink',3.84,NULL,210,908),
        (9,'Greenland Shark','slate or purplish gray, violent, brown, black',7.3,140,1400,909),
        (10,'Basking Shark','grayish brown',8.8,50,2200,910),
        (11,'Sawfish','gray greenish or golden brown',7.0,42,600,911),
        (12,'Chimaera','black, brown or gray',2,30,2.5,912),
        (13,'Blue Shark','bluish or greenish gray',6.09,20,182,913),
        (14,'Lemon Shark','yellow brown or olive gray',3.4,27,183.7,914),
        (15,'Threster Shark','metallic brown or blue',6.1,22,600,915),
        (16,'Blacktip Shark','gray, brown',2.56,12,18,916),
        (17,'Electric Ray','marbled varies',2.0,24,90,917),
        (18,'Angel Shark','brown, reddish, grey or greenish',1.98,30,34.92,918),
        (19,'Leopard Shark','dark brown spots on yellow brown skin',1.83,25,18.4,919),
        (20,'Skate        brownish','gray',2.85,50,113,920),
        (21,'Eagle Ray','white spots on black, dark gray or bluish skin',2,6.0,230,921),
        (22,'Saw Shark','black spots on yellowish brown skin',1.52,15,8.48,922),
        (23,'Sand Shark','rusty spots on brownish gray',3.2,7,200,923),
        (24,'Guitarfish','highly distinctive',2,16.0,18.4,924),
        (25,'Cat Shark','highly distinctive',1.7,75,3,925),
        (26,'Tautog','brown dark olive with white blotches',0.91,34,1.5,926),
        (27,'Lookdowns','silvery to golden, with a metallic bluish',0.4,20,2,927),
        (28,'Permits','orange or yellow patches',3,23,9.07,928),
        (29,'Gag grouper','mottled gray',1.45,16,36.5,929),
        (30,'black drum','black,  gray with blue hint'          ,1.7,58,51.3,930),
        (31,'Gray Snapper','dark brown, gray with reddish, orange spots',0.89,25,20,931),
        (32,'Blue runners','bluish or olive green, silvery gray',0.70,11,5.05,932),
        (33,'Fu manchu lionfish','black brown, red and white',0.15,15.0,NULL,933),
        (34,'Moray eels','Highly distinctive',4.57,60,13.6,934),
        (35,'Regal/hippo tang','Blue whitish with shade of violent, yellow',0.38,30,0.6,935),
        (36,'Sailfin tang','light beige with stripes turns dark brown',0.4,NULL,NULL,936),
        (37,'Mandorit dragonet','wavy lines of orange, blue and green'    ,0.07,15.0,NULL,937),
        (38,'yellow tang',       'bright yellow, brownish',0.2,30,NULL,938),
        (39,'red fairy anthias','Orange, Red, White',0.12,NULL,NULL,939),
        (40,'emperor snapper',          'rusty red',1.16,20.0,32.7,940),
        (41,'porcupine puffer','Black, Tan, Yellow',0.7,15.0,NULL,941),
        (42,'clown triggerfish','brown with white spots',0.5,8,NULL,942),
        (43,'queen triggerfish','blue, green and yellow',      0.6,13.0,5.44,943),
        (44,'black triggerfish','bright white lines on black skin',0.5,8.0,NULL,944),
        (45,'Tusk goby','Brown with black and light blue spots',0.05,8,0.006,945),
        (46,'Apareiodon agmatos','yellow with a black strip',0.08,5,0.009,946),
        (47,'Ceylonese combtail','Yellow with red fins',0.18,10,0.02,947),
        (48,'Bryconamericus agna','Azpelicueta & Almirón',0.065,15,0.007,948),
        (49,'Swallowtail seaperch','orange and light purple',0.27,6,0.02,949),
        (50,'Sailfin glass perchlet','silver and transparent.',0.07,12,0.008,950),
        (51,'Chascanopsetta megagnatha','Amaoka & Parin',0.24,15,0.03,951),
        (52,'Pacific hagfish','dark brown, gray or brownish red',0.62,5,0.17,952),
        (53,'European River lamprey','uniform dark grey',0.4,10,0.15,953),
        (54,'European brook lamprey','dark blue or greenish',0.6,9,0.16,954);
```

Fish Table:

```
insert into family(fish_id,Sci_name,family_name)values
(1,'Carcharodon carcharias','Lamnidae'),
(2,'Rhincodon typus','Rhincodontidae'),
(3,'Myliobatoidei','Chondrichthyes'),
(4,'Galeocerdo cuvier','Requiem shark'),
(5,'Manta birostris','Eagle ray'),
(6,'Carcharhinus leucas','Requiem shark'),
(7,'Sphyrnidae','Sphyrna mokarran'),
(8,'Mitsukurina owstoni','Mitsukurinidae'),
(9,'Somniosus microcephalus','Somniosidae'),
(10,'Cetorhinus maximus','Cetorhinidae'),
(11,'Pristidae','Pristidae'),
(12,'Chimaeriformes','genus'),
(13,'Prionace glauca','Requiem shark'),
(14,'Negaprion acutidens','Requiem shark'),
(15,'Alopias','Alopiidae'),
(16,'Carcharhinus limbatus','Requiem shark'),
(17,'Torpediniformes','Torpedinidae'),
(18,'Squatina','Squatinidae'),
(19,'Triakis semifasciata','Houndshark'),
(20,'Rajidae','Rajidae'),
(21,'Myliobatidae','Eagle ray'),
(22,'Pristiophoridae','Sand Shark'),
(23,'Odontaspididae','Odontaspididae'),
(24,'Rhinobatidae','Rhynchobatus djiddensis'),
(25,'Scyliorhinidae','Scyliorhinidae'),
(26,'Tautoga onitis','Labridae'),
(27,'Selene vomer','Carangidae'),
(28,'Trachinotus falcatus'      ,'Trachinotus falcatus'),
(29,'Mycteroperca microlepis','Serranidae'),
(30,'Pogonias cromis','Sciaenidae'),
(31,'Lutjanus griseus','Lutjanus griseus'),
(32,'Caranx crysos','Carangidae'),
(33,'Dendrochirus biocellatus','Scorpaenidae'),
(34,'Muraenidae','Muraenidae'),
(35,'Paracanthurus','Paracanthurus'),
(36,'Zebrasoma veliferum','Acanthuridae'),
(37,'Synchiropus splendidus','Dragonet'),
(38,'Zebrasoma flavescens','Acanthuridae'),
(39,'Anthias','Pseudanthias huchtii'),
(40,'Lutjanus sebae','Snapper'),
(41,'Diodontidae','Diodontidae'),
(42,'Balistoides conspicillum','Balistoides conspicillum'),
(43,'Balistes vetula','Triggerfish'),
(44,'Melichthys niger','Triggerfish'),
(45,'Amoya signata','Gobiidae'),
(46,'Apareiodon agmatos','Parodontidae'),
(47,'Belontia signata','Osphronemidae'),
(48,'Bryconamericus agna Azpelicueta & Almirón','Characidae'),
(49,'Anthias anthias','Serranidae'),
(50,'Ambassis agrammus Günther','Ambassidae'),
(51,'Chascanopsetta megagnatha Amaoka & Parin','Bothidae'),
(52,'Eptatretus stoutii','Myxinidae'),
(53,'Lampetra fluviatilis','Petromyzontidae'),
(54,'Lampetra planeri','Petromyzontidae');
```

By -Product Table:

```
 insert into by_product(product_num,product_name,manufacture_date,expiry_date)
 values

 (501,'Shark liver oil','2016/02/20','2018/02/20'),
        (502,'anesthetic','2014/8/15','2017/9/18'),
        (503,'Leather hide','2015/5/25','2018/6/25'),
        (505,'Shark liver oil','2018/10/29','2020/11/30'),

        (510,'Shark liver oil','2013/3/10','2015/4/12'),
        (511,'Shark liver oil','2014/9/30','2016/9/29'),
        (513,'Shark liver oil,Leather','2018/4/25','2020/6/29'),
        (515,'Shark liver oil,Leather','2017/8/16','2019/7/20'),
        (516,'liver oil','2018/4/5','2020/8/10'),
        (517,'treatment of headaches','2012/8/15','2013/9/7'),

        (519,'medicine for gout','2014/1/30','2017/2/22'),
        (521,'Oil','2018/12/20','2020/11/25'),
        (523,'Shark liver oil','2016/5/25','2018/10/20'),
        (524,NULL,NULL,NULL),
        (525,Null,NULL,NULL),
        (526,NULL,NULL,NULL),
        (527,'food','2015/5/20','2016/1/31'),
        (528,'food','2017/6/14','2018/9/25'),
        (529,'food','2018/3/18','2019/5/19'),
        (530,'food','2015/9/9','2016/1/31'),
        (531,'food','2017/1/4','2018/2/21'),
        (532,'food','2016/8/12','2017/9/23'),
        (533,'Acquarium','2014/6/28','2017/7/22'),
        (534,'Acquarium','2017/11/17','2020/9/7'),
        (535,'Acquarium','2015/5/29','2018/9/25'),
        (536,'Acquarium','2016/2/6','2019/3/14'),
        (537,'Acquarium','2014/5/17','2017/10/31'),
        (538,'Acquarium','2018-4-19','2021/12/29'),
        (539,'Acquarium','2014/1/25','2017/9/28'),
        (540,'Acquarium','2018/3/11','2021/9/15'),
        (541,Null,NULL,NULL),
        (542,'Acquarium','2017/9/18','2020/1/18'),
        (543,'Acquarium','2014/8/21','2017/9/26'),
        (544,'Acquarium','2018/12/31','2021/9/29');
```

Use-In Table:

```
 insert into use_in(fish_id,product_num)values
(1,501),(2,502),(3,503),(5,505),(10,510),
(11,511),(13,513),(15,515),(16,516),(17,517),(19,519),
(21,521),(23,523),(27,527),(28,528),(29,529),(30,530),(31,531),(32,532),
(33,533),(34,534),(35,535),(36,536),(37,537),(38,538),(39,539),
(40,540),(42,542),
(43,543),(44,544);
```

Cartilaginious_fish Table:

```
insert into cartilaginious_fish(fish_id,breadth_type,cover_structure,fgroup)values
        (1,'gills','V-shaped scales','Carcharodon'),
        (2,'gills','V-shaped scales','Rhincodon'),
        (3,'gills','tiny placoid scales','Myliobatoidei'),
        (4,'gills','V-shaped scales','Galeocerdo'),
        (5,'gills','conical dermal denticles','Manta'),
        (6,'gills','Dermal denticles','Carcharhinus'),
        (7,'gills','dermal denticles with ridges','Sphyma'),
        (8,'gills','dermal denticles','Mitsukurina'),
        (9,'gills','dermal denticles','Somniosus'),
        (10,'gills','placoid scales','Cetorhinus'),
        (11,'gills','sandpaper like decimal denticles','Pristis'),
        (12,'gills','placoid scales','Chimaeriformes'),
        (13,'gills','dermal denticles','Prionace'),
        (14,'gills','dermal denticles','Negaprion'),
        (15,'gills','dermal denticles','Thresher shark'),
        (16,'gills','dermal denticles','Carcharhinus'),
        (17, 'gills','soft loose skin with no dermal denticles or thorn','Chondrichthyes'),
        (18,'gills','sandpaper-like','Squatina'),
        (19,'gills','triangular flaps','Triakis'),
        (20,'gills','dermal denticles','Rajidae'),
        (21,'gills','thornlike scales','Aetobatus'),
        (22,'gills','placoid scales','Pristiophorus'),
        (23,'gills','sandpaper-like','Lamniformes'),
        (24,'gills','dermal denticles','Rhinopristiformes'),
        (25,'gills','placoid scales','Scyliorhinus');
```

Bony Fish Table:

```
insert into bony_fish(fish_id,fgroup)values
(26,'Tautoga'),
        (27,'Selene'),
        (28,'Pompano'),
        (29,'Mycteroperca'),
        (30,'Pogonias'),
        (31,'Lutjanus'),
        (32,'Caranx'),
        (33,'Pterois'),
        (34,'Muraenidae'),
        (35,'Paracanthurus'),
        (36,'Zebrasoma'),
        (37,'Synchiropus'),
        (38,'Zebrasoma'),
        (39,'Pseudanthias'),
        (40,'Lutjanus'),
        (41,'Diodontidae'),
        (42,'Balistoides'),
        (43,'Balistes'),
        (44,'Melichthys');
```

Jawless Fish Table:

```
 insert into jawless_fish(fish_id,fgroup)values
(45,'Actinopterygii'),
     (46,'Actinopterygii'),
     (47,'Actinopterygii'),
     (48,'Actinopterygii'),
     (49,'Actinopterygii'),
     (50,'Actinopterygii'),
     (51,'Osteichthyes'),
     (52,'Myxini'),
     (53,'Cephalaspidomorphi'),
     (54,'Cephalaspidomorphi');
```

Food Table:

```
insert into food(food_id,food_desc,food_type,food_name)values

        (101,'fish, rays,other sharks,pinnipeds, otters,sea turtles','fishes','fish'),
        (102,'plankton,red crab larvae,small nektonic life','microrganisms','plankton'),
        (103,'sea worms,shrimp,clams,soft shelled animals','molluscs','sea worms'),
        (104,'turtles,birds,other sharks,fish','animals','turtles'),
        (105,'plankton, small fish,crustaceans.','microrganisms','plankton'),
        (106,'Squid,pelagic octopuses, lobster, shrimp,fishes, mammalian carrion,sea
birds','birds','sea birds'),
        (107,'fish, squid, octopus, crustaceans,Stingrays','fishes','octopus'),
        (108,'fish,squid,crustaceans','molluscs','squid'),
        (109,'fish,seals','animals','seals'),
        (110,'plankton','microrganisms','plankton'),
        (111,'small fishes','fishes','fish'),
        (112,'clams, fish,crustaceans','molluscs','crustaceans'),
        (113,'lobster, shrimp, crab,fishes, mammalian carrion,sea birds.','molluscs','lobster'),
        (114,'mullet, jacks, croakers,fish,crabs','molluscs','jacks'),
        (115,'schooling fish','fishes','fish'),
        (116,'jacks, snook, porgies, grunts, croakers,fish','molluscs','grunts'),
        (117,'fishes, worms, and crustaceans.','insects','worms'),
        (118,'fish, crustaceans','molluscs','crustaceans'),
        (119,'clams, spoon worms, crabs, shrimp','insects','spoon worms'),
        (120,'shrimps, crabs, oysters, clams','animals','crabs'),
        (121,'bivalves, crabs, whelks,,crustaceans,hermit crabs, shrimp, octopuses,fish.','molluscs','shrimp'),
        (122,'fish, shrimp, crustaceans,squid.','molluscs','squid'),
        (123,'fish,crustaceans and squid','molluscs','squid'),
        (124,'fishes,shrimps,crabs','insects','shrimps'),
        (125,'crustaceans,fish','fishes','fish'),
        (126,'crabs, clams, shrimp, mussels, sandworms,lobsters','worms','sandworms'),
        (127,'shrimps, squids,worms,small fishes.',  'insects','squids'),
        (128,'crabs, shrimp, and smaller fish',          'fishes','fish'),
        (129,'squid, octopus,crabs','molluscs','octopus'),
        (130,'crabs,occtupus','molluscs','occtupus'),
        (131,'small fishes, shrimps, crabs,worms','insects','worms'),
        (132,'shrimp, prawns, lobsters, jellyfish','molluscs','jellyfish'),
        (133,'shrimp,fish,crustacean flesh','insects','shrimp'),
        (134,'fish, octopuses, squid, cuttlefish, crabs','fish','cuttlefish'),
        (135,'tiny crustaceans and worms.','insects','worms'),
        (136,'seaweed and algae,small fish','microrganisms','algae'),
        (137,'Phytoplankton','microrganisms','Phytoplankton'),
        (138,'seaweed and algae,small fish','microrganisms','seaweed'),
        (139,'shrimps','insects','shrimps'),
        (140,'crustaceans ,meat','insects','crustaceans'),
        (141,'squid,krill,clams,hard shelled shrimp','insects','shrimp'),
        (142,'squid,krill,clams,small fish,hard shelled shrimp','fish','fish'),
        (143,'squid,krill,clams,small fish,hard shelled shrimp','insects','krill'),
        (144,'squid,krill,clams,small fish,hard shelled shrimp','insects','krill');
```

Eats Table:

```
insert into eats(fish_id,food_id)
values

(1,101),(2,102),(3,103),(4,104),(5,105),(6,106),
(7,107),(8,108),(9,109),(10,110),
(11,111),(12,112),(13,113),(14,114),(15,115),
(16,116),(17,117),(18,118),
(50,119),(20,120),(21,121),(22,122),
(23,123),(45,124),
(25,125),(26,126),(47,127),(28,128),(29,129),(30,130),
(31,131),(32,132),(33,133),(34,134),
(35,135),(36,136),(37,137),(38,138),(39,139),
(40,140),(41,141),(42,142),(43,143),(51,144);
```

Disease Table:

```
insert into disease(disease_id,d_name,d_type,d_cause,d_time)
values

(301,'jaw_tumor','cancer','industry_pollution','2010/03/20'),
(302,'skin_disorder','skin_disease','industry_pollution','2016/04/25'),
(303,'intestinal_mucosa','intestinal','worm','2011/02/10'),
(304,'skin_disorder','skin_disease','industry_pollution','2013/03/29'),
(305,'blotches','virus','parasite','2016/04/02'),
(306,'skin_disorder','skin_disease','industry_pollution','2016/02/21'),
(307,'skin_disorder','skin_disease','industry_pollution','2016/08/20'),
(308,'intestinal_mucosa','intestinal','worm','2016/07/19'),
(309,'skin_disorder','skin_disease','industry_pollution','2015/02/20'),
(310,'skin_disorder','skin_disease','industry_pollution','2015/03/12'),
(311,'jaw_tumor','cancer','industry_pollution','2017/01/31'),
(312,'intestinal_mucosa','intestinal','worm','2017/08/8'),
(313,'blotches','virus','parasite','2017/05/6'),
(314,'skin_disorder','skin_disease','industry_pollution','2014/08/9'),
(315,'jaw_tumor','cancer','industry_pollution','2017/02/20'),
(316,'blotches','virus','parasite','2017/09/22'),
(317,'skin_disorder','skin_disease','industry_pollution','2016/05/5'),
(318,'intestinal_mucosa','intestinal','worm','2017/05/25'),
(319,'blotches','virus','parasite','2017/09/22');
```

Possesses Table:

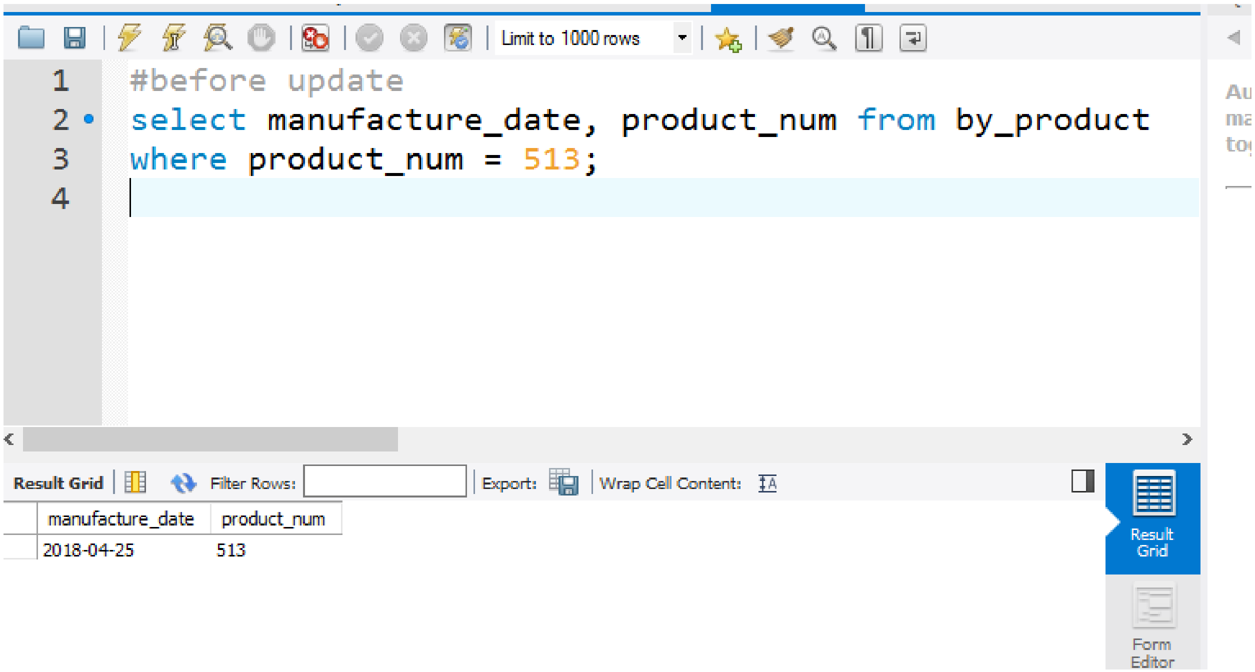
```
insert into possesses(fish_id,disease_id)

values

(1,301),(2,302),(3,303),(4,304),

(30,305),(29,306),(7,307),

(8,308),(39,309),(10,310),(11,311),(19,312),

(20,313),(14,314),(15,315),

(23,316),(17,317),(48,318),(50,319);
```

Location Table:

```
INSERT INTO location (species_no,country,continent, city, fish_population)


VALUES


 (901, 'India', 'Asia', 'bombay', 2000),

 (902, 'India', 'Asia', 'bombay', 1500),

 (903, 'India', 'Asia', 'aagra', 1000),

 (904, 'India', 'Asia', 'dehli', 1000),

 (905, 'pakistan', 'Asia', 'karachi', 800),

 (906, 'pakistan', 'Asia', 'karachi', 500),

 (907, 'pakistan', 'Asia', 'lahore', 1000),

 (908, 'Africa', 'Africa', 'cape town', 1500),

 (909, 'Africa', 'Africa', 'Pretoria', 2000),

 (910, 'Africa', 'Africa', 'Durban', 600),


 (911, 'India', 'Asia', 'bombay', 400),

 (912, 'India', 'Asia', 'bombay', 800),

 (913, 'India', 'Asia', 'aagra',  1200),
 (914, 'India', 'Asia', 'dehli',  800),

 (915, 'pakistan', 'Asia', 'karachi', 800),

 (916, 'pakistan', 'Asia', 'karachi', 500),

 (917, 'pakistan', 'Asia', 'lahore', 1000),

 (918, 'Africa', 'Africa', 'cape town', 1600),

 (919, 'Africa', 'Africa', 'Pretoria', 1700),

 (920, 'Africa', 'Africa', 'Durban', 900),


 (921, 'India', 'Asia', 'bombay', 60400),

 (922, 'India', 'Asia', 'banglore', 600),

 (923, 'India', 'Asia', 'rajistan',  300),

 (924, 'India', 'Asia', 'dehli', 150),

 (925, 'pakistan', 'Asia', 'karachi',  400),

 (926, 'pakistan', 'Asia', 'hyderabad', 300),

 (927, 'pakistan', 'Asia', 'larkana', 250),

 (928, 'Pakistan', 'Asia', 'islamabad', 1600),

 (929, 'Africa', 'Africa', 'capetown', 1700),

 (930, 'Africa', 'Africa', 'Durban',900),


 (931, 'India', 'Asia', 'bombay', 500),

 (932, 'India', 'Asia', 'rajistan', 800),

 (933, 'India', 'Asia', 'banglore', 200),

 (934, 'India', 'Asia', 'dehli', 800),

 (935, 'pakistan', 'Asia', 'karachi', 800),

 (936, 'pakistan', 'Asia', 'larkana', 500),

 (937, 'pakistan', 'Asia', 'lahore', 1000),

 (938, 'Africa', 'Africa', 'cape town', 1600),
  (939, 'Africa', 'Africa', 'Pretoria', 1700),
  (940, 'Africa', 'Africa', 'Durban', 900),



  (941, 'Greece', 'europe', 'patras', 590),
  (942, 'Greece', 'europe', 'Thebes', 530),
  (943, 'Greece', 'europe', 'Thebes', 300),
  (944, 'Greece', 'europe', 'patras', 540),
  (945, 'Greece', 'europe', 'patras', 300),
  (946, 'Greece', 'europe', 'Corinth', 50),
  (947, 'Greece', 'europe', 'patras', 200),
  (948, 'Germany', 'europe', 'Munich', 160),
  (949, 'Germany', 'europe', 'Berlin', 179),
  (950, 'Germany', 'europe', 'Munich', 430),
 (951, 'Germany', 'europe', 'Berlin', 220),
 (952, 'Germany', 'europe', 'Munich', 900),
 (953, 'Germany', 'europe', 'Berlin', 980),
 (954, 'Germany', 'europe', 'Berlin', 900);
```

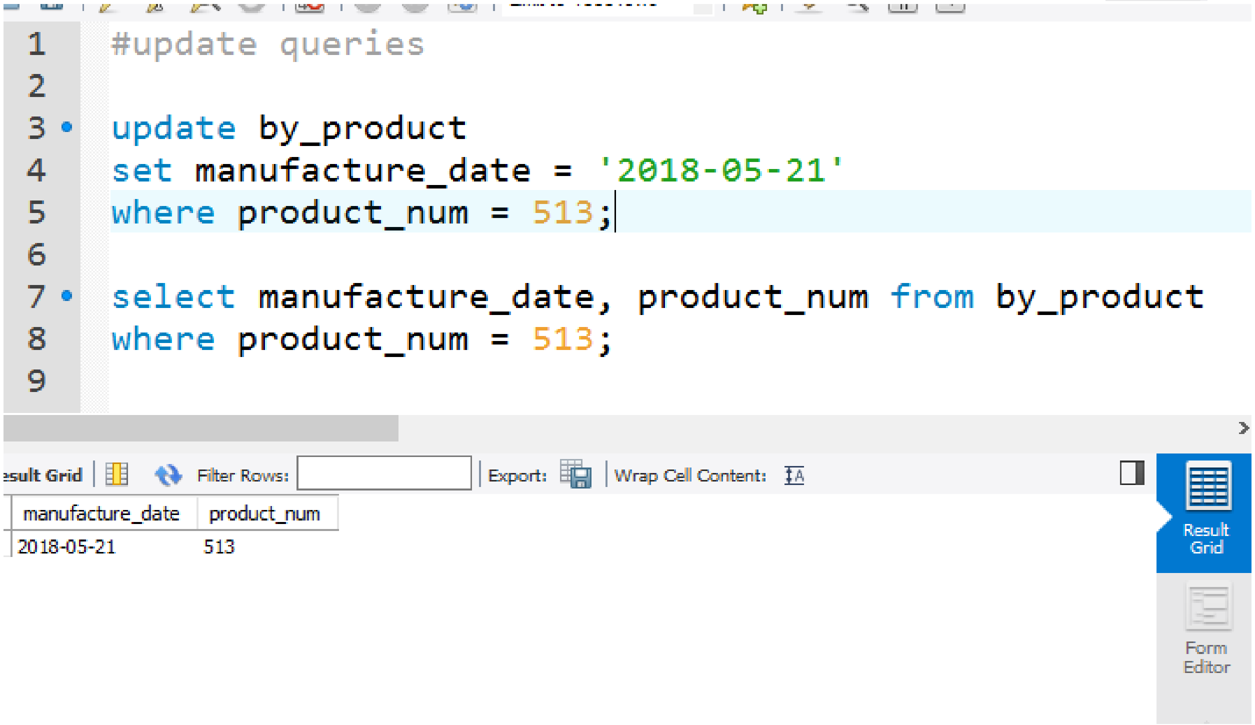
SQL Queries:

Update:



```
#before update
select manufacture_date, product_num from by_product
where product_num = 513;
```

manufacture_date	product_num
2018-04-25	513

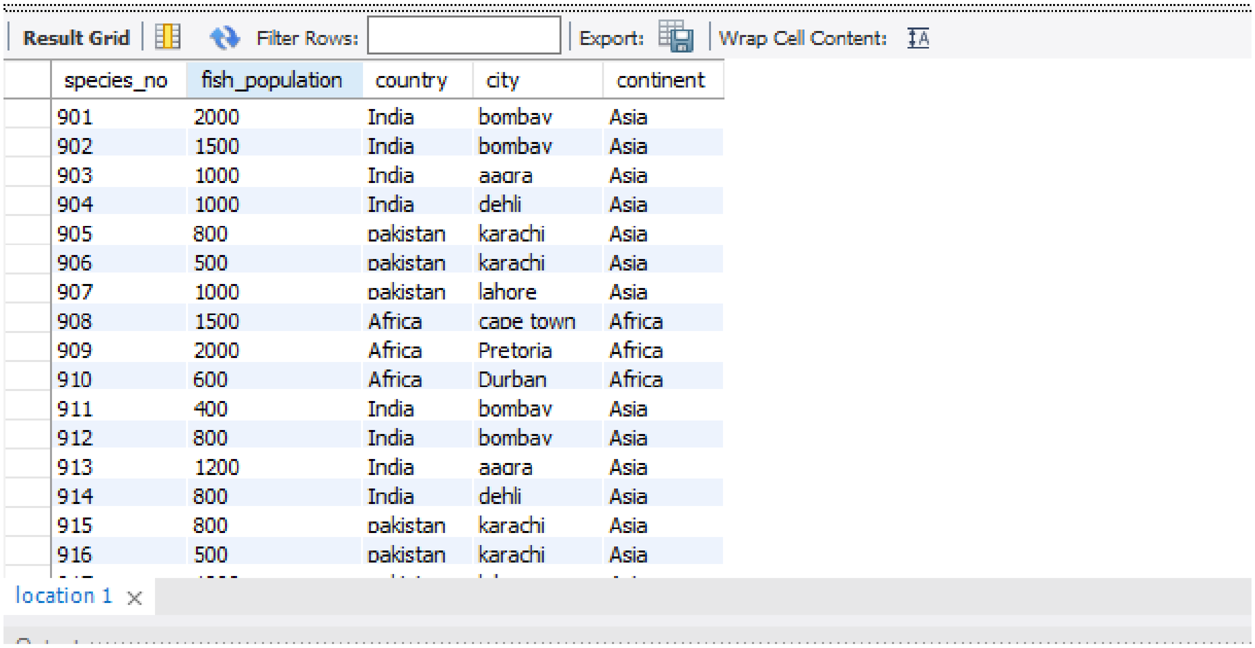


```
#update queries

update by_product
set manufacture_date = '2018-05-21'
where product_num = 513;

select manufacture_date, product_num from by_product
where product_num = 513;
```

manufacture_date	product_num
2018-05-21	513

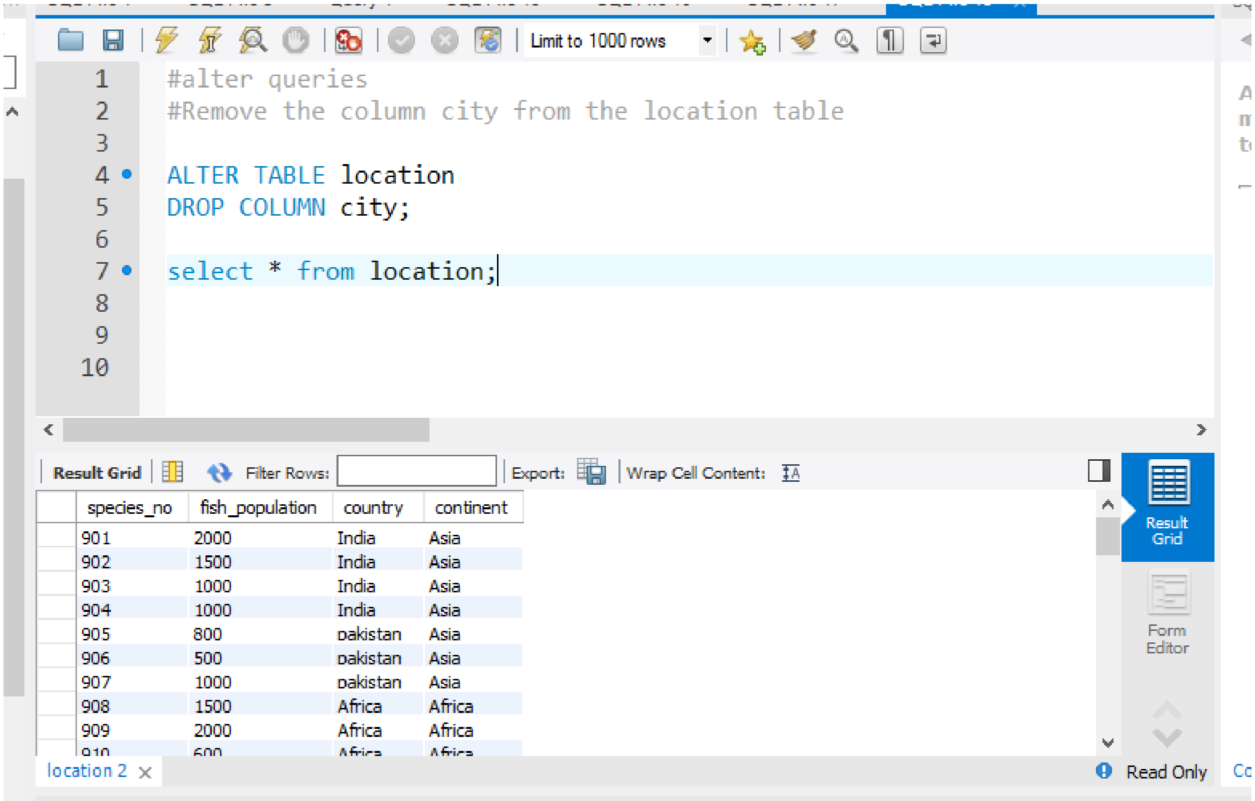
Alter command:

Alter command Before:



species_no	fish_population	country	city	continent
901	2000	India	bombav	Asia
902	1500	India	bombav	Asia
903	1000	India	aagra	Asia
904	1000	India	dehli	Asia
905	800	pakistan	karachi	Asia
906	500	pakistan	karachi	Asia
907	1000	pakistan	lahore	Asia
908	1500	Africa	cape town	Africa
909	2000	Africa	Pretoria	Africa
910	600	Africa	Durban	Africa
911	400	India	bombav	Asia
912	800	India	bombav	Asia
913	1200	India	aagra	Asia
914	800	India	dehli	Asia
915	800	pakistan	karachi	Asia
916	500	pakistan	karachi	Asia

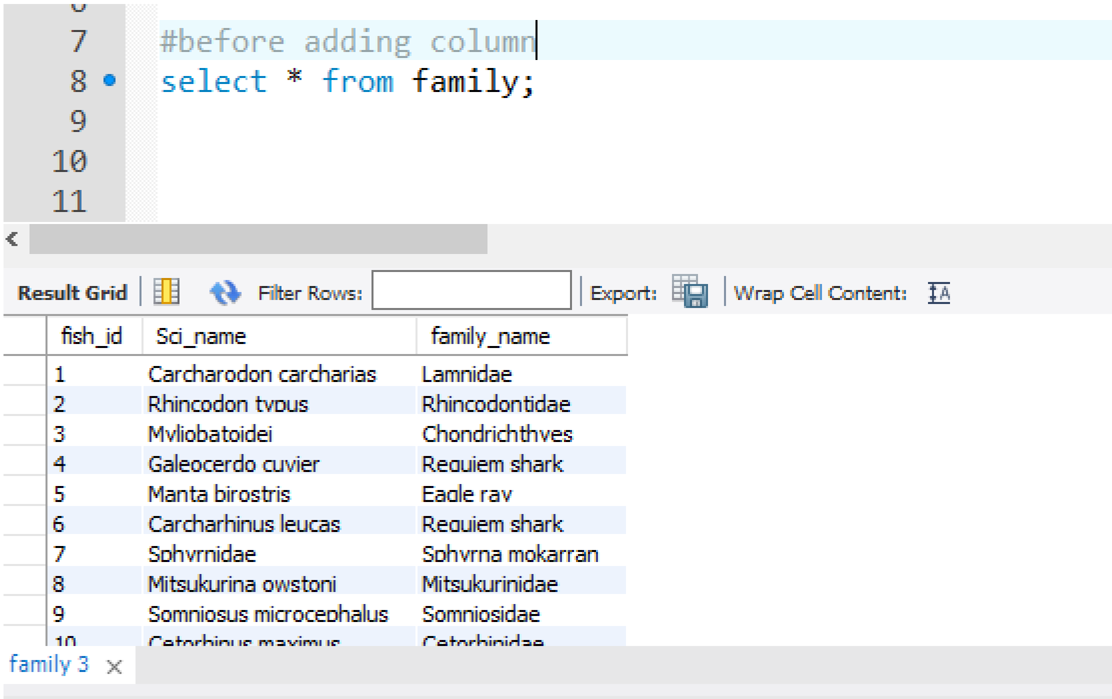
After Alter:



```sql
#alter queries
#Remove the column city from the location table

ALTER TABLE location
DROP COLUMN city;

select * from location;
```

species_no	fish_population	country	continent
901	2000	India	Asia
902	1500	India	Asia
903	1000	India	Asia
904	1000	India	Asia
905	800	pakistan	Asia
906	500	pakistan	Asia
907	1000	pakistan	Asia
908	1500	Africa	Africa
909	2000	Africa	Africa
910	600	Africa	Africa

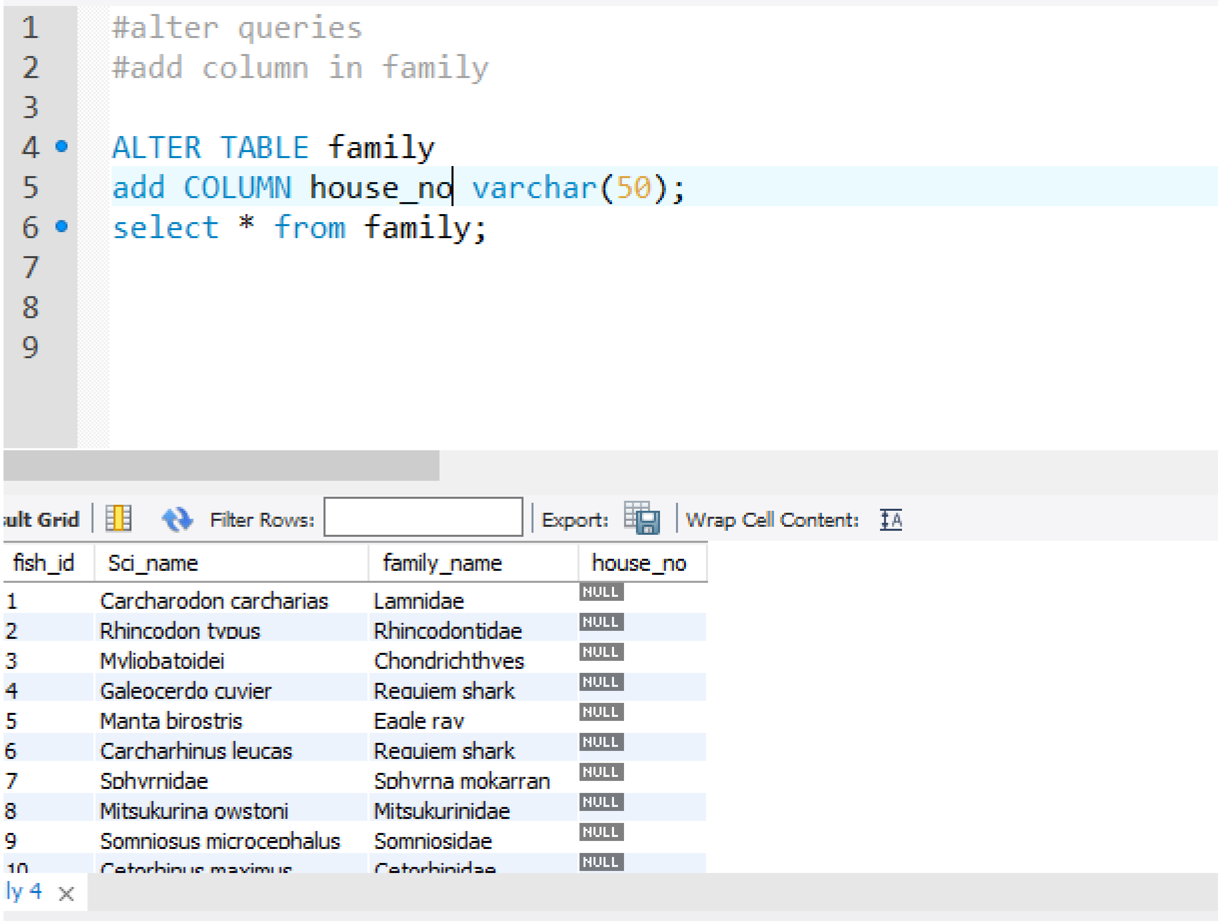
Before Alter 2nd command:



```sql
#before adding column
select * from family;
```

fish_id	Sci_name	family_name
1	Carcharodon carcharias	Lamnidae
2	Rhincodon typus	Rhincodontidae
3	Myliobatoidei	Chondrichthyes
4	Galeocerdo cuvier	Requiem shark
5	Manta birostris	Eagle ray
6	Carcharhinus leucas	Requiem shark
7	Sphyrnidae	Sphyrna mokarran
8	Mitsukurina owstoni	Mitsukurinidae
9	Somniosus microcephalus	Somniosidae
10	Cetorhinus maximus	Cetorhinidae

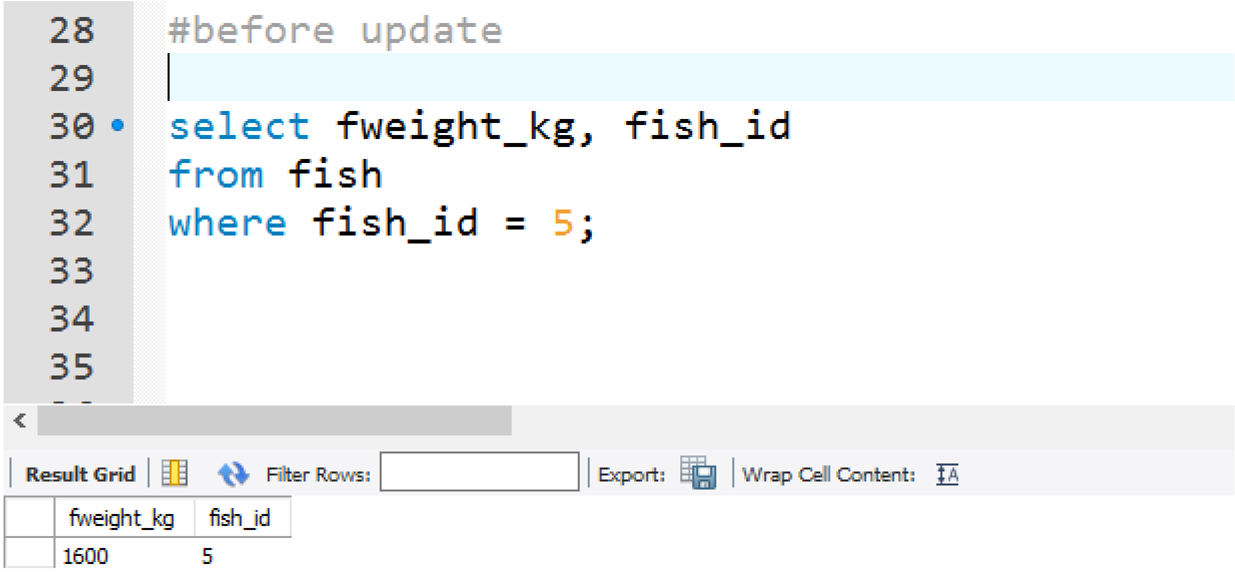
After alter:



```
#alter queries
#add column in family

ALTER TABLE family
add COLUMN house_no varchar(50);
select * from family;
```

fish_id	Sci_name	family_name	house_no
1	Carcharodon carcharias	Lamnidae	NULL
2	Rhincodon typus	Rhincodontidae	NULL
3	Myliobatoidei	Chondrichthyes	NULL
4	Galeocerdo cuvier	Requiem shark	NULL
5	Manta birostris	Eagle ray	NULL
6	Carcharhinus leucas	Requiem shark	NULL
7	Sphyrnidae	Sphyrna mokarran	NULL
8	Mitsukurina owstoni	Mitsukurinidae	NULL
9	Somniosus microcephalus	Somniosidae	NULL
10	Cetorhinus maximus	Cetorhinidae	NULL

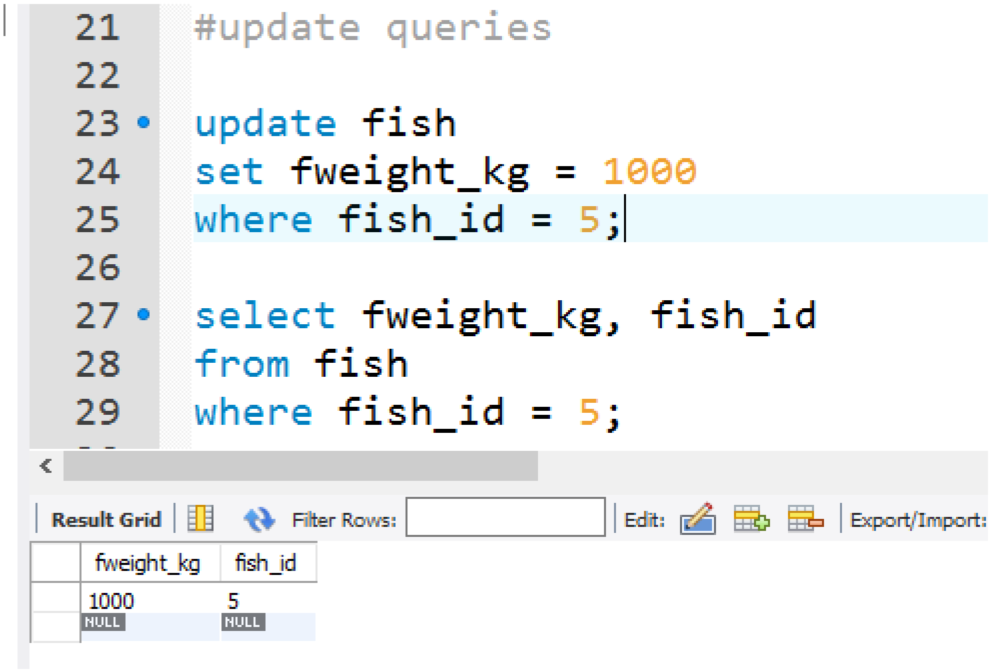
Before Update:



```sql
#before update

select fweight_kg, fish_id
from fish
where fish_id = 5;
```

fweight_kg	fish_id
1600	5

After Update:

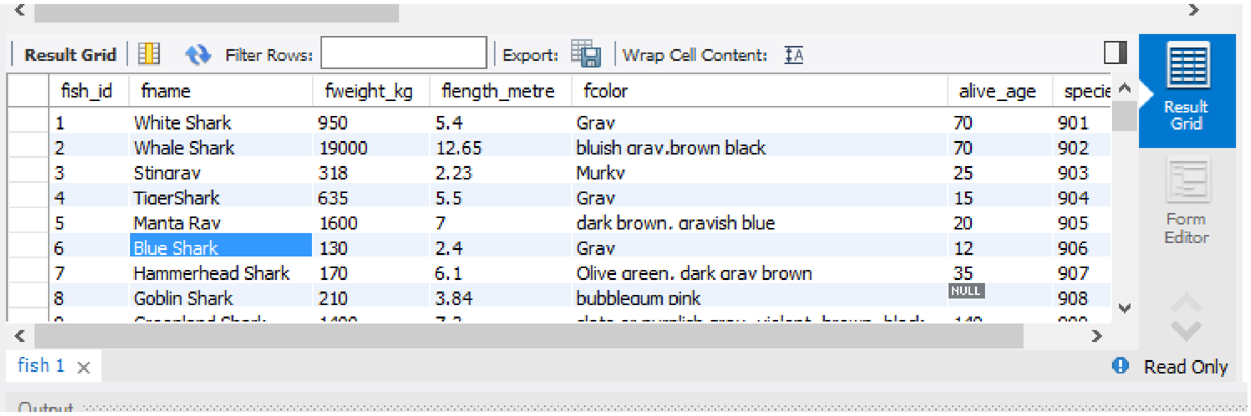


```sql
#update queries

update fish
set fweight_kg = 1000
where fish_id = 5;

select fweight_kg, fish_id
from fish
where fish_id = 5;
```

fweight_kg	fish_id
1000	5
NULL	NULL

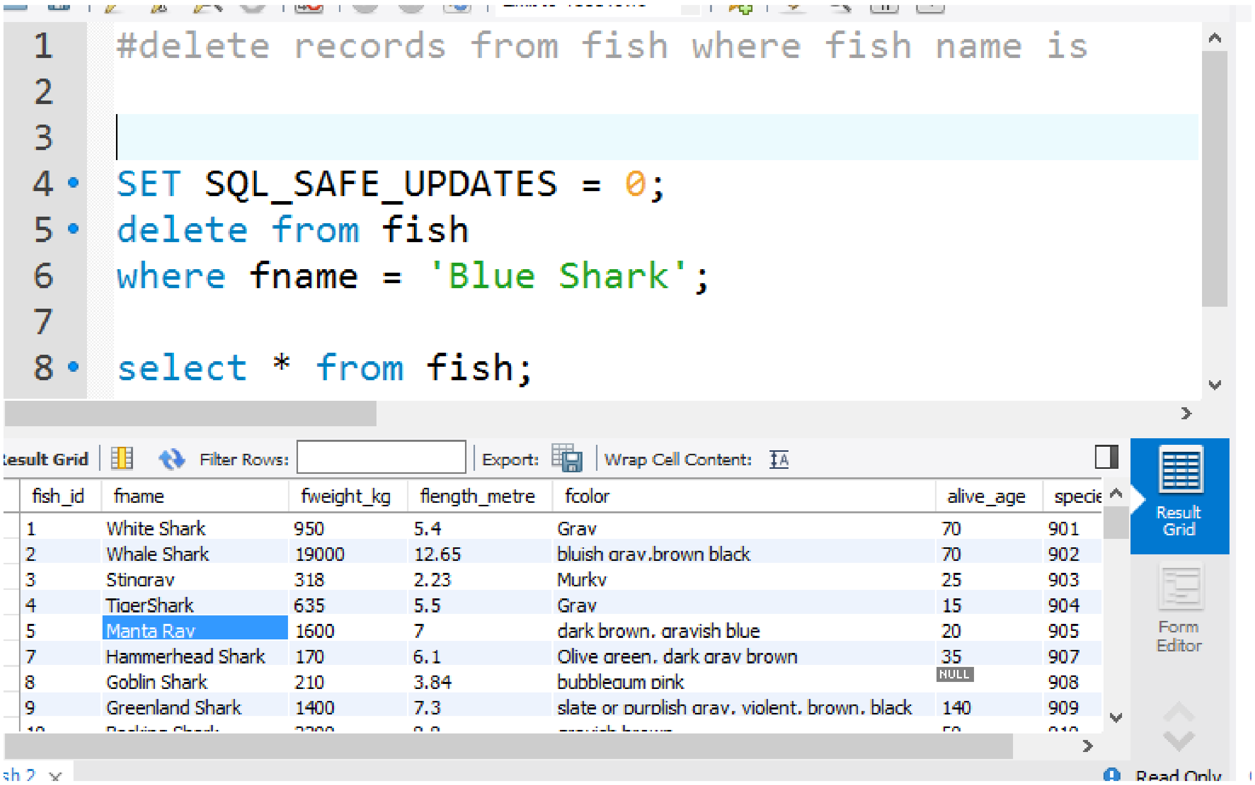
Delete Record:

Before:



fish_id	fname	fweight_kg	flength_metre	fcolor	alive_age	specie
1	White Shark	950	5.4	Gray	70	901
2	Whale Shark	19000	12.65	bluish gray,brown black	70	902
3	Stingray	318	2.23	Murky	25	903
4	TigerShark	635	5.5	Gray	15	904
5	Manta Ray	1600	7	dark brown, grayish blue	20	905
6	Blue Shark	130	2.4	Gray	12	906
7	Hammerhead Shark	170	6.1	Olive green, dark gray brown	35	907
8	Goblin Shark	210	3.84	bubblegum pink	NULL	908

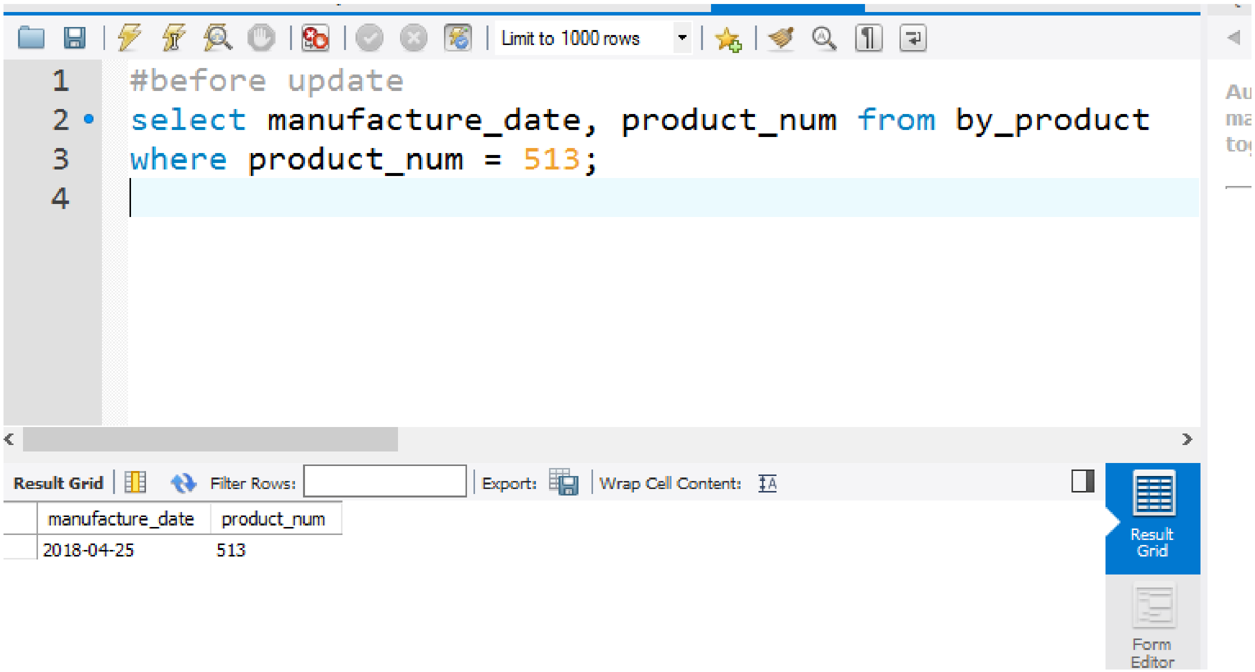
After delete record:



```
#delete records from fish where fish name is


SET SQL_SAFE_UPDATES = 0;
delete from fish
where fname = 'Blue Shark';

select * from fish;
```

fish_id	fname	fweight_kg	flength_metre	fcolor	alive_age	specie
1	White Shark	950	5.4	Gray	70	901
2	Whale Shark	19000	12.65	bluish gray,brown black	70	902
3	Stingray	318	2.23	Murky	25	903
4	TigerShark	635	5.5	Gray	15	904
5	Manta Ray	1600	7	dark brown, grayish blue	20	905
7	Hammerhead Shark	170	6.1	Olive green, dark gray brown	35	907
8	Goblin Shark	210	3.84	bubblegum pink	NULL	908
9	Greenland Shark	1400	7.3	slate or purplish gray, violent, brown, black	140	909

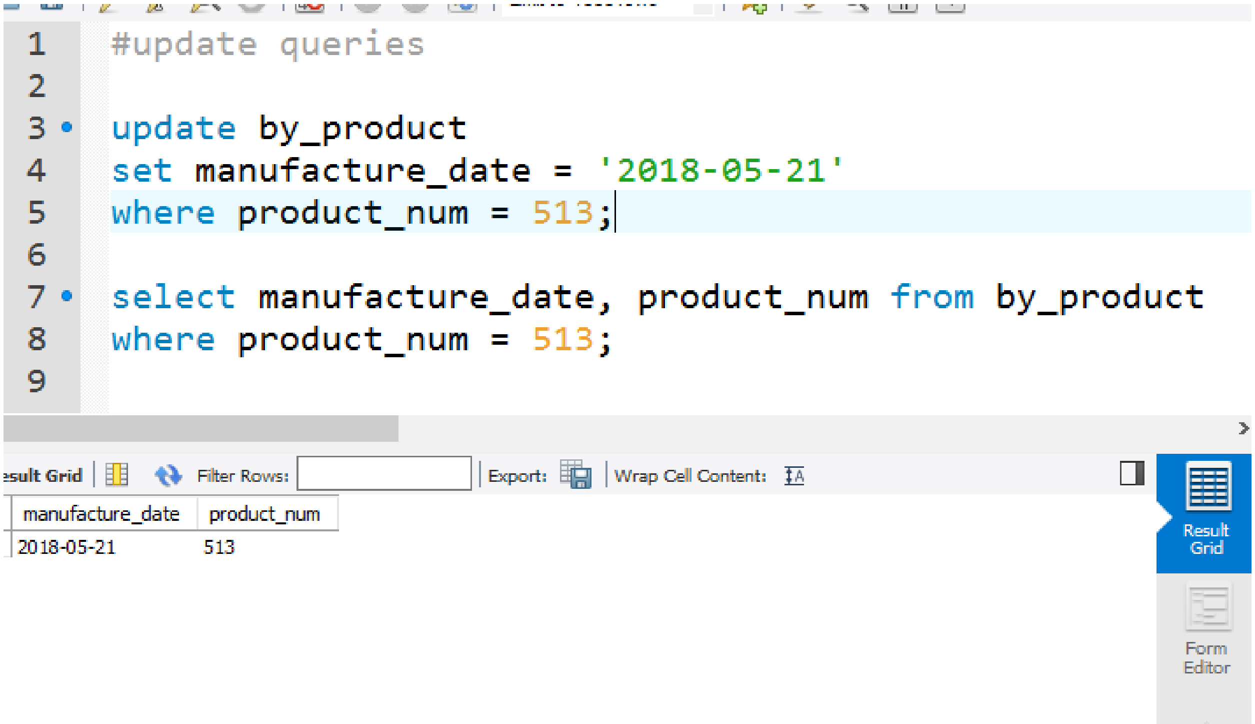
Before Update 2nd command:



```
#before update
select manufacture_date, product_num from by_product
where product_num = 513;
```

manufacture_date	product_num
2018-04-25	513

After Update:

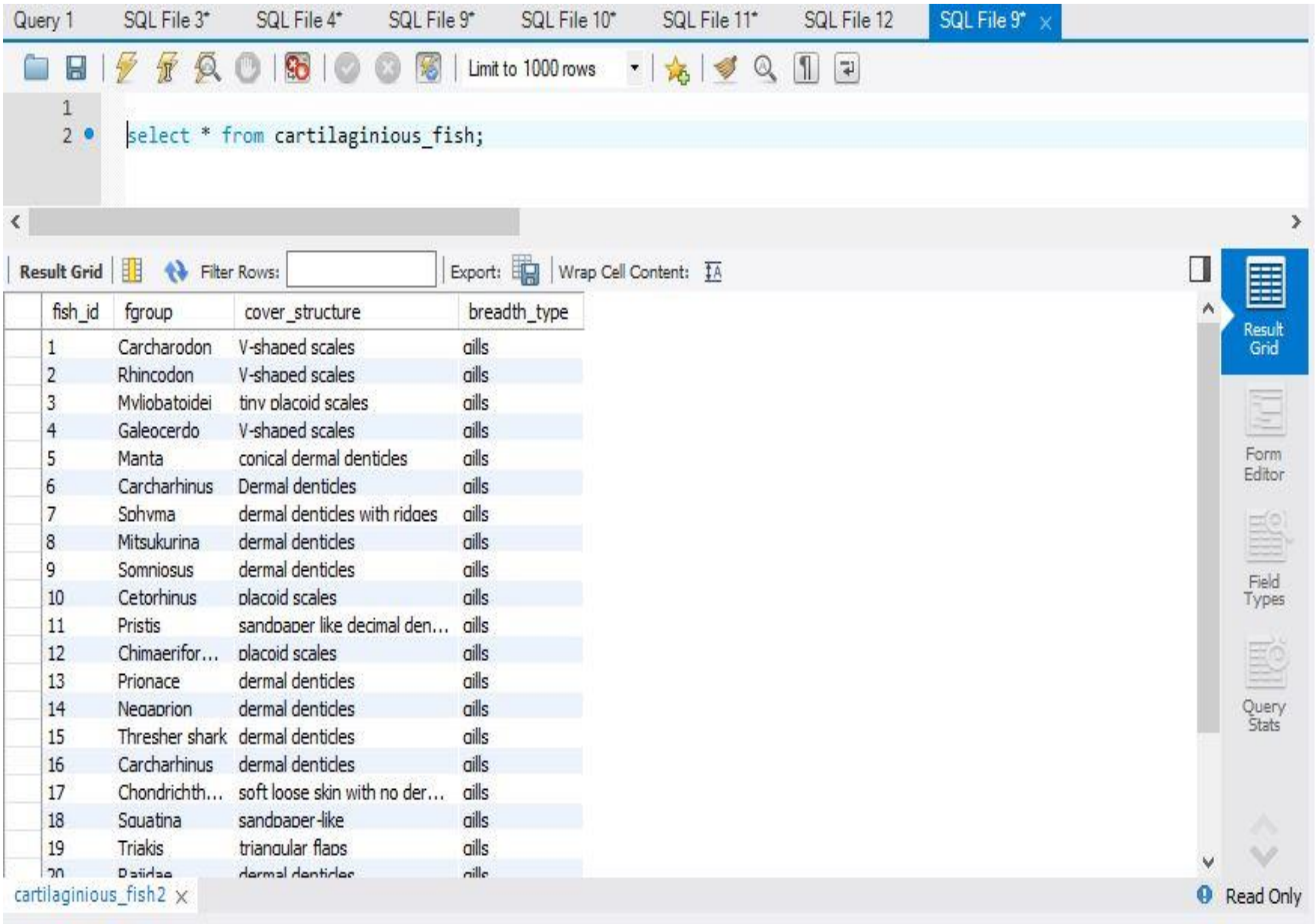


```
#update queries

update by_product
set manufacture_date = '2018-05-21'
where product_num = 513;

select manufacture_date, product_num from by_product
where product_num = 513;
```

manufacture_date	product_num
2018-05-21	513

Simple Queries:

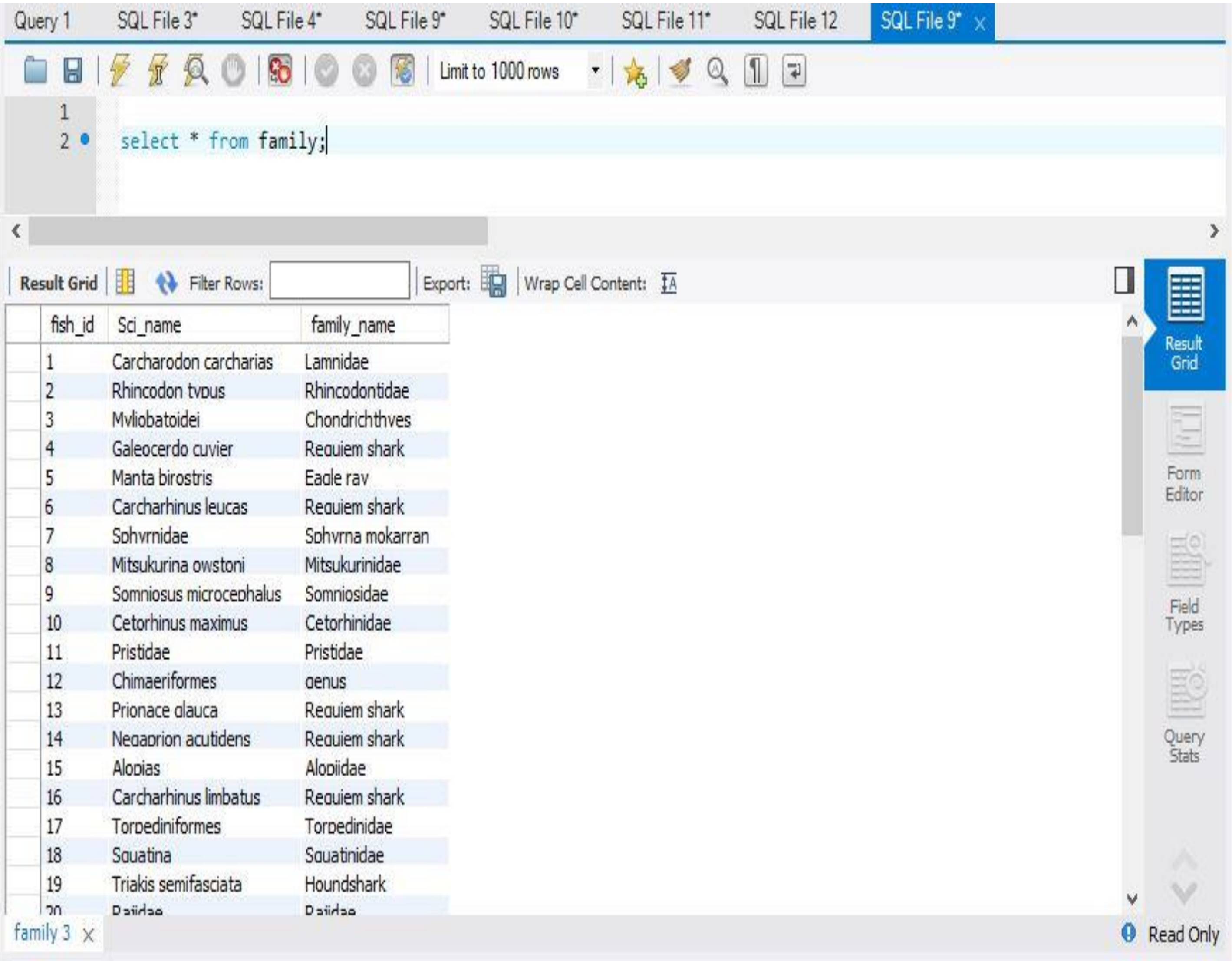
Retrieve all data from cartilaginous fish table



```sql
select * from cartilaginious_fish;
```

fish_id	fgroup	cover_structure	breadth_type
1	Carcharodon	V-shaped scales	gills
2	Rhincodon	V-shaped scales	gills
3	Myliobatoidei	tiny placoid scales	gills
4	Galeocerdo	V-shaped scales	gills
5	Manta	conical dermal denticles	gills
6	Carcharhinus	Dermal denticles	gills
7	Sphyrna	dermal denticles with ridges	gills
8	Mitsukurina	dermal denticles	gills
9	Somniosus	dermal denticles	gills
10	Cetorhinus	placoid scales	gills
11	Pristis	sandpaper like decimal den...	gills
12	Chimaerifor...	placoid scales	gills
13	Prionace	dermal denticles	gills
14	Negaprion	dermal denticles	gills
15	Thresher shark	dermal denticles	gills
16	Carcharhinus	dermal denticles	gills
17	Chondrichth...	soft loose skin with no der...	gills
18	Squatina	sandpaper-like	gills
19	Triakis	triangular flaps	gills
20	Rajidae	dermal denticles	gills

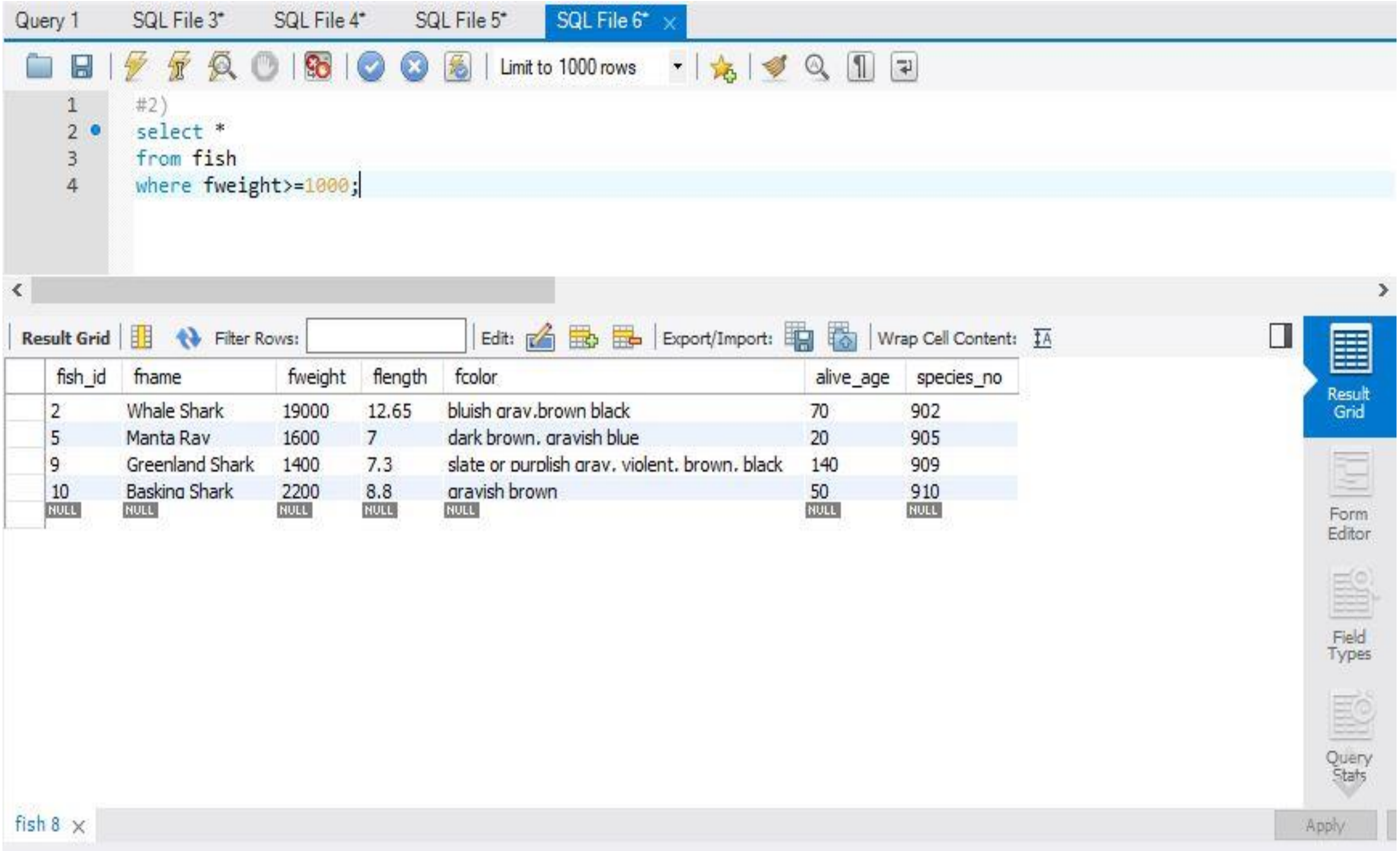
Retrieve all data from family table



```
select * from family;
```

fish_id	Sci_name	family_name
1	Carcharodon carcharias	Lamnidae
2	Rhincodon tvpus	Rhincodontidae
3	Mvliobatoidei	Chondrichthves
4	Galeocerdo cuvier	Reauiem shark
5	Manta birostris	Eagle rav
6	Carcharhinus leucas	Reauiem shark
7	Sphvrnidae	Sphvrna mokarran
8	Mitsukurina owstoni	Mitsukurinidae
9	Somniosus microcephalus	Somniosidae
10	Cetorhinus maximus	Cetorhinidae
11	Pristidae	Pristidae
12	Chimaeriformes	aenus
13	Prionace alauca	Reauiem shark
14	Neaaprion acutidens	Reauiem shark
15	Alopias	Alopiidae
16	Carcharhinus limbatus	Reauiem shark
17	Torpediniformes	Torpedinidae
18	Squatina	Squatinidae
19	Triakis semifasciata	Houndshark
20	Raiidae	Raiidae

List all fishes having weight greater then 1000

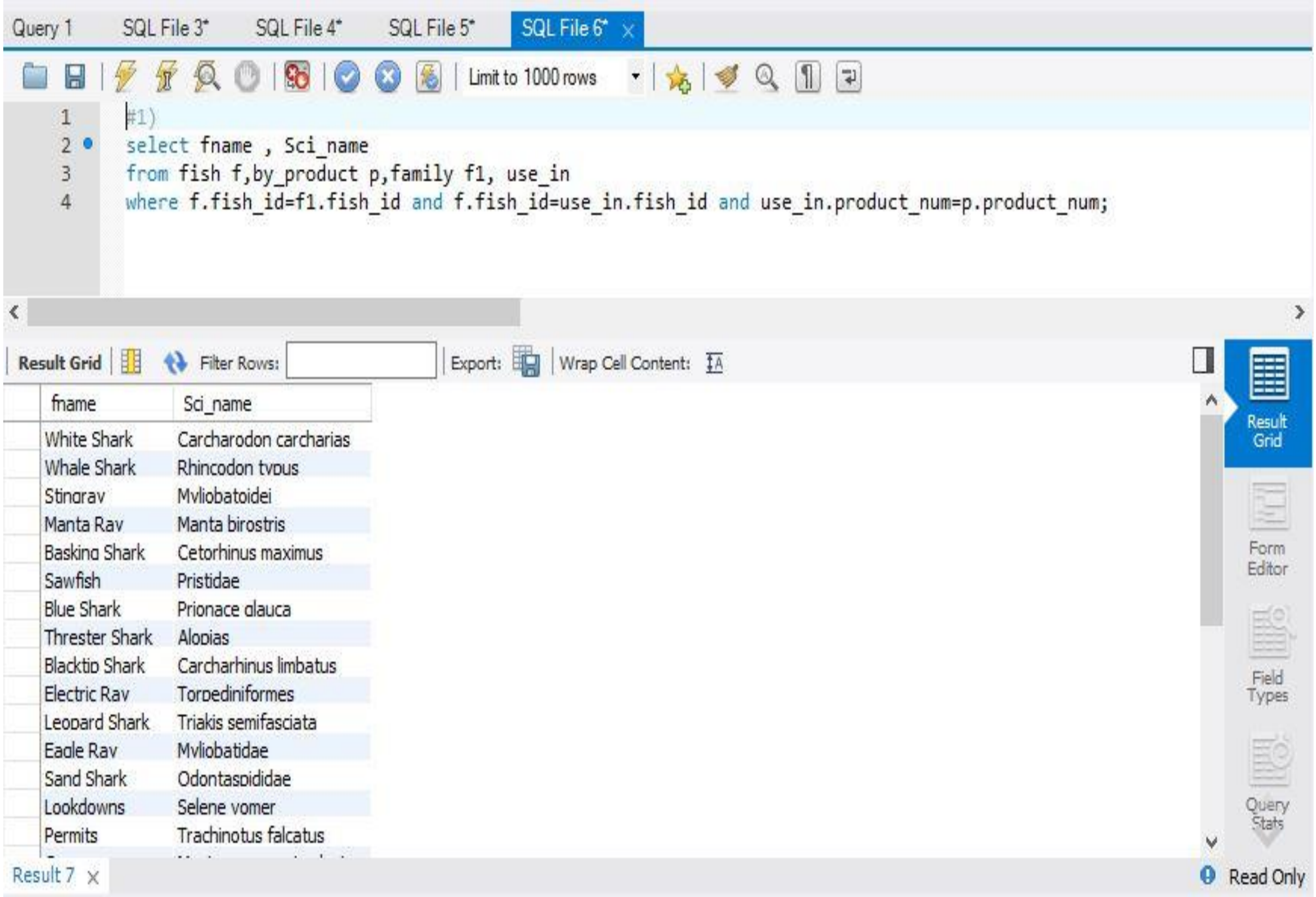


```
#2)
select *
from fish
where fweight>=1000;
```

fish_id	fname	fweight	flength	fcolor	alive_age	species_no
2	Whale Shark	19000	12.65	bluish grav.brown black	70	902
5	Manta Rav	1600	7	dark brown, gravish blue	20	905
9	Greenland Shark	1400	7.3	slate or purplish grav, violent, brown, black	140	909
10	Baskina Shark	2200	8.8	gravish brown	50	910
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Join Queries:

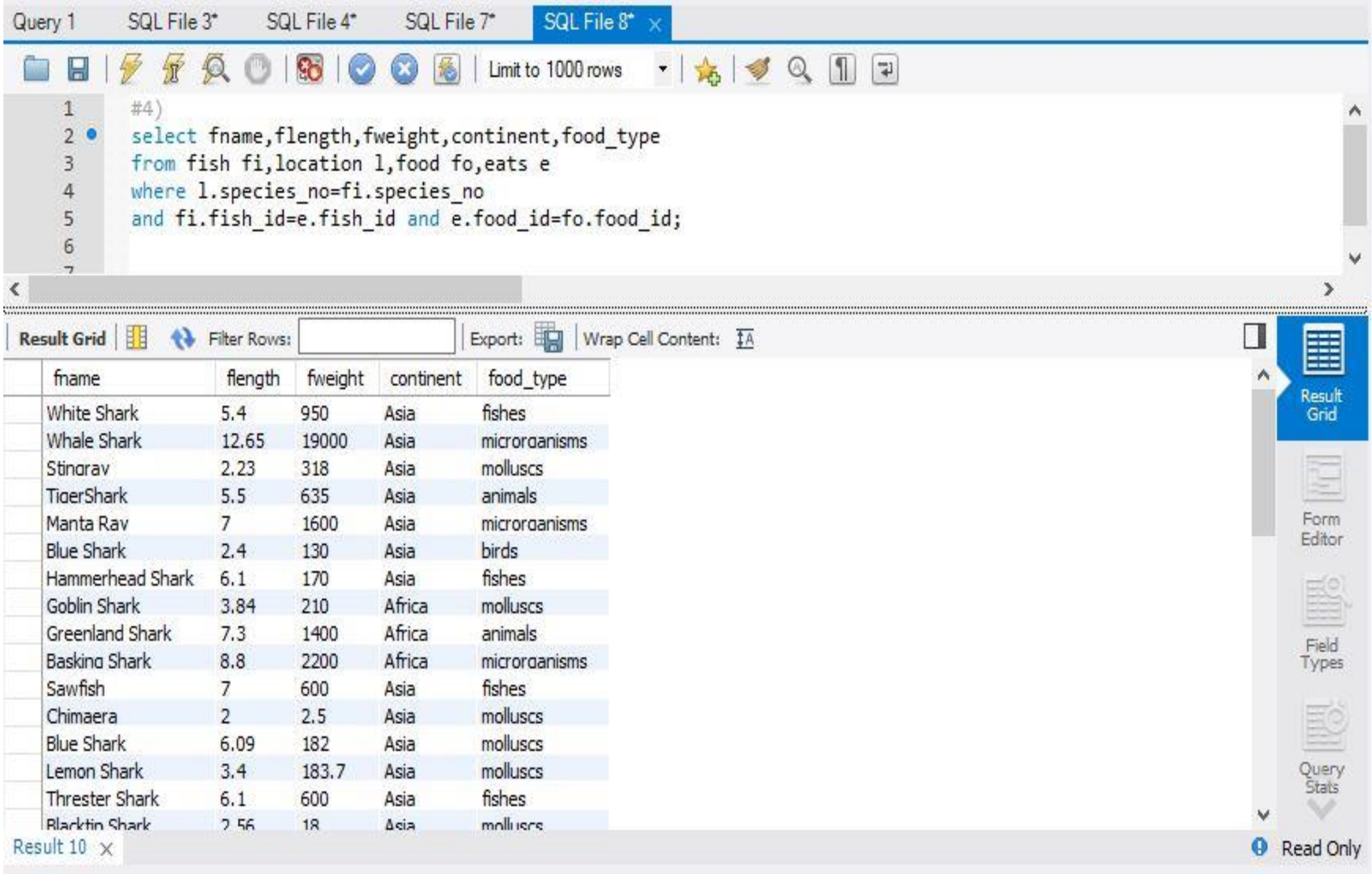
List all fish names and their scientific names which are used in products.



```
#1)
select fname , Sci_name
from fish f,by_product p,family f1, use_in
where f.fish_id=f1.fish_id and f.fish_id=use_in.fish_id and use_in.product_num=p.product_num;
```

fname	Sci_name
White Shark	Carcharodon carcharias
Whale Shark	Rhincodon typus
Stingray	Myliobatoidei
Manta Ray	Manta birostris
Basking Shark	Cetorhinus maximus
Sawfish	Pristidae
Blue Shark	Prionace glauca
Threster Shark	Alopias
Blacktip Shark	Carcharhinus limbatus
Electric Ray	Torpediniformes
Leopard Shark	Triakis semifasciata
Eagle Ray	Myliobatidae
Sand Shark	Odontaspididae
Lookdowns	Selene vomer
Permits	Trachinotus falcatus

List all fish names,their length,weight,continent and their food type

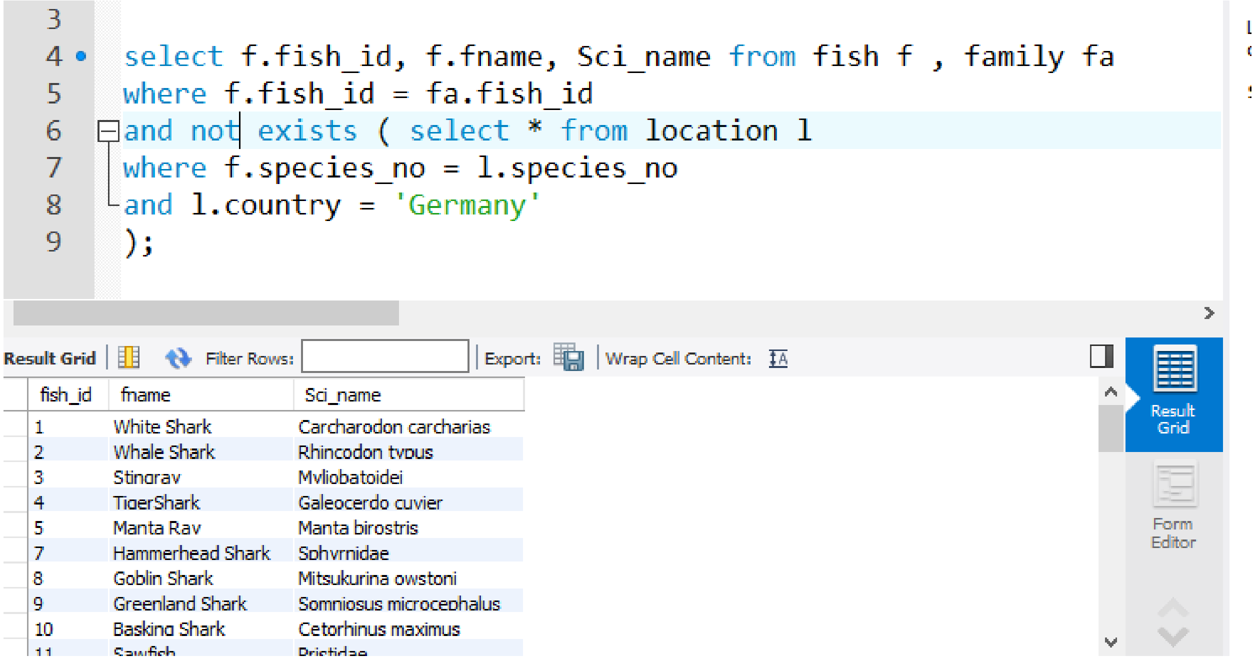


```
#4)
select fname,flength,fweight,continent,food_type
from fish fi,location l,food fo,eats e
where l.species_no=fi.species_no
and fi.fish_id=e.fish_id and e.food_id=fo.food_id;
```

fname	flength	fweight	continent	food_type
White Shark	5.4	950	Asia	fishes
Whale Shark	12.65	19000	Asia	microrganisms
Stingray	2.23	318	Asia	molluscs
TigerShark	5.5	635	Asia	animals
Manta Ray	7	1600	Asia	microrganisms
Blue Shark	2.4	130	Asia	birds
Hammerhead Shark	6.1	170	Asia	fishes
Goblin Shark	3.84	210	Africa	molluscs
Greenland Shark	7.3	1400	Africa	animals
Basking Shark	8.8	2200	Africa	microrganisms
Sawfish	7	600	Asia	fishes
Chimaera	2	2.5	Asia	molluscs
Blue Shark	6.09	182	Asia	molluscs
Lemon Shark	3.4	183.7	Asia	molluscs
Threster Shark	6.1	600	Asia	fishes
Blacktip Shark	2.56	18	Asia	molluscs

Nested Queries:

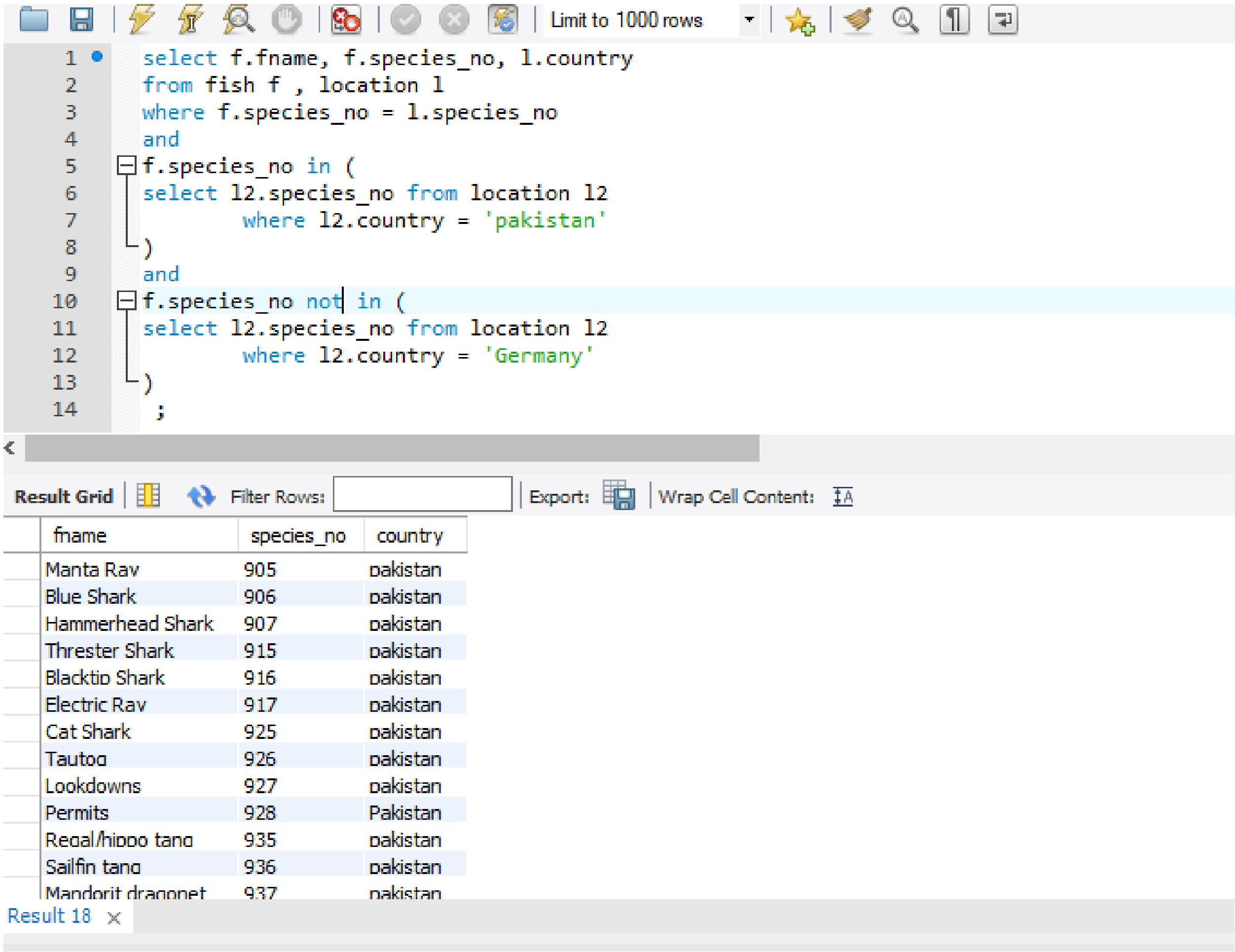
List fish id,name and scientific name of all those fishes that are not found in Germany.



```
select f.fish_id, f.fname, Sci_name from fish f , family fa
where f.fish_id = fa.fish_id
and not exists ( select * from location l
where f.species_no = l.species_no
and l.country = 'Germany'
);
```

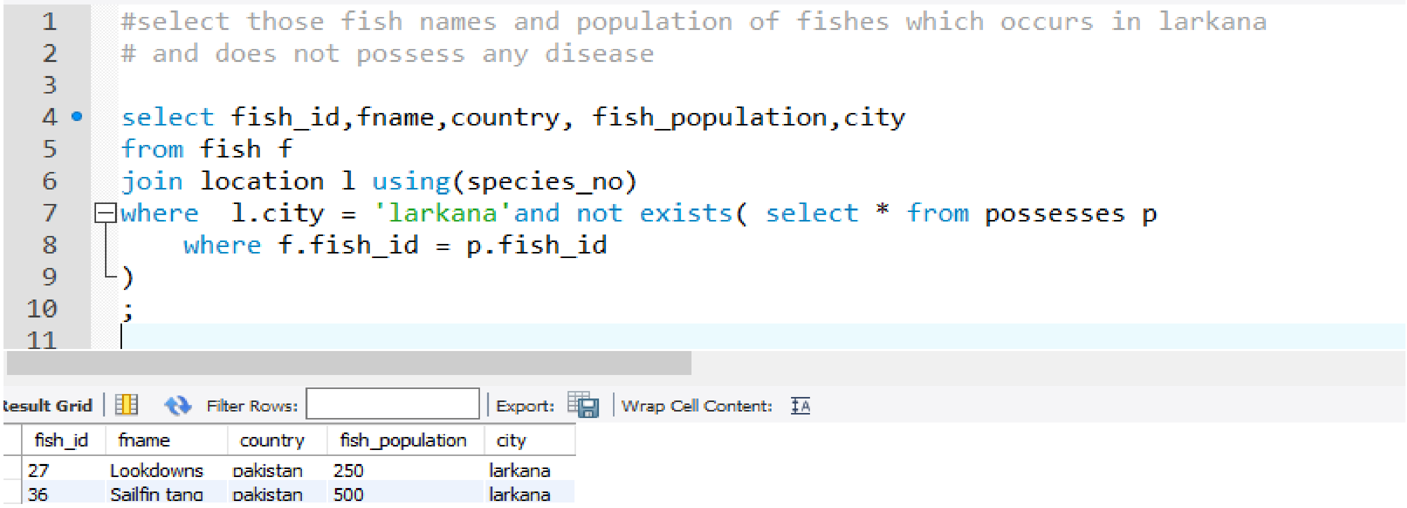
fish_id	fname	Sci_name
1	White Shark	Carcharodon carcharias
2	Whale Shark	Rhincodon typus
3	Stingray	Myliobatoidei
4	TigerShark	Galeocerdo cuvier
5	Manta Ray	Manta birostris
7	Hammerhead Shark	Sphyrnidae
8	Goblin Shark	Mitsukurina owstoni
9	Greenland Shark	Somniosus microcephalus
10	Basking Shark	Cetorhinus maximus
11	Sawfish	Pristidae

Find fishes that are in Pakistan and Not in Germany



```sql
select f.fname, f.species_no, l.country
from fish f , location l
where f.species_no = l.species_no
and
f.species_no in (
select l2.species_no from location l2
        where l2.country = 'pakistan'
)
and
f.species_no not in (
select l2.species_no from location l2
        where l2.country = 'Germany'
)
 ;
```

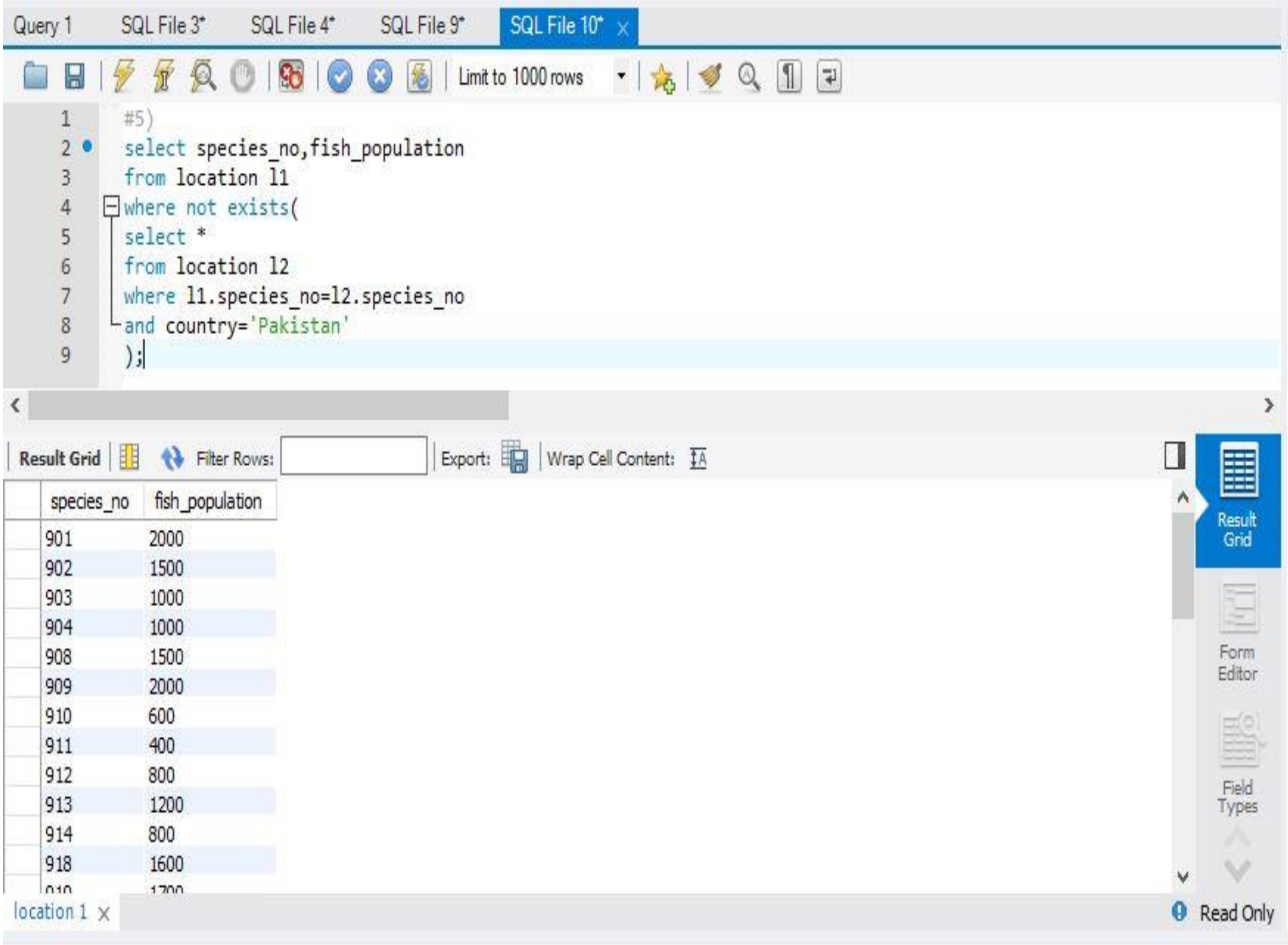
fname	species_no	country
Manta Ray	905	pakistan
Blue Shark	906	pakistan
Hammerhead Shark	907	pakistan
Threster Shark	915	pakistan
Blacktip Shark	916	pakistan
Electric Ray	917	pakistan
Cat Shark	925	pakistan
Tautog	926	pakistan
Lookdowns	927	pakistan
Permits	928	Pakistan
Regal/hippo tang	935	pakistan
Sailfin tang	936	pakistan
Mandorit dragonet	937	pakistan



```sql
#select those fish names and population of fishes which occurs in larkana
# and does not possess any disease

select fish_id,fname,country, fish_population,city
from fish f
join location l using(species_no)
where  l.city = 'larkana'and not exists( select * from possesses p
    where f.fish_id = p.fish_id
)
;
```

fish_id	fname	country	fish_population	city
27	Lookdowns	pakistan	250	larkana
36	Sailfin tang	pakistan	500	larkana

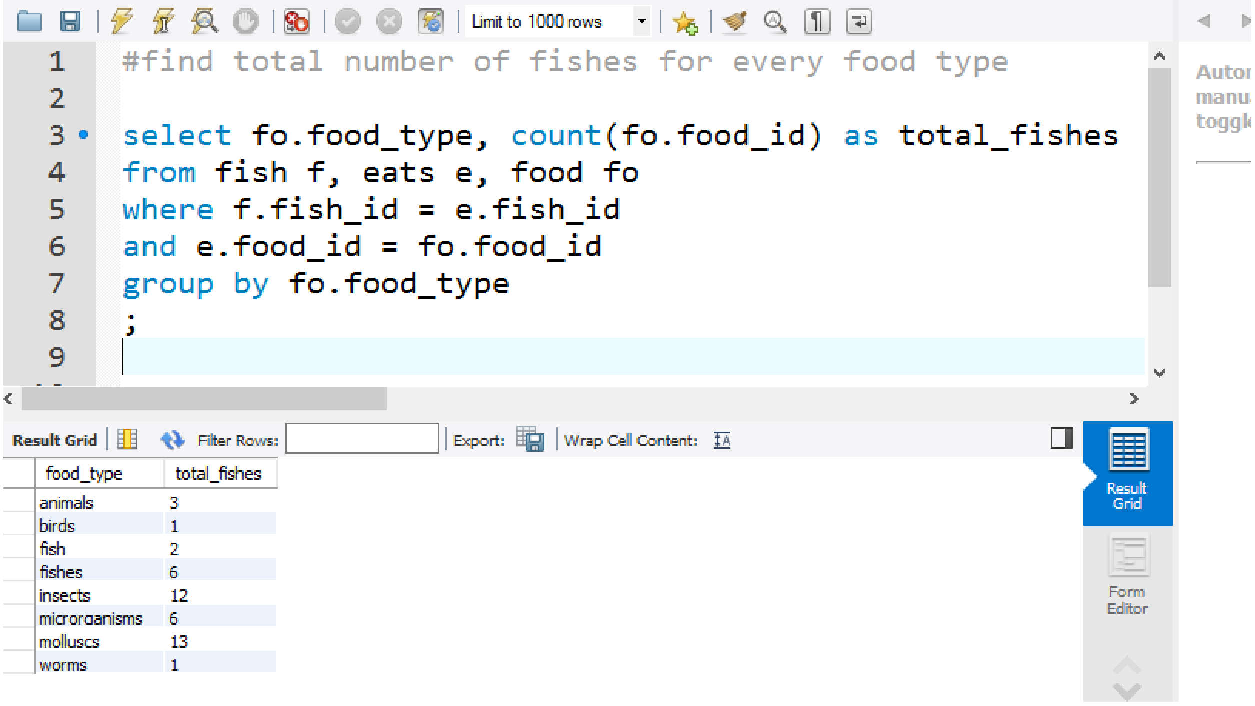
List species number and population of all those fishes that are not in Pakistan



```
#5)
select species_no,fish_population
from location l1
where not exists(
select *
from location l2
where l1.species_no=l2.species_no
and country='Pakistan'
);
```

species_no	fish_population
901	2000
902	1500
903	1000
904	1000
908	1500
909	2000
910	600
911	400
912	800
913	1200
914	800
918	1600
919	1700

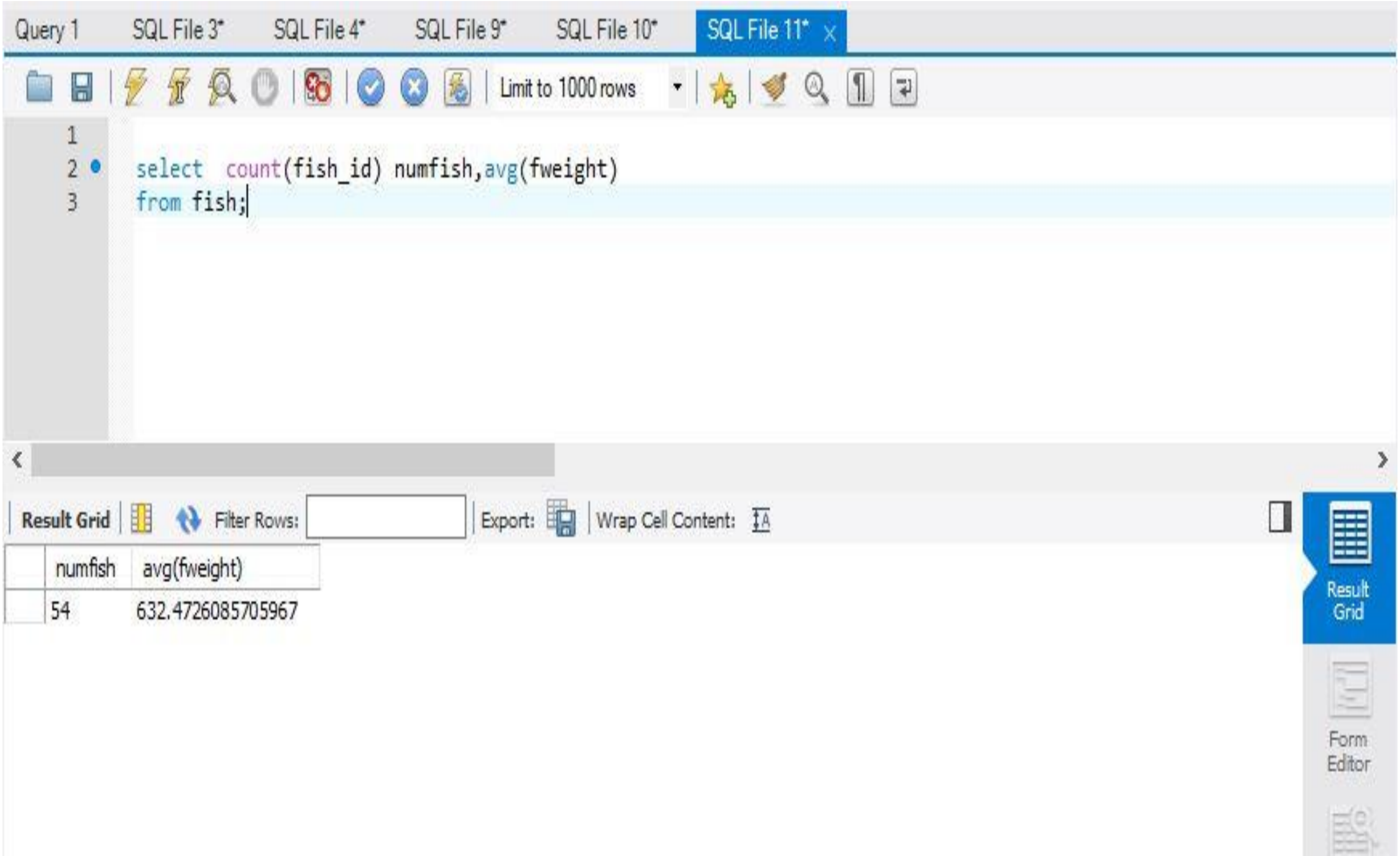
Aggregation Functions and queries:



```sql
#find total number of fishes for every food type

select fo.food_type, count(fo.food_id) as total_fishes
from fish f, eats e, food fo
where f.fish_id = e.fish_id
and e.food_id = fo.food_id
group by fo.food_type
;
```

food_type	total_fishes
animals	3
birds	1
fish	2
fishes	6
insects	12
microorganisms	6
molluscs	13
worms	1

List the strength of fishes and their average weight



```
select  count(fish_id) numfish,avg(fweight)
from fish;
```

numfish	avg(fweight)
54	632.4726085705967