Task 1

Code for the function creation:

```
CREATE FUNCTION get_addresses(pattern varchar, lower_bound int, upper_bound int)
returns setof address
as
$$
Begin
    return query SELECT * FROM "address"
    WHERE address.address LIKE pattern AND (address.address_id BETWEEN
lower_bound AND upper_bound);
End;
$$

LANGUAGE 'plpgsql';
```

The output of the function:

	get_addresses address
1	(400,"1152 Citrus Heights Manor","",al-Qadarif,15,5239,765957414528,"2006-02-15 09:45:30")
2	(403,"1190 0 Place","","Rio Grande do Sul",44,10417,841876514789,"2006-02-15 09:45:30")
3	(466,"118 Jaffna Loop","","Northern Mindanao",182,10447,325526730021,"2006-02-15 09:45:30")
4	(481,"1153 Allende Way","",Qubec,179,20336,856872225376,"2006-02-15 09:45:30")
5	(507,"1197 Sokoto Boulevard","","West Bengali",478,87687,868602816371,"2006-02-15 09:45:30")
6	(511,"1152 al-Qatif Lane","","Kalimantan Barat",412,44816,131370665218,"2006-02-15 09:45:30")
7	(528,"1176 Southend-on-Sea Manor","","Southern Tagalog",458,81651,236679267178,"2006-02-15 09:45:30")

The output of the Python script (ex1.py):

```
(38.6830412, -121.3069555)
(50.8239854, 4.3347328)
0 0
(53.3942146, -1.4199872)
0 0
(26.2844342, 50.1116357)
(51.5364227, 0.6900118)
```

After the python script (ex1.py) is executed the longitude and latitude are updated:

1	(403,"1190 0 Place","","Rio Grande do Sul",44,10417,841876514789,"2022-04-15 16:30:16.423133",50.823986,4.334733)
2	(466,"118 Jaffna Loop","","Northern Mindanao",182,10447,325526730021,"2022-04-15 16:30:16.423133",0,0)
3	(481,"1153 Allende Way","",Qubec,179,20336,856872225376,"2022-04-15 16:30:16.423133",53.394215,-1.4199872)
4	(507,"1197 Sokoto Boulevard","","West Bengali",478,87687,868602816371,"2022-04-15 16:30:16.423133",0,0)
5	(511,"1152 al-Qatif Lane","","Kalimantan Barat",412,44816,131370665218,"2022-04-15 16:30:16.423133",26.284433,50.111637)
6	(528,"1176 Southend-on-Sea Manor","","Southern Tagalog",458,81651,236679267178,"2022-04-15 16:30:16.423133",51.536423,0.6900118)
7	(400,"1152 Citrus Heights Manor","",al-Qadarif,15,5239,765957414528,"2022-04-15 16:30:16.423133",38.68304,-121.30695)

Task 2

Function to retrieve the customers:

```
CREATE OR REPLACE FUNCTION retrievecustomers(start_id int, end_id int) returns setof customer
as
$$
Begin
    IF start_id < 0 OR end_id < 0 OR start_id > 600 OR end_id > 600 THEN
        RAISE EXCEPTION 'The boundary id are out of range';
    END IF;
    return query SELECT * FROM "customer"
    WHERE customer.customer_id BETWEEN start_id AND end_id
    ORDER BY customer.customer_id;
End;
$$

LANGUAGE 'plpgsql';
```

The sample output for retrievecustomers(10,40):

retrievecustomers
customer

1	(10,1,Dorothy,Taylor,dorothy.taylor@sakilacustomer.org,14,t,2006-02-14,"2013-05-26 14:49:45.738",1)
2	(11,2,Lisa,Anderson,lisa.anderson@sakilacustomer.org,15,t,2006-02-14,"2013-05-26 14:49:45.738",1)
3	(12,1,Nancy,Thomas,nancy.thomas@sakilacustomer.org,16,t,2006-02-14,"2013-05-26 14:49:45.738",1)
4	(13,2,Karen,Jackson,karen.jackson@sakilacustomer.org,17,t,2006-02-14,"2013-05-26 14:49:45.738",1)
5	(14,2,Betty,White,betty.white@sakilacustomer.org,18,t,2006-02-14,"2013-05-26 14:49:45.738",1)
6	(15,1,Helen,Harris,helen.harris@sakilacustomer.org,19,t,2006-02-14,"2013-05-26 14:49:45.738",1)
7	(16,2,Sandra,Martin,sandra.martin@sakilacustomer.org,20,t,2006-02-14,"2013-05-26 14:49:45.738",0)
8	(17,1,Donna,Thompson,donna.thompson@sakilacustomer.org,21,t,2006-02-14,"2013-05-26 14:49:45.738",1)
9	(18,2,Carol,Garcia,carol.garcia@sakilacustomer.org,22,t,2006-02-14,"2013-05-26 14:49:45.738",1)
10	(19,1,Ruth,Martinez,ruth.martinez@sakilacustomer.org,23,t,2006-02-14,"2013-05-26 14:49:45.738",1)
11	(20,2,Sharon,Robinson,sharon.robinson@sakilacustomer.org,24,t,2006-02-14,"2013-05-26 14:49:45.738",1)
12	(21,1,Michelle,Clark,michelle.clark@sakilacustomer.org,25,t,2006-02-14,"2013-05-26 14:49:45.738",1)
13	(22,1,Laura,Rodriguez,laura.rodriguez@sakilacustomer.org,26,t,2006-02-14,"2013-05-26 14:49:45.738",1)
14	(23,2,Sarah,Lewis,sarah.lewis@sakilacustomer.org,27,t,2006-02-14,"2013-05-26 14:49:45.738",1)

The sample output for retrievecustomers(-2, 5):

```
ERROR:  The boundary id are out of range
CONTEXT:  PL/pgSQL function retrievecustomers(integer,integer) line 4 at RAISE
SQL state: P0001
```