DNS Seeding

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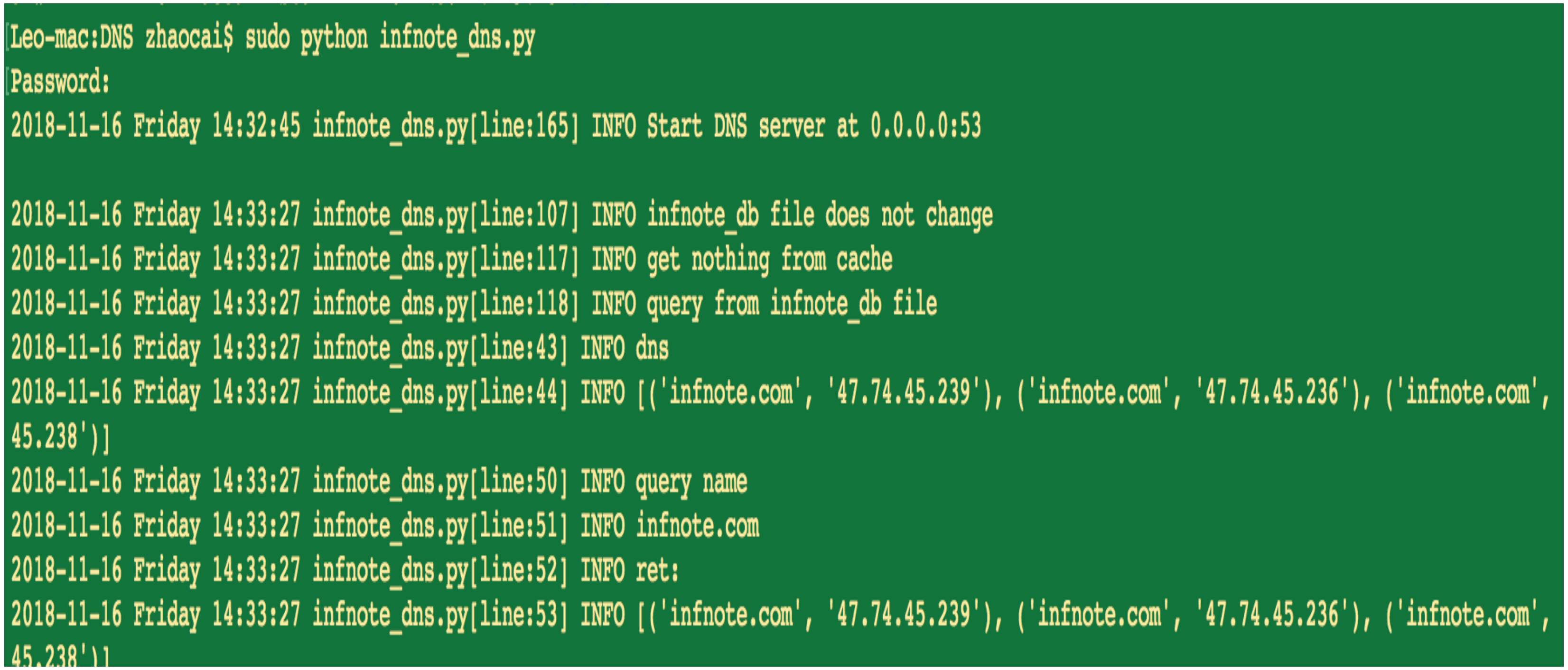
Results(1)

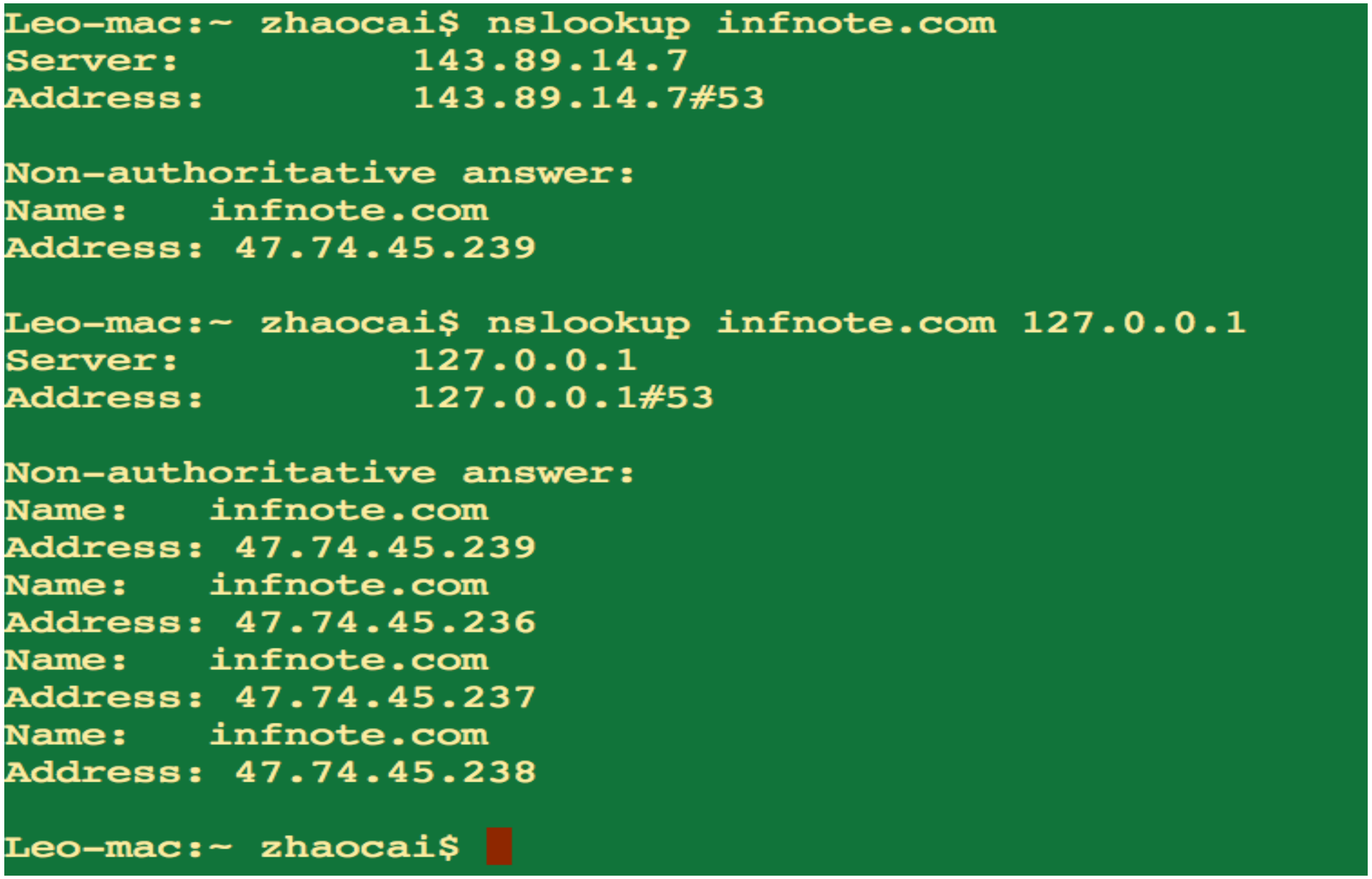
- **1. start infnote_dns sever**



```
[Leo-mac:DNS zhaocai$ sudo python infnote_dns.py
[Password:
2018-11-16 Friday 14:32:45 infnote_dns.py[line:165] INFO Start DNS server at 0.0.0.0:53

2018-11-16 Friday 14:33:27 infnote_dns.py[line:107] INFO infnote_db file does not change
2018-11-16 Friday 14:33:27 infnote_dns.py[line:117] INFO get nothing from cache
2018-11-16 Friday 14:33:27 infnote_dns.py[line:118] INFO query from infnote_db file
2018-11-16 Friday 14:33:27 infnote_dns.py[line:43] INFO dns
2018-11-16 Friday 14:33:27 infnote_dns.py[line:44] INFO [('infnote.com', '47.74.45.239'), ('infnote.com', '47.74.45.236'), ('infnote.com',
45.238')]
2018-11-16 Friday 14:33:27 infnote_dns.py[line:50] INFO query name
2018-11-16 Friday 14:33:27 infnote_dns.py[line:51] INFO infnote.com
2018-11-16 Friday 14:33:27 infnote_dns.py[line:52] INFO ret:
2018-11-16 Friday 14:33:27 infnote_dns.py[line:53] INFO [('infnote.com', '47.74.45.239'), ('infnote.com', '47.74.45.236'), ('infnote.com',
45.238')]
```

Results(2)

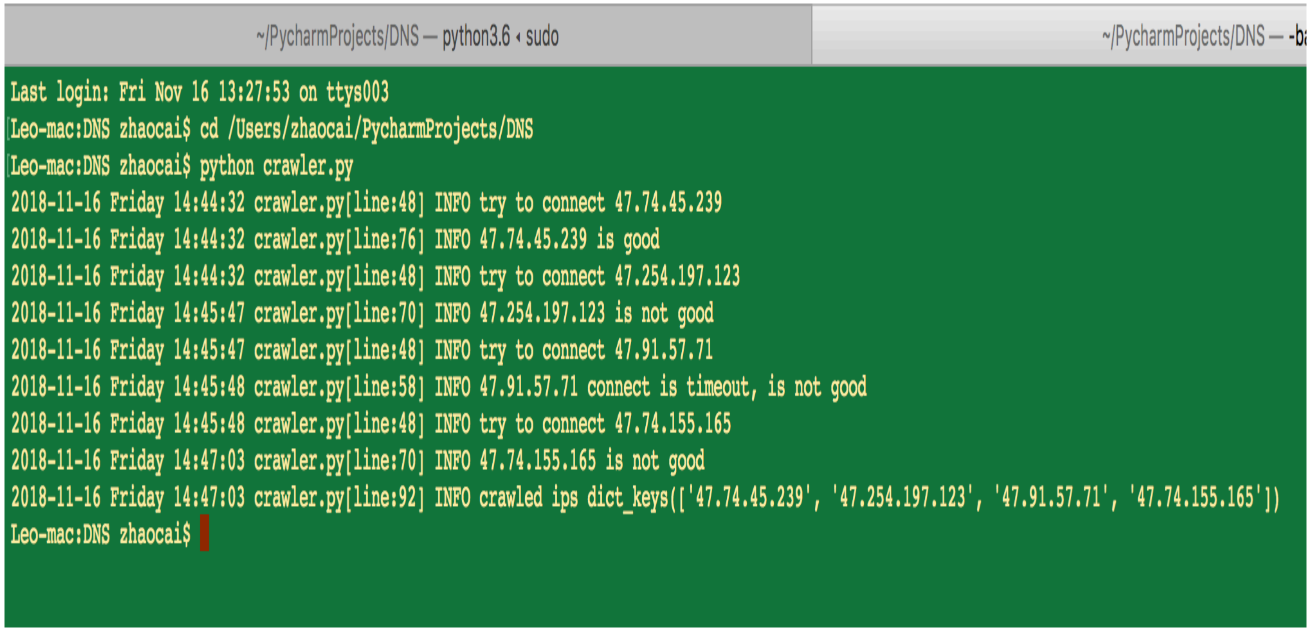
- **2. nslookup infnote.com**



```
Leo-mac:~ zhaocai$ nslookup infnote.com
Server:         143.89.14.7
Address:        143.89.14.7#53

Non-authoritative answer:
Name:   infnote.com
Address: 47.74.45.239

Leo-mac:~ zhaocai$ nslookup infnote.com 127.0.0.1
Server:         127.0.0.1
Address:        127.0.0.1#53

Non-authoritative answer:
Name:   infnote.com
Address: 47.74.45.239
Name:   infnote.com
Address: 47.74.45.236
Name:   infnote.com
Address: 47.74.45.237
Name:   infnote.com
Address: 47.74.45.238

Leo-mac:~ zhaocai$ 
```

Results(3)

- **3. run crawler**

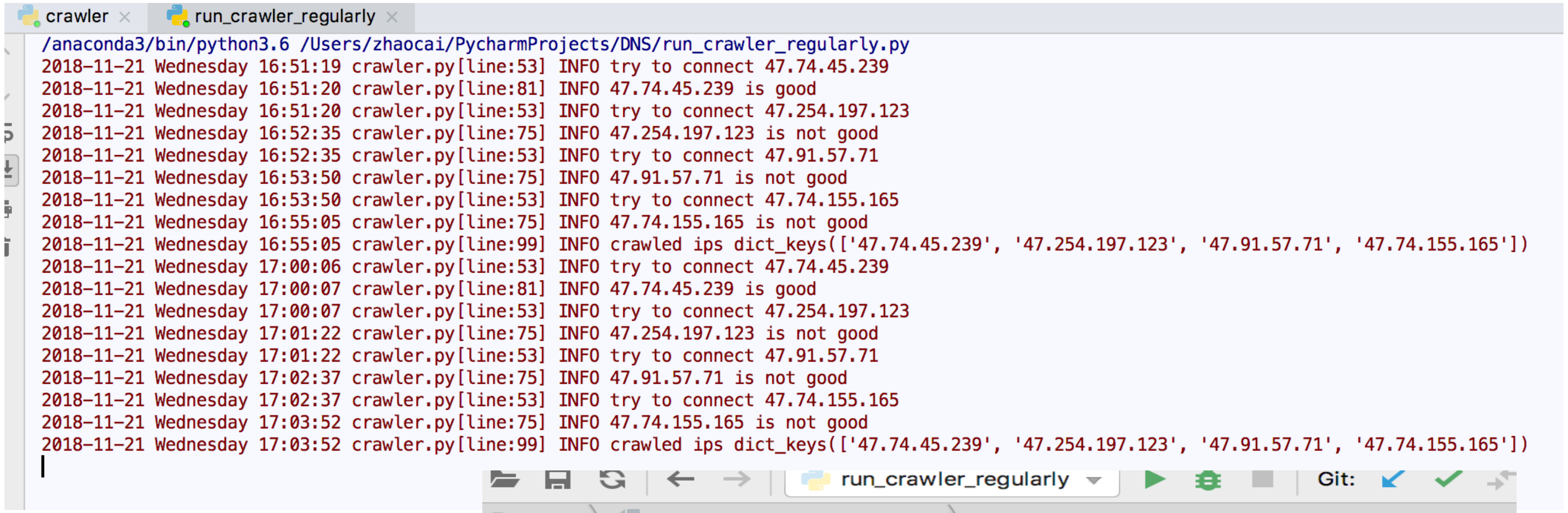


~/PycharmProjects/DNS — python3.6 ◂ sudo   ~/PycharmProjects/DNS — -ba

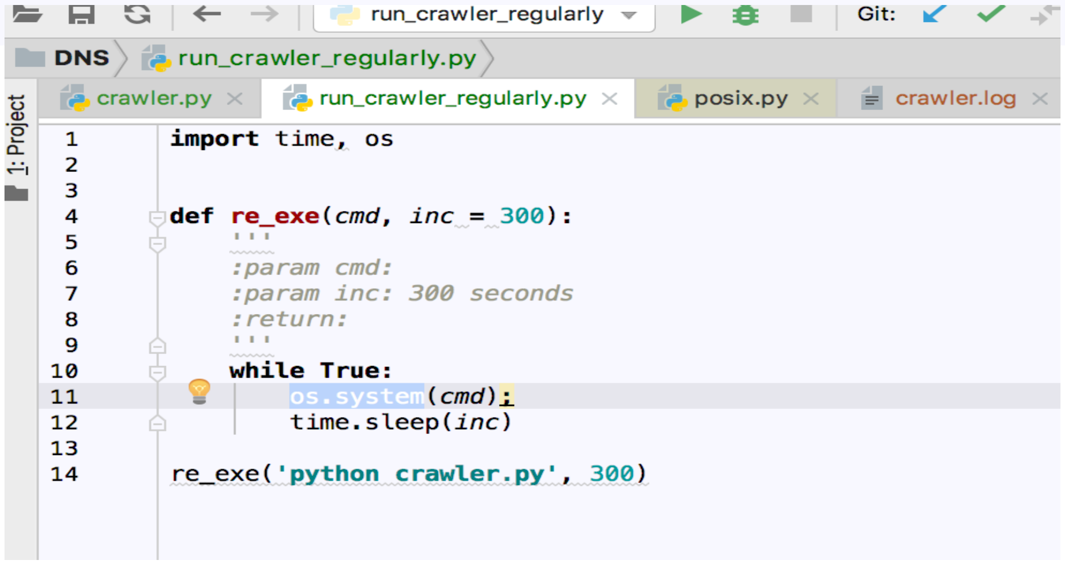
```
Last login: Fri Nov 16 13:27:53 on ttys003
Leo-mac:DNS zhaocai$ cd /Users/zhaocai/PycharmProjects/DNS
Leo-mac:DNS zhaocai$ python crawler.py
2018-11-16 Friday 14:44:32 crawler.py[line:48] INFO try to connect 47.74.45.239
2018-11-16 Friday 14:44:32 crawler.py[line:76] INFO 47.74.45.239 is good
2018-11-16 Friday 14:44:32 crawler.py[line:48] INFO try to connect 47.254.197.123
2018-11-16 Friday 14:45:47 crawler.py[line:70] INFO 47.254.197.123 is not good
2018-11-16 Friday 14:45:47 crawler.py[line:48] INFO try to connect 47.91.57.71
2018-11-16 Friday 14:45:48 crawler.py[line:58] INFO 47.91.57.71 connect is timeout, is not good
2018-11-16 Friday 14:45:48 crawler.py[line:48] INFO try to connect 47.74.155.165
2018-11-16 Friday 14:47:03 crawler.py[line:70] INFO 47.74.155.165 is not good
2018-11-16 Friday 14:47:03 crawler.py[line:92] INFO crawled ips dict_keys(['47.74.45.239', '47.254.197.123', '47.91.57.71', '47.74.155.165'])
Leo-mac:DNS zhaocai$
```

Results(4)

- **4. run crawler regularly** **(**run_crawler_regularly.py**)**



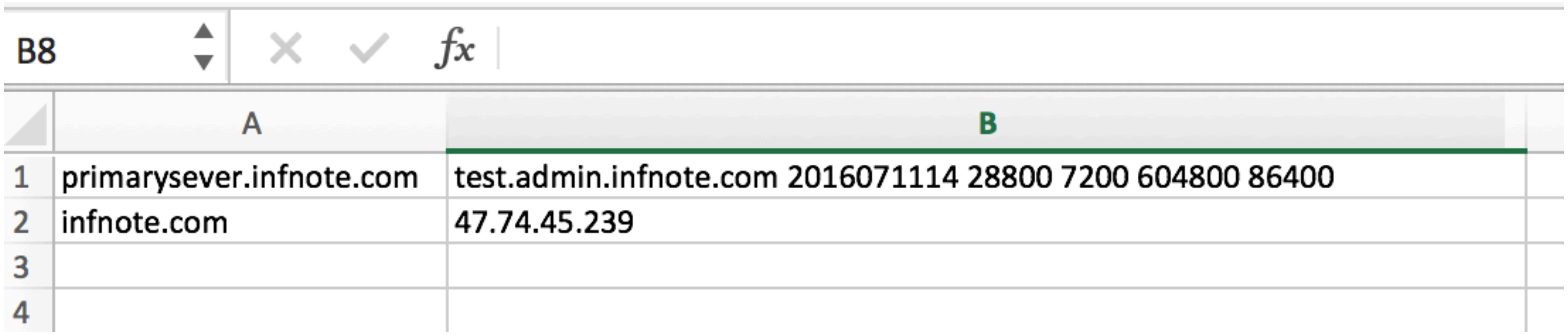
```
/anaconda3/bin/python3.6 /Users/zhaocai/PycharmProjects/DNS/run_crawler_regularly.py
2018-11-21 Wednesday 16:51:19 crawler.py[line:53] INFO try to connect 47.74.45.239
2018-11-21 Wednesday 16:51:20 crawler.py[line:81] INFO 47.74.45.239 is good
2018-11-21 Wednesday 16:51:20 crawler.py[line:53] INFO try to connect 47.254.197.123
2018-11-21 Wednesday 16:52:35 crawler.py[line:75] INFO 47.254.197.123 is not good
2018-11-21 Wednesday 16:52:35 crawler.py[line:53] INFO try to connect 47.91.57.71
2018-11-21 Wednesday 16:53:50 crawler.py[line:75] INFO 47.91.57.71 is not good
2018-11-21 Wednesday 16:53:50 crawler.py[line:53] INFO try to connect 47.74.155.165
2018-11-21 Wednesday 16:55:05 crawler.py[line:75] INFO 47.74.155.165 is not good
2018-11-21 Wednesday 16:55:05 crawler.py[line:99] INFO crawled ips dict_keys(['47.74.45.239', '47.254.197.123', '47.91.57.71', '47.74.155.165'])
2018-11-21 Wednesday 17:00:06 crawler.py[line:53] INFO try to connect 47.74.45.239
2018-11-21 Wednesday 17:00:07 crawler.py[line:81] INFO 47.74.45.239 is good
2018-11-21 Wednesday 17:00:07 crawler.py[line:53] INFO try to connect 47.254.197.123
2018-11-21 Wednesday 17:01:22 crawler.py[line:75] INFO 47.254.197.123 is not good
2018-11-21 Wednesday 17:01:22 crawler.py[line:53] INFO try to connect 47.91.57.71
2018-11-21 Wednesday 17:02:37 crawler.py[line:75] INFO 47.91.57.71 is not good
2018-11-21 Wednesday 17:02:37 crawler.py[line:53] INFO try to connect 47.74.155.165
2018-11-21 Wednesday 17:03:52 crawler.py[line:75] INFO 47.74.155.165 is not good
2018-11-21 Wednesday 17:03:52 crawler.py[line:99] INFO crawled ips dict_keys(['47.74.45.239', '47.254.197.123', '47.91.57.71', '47.74.155.165'])
```



```python
import time, os


def re_exe(cmd, inc = 300):
    '''
    :param cmd:
    :param inc: 300 seconds
    :return:
    '''
    while True:
        os.system(cmd);
        time.sleep(inc)

re_exe('python crawler.py', 300)
```

Results(5)

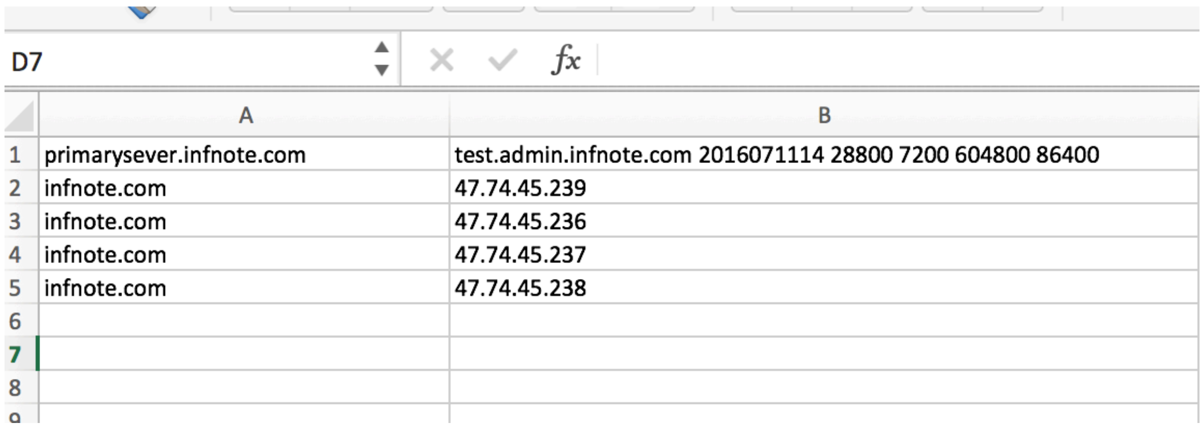
- **5.1. update infnote_db.csv (the first line is a SOA record)**



B8

	A	B
1	primarysever.infnote.com	test.admin.infnote.com 2016071114 28800 7200 604800 86400
2	infnote.com	47.74.45.239
3		
4		

- **5.2.backup of infnote_db.csv: infnote_db_old.csv**

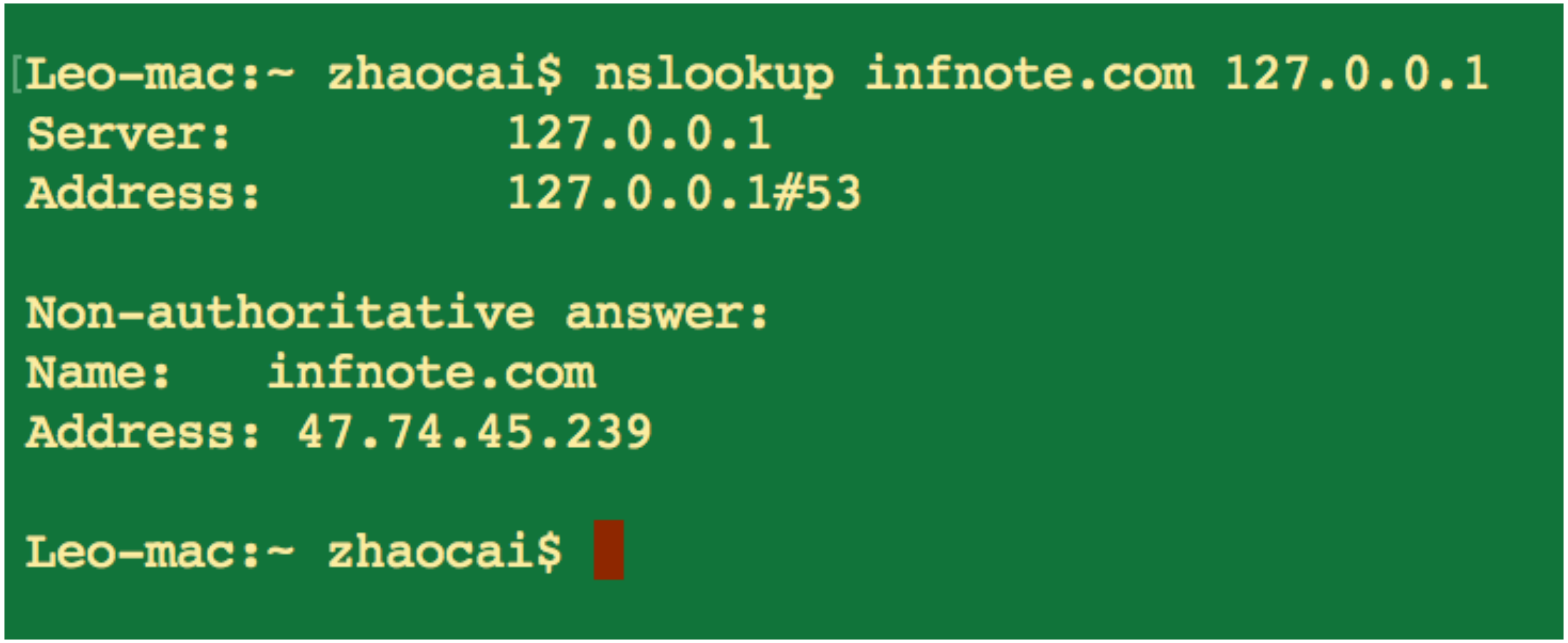


D7

	A	B
1	primarysever.infnote.com	test.admin.infnote.com 2016071114 28800 7200 604800 86400
2	infnote.com	47.74.45.239
3	infnote.com	47.74.45.236
4	infnote.com	47.74.45.237
5	infnote.com	47.74.45.238
6		
7		
8		

Results(6)

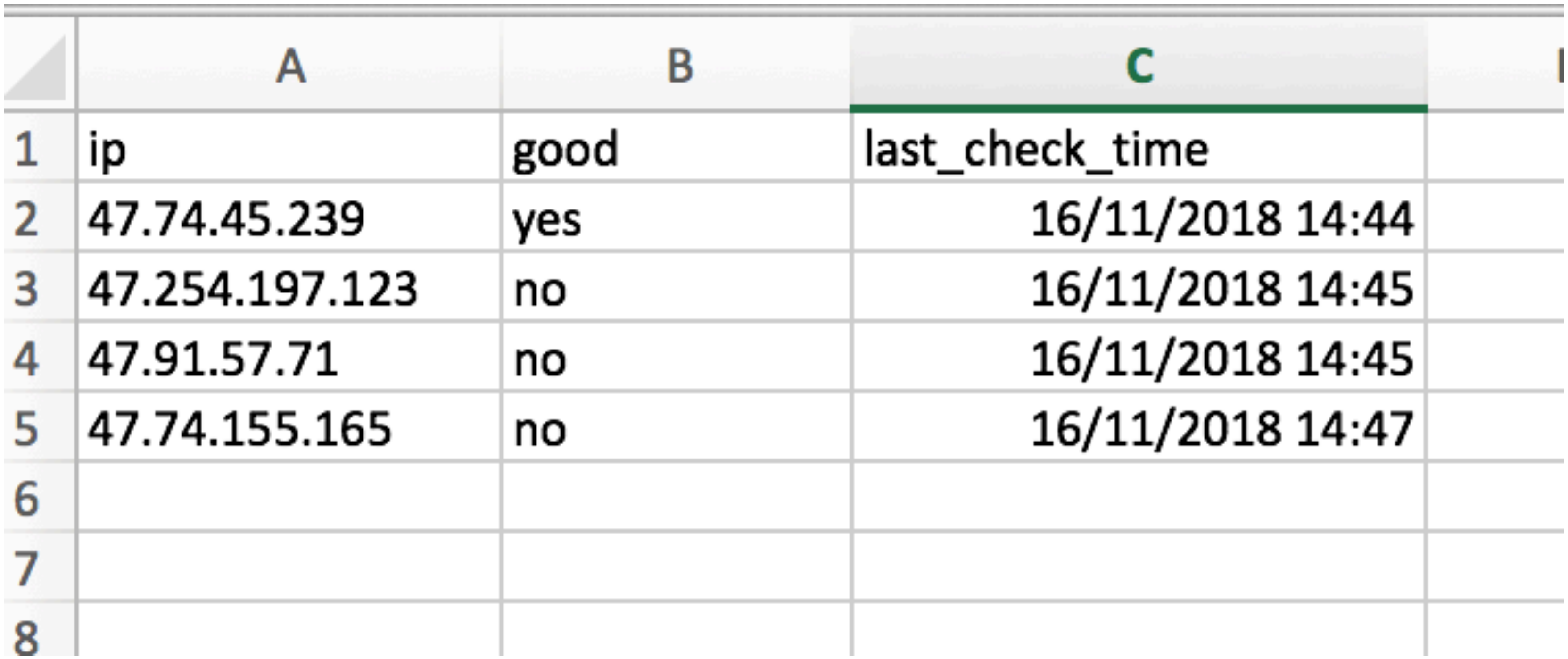
- **6. nslookup infnote.com after crawler**



```
[Leo-mac:~ zhaocai$ nslookup infnote.com 127.0.0.1
Server:         127.0.0.1
Address:        127.0.0.1#53

Non-authoritative answer:
Name:   infnote.com
Address: 47.74.45.239

Leo-mac:~ zhaocai$
```

Results(7)

- **7. generate nodes check report :nodes.csv**



	A	B	C
1	ip	good	last_check_time
2	47.74.45.239	yes	16/11/2018 14:44
3	47.254.197.123	no	16/11/2018 14:45
4	47.91.57.71	no	16/11/2018 14:45
5	47.74.155.165	no	16/11/2018 14:47
6			
7			
8			

Key Python Pakages used

- 1. gevent is used to start coroutines
- 2.gevent.queue is used as request message queue
- 3.dnslib is used to encode/decode DNS packets
- 4.pylru is used as LRU cache

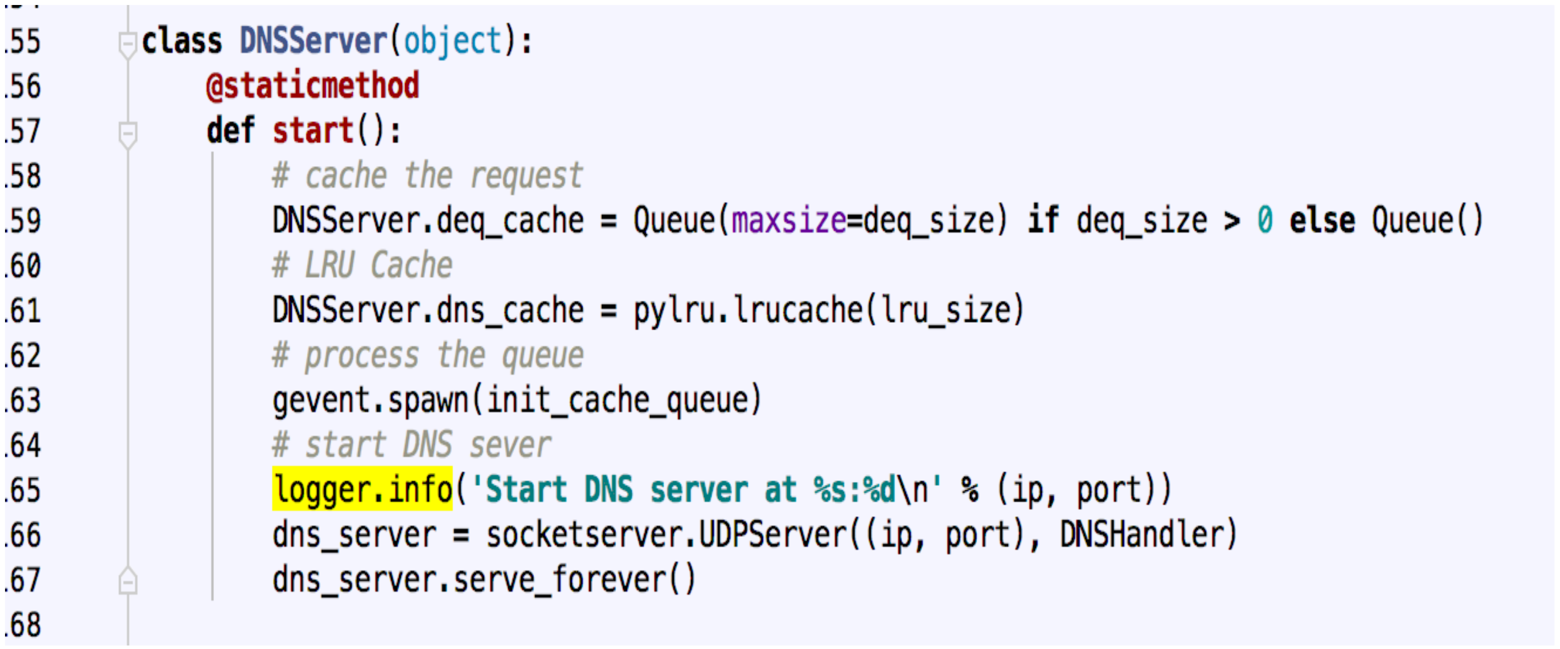
Steps of infnote_dns

- **1. start udp sever**
- **2. accept requests, and store in deq_cache**
- **3. get data from deq_cache**
- **4. decode DNS packets from data**
- **5. query in dns_cache if dns db does not change,**

  else query in dns db , and return

Steps of infnote_dns 1

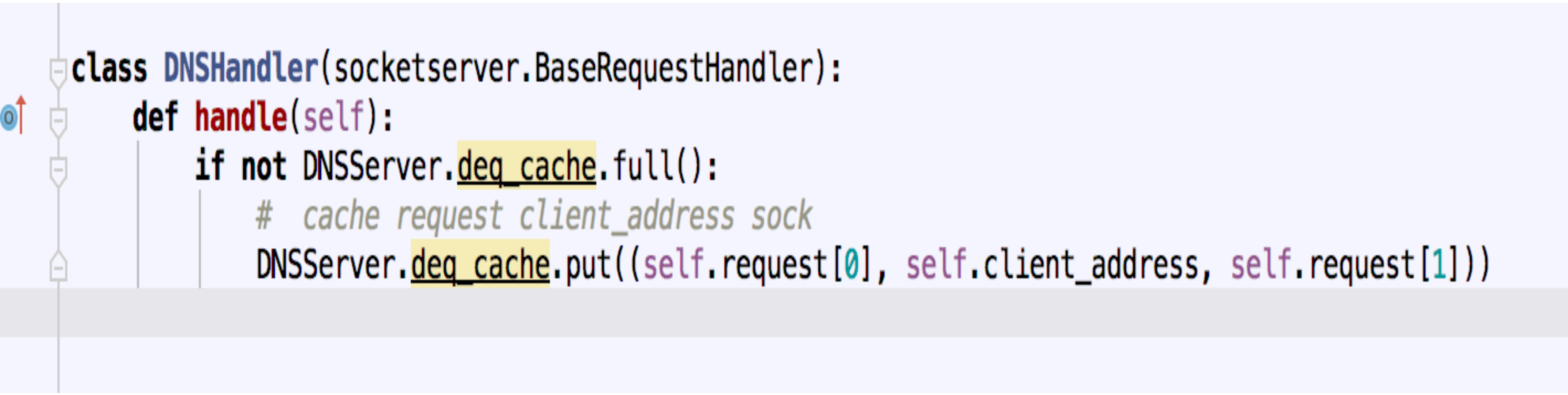
- **1. start udp sever**



```
class DNSServer(object):
    @staticmethod
    def start():
        # cache the request
        DNSServer.deq_cache = Queue(maxsize=deq_size) if deq_size > 0 else Queue()
        # LRU Cache
        DNSServer.dns_cache = pylru.lrucache(lru_size)
        # process the queue
        gevent.spawn(init_cache_queue)
        # start DNS sever
        logger.info('Start DNS server at %s:%d\n' % (ip, port))
        dns_server = socketserver.UDPServer((ip, port), DNSHandler)
        dns_server.serve_forever()
```

Steps of infnote_dns 2

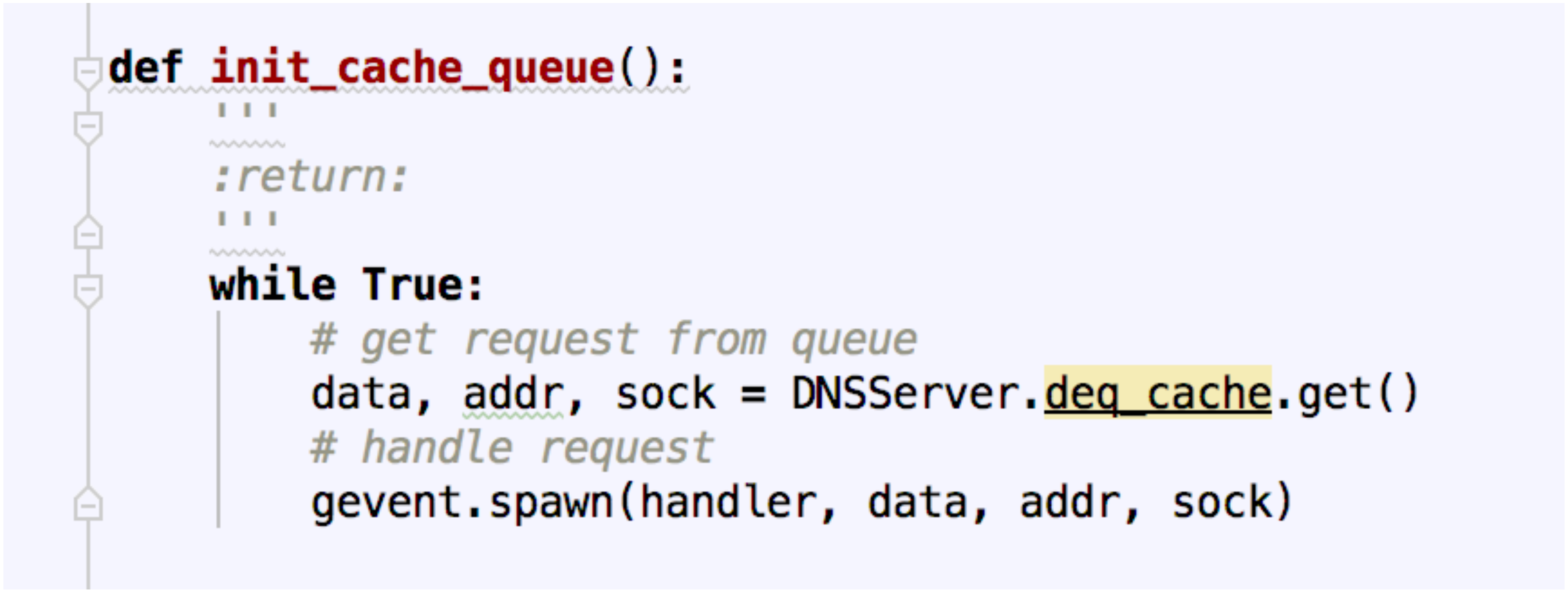
- **2.accept requests, and store in deq_cache**



```python
class DNSHandler(socketserver.BaseRequestHandler):
    def handle(self):
        if not DNSServer.deq_cache.full():
            #  cache request client_address sock
            DNSServer.deq_cache.put((self.request[0], self.client_address, self.request[1]))
```

Steps of infnote_dns 3

- **3. get data from deq_cache**

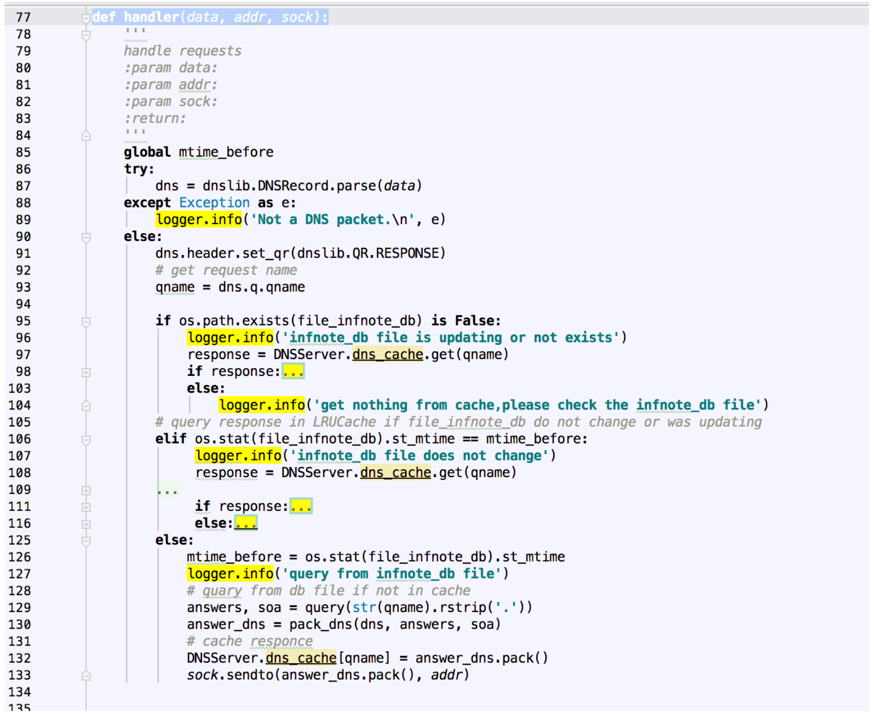


```
def init_cache_queue():
    '''
    :return:
    '''
    while True:
        # get request from queue
        data, addr, sock = DNSServer.deq_cache.get()
        # handle request
        gevent.spawn(handler, data, addr, sock)
```

Steps of infnote_dns 4&5

- **4. decode DNS packets from data**
- **5. query in dns_cache if dns db does not change,**

  else query in dns db , and return



```python
def handler(data, addr, sock):
    '''
    handle requests
    :param data:
    :param addr:
    :param sock:
    :return:
    '''
    global mtime_before
    try:
        dns = dnslib.DNSRecord.parse(data)
    except Exception as e:
        logger.info('Not a DNS packet.\n', e)
    else:
        dns.header.set_qr(dnslib.QR.RESPONSE)
        # get request name
        qname = dns.q.qname

        if os.path.exists(file_infnote_db) is False:
            logger.info('infnote_db file is updating or not exists')
            response = DNSServer.dns_cache.get(qname)
            if response:...
            else:
                logger.info('get nothing from cache,please check the infnote_db file')
        # query response in LRUCache if file_infnote_db do not change or was updating
        elif os.stat(file_infnote_db).st_mtime == mtime_before:
             logger.info('infnote_db file does not change')
             response = DNSServer.dns_cache.get(qname)
        ...
             if response:...
             else:...
        else:
            mtime_before = os.stat(file_infnote_db).st_mtime
            logger.info('query from infnote_db file')
            # quary from db file if not in cache
            answers, soa = query(str(qname).rstrip('.'))
            answer_dns = pack_dns(dns, answers, soa)
            # cache responce
            DNSServer.dns_cache[qname] = answer_dns.pack()
            sock.sendto(answer_dns.pack(), addr)
```

Steps of crawler

- 1. init a ip dict ips = {‘47.74.45.239’:False}

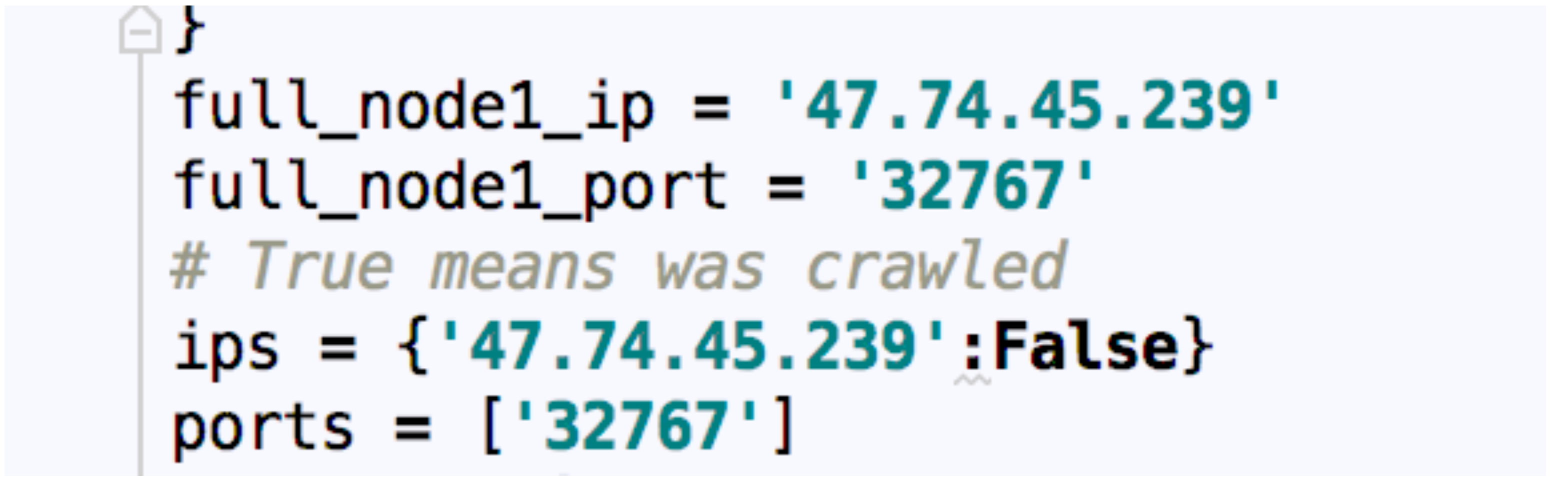
  the value is False indicates the fullnode is not visited
- 2. want_peers from the not visited fullnodes in ips
- 3. get peer’s ip from the response meassge and update ips

  If the fullnode is visited, set the value as True
- 4.Repeat step 2 and 3, until all the fullnodes are visited
- 5.Generate infnode_db.csv and nodes.csv, a report of fullnodes’ availability

Steps of crawler 1

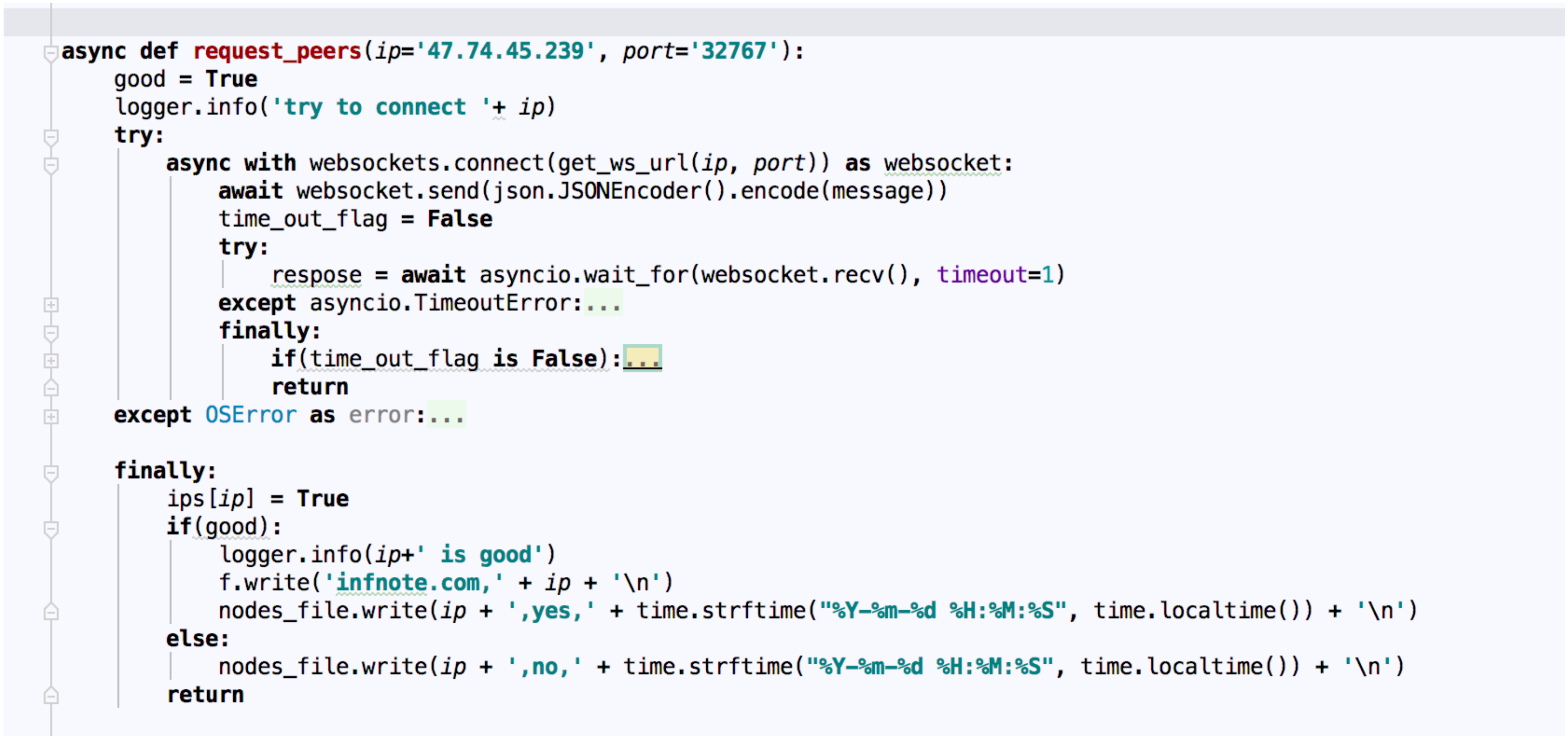
- **1. init a ip dict ips = {‘47.74.45.239’:False}**

the value is False indicates the fullnode is not visited



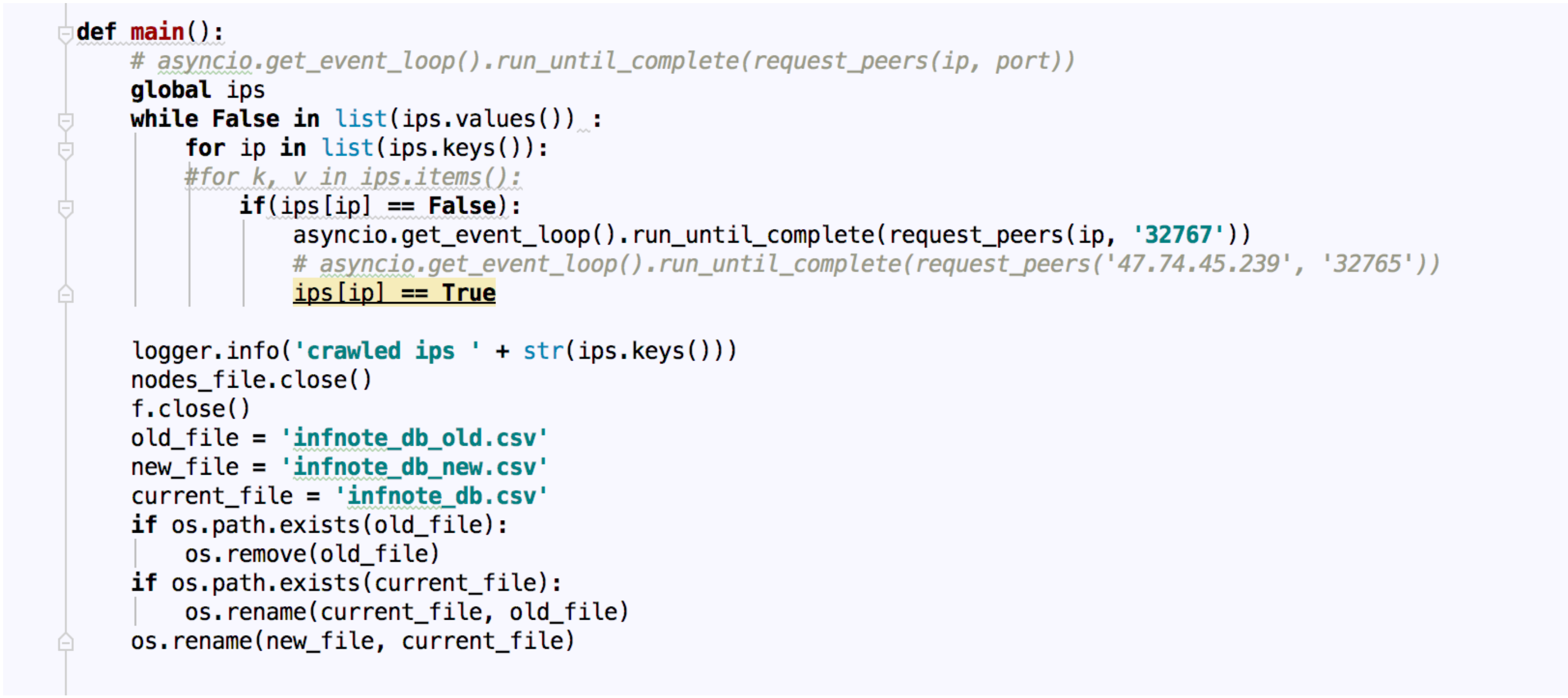
```
}
full_node1_ip = '47.74.45.239'
full_node1_port = '32767'
# True means was crawled
ips = {'47.74.45.239':False}
ports = ['32767']
```

Steps of crawler 2,3&4



```python
async def request_peers(ip='47.74.45.239', port='32767'):
    good = True
    logger.info('try to connect '+ ip)
    try:
        async with websockets.connect(get_ws_url(ip, port)) as websocket:
            await websocket.send(json.JSONEncoder().encode(message))
            time_out_flag = False
            try:
                respose = await asyncio.wait_for(websocket.recv(), timeout=1)
            except asyncio.TimeoutError:...
            finally:
                if(time_out_flag is False):...
                return
    except OSError as error:...

    finally:
        ips[ip] = True
        if(good):
            logger.info(ip+' is good')
            f.write('infnote.com,' + ip + '\n')
            nodes_file.write(ip + ',yes,' + time.strftime("%Y-%m-%d %H:%M:%S", time.localtime()) + '\n')
        else:
            nodes_file.write(ip + ',no,' + time.strftime("%Y-%m-%d %H:%M:%S", time.localtime()) + '\n')
        return
```

Steps of crawler 5



```python
def main():
    # asyncio.get_event_loop().run_until_complete(request_peers(ip, port))
    global ips
    while False in list(ips.values()) :
        for ip in list(ips.keys()):
        #for k, v in ips.items():
            if(ips[ip] == False):
                asyncio.get_event_loop().run_until_complete(request_peers(ip, '32767'))
                # asyncio.get_event_loop().run_until_complete(request_peers('47.74.45.239', '32765'))
                ips[ip] == True

    logger.info('crawled ips ' + str(ips.keys()))
    nodes_file.close()
    f.close()
    old_file = 'infnote_db_old.csv'
    new_file = 'infnote_db_new.csv'
    current_file = 'infnote_db.csv'
    if os.path.exists(old_file):
        os.remove(old_file)
    if os.path.exists(current_file):
        os.rename(current_file, old_file)
    os.rename(new_file, current_file)
```

The end

Thanks