**Maricopa County Assessor - Property Search Project Details:**

1. ***Project Goals:***
   1. Create an interactive python popup that allows me to utilize the Maricopa County Assessor, AZ API and/or send headless information to the URL and scrape the information from the results, related to searching property parcels, property taxes, property sales, documents, etc. across the Maricopa County Assessor’s website, Maricopa County Treasurer’s website, and Maricopa County Recorder’s website.
   2. The goal will be to pull as much of the information for a searched property across all of the three aforementioned Maricopa County websites as possible.
      1. Please see the very last section of this project documentation list, or “F. Project Resources”, for a myriad of URL links across the Maricopa websites listed above.
   3. Provide detailed documentation for how to utilize and run this interactive python popup.
2. ***Project Details:***
   1. ***Main Sections:***
      1. Search area (top)
      2. Results tabs (middle)
      3. Export toolbar (bottom)
      4. Status bar (very bottom)
      5. Please provide recommendations of other sections to incorporate.
   2. ***Search Methods:***
      1. **APN Search** (Assessor Parcel Number):
         1. Select "APN" radio button
         2. Enter formats like: 123-45-678 or 12345678
         3. Examples: 501-23-456A, 212-07-810, 21207810
      2. **Address Search:**
         1. Select "Address" radio button
         2. Enter partial or full address
         3. Examples: 123 Main St Phoenix
   3. ***Interface Navigation – After searching, you'll see 4 tabs:***
      1. **Property Info Tab:**
         1. Owner name, addresses
         2. Property characteristics (size, bedrooms, year built)
         3. Legal description
         4. Land use classification
      2. **Tax Information Tab:**
         1. Historical assessed values
         2. Limited property values
         3. Annual tax amounts
         4. Payment status
         5. Detailed Tax Information
      3. **Sales History Tab:**
         1. Transaction dates and prices
         2. Buyer/seller information
         3. Deed types
      4. **Documents Tab:**
         1. Pulls list of all available documents associated with the property in a table format, which includes the following attributes:
            1. The document URL link
            2. The document type based upon the document list description
            3. Document recording date
            4. Legal entities associated with the document
         2. Document URLs List:
            1. **View on Assessor Website**: Please see all URL links under the “**b.** **Maricopa County Assessor (Parcel/Address Search)”** subsection within the “F. Project Resources” section below.
            2. **View Tax Bills**: Please see all URL links under the “**c.** **Maricopa County Treasurer (Property Tax)”** subsection within the “F. Project Resources” section below.
            3. **Search Recorder Documents**: Please see all URL links under the “**d.** **Maricopa County Recorder (Documents)”** subsection within the “F. Project Resources” section below.
   4. ***Code Structure – Breaking into logical components – Project Initial logical structure Thoughts:***
      1. **API Client Class** - Handles all API interactions with retry logic and caching
      2. **Data Models** - Structured dataclasses for property, tax, and sales information
      3. **GUI with Tabs** - Property info, tax information, sales history, and documents
      4. **Search Capabilities** - By APN or address
      5. **Background Threading** - Prevents UI freezing during API calls
      6. **Document Links** - Direct links to assessor, recorder, and tax bill websites
      7. **Claude Recommendations** – Please provide recommendations to any aspects of the above you believe will be beneficial in any regard.
   5. ***Key Features:***
      1. **Production Optimizations:**
         1. LRU caching on API calls reduces redundant requests
         2. Session reuse for connection pooling
         3. Non-blocking UI with threading
         4. Retry logic with exponential backoff potential
         5. Clean separation of concerns (API/Model/View)
      2. **Error Resilience:**
         1. Graceful fallback to mock data
         2. Try multiple API endpoints
         3. User-friendly error messages
         4. Validation of input formats
      3. **Extensibility:**
         1. Easy to add new data types (permits, valuations)
         2. Modular API client can be reused
         3. Clean data model structure for serialization
      4. ***Advanced Features to Incorporate:***
         1. Batch Processing:
            1. Prepare CSV file with APNs (one per line)
            2. Load file via Browse button
            3. Monitor progress (processes ~2 properties/second)
            4. Review results in Batch Results tab
            5. Export all data to organized CSV files
         2. Export Functionality & Features:
            1. Export Current: Saves current property only
            2. Export All Tabs: Saves property + tax + sales
            3. Export Batch: Creates 4 files (properties, taxes, sales, summary)
            4. Auto-organization: Creates timestamped folders
   6. ***API Usage Details:***
      1. **Headers:**
         1. Once you receive your token, the next step is to add a custom header to your request (documentation varies between languages and transports). We use a custom header name of AUTHORIZATION with a value of your token and user-agent with a value of null.
            1. **API Token** – ca1a11a6-adc4-4e0c-a584-36cbb6eb35e5
      2. **Search Functions:**
         1. **Parameters:**
            1. **{query}** – URL encoded query to search for.
         2. **Search Property:**
            1. **Description**: Searches all data points available. Returns a structured JSON result set with Real Property, BPP, MH, Rentals, Subdivisions, and Content along with totals found.
            2. **Path**: /search/property/?q={query}
            3. **Example**: [https://mcassessor.maricopa.gov/search/property/?q={query}](https://mcassessor.maricopa.gov/search/property/?q=%7bquery%7d)
            4. **Paging within Property Results**: Results are returned at 25 results at a time. To access results after 25 simply add the page number. For example, if there are 250 results and you want to access results 201-225, then that would be page 9.
            5. **Path**: /search/property/?q={query}&page={number}
            6. **Example**: https://mcassessor.maricopa.gov/search/property/?q={query}&page=9
         3. **Search Subdivisions:**
            1. **Description**: Searches only subdivision names. Returns a structured JSON result set with a list of subdivision names and parcel counts.
            2. **Path**: /search/sub/?q={query}
            3. **Example**: https://mcassessor.maricopa.gov/search/sub/?q={query}
         4. **Search Rentals:**
            1. **Description**: Searches only rental registrations. Returns a structured JSON result set with only rental registrations.
            2. **Path**: /search/rental/?q={query}
            3. **Example**: [https://mcassessor.maricopa.gov/search/rental/?q={query}](https://mcassessor.maricopa.gov/search/rental/?q=%7bquery%7d)
            4. **Paging within Property Results**: Results are returned at 25 results at a time. To access results after 25 simply add the page number. For example, if there are 250 results and you want to access results 201-225, then that would be page 9.
            5. **Path**: /search/ rentals /?q={query}&page={number}
            6. **Example**: https://mcassessor.maricopa.gov/search/ rentals /?q={query}&page=9
      3. **Parcel Functions:**
         1. ***Parameters:***
            1. **{apn} –** APN (Assessor Parcel Number or APN for short) must formatted with (or without) spaces, dashes, or dots.
         2. ***Parcel Details:***
            1. **Description**: Returns a JSON object with all available parcel data. Works with parcel type(s): Residential, Commercial, Land, Agriculture
            2. **Path**: /parcel/{apn}
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}
         3. ***Property Information:***
            1. **Description**: Returns a JSON object with information specific to the property. Works with parcel type(s): Residential, Commercial, Land, Agriculture
            2. **Path**: /parcel/{apn}/propertyinfo
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}/propertyinfo
         4. ***Property Address:***
            1. **Description**: Returns a JSON object with address of the property. Works with parcel type(s): Residential, Commercial, Land, Agriculture
            2. **Path**: /parcel/{apn}/address
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}/address
         5. ***Valuation Details:***
            1. **Description**: Returns a JSON object with the past 5 years of valuation data from a parcel. Works with parcel type(s): Residential, Commercial, Land, Agriculture
            2. **Path**: /parcel/{apn}/valuations
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}/valuations
         6. ***Residential Details:***
            1. **Description**: Returns a JSON object with all the available residential parcel data. Does not apply to commerical, land or agriculture parcels. Works with parcel type(s): Residential, Commercial, Land
            2. **Path**: /parcel/{apn}
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}/residential-details
         7. ***Owner Details:***
            1. **Description**: Returns a JSON object with all available parcel data. Works with parcel type(s): Residential, Commercial, Land, Agriculture
            2. **Path**: /parcel/{apn}/owner-details
            3. **Example**: https://mcassessor.maricopa.gov/parcel/{apn}/owner-details
3. ***Workflow Examples:***
   1. ***Research a Property Purchase:***
      1. Enter property address
      2. Check Property Info tab for details
      3. Review Sales History
      4. Check Tax Information for annual costs
      5. Click Documents → Recorder to see deed history
   2. ***Verify Tax Assessment:***
      1. Enter your APN (from tax bill)
      2. Go to Tax Information tab
      3. Compare assessed vs limited values
      4. Click Documents → View Tax Bills for statements
   3. ***Find Comparable Sales:***
      1. Search street name (partial address)
      2. Get list of properties
      3. Check each property's Sales History
      4. Export data for analysis
4. ***Technology Stack:***
   1. **Interactive Pop-up Box:**
      1. **Tkinter + Threading (Production-ready):** Native Python, no dependencies, responsive UI with background API calls; or
      2. **PyQt5/PySide2**: More modern UI, better widgets, but requires external dependency.
   2. **Python Packages (Recommend any/all Updates to the Below Package List):**
      1. import os
      2. import sys
      3. import queue
      4. import traceback
      5. import time
      6. from datetime import datetime
      7. from typing import Dict, List, Optional, Any, Tuple
      8. from functools import lru\_cache
      9. import threading
      10. import numpy as np
      11. import pandas as pd
      12. import matplotlib
      13. import matplotlib.pyplot as plt
      14. import matplotlib\_inline
      15. import IPython
      16. from IPython import get\_ipython, paths
      17. from IPython.paths import get\_ipython\_dir, get\_ipython\_module\_path, get\_ipython\_package\_dir
      18. from IPython import display, extensions, extract\_module\_locals, Application
      19. from IPython.display import HTML, SVG, YouTubeVideo, FileLink, IFrame
      20. from IPython.display import display, Pretty, DisplayHandle, DisplayObject
      21. from IPython.core.pylabtools import figsize, getfigs
      22. from IPython.core.interactiveshell import InteractiveShell
      23. import nbformat
      24. from nbformat import read
      25. import notebook
      26. import nbconvert
      27. import nb\_conda\_kernels
      28. import nbclient
      29. import seaborn as sns
      30. import sqlite3
      31. import selenium
      32. import requests
      33. import webbrowser
      34. import urllib3
      35. from pathlib import Path
      36. import bs4
      37. import re
      38. import lxml
      39. import json
      40. import csv
      41. import tkinter as tk
      42. from tkinter import ttk, scrolledtext, messagebox, filedialog
      43. import pyqtgraph
      44. import PyQt6
      45. import ipywidgets
      46. from ipywidgets import AppLayout, FloatLogSlider, load\_ipython\_extension, widgets
      47. import ipydatetime
      48. import ipyparallel
      49. import ipyleaflet
      50. import ipykernel
      51. import openpyxl
      52. import plyer
      53. from plyer import notification
      54. import win10toast
      55. from win10toast import ToastNotifier
      56. from fastapi import FastAPI, HTTPException
      57. from fastapi.responses import JSONResponse
      58. from fastapi.middleware.cors import CORSMiddleware
      59. from pydantic import BaseModel
      60. import uvicorn
      61. import flask
      62. from flask import Flask, render\_template, jsonify, request
      63. import jinja2
      64. import asyncio
      65. import nest\_asyncio
      66. import aiohttp
      67. from threading import Thread
   3. **Operating System:**
      1. Windows 11 Professional
   4. **Browser:**
      1. Microsoft Edge
      2. Chrome (if necessary)
   5. **Recommendations:**
      1. Please provide any recommendations that come to mind when reviewing this project’s goals, details, technology stack, etc.
5. ***Project Resources (Clean URLs):***
   1. **Maricopa County Assessor API:**
      1. [MC Assessor API - Documentation](https://mcassessor.maricopa.gov/file/home/MC-Assessor-API-Documentation.pdf)
      2. [MC Assessor API - RESTFUL API Tool (Node.js using Requests)](https://github.com/request/request)
      3. [MC Assessor API - RESTFUL API Tool (cURL PHP-CommandLine)](https://curl.se/libcurl/c/CURLOPT_HTTPHEADER.html)
   2. **Maricopa County Assessor (Parcel/Address Search):**
      1. [Maricopa County Assessor - Search Page](https://mcassessor.maricopa.gov/)
      2. [Maricopa County Assessor - Owner Information](https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#owner)
      3. [Maricopa County Assessor - Valuations](https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#valuation)
      4. [Maricopa County Assessor - Additional Property Data](https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#addinfo)
   3. **Maricopa County Treasurer (Property Tax):**
      1. [Maricopa County Treasurer - Tax Summary](https://treasurer.maricopa.gov/parcel/Summary.aspx)
      2. [Maricopa County Treasurer - Tax History](https://treasurer.maricopa.gov/parcel/Summary.aspx?List=All)
      3. [Maricopa County Treasurer - Tax Activities](https://treasurer.maricopa.gov/parcel/Activities.aspx)
      4. [Maricopa County Treasurer - Tax Valuations](https://treasurer.maricopa.gov/parcel/Valuations.aspx)
      5. [Maricopa County Treasurer - Detailed Tax Statement](https://treasurer.maricopa.gov/parcel/DetailedTaxStatement.aspx)
   4. **Maricopa County Recorder (Documents):**
      1. [Maricopa County Recorder - Home](https://recorder.maricopa.gov/)
      2. [Maricopa County Recorder - FAQs](https://recorder.maricopa.gov/information/faqs.html)
      3. [Maricopa County Recorder - Document Codes](https://recorder.maricopa.gov/recording/new-document-codes.html)
      4. [Maricopa County Recorder - Document Search (Home)](https://recorder.maricopa.gov/recording/document-search.html)
      5. [Maricopa County Recorder - Document Search (Recorded Documents Search)](https://recorder.maricopa.gov/recording/document-search.html#tab-doc-search)
      6. [Maricopa County Recorder - Document Search (Recorded Maps Search)](https://recorder.maricopa.gov/recording/document-search.html#tab-map-search)
      7. [Maricopa County Recorder - Document Search (Research)](https://recorder.maricopa.gov/recording/document-search.html#tab-research)
6. ***Project Resources (Raw URLs):***
   1. **Maricopa County Assessor API:**
      1. <https://mcassessor.maricopa.gov/file/home/MC-Assessor-API-Documentation.pdf>
      2. <https://github.com/request/request>
      3. <https://curl.se/libcurl/c/CURLOPT_HTTPHEADER.html>
   2. **Maricopa County Assessor (Parcel/Address Search):**
      1. <https://mcassessor.maricopa.gov/>
      2. <https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#owner>
      3. <https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#valuation>
      4. <https://mcassessor.maricopa.gov/mcs/?q=20053822&mod=pd#addinfo>
   3. **Maricopa County Treasurer (Property Tax):**
      1. <https://treasurer.maricopa.gov/Parcel/Summary.aspx>
      2. <https://treasurer.maricopa.gov/Parcel/Summary.aspx?List=All>
      3. <https://treasurer.maricopa.gov/Parcel/Activities.aspx>
      4. <https://treasurer.maricopa.gov/Parcel/Valuations.aspx>
      5. <https://treasurer.maricopa.gov/Parcel/DetailedTaxStatement.aspx>
   4. **Maricopa County Recorder (Documents):**
      1. <https://recorder.maricopa.gov/recording/document-search.html#tab-research>
      2. <https://recorder.maricopa.gov/recording/document-search.html#tab-map-search>
      3. <https://recorder.maricopa.gov/recording/document-search.html#tab-doc-search>
      4. <https://recorder.maricopa.gov/recording/document-search.html>
      5. <https://recorder.maricopa.gov/recording/new-document-codes.html>
      6. <https://recorder.maricopa.gov/information/faqs.html>
      7. <https://recorder.maricopa.gov/>