Task 1

Code for the function creation:

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

LANGUAGE 'plpgsql';
```

The output of the function:

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

```
0.0, 0.0)
ocation not found
0.0, 0.0)
ocation not found
0.0, 0.0)
ocation not found
0.0, 0.0)
ocation not found
0.0, 0.0)
ocation not found
0.0, 0.0)
54.65967825, 24.94371497
ocation not found
0.0, 0.0)
35.092307, 119.2624129)
ocation not found
0.0, 0.0)
ocation not found
0.0, 0.0)
ocation not found
0.0, 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	(366,"114 Jalib al-Shuyukh Manor","",Centre,585,60440,845378657301,"2022-04-15 17:12:50.664979",0,0)
2	(4,"1411 Lillydale Drive",,QLD,576,"",6172235589,"2022-04-15 17:12:50.664979",0,0)
3	(6,"1121 Loja Avenue","",California,449,17886,838635286649,"2022-04-15 17:12:50.664979",0,0)
4	(127,"117 Boa Vista Way","","Uttar Pradesh",566,6804,677976133614,"2022-04-15 17:12:50.664979",0,0)
5	(245,"1103 Bilbays Parkway","",Hubei,578,87660,279979529227,"2022-04-15 17:12:50.664979",0,0)
6	(297,"1192 Tongliao Street","",Sharja,470,19065,350970907017,"2022-04-15 17:12:50.664979",0,0)
7	(324,"1145 Vilnius Manor","",Mxico,451,73170,674805712553,"2022-04-15 17:12:50.664979",54.65968,24.943714)
8	(378,"1191 Tandil Drive","","Southern Tagalog",523,6362,45554316010,"2022-04-15 17:12:50.664979",0,0)
9	(379,"1133 Rizhao Avenue","",Pernambuco,572,2800,600264533987,"2022-04-15 17:12:50.664979",35.092308,119.26241)
10	(602,"1101 Bucuresti Boulevard","","West Greece",401,97661,199514580428,"2022-04-15 17:12:50.664979",0,0)
11	(603,"1103 Quilmes Boulevard","",Piura,503,52137,644021380889,"2022-04-15 17:12:50.664979",0,0)
12	(507,"1197 Sokoto Boulevard","","West Bengali",478,87687,868602816371,"2022-04-15 17:12:50.664979",0,0)
13	(511,"1152 al-Qatif Lane","","Kalimantan Barat",412,44816,131370665218,"2022-04-15 17:12:50.664979",26.284433,50.111637)

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
```