Applied Data Science Capstone Project Week 3

June 1, 2021

Week Three Assignments - All questions are answered in this notebook.

```python
[1]: # Import required libraries.
     import pandas as pd # Library for data analysis
     import numpy as np
     import json # Library to handle JSON files
     import requests # Library to handle requests
     from pandas.io.json import json_normalize # Tranform JSON file into a pandas
      ↪dataframe
     import matplotlib.pyplot as plt
     import matplotlib.cm as cm
     import matplotlib.colors as colors # Matplotlib and associated plotting modules
     from sklearn.cluster import KMeans # Import k-means for clustering.
     import bs4 as bs
     from bs4 import BeautifulSoup # Website scraping libraries.
     from geopy.geocoders import Nominatim  # Convert an address into latitude and
      ↪longitude values.
     from shapely.geometry import Point
     import geopandas as gpd
     import lxml.html as lh
     import folium
```

```python
[2]: # GET request
     url = "https://en.wikipedia.org/w/index.php?
      ↪title=List_of_postal_codes_of_Canada:_M&oldid=1012118802" # Use old link
     extracting_data = requests.get(url).text
     wiki_data = BeautifulSoup(extracting_data, 'lxml')
```

```python
[3]: wiki_data
```

```
[3]: <!DOCTYPE html>
     <html class="client-nojs" dir="ltr" lang="en">
     <head>
     <meta charset="utf-8"/>
     <title>List of postal codes of Canada: M - Wikipedia</title>
     <script>document.documentElement.className="client-js";RLCONF={"wgBreakFrames":!
     1,"wgSeparatorTransformTable":["",""],"wgDigitTransformTable":["",""],"wgDefault
     DateFormat":"dmy","wgMonthNames":["","January","February","March","April","May",
```

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<script>(RLQ=window.RLQ||[]).push(function(){mw.loader.implement("user.options@1hzgi",function($,jQuery,require,module){/*@nomin*/mw.user.tokens.set({"patrolToken":"+\\","watchToken":"+\\","csrfToken":"+\\"});
});});</script>
<link href="/w/load.php?lang=en&modules=ext.cite.styles%7Cext.uls.interlanguage%7Cext.visualEditor.desktopArticleTarget.noscript%7Cext.wikimediaBadges%7Cjquery.tablesorter.styles%7Cmediawiki.action.styles%7Cmediawiki.interface.helpers.styles%7Cskins.vector.styles.legacy%7Cwikibase.client.init&only=styles&skin=vector" rel="stylesheet"/>
<script async="" src="/w/load.php?lang=en&modules=startup&only=scripts&a

```
mp;raw=1&amp;skin=vector"></script>
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=vector" rel="stylesheet"/>
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media="only screen and (max-width: 720px)" rel="alternate"/>
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<link href="/static/favicon/wikipedia.ico" rel="shortcut icon"/>
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type="application/rsd+xml"/>
<link href="//creativecommons.org/licenses/by-sa/3.0/" rel="license"/>
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rel="canonical"/>
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</head>
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vector action-view skin-vector-legacy"><div class="noprint" id="mw-page-
base"></div>
<div class="noprint" id="mw-head-base"></div>
<div class="mw-body" id="content" role="main">
<a id="top"></a>
<div id="siteNotice"><!-- CentralNotice --></div>
<div class="mw-indicators">
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M</h1>
<div class="vector-body" id="bodyContent">
<div class="noprint" id="siteSub">From Wikipedia, the free encyclopedia</div>
<div id="contentSub"><div class="mw-revision warningbox"><div id="mw-revision-
info"><p><b>This is an <a href="/wiki/Help:Page_history" title="Help:Page
history">old revision</a> of this page, as edited by <span id="mw-revision-
name"><a class="mw-userlink" href="/wiki/User:Eddyholland"
title="User:Eddyholland"><bdi>Eddyholland</bdi></a> <span class="mw-
usertoollinks">(<a class="mw-usertoollinks-talk"
```

```
href="/wiki/User_talk:Eddyholland" title="User talk:Eddyholland">talk</a> | <a
class="mw-usertoollinks-contribs" href="/wiki/Special:Contributions/Eddyholland"
title="Special:Contributions/Eddyholland">contribs</a>)</span></span> at <span
id="mw-revision-date">18:25, 14 March 2021</span><span id="mw-revision-summary">
<span class="comment">(Undid revision 1012023397 by <a
href="/wiki/Special:Contributions/Denelson83"
title="Special:Contributions/Denelson83">Denelson83</a> (<a
href="/wiki/User_talk:Denelson83" title="User talk:Denelson83">talk</a>) because
it broke many DataSci student's ipython call to this page, which is being
referenced or needed, by the Coursera course : Data Science
Capstone)</span></span>. The present address (URL) is a <a
href="/wiki/Help:Permanent_link" title="Help:Permanent link">permanent link</a>
to this revision, which may differ significantly from the <span
class="plainlinks"><a class="external text"
href="https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M">current
revision</a></span>.</b></p><div id="revision-info-plain" style="display:
none;">Revision as of 18:25, 14 March 2021 by <a class="mw-userlink"
href="/wiki/User:Eddyholland"
title="User:Eddyholland"><bdi>Eddyholland</bdi></a> <span class="mw-
usertoollinks">(<a class="mw-usertoollinks-talk"
href="/wiki/User_talk:Eddyholland" title="User talk:Eddyholland">talk</a> | <a
class="mw-usertoollinks-contribs" href="/wiki/Special:Contributions/Eddyholland"
title="Special:Contributions/Eddyholland">contribs</a>)</span> <span
class="comment">(Undid revision 1012023397 by <a
href="/wiki/Special:Contributions/Denelson83"
title="Special:Contributions/Denelson83">Denelson83</a> (<a
href="/wiki/User_talk:Denelson83" title="User talk:Denelson83">talk</a>) because
it broke many DataSci student's ipython call to this page, which is being
referenced or needed, by the Coursera course : Data Science
Capstone)</span></div></div><div id="mw-revision-nav">(<a href="/w/index.php?tit
le=List_of_postal_codes_of_Canada:_M&amp;diff=prev&amp;oldid=1012118802"
title="List of postal codes of Canada: M">diff</a>) <a href="/w/index.php?title=
List_of_postal_codes_of_Canada:_M&amp;direction=prev&amp;oldid=1012118802"
title="List of postal codes of Canada: M">← Previous revision</a> | <a
href="/wiki/List_of_postal_codes_of_Canada:_M" title="List of postal codes of
Canada: M">Latest revision</a> (<a href="/w/index.php?title=List_of_postal_codes
_of_Canada:_M&amp;diff=cur&amp;oldid=1012118802" title="List of postal codes of
Canada: M">diff</a>) | <a href="/w/index.php?title=List_of_postal_codes_of_Canad
a:_M&amp;direction=next&amp;oldid=1012118802" title="List of postal codes of
Canada: M">Newer revision →</a> (<a href="/w/index.php?title=List_of_postal_code
s_of_Canada:_M&amp;diff=next&amp;oldid=1012118802" title="List of postal codes
of Canada: M">diff</a>)</div></div></div>
<div id="contentSub2"></div>
<div id="jump-to-nav"></div>
<a class="mw-jump-link" href="#mw-head">Jump to navigation</a>
<a class="mw-jump-link" href="#searchInput">Jump to search</a>
<div class="mw-body-content mw-content-ltr" dir="ltr" id="mw-content-text"
```

lang="en"><div class="mw-parser-output"><div class="shortdescription nomobile noexcerpt noprint searchaux" style="display:none">Wikipedia list article</div>
<p>This is a list of postal codes in Canada where the first letter is M. Postal codes beginning with M are located within the city of Toronto in the province of Ontario. Only the first three characters are listed, corresponding to the Forward Sortation Area.
</p><p>Canada Post provides a free postal code look-up tool on its website,^{[1]} via its applications for such smartphones as the iPhone and BlackBerry,^{[2]} and sells hard-copy directories and CD-ROMs. Many vendors also sell validation tools, which allow customers to properly match addresses and postal codes. Hard-copy directories can also be consulted in all post offices, and some libraries.
</p>
<h2>Toronto - 103 FSAs</h2>
<p>Note: There are no rural FSAs in Toronto, hence no postal codes should start with M0. However, the postal code M0R 8T0 is assigned to an Amazon warehouse in Mississauga, and the postal code M0R 2A2 is used for the Gateway postal facility in Mississauga, suggesting that Canada Post may have reserved the M0 FSA for high volume addresses.
</p>
<table class="wikitable sortable">
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</th>
<th>Borough
</th>
<th>Neighbourhood
</th></tr>
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</td>
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</td></tr>

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<tr>
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</td>
<td>Parkwoods
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<tr>
<td>M4A
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</td>
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</td></tr>
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</td>
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<td>M7A
</td>
<td>Downtown Toronto
</td>
<td>Queen's Park, Ontario Provincial Government
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```html
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<td>Etobicoke
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</td>
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<td>North York
</td>
<td>Don Mills
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</td>
<td>East York
</td>
<td>Parkview Hill, Woodbine Gardens
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<td>M5B
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</td>
<td>Garden District, Ryerson
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```

```
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</td>
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<td>Rouge Hill, Port Union, Highland Creek
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</td>
<td>Guildwood, Morningside, West Hill
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<td>The Beaches
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</td>
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```
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</td>
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<td>Not assigned
</td></tr>
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<tr>
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```
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<td>North York
</td>
<td>Northwood Park, York University
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<td>M4J
</td>
<td>East York
</td>
<td>East Toronto, Broadview North (Old East York)
</td></tr>
<tr>
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</td>
<td>Downtown Toronto
</td>
<td>Harbourfront East, Union Station, Toronto Islands
</td></tr>
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<td>Little Portugal, Trinity
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<td>Scarborough
</td>
<td>Kennedy Park, Ionview, East Birchmount Park
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<tr>
<td>M2K
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<td>North York
</td>
<td>Bayview Village
</td></tr>
<tr>
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<td>North York
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</td></tr>
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<td>M4K
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<td>East Toronto
</td>
<td>The Danforth West, Riverdale
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<tr>
<td>M5K
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<td>Downtown Toronto
</td>
<td>Toronto Dominion Centre, Design Exchange
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<tr>
```

```
<td>M6K
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<td>West Toronto
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<td>Brockton, Parkdale Village, Exhibition Place
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<tr>
<td>M7K
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<tr>
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<tr>
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<tr>
<td>M1L
</td>
<td>Scarborough
</td>
<td>Golden Mile, Clairlea, Oakridge
</td></tr>
<tr>
<td>M2L
</td>
<td>North York
</td>
<td>York Mills, Silver Hills
</td></tr>
<tr>
<td>M3L
</td>
<td>North York
</td>
<td>Downsview
```

```html
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<tr>
<td>M4L
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<td>East Toronto
</td>
<td>India Bazaar, The Beaches West
</td></tr>
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<td>M5L
</td>
<td>Downtown Toronto
</td>
<td>Commerce Court, Victoria Hotel
</td></tr>
<tr>
<td>M6L
</td>
<td>North York
</td>
<td>North Park, Maple Leaf Park, Upwood Park
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<td>North York
</td>
<td>Humber Summit
</td></tr>
<tr>
<td>M1M
</td>
<td>Scarborough
```

```
</td>
<td>Cliffside, Cliffcrest, Scarborough Village West
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<tr>
<td>M2M
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<td>North York
</td>
<td>Willowdale, Newtonbrook
</td></tr>
<tr>
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</td>
<td>North York
</td>
<td>Downsview
</td></tr>
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<td>East Toronto
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<td>Studio District
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<td style="text-align:center; border:1px solid #aaa;"><a href="/wiki/Manitoba"
title="Manitoba">MB</a>
</td>
<td style="text-align:center; border:1px solid #aaa;"><a
href="/wiki/Saskatchewan" title="Saskatchewan">SK</a>
</td>
<td style="text-align:center; border:1px solid #aaa;"><a href="/wiki/Alberta"
title="Alberta">AB</a>
</td>
<td style="text-align:center; border:1px solid #aaa;"><a
```

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href="/wiki/British_Columbia" title="British Columbia">BC</a>
</td>
<td style="text-align:center; border:1px solid #aaa;"><a href="/wiki/Nunavut"
title="Nunavut">NU</a>/<a href="/wiki/Northwest_Territories" title="Northwest
Territories">NT</a>
</td>
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title="Yukon">YT</a>
</td></tr>
<tr>
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font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_A"
title="List of postal codes of Canada: A">A</a>
</td>
<td align="center" style="border: 1px solid #FF4000; background-color: #FFE8E0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_B"
title="List of postal codes of Canada: B">B</a>
</td>
<td align="center" style="border: 1px solid #FF8000; background-color: #FFF0E0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_C"
title="List of postal codes of Canada: C">C</a>
</td>
<td align="center" style="border: 1px solid #FFC000; background-color: #FFF8E0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_E"
title="List of postal codes of Canada: E">E</a>
</td>
<td align="center" style="border: 1px solid #FFFF00; background-color: #FFFFE0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_G"
title="List of postal codes of Canada: G">G</a>
</td>
<td align="center" style="border: 1px solid #C0FF00; background-color: #F8FFE0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_H"
title="List of postal codes of Canada: H">H</a>
</td>
<td align="center" style="border: 1px solid #80FF00; background-color: #F0FFE0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_J"
title="List of postal codes of Canada: J">J</a>
</td>
<td align="center" style="border: 1px solid #00FF00; background-color: #E0FFE0;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_K"
title="List of postal codes of Canada: K">K</a>
</td>
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font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_L"
title="List of postal codes of Canada: L">L</a>
</td>
<td align="center" style="border: 1px solid #E0FFF8; background-color: #00FFC0;
```

```
font-size: 135%; color: black;" width="5%"><a class="mw-selflink selflink">M</a>
</td>
<td align="center" style="border: 1px solid #00FFE0; background-color: #E0FFFC;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_N"
title="List of postal codes of Canada: N">N</a>
</td>
<td align="center" style="border: 1px solid #00FFFF; background-color: #E0FFFF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_P"
title="List of postal codes of Canada: P">P</a>
</td>
<td align="center" style="border: 1px solid #00C0FF; background-color: #E0F8FF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_R"
title="List of postal codes of Canada: R">R</a>
</td>
<td align="center" style="border: 1px solid #0080FF; background-color: #E0F0FF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_S"
title="List of postal codes of Canada: S">S</a>
</td>
<td align="center" style="border: 1px solid #0040FF; background-color: #E0E8FF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_T"
title="List of postal codes of Canada: T">T</a>
</td>
<td align="center" style="border: 1px solid #0000FF; background-color: #E0E0FF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_V"
title="List of postal codes of Canada: V">V</a>
</td>
<td align="center" style="border: 1px solid #A000FF; background-color: #E8E0FF;
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title="List of postal codes of Canada: X">X</a>
</td>
<td align="center" style="border: 1px solid #FF00FF; background-color: #FFE0FF;
font-size: 135%;" width="5%"><a href="/wiki/List_of_postal_codes_of_Canada:_Y"
title="List of postal codes of Canada: Y">Y</a>
</td></tr></tbody></table>
</td></tr></tbody></table>
<!--
NewPP limit report
Parsed by mw1401
Cached time: 20210531122747
Cache expiry: 1814400
Reduced expiry: false
Complications: [vary-revision-sha1]
CPU time usage: 0.181 seconds
Real time usage: 0.236 seconds
Preprocessor visited node count: 278/1000000
Post-expand include size: 10850/2097152 bytes
Template argument size: 275/2097152 bytes
```

```
Highest expansion depth: 8/40
Expensive parser function count: 0/500
Unstrip recursion depth: 1/20
Unstrip post-expand size: 9406/5000000 bytes
Lua time usage: 0.092/10.000 seconds
Lua memory usage: 3063228/52428800 bytes
Number of Wikibase entities loaded: 0/400
-->
<!--
Transclusion expansion time report (%,ms,calls,template)
100.00%   187.412      1 -total
 52.70%    98.771      3 Template:Cite_web
 39.40%    73.839      1 Template:Short_description
 24.83%    46.534      1 Template:Pagetype
  8.35%    15.654      2 Template:Main_other
  6.62%    12.405      1 Template:SDcat
  3.16%     5.915      1 Template:Canadian_postal_codes
-->
<!-- Saved in RevisionOutputCache with key
enwiki:rcache:1012118802:dateformat=default and timestamp 20210531122747 and
revision id 1012118802.
 -->
</div><noscript><img alt="" height="1"
src="//en.wikipedia.org/wiki/Special:CentralAutoLogin/start?type=1x1"
style="border: none; position: absolute;" title="" width="1"/></noscript>
<div class="printfooter">Retrieved from "<a dir="ltr" href="https://en.wikipedia
.org/w/index.php?title=List_of_postal_codes_of_Canada:_M&amp;oldid=1012118802">h
ttps://en.wikipedia.org/w/index.php?title=List_of_postal_codes_of_Canada:_M&amp;
oldid=1012118802</a>"</div></div>
<div class="catlinks" data-mw="interface" id="catlinks"><div class="mw-normal-
catlinks" id="mw-normal-catlinks"><a href="/wiki/Help:Category"
title="Help:Category">Categories</a>: <ul><li><a
href="/wiki/Category:Communications_in_Ontario" title="Category:Communications
in Ontario">Communications in Ontario</a></li><li><a
href="/wiki/Category:Postal_codes_in_Canada" title="Category:Postal codes in
Canada">Postal codes in Canada</a></li><li><a href="/wiki/Category:Toronto"
title="Category:Toronto">Toronto</a></li><li><a href="/wiki/Category:Ontario-
related_lists" title="Category:Ontario-related lists">Ontario-related
lists</a></li></ul></div><div class="mw-hidden-catlinks mw-hidden-cats-hidden"
id="mw-hidden-catlinks">Hidden categories: <ul><li><a
href="/wiki/Category:Articles_with_short_description" title="Category:Articles
with short description">Articles with short description</a></li><li><a
href="/wiki/Category:Short_description_is_different_from_Wikidata"
title="Category:Short description is different from Wikidata">Short description
is different from Wikidata</a></li></ul></div></div>
</div>
</div>
```

```html
<div id="mw-data-after-content">
<div class="read-more-container"></div>
</div>
<div id="mw-navigation">
<h2>Navigation menu</h2>
<div id="mw-head">
<nav aria-labelledby="p-personal-label" class="mw-portlet mw-portlet-personal
vector-user-menu-legacy vector-menu" id="p-personal" role="navigation">
<h3 class="vector-menu-heading" id="p-personal-label">
<span>Personal tools</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li id="pt-anonuserpage">Not logged
in</li><li id="pt-anontalk"><a accesskey="n" href="/wiki/Special:MyTalk"
title="Discussion about edits from this IP address [n]">Talk</a></li><li id="pt-
anoncontribs"><a accesskey="y" href="/wiki/Special:MyContributions" title="A
list of edits made from this IP address [y]">Contributions</a></li><li id="pt-
createaccount"><a href="/w/index.php?title=Special:CreateAccount&amp;returnto=Li
st+of+postal+codes+of+Canada%3A+M&amp;returntoquery=oldid%3D1012118802"
title="You are encouraged to create an account and log in; however, it is not
mandatory">Create account</a></li><li id="pt-login"><a accesskey="o" href="/w/in
dex.php?title=Special:UserLogin&amp;returnto=List+of+postal+codes+of+Canada%3A+M
&amp;returntoquery=oldid%3D1012118802" title="You're encouraged to log in;
however, it's not mandatory. [o]">Log in</a></li></ul>
</div>
</nav>
<div id="left-navigation">
<nav aria-labelledby="p-namespaces-label" class="mw-portlet mw-portlet-
namespaces vector-menu vector-menu-tabs" id="p-namespaces" role="navigation">
<h3 class="vector-menu-heading" id="p-namespaces-label">
<span>Namespaces</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li class="selected" id="ca-nstab-main"><a
accesskey="c" href="/wiki/List_of_postal_codes_of_Canada:_M" title="View the
content page [c]">Article</a></li><li id="ca-talk"><a accesskey="t"
href="/wiki/Talk:List_of_postal_codes_of_Canada:_M" rel="discussion"
title="Discuss improvements to the content page [t]">Talk</a></li></ul>
</div>
</nav>
<nav aria-labelledby="p-variants-label" class="mw-portlet mw-portlet-variants
emptyPortlet vector-menu vector-menu-dropdown" id="p-variants"
role="navigation">
<input aria-labelledby="p-variants-label" class="vector-menu-checkbox"
type="checkbox"/>
<h3 class="vector-menu-heading" id="p-variants-label">
<span>Variants</span>
```

```
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"></ul>
</div>
</nav>
</div>
<div id="right-navigation">
<nav aria-labelledby="p-views-label" class="mw-portlet mw-portlet-views vector-
menu vector-menu-tabs" id="p-views" role="navigation">
<h3 class="vector-menu-heading" id="p-views-label">
<span>Views</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li class="selected" id="ca-view"><a
href="/wiki/List_of_postal_codes_of_Canada:_M">Read</a></li><li id="ca-
viewsource"><a accesskey="e" href="/w/index.php?title=List_of_postal_codes_of_Ca
nada:_M&amp;action=edit&amp;oldid=1012118802" title="This page is protected.
You can view its source [e]">View source</a></li><li id="ca-history"><a
accesskey="h"
href="/w/index.php?title=List_of_postal_codes_of_Canada:_M&amp;action=history"
title="Past revisions of this page [h]">View history</a></li></ul>
</div>
</nav>
<nav aria-labelledby="p-cactions-label" class="mw-portlet mw-portlet-cactions
emptyPortlet vector-menu vector-menu-dropdown" id="p-cactions"
role="navigation">
<input aria-labelledby="p-cactions-label" class="vector-menu-checkbox"
type="checkbox"/>
<h3 class="vector-menu-heading" id="p-cactions-label">
<span>More</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"></ul>
</div>
</nav>
<div id="p-search" role="search">
<h3>
<label for="searchInput">Search</label>
</h3>
<form action="/w/index.php" id="searchform">
<div data-search-loc="header-navigation" id="simpleSearch">
<input accesskey="f" autocapitalize="sentences" id="searchInput" name="search"
placeholder="Search Wikipedia" title="Search Wikipedia [f]" type="search"/>
<input name="title" type="hidden" value="Special:Search"/>
<input class="searchButton mw-fallbackSearchButton" id="mw-searchButton"
name="fulltext" title="Search Wikipedia for this text" type="submit"
value="Search"/>
```

```html
<input class="searchButton" id="searchButton" name="go" title="Go to a page with
this exact name if it exists" type="submit" value="Go"/>
</div>
</form>
</div>
</div>
</div>
<div id="mw-panel">
<div id="p-logo" role="banner">
<a class="mw-wiki-logo" href="/wiki/Main_Page" title="Visit the main page"></a>
</div>
<nav aria-labelledby="p-navigation-label" class="mw-portlet mw-portlet-
navigation vector-menu vector-menu-portal portal" id="p-navigation"
role="navigation">
<h3 class="vector-menu-heading" id="p-navigation-label">
<span>Navigation</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li id="n-mainpage-description"><a
accesskey="z" href="/wiki/Main_Page" title="Visit the main page [z]">Main
page</a></li><li id="n-contents"><a href="/wiki/Wikipedia:Contents"
title="Guides to browsing Wikipedia">Contents</a></li><li
id="n-currentevents"><a href="/wiki/Portal:Current_events" title="Articles
related to current events">Current events</a></li><li id="n-randompage"><a
accesskey="x" href="/wiki/Special:Random" title="Visit a randomly selected
article [x]">Random article</a></li><li id="n-aboutsite"><a
href="/wiki/Wikipedia:About" title="Learn about Wikipedia and how it
works">About Wikipedia</a></li><li id="n-contactpage"><a
href="//en.wikipedia.org/wiki/Wikipedia:Contact_us" title="How to contact
Wikipedia">Contact us</a></li><li id="n-sitesupport"><a href="https://donate.wik
imedia.org/wiki/Special:FundraiserRedirector?utm_source=donate&amp;utm_medium=si
debar&amp;utm_campaign=C13_en.wikipedia.org&amp;uselang=en" title="Support us by
donating to the Wikimedia Foundation">Donate</a></li></ul>
</div>
</nav>
<nav aria-labelledby="p-interaction-label" class="mw-portlet mw-portlet-
interaction vector-menu vector-menu-portal portal" id="p-interaction"
role="navigation">
<h3 class="vector-menu-heading" id="p-interaction-label">
<span>Contribute</span>
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li id="n-help"><a
href="/wiki/Help:Contents" title="Guidance on how to use and edit
Wikipedia">Help</a></li><li id="n-introduction"><a
href="/wiki/Help:Introduction" title="Learn how to edit Wikipedia">Learn to
edit</a></li><li id="n-portal"><a href="/wiki/Wikipedia:Community_portal"
```

title="The hub for editors">Community portal
<li id="n-recentchanges"><a
accesskey="r" href="/wiki/Special:RecentChanges" title="A list of recent changes
to Wikipedia [r]">Recent changes
<li id="n-upload"><a
href="/wiki/Wikipedia:File_Upload_Wizard" title="Add images or other media for
use on Wikipedia">Upload file
</div>
</nav>
<nav aria-labelledby="p-tb-label" class="mw-portlet mw-portlet-tb vector-menu
vector-menu-portal portal" id="p-tb" role="navigation">
<h3 class="vector-menu-heading" id="p-tb-label">
Tools
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li id="t-whatlinkshere"><a accesskey="j"
href="/wiki/Special:WhatLinksHere/List_of_postal_codes_of_Canada:_M" title="List
of all English Wikipedia pages containing links to this page [j]">What links
here
<li id="t-recentchangeslinked"><a accesskey="k"
href="/wiki/Special:RecentChangesLinked/List_of_postal_codes_of_Canada:_M"
rel="nofollow" title="Recent changes in pages linked from this page [k]">Related
changes
<li id="t-upload"><a accesskey="u"
href="/wiki/Wikipedia:File_Upload_Wizard" title="Upload files [u]">Upload
file
<li id="t-specialpages"><a accesskey="q"
href="/wiki/Special:SpecialPages" title="A list of all special pages
[q]">Special pages
<li id="t-permalink"><a
href="/w/index.php?title=List_of_postal_codes_of_Canada:_M&oldid=1012118802"
title="Permanent link to this revision of this page">Permanent link
<li
id="t-info"><a
href="/w/index.php?title=List_of_postal_codes_of_Canada:_M&action=info"
title="More information about this page">Page information
<li
id="t-cite"><a href="/w/index.php?title=Special:CiteThisPage&page=List_of_po
stal_codes_of_Canada%3A_M&id=1012118802&wpFormIdentifier=titleform"
title="Information on how to cite this page">Cite this page
<li
id="t-wikibase"><a accesskey="g"
href="https://www.wikidata.org/wiki/Special:EntityPage/Q3248240"
title="Structured data on this page hosted by Wikidata [g]">Wikidata
item
</div>
</nav>
<nav aria-labelledby="p-coll-print_export-label" class="mw-portlet mw-portlet-
coll-print_export vector-menu vector-menu-portal portal" id="p-coll-
print_export" role="navigation">
<h3 class="vector-menu-heading" id="p-coll-print_export-label">
Print/export
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li id="coll-download-as-rl"><a href="/w/in
dex.php?title=Special:DownloadAsPdf&page=List_of_postal_codes_of_Canada%3A_M

&action=show-download-screen" title="Download this page as a PDF
file">Download as PDF
<li id="t-print"><a accesskey="p"
href="/w/index.php?title=List_of_postal_codes_of_Canada:_M&printable=yes"
title="Printable version of this page [p]">Printable version
</div>
</nav>
<nav aria-labelledby="p-lang-label" class="mw-portlet mw-portlet-lang vector-
menu vector-menu-portal portal" id="p-lang" role="navigation">
<h3 class="vector-menu-heading" id="p-lang-label">
Languages
</h3>
<div class="vector-menu-content">
<ul class="vector-menu-content-list"><li class="interlanguage-link interwiki-
fr"><a class="interlanguage-link-target" href="https://fr.wikipedia.org/wiki/Lis
te_des_codes_postaux_canadiens_d%C3%A9butant_par_M" hreflang="fr" lang="fr"
title="Liste des codes postaux canadiens débutant par M –
French">Français
<div class="after-portlet after-portlet-lang"><span class="wb-langlinks-edit wb-
langlinks-link"><a class="wbc-editpage"
href="https://www.wikidata.org/wiki/Special:EntityPage/Q3248240#sitelinks-
wikipedia" title="Edit interlanguage links">Edit links</div>
</div>
</nav>
</div>
</div>
<footer class="mw-footer" id="footer" role="contentinfo">
<ul id="footer-info">
<li id="footer-info-lastmod"> This page was last edited on 14 March 2021, at
18:25 (UTC).
<li id="footer-info-copyright">This version of the
page has been <a href="https://en.wikipedia.org/wiki/Wikipedia:Page_history"
title="Wikipedia:Page history">revised. Besides normal editing, the reason
for revision may have been that this version contains factual inaccuracies,
vandalism, or material not compatible with the <a href="https://en.wikipedia.org
/wiki/Wikipedia:Text_of_Creative_Commons_Attribution-
ShareAlike_3.0_Unported_License">Creative Commons Attribution-ShareAlike
License.

<ul id="footer-places">
<li id="footer-places-privacy"><a class="extiw"
href="https://foundation.wikimedia.org/wiki/Privacy_policy" title="wmf:Privacy
policy">Privacy policy
<li id="footer-places-about"><a href="/wiki/Wikipedia:About"
title="Wikipedia:About">About Wikipedia
<li id="footer-places-disclaimer"><a href="/wiki/Wikipedia:General_disclaimer"
title="Wikipedia:General disclaimer">Disclaimers
<li id="footer-places-contact"><a

href="//en.wikipedia.org/wiki/Wikipedia:Contact_us">Contact Wikipedia
<li id="footer-places-mobileview"><a class="noprint stopMobileRedirectToggle" hr
ef="//en.m.wikipedia.org/w/index.php?title=List_of_postal_codes_of_Canada:_M&amp
;oldid=1012118802&mobileaction=toggle_view_mobile">Mobile view
<li id="footer-places-developers"><a href="https://www.mediawiki.org/wiki/Specia
l:MyLanguage/How_to_contribute">Developers
<li id="footer-places-statslink"><a
href="https://stats.wikimedia.org/#/en.wikipedia.org">Statistics
<li id="footer-places-cookiestatement"><a
href="https://foundation.wikimedia.org/wiki/Cookie_statement">Cookie
statement

<ul class="noprint" id="footer-icons">
<li id="footer-copyrightico"><img
alt="Wikimedia Foundation" height="31" loading="lazy"
src="/static/images/footer/wikimedia-button.png"
srcset="/static/images/footer/wikimedia-button-1.5x.png 1.5x,
/static/images/footer/wikimedia-button-2x.png 2x" width="88"/>
<li id="footer-poweredbyico"><img
alt="Powered by MediaWiki" height="31" loading="lazy"
src="/static/images/footer/poweredby_mediawiki_88x31.png"
srcset="/static/images/footer/poweredby_mediawiki_132x47.png 1.5x,
/static/images/footer/poweredby_mediawiki_176x62.png 2x" width="88"/>

</footer>
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78,"limit":1000000},"postexpandincludesize":{"value":10850,"limit":2097152},"tem
plateargumentsize":{"value":275,"limit":2097152},"expansiondepth":{"value":8,"li
mit":40},"expensivefunctioncount":{"value":0,"limit":500},"unstrip-
depth":{"value":1,"limit":20},"unstrip-size":{"value":9406,"limit":5000000},"ent
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1 -total"," 52.70%   98.771   3 Template:Cite_web"," 39.40%   73.839   1
Template:Short_description"," 24.83%   46.534   1 Template:Pagetype"," 8.35%
15.654   2 Template:Main_other"," 6.62%   12.405   1 Template:SDcat","
3.16%   5.915   1
Template:Canadian_postal_codes"]},"scribunto":{"limitreport-
timeusage":{"value":"0.092","limit":"10.000"},"limitreport-memusage":{"value":30
63228,"limit":52428800}},"cachereport":{"origin":"mw1401","timestamp":"202105311
22747","ttl":1814400,"transientcontent":false}});});</script>
<script type="application/ld+json">{"@context":"https:\/\/schema.org","@type":"A
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.org\/wiki\/List_of_postal_codes_of_Canada:_M","sameAs":"http:\/\/www.wikidata.o
rg\/entity\/Q3248240","mainEntity":"http:\/\/www.wikidata.org\/entity\/Q3248240"
,"author":{"@type":"Organization","name":"Contributors to Wikimedia
projects"},"publisher":{"@type":"Organization","name":"Wikimedia Foundation, Inc
.","logo":{"@type":"ImageObject","url":"https:\/\/www.wikimedia.org\/static\/ima

ges\/wmf-hor-googpub.png"}},"datePublished":"2004-03-20T10:02:13Z","dateModified":"2021-03-14T18:25:10Z","headline":"Wikimedia list article"}</script>
<script>(RLQ=window.RLQ||[]).push(function(){mw.config.set({"wgBackendResponseTime":160,"wgHostname":"mw1268"});});</script>
</body></html>

```python
[4]: column_names = ['Postalcode','Borough','Neighborhood']
     toronto = pd.DataFrame(columns = column_names)

     content = wiki_data.find('div', class_='mw-parser-output')
     table = content.table.tbody
     postcode = 0
     borough = 0
     neighborhood = 0

     for tr in table.find_all('tr'):
         i = 0
         for td in tr.find_all('td'):
             if i == 0:
                 postcode = td.text
                 i = i + 1
             elif i == 1:
                 borough = td.text
                 i = i + 1
             elif i == 2:
                 neighborhood = td.text.strip('').replace(']','')
         toronto = toronto.append({'Postalcode': postcode,'Borough':
     ↪borough,'Neighborhood': neighborhood},ignore_index=True)
```

```python
[5]: # clean dataframe
     toronto = toronto[toronto.Borough != 'Not assigned']
     toronto = toronto[toronto.Borough !=  0]
     toronto.reset_index(drop = True, inplace = True)
     i = 0
     for i in range(0,toronto.shape[0]):
         if toronto.iloc[i][2] == 'Not assigned':
             toronto.iloc[i][2] = toronto.iloc[i][1]
             i = i+1
```

```python
[6]: df = toronto.groupby(['Postalcode','Borough'])['Neighborhood'].apply(', '.join).
     ↪reset_index()
     df.describe()
```

```
[6]:         Postalcode         Borough     Neighborhood
     count          180             180              180
     unique         180              12              100
     top          M9B\n  Not assigned\n  Not assigned\n
```

```
freq              1              77              77
```

```
[7]: # Getting the data from url
     url = "https://en.wikipedia.org/w/index.php?
      ↪title=List_of_postal_codes_of_Canada:_M&oldid=1012118802"
     res = requests.get(url)
     soup = bs.BeautifulSoup(res.content,'lxml')
     table = soup.find_all('table')[0]
     df = pd.read_html(str(table))
     data = pd.read_json(df[0].to_json(orient='records'))
```

```
[8]: data.head()
```

```
[8]:   Postal Code          Borough            Neighbourhood
     0         M1A     Not assigned             Not assigned
     1         M2A     Not assigned             Not assigned
     2         M3A       North York                Parkwoods
     3         M4A       North York          Victoria Village
     4         M5A  Downtown Toronto  Regent Park, Harbourfront
```

```
[9]: # Choosing only data where field Borough doesn't have not assigned value
     raw_data_selected = data[data['Borough'] != 'Not assigned']
     # Grouping Data
     raw_data_selected = raw_data_selected.groupby(['Borough', 'Postal Code'],␣
      ↪as_index=False).agg(','.join)
     # Check dataframe
     raw_data_selected.head()
```

```
[9]:           Borough Postal Code                     Neighbourhood
     0  Central Toronto         M4N                     Lawrence Park
     1  Central Toronto         M4P                   Davisville North
     2  Central Toronto         M4R  North Toronto West, Lawrence Park
     3  Central Toronto         M4S                        Davisville
     4  Central Toronto         M4T        Moore Park, Summerhill East
```

```
[10]: # Replacing values in Neighbourhood field with Borough where Neighbourhood is␣
       ↪not assigned
      raw_data_selected['Neighbourhood'] = np.
       ↪where(raw_data_selected['Neighbourhood'] == 'Not assigned',␣
       ↪raw_data_selected['Borough'], raw_data_selected['Neighbourhood'])
      # Shape of Data
      raw_data_selected.shape
```

```
[10]: (103, 3)
```

```
[11]: column_titles = ['Postal Code', 'Borough','Neighbourhood']
      df = raw_data_selected[column_titles]
      df.head()
```

```
[11]:   Postal Code          Borough                       Neighbourhood
      0        M4N   Central Toronto                       Lawrence Park
      1        M4P   Central Toronto                     Davisville North
      2        M4R   Central Toronto  North Toronto West, Lawrence Park
      3        M4S   Central Toronto                           Davisville
      4        M4T   Central Toronto       Moore Park, Summerhill East
```

```
[12]: df.shape
```

```
[12]: (103, 3)
```

```
[13]: geospatial_url = "https://cocl.us/Geospatial_data"
      geospatial_data = pd.read_csv(geospatial_url)
      geospatial_data.head()
```

```
[13]:   Postal Code   Latitude  Longitude
      0        M1B  43.806686 -79.194353
      1        M1C  43.784535 -79.160497
      2        M1E  43.763573 -79.188711
      3        M1G  43.770992 -79.216917
      4        M1H  43.773136 -79.239476
```

```
[14]: # Merging dataframes
      merged_data = pd.merge(df, geospatial_data, on='Postal Code')
      merged_data.head()
```

```
[14]:   Postal Code          Borough                       Neighbourhood   Latitude  \
      0        M4N   Central Toronto                       Lawrence Park  43.728020
      1        M4P   Central Toronto                     Davisville North  43.712751
      2        M4R   Central Toronto  North Toronto West, Lawrence Park  43.715383
      3        M4S   Central Toronto                           Davisville  43.704324
      4        M4T   Central Toronto       Moore Park, Summerhill East  43.689574

          Longitude
      0 -79.388790
      1 -79.390197
      2 -79.405678
      3 -79.388790
      4 -79.383160
```

```
[15]: merged_data['Coordinates'] = list(zip(merged_data['Latitude'],␣
      ↪merged_data['Longitude']))
      merged_data.head()
```

```
[15]:    Postal Code          Borough                      Neighbourhood   Latitude  \
      0          M4N    Central Toronto                      Lawrence Park  43.728020
      1          M4P    Central Toronto                    Davisville North  43.712751
      2          M4R    Central Toronto  North Toronto West, Lawrence Park  43.715383
      3          M4S    Central Toronto                          Davisville  43.704324
      4          M4T    Central Toronto       Moore Park, Summerhill East  43.689574

         Longitude                 Coordinates
      0 -79.388790   (43.7280205, -79.3887901)
      1 -79.390197   (43.7127511, -79.3901975)
      2 -79.405678   (43.7153834, -79.4056784)
      3 -79.388790   (43.7043244, -79.3887901)
      4 -79.383160   (43.6895743, -79.3831599)
```

```
[18]: merged_data['Coordinates'] = merged_data['Coordinates'].apply(Point)
      gdf = gpd.GeoDataFrame(merged_data, geometry='Coordinates')
      gdf.head()
```

```
[18]:    Postal Code          Borough                      Neighbourhood   Latitude  \
      0          M4N    Central Toronto                      Lawrence Park  43.728020
      1          M4P    Central Toronto                    Davisville North  43.712751
      2          M4R    Central Toronto  North Toronto West, Lawrence Park  43.715383
      3          M4S    Central Toronto                          Davisville  43.704324
      4          M4T    Central Toronto       Moore Park, Summerhill East  43.689574

         Longitude                  Coordinates
      0 -79.388790   POINT (43.72802 -79.38879)
      1 -79.390197   POINT (43.71275 -79.39020)
      2 -79.405678   POINT (43.71538 -79.40568)
      3 -79.388790   POINT (43.70432 -79.38879)
      4 -79.383160   POINT (43.68957 -79.38316)
```
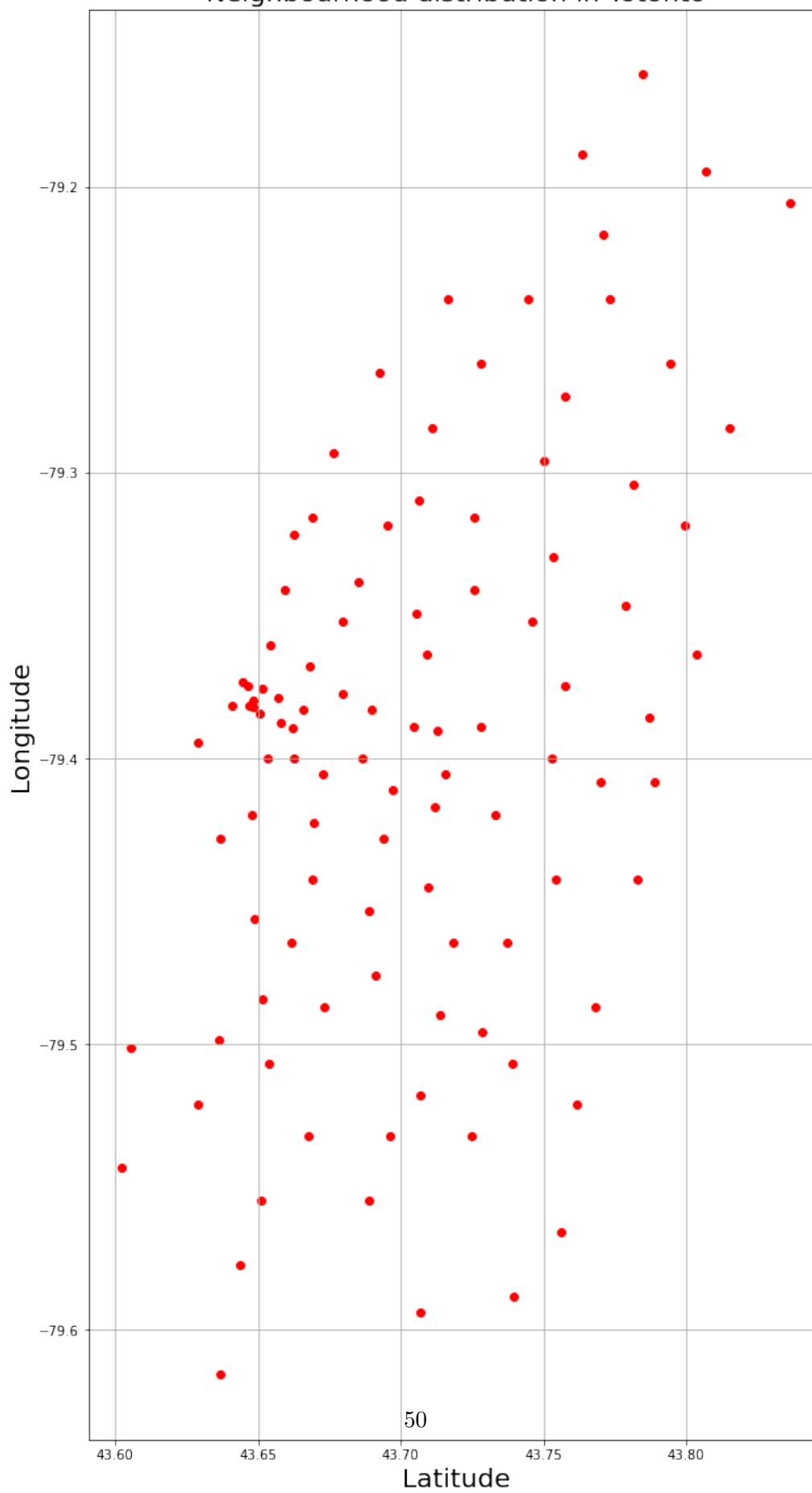
```
[27]: # set up map

      cities = gpd.read_file(gpd.datasets.get_path('naturalearth_cities'))
      ax = cities[cities.name == "Toronto"].plot(
          color='green', edgecolor='black', figsize =(20,20))
      # plot and show
      gdf.plot(ax=ax, color='red')
      plt.xlabel('Latitude', fontsize = 20)
      plt.ylabel('Longitude', fontsize = 20)
      plt.title('Neighbourhood distribution in Totonto', fontsize = 20)
      plt.grid()
      plt.show()
```

/home/roe/anaconda3/envs/ai/lib/python3.8/site-
packages/geopandas/plotting.py:678: UserWarning: The GeoDataFrame you are

```
attempting to plot is empty. Nothing has been displayed.
  warnings.warn(
```

Neighbourhood distribution in Totonto

[ ]: