ReadMe:

- Hi, since I visited hundreds of sources for this project (I started project around early March), I am using a special source organization format. Apologies if this is not very organized or if reading through this is painful.
- In general, I put more specific/relevant sources inside the actual files. While the sources here are much more broad.
- Here is the general organization format (more specific as you go down)
    a. Sources that are commented in line are the most specific (most likely used specifically for that line)
    b. Sources that are commented above the function are the next most specific (most likely used specifically for that function)
    c. Sources that are commented on the top of the file/on this documents are least specific (used multiple times in the code or used as general background reading)
    d. Note that this is a general organization, it is not 100% the case all the time
- Finally, looking at this on the google doc might be the most convenient as it contains headers(pdf does not have headers), below is the link
- https://docs.google.com/document/d/122ZY2X5Espnb0HBDb5-PqEHoUPoF5_6DrjqzFliar7w/edit#

PIL and Image Processing: mainly used on Term Project Playing Around.py and a little bit on CMU Graphics Front End files

- Most sources are in Term Project Playing Around.py. They are the most relevant sources
- Below are less relevant sources that I mainly helped me get a big picture and do more background research
- https://www.wikihow.com/Convert-JPG-to-Bitmap
- https://ofstack.com/python/10652/python-implementation-of-bitmap-data-structure-details.html
- https://datacarpentry.org/image-processing/02-image-basics/
- https://www.adobe.com/creativecloud/file-types/image/raster/bmp-file.html#bmp
- https://www.adobe.com/creativecloud/file-types/image/raster/jpeg-file.html#jpeg
- https://en.wikipedia.org/wiki/BMP_file_format
- https://neptune.ai/blog/image-processing-python-libraries-for-machine-learning
- http://jeromebelleman.gitlab.io/posts/graphics/rotating/
- https://pyimagesearch.com/2021/01/20/opencv-rotate-image/ ==(entiere openCV docs==
- https://pyimagesearch.com/2020/08/24/ocr-handwriting-recognition-with-opencv-keras-and-tensorflow/
- https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html
- https://citrusbug.com/blog/python-libraries-for-machine-learning
- https://www.pythoninformer.com/python-libraries/pillow/imageops-deforming/ ==(do not think I actually used anything)==
- https://stackoverflow.com/questions/66121948/matplotlib-plots-not-showing-in-vs-code
- https://github.com/FormerLurker/Octolapse/issues/850
- https://stackoverflow.com/questions/11174024/why-do-i-get-str-object-has-no-attribute-read-when-trying-to-use-json-loa`json`

- https://stackoverflow.com/questions/11406990/open-pil-image-in-a-folder-outside-directory-of-script semi useful
- https://pillow.readthedocs.io/en/stable/installation.html
- https://www.geeksforgeeks.org/how-to-append-a-numpy-array-to-an-empty-array-in-python/ not useful at all
- https://colab.research.google.com/drive/1MALKxRqmNdjBUXJ-6V4PFYU6inPWq7Qe#scrollTo=2ihabI0hUjuh (did not use)
- https://www.geeksforgeeks.org/overlay-an-image-on-another-image-in-python/
- https://stackoverflow.com/questions/40659212/futurewarning-elementwise-comparison-failed-returning-scalar-but-in-the-futur

Database: sources about databases

- Background reading/understanding how to
    - https://en.wikipedia.org/wiki/MNIST_database
    - https://arxiv.org/pdf/1702.05373v1.pdf
    - https://www.youtube.com/watch?v=gogV2wKKF_8&ab_channel=ProfessorRyan
    - https://hackernoon.com/top-20-image-datasets-for-machine-learning-and-computer-vision-rq3w3zxo not useful at all
    - https://www.kaggle.com/c/imagenet-object-localization-challenge/overview/description
    - https://www.nist.gov/itl/products-and-services/emnist-dataset
    - https://datasets.activeloop.ai/docs/ml/datasets/emnist-dataset/
    - https://www.simonwenkel.com/notes/ai/datasets/vision/EMNIST.html#emnist-letters
    - https://www.tensorflow.org/datasets/catalog/emnist

Non CMU graphics (ex. react): sources I used when I tried to do front end in something that is not CMU graphics. However, they are not relevant because I gave up

- https://flask.palletsprojects.com/en/1.1.x/
- https://stackoverflow.com/questions/60528792/how-to-combine-javascript-react-frontend-and-python-backend
- https://popupsmart.com/blog/python-popup
- https://www.accordbox.com/blog/how-to-combine-frontend-and-backend-for-python-web-developers/

AI implementation/background reading. More relevant and specific sources (ex. The site I copied a lot of code from) is in Basic_AI_LAB.py and AI_Class.py

- https://docs.opencv.org/
- https://wiki.python.org/moin/TimeComplexity (time complexity of converting a array to a list)
- https://stackoverflow.com/questions/46610689/how-to-import-cv2-in-python3
- https://www.youtube.com/watch?v=HVXime0nQeI&ab_channel=StatQuestwithJoshStarmer(useless, did not use)
- https://builtin.com/machine-learning/nearest-neighbor-algorithm
- https://www.youtube.com/watch?v=UqYde-LULfs&t=270s&ab_channel=ThalesSehnK%C3%B6rting
- https://xtracta.com/how-it-works/#:~:text=OCR%20scanning%20works%20by%20analysing,data%20into%20machine%2Dreadable%20text
- https://nanonets.com/blog/handwritten-character-recognition/
- https://colab.research.google.com/drive/1NyYH1EPpaJlMBLK0fcKYz4icaD1SNSLK
- https://scikit-learn.org/stable/install.html
- https://pianalytix.com/sklearn-or-scikit-learn/#:~:text=Scikit%2Dlearn%20is%20also%20known,machine%20learning%20library%20for%20Python (visited to ensure that scikit learn is same as sklearn
- https://stackoverflow.com/questions/3323001/what-is-the-maximum-recursion-depth-in-python-and-how-to-increase-it
- https://www.youtube.com/watch?v=6nGCGYWMObE&list=PL8dPuuaLjXtO65LeD2p4_Sb5XQ51par_b&index=6&ab_channel=CrashCourse
- 3BlueOneBrown neural networks playlist
- http://neuralnetworksanddeeplearning.com/chap1.html (to learn more about neural networks and digit recognition)
- 18100 (intro to ECE) lecture notes/notes/lab 9/resources about neural networks (topic we are currently learning, which is neural networks)

Graphics/front end(since there are multiple graphics files, I am placing all general sources on this document:

- CMU graphics examples in CMU graphics download file (ex. They taught me that there are text input box features)
- Image/OOP Demos from class(specifically makeNewImages.py)
- Background Color:
    1. https://www.color-hex.com/
    2. https://coolors.co/
- https://www.youtube.com/watch?v=vzInPI6t70w&ab_channel=AlyssaRobert (previous term projected inspired me to make changes on instructions page)
- https://www.khanacademy.org/math/grade-6-virginia/x99d65df986ffa9b5:ratios-rates-and-proportions/x99d65df986ffa9b5:intro-to-ratios/e/representing-ratios (to understand how Khan Acadamy practice interacts with user)

Old files on uploading files using CMU Graphics(I gave up, so not relevant)

- https://pyimagesearch.com/2021/01/20/opencv-load-image-cv2-imread/: did not use
- https://www.geeksforgeeks.org/python-opencv-cv2-imread-method/:did not use
- https://www.geeksforgeeks.org/upload-files-in-python/ :not relevant, but gave me valuable insight in how to do things in html
- https://www.tutorialspoint.com/file-upload-example-in-python :clicked on wrong link
- https://www.stechies.com/upload-files-python/ :wrong techniques
- https://www.youtube.com/watch?v=00bLHDtU7U4&ab_channel=HusseinNasser :not relevant
- Zip file parsing
    1. https://www.geeksforgeeks.org/working-zip-files-python/ :basic intro, not much use
    2. https://docs.python.org/3/library/io.html#io.IOBase.readlines :useful, taught me how to read one by line

sources that I visited when I was trying to read training data from zips and JSON (I gave up, so not really relevant), nonetheless important because it taught me about directories

- https://support.apple.com/en-gb/guide/mac-help/mchlp1774/mac
- https://stackoverflow.com/questions/11406990/open-pil-image-in-a-folder-outside-directory-of-script :did not really consult, but cite bc it gave me idea to look into more about directories
- https://www.macworld.com/article/221277/command-line-navigating-files-folders-mac-terminal.html#:~:text=To%20do%20that%20you%20use,files)%20in%20the%20current%20directory.
- https://stackoverflow.com/questions/18707338/print-raw-string-from-variable-not-getting-the-answers visited this but don't think I eversed used this
- https://osxdaily.com/2007/03/30/mac-os-x-directory-structure-explained/ did not use
- https://www.youtube.com/watch?v=9ArnOqG7bgU&ab_channel=macmostvideo used but did not work
- https://stackoverflow.com/questions/33166316/how-to-read-an-image-inside-a-zip-file-with-pil-pillow VERY IMPORTANT BUG FIX
- https://stackoverflow.com/questions/67505710/pil-unidentifiedimageerror-cannot-identify-image-file-io-bytesio-object
- https://forums.developer.nvidia.com/t/pil-unidentifiedimageerror-cannot-identify-image-file-io-bytesio/228927/7
- https://realpython.com/python-json/ Kson tutorial
- https://stackoverflow.com/questions/71330183/how-to-export-a-variable-to-another-python-file
- https://stackoverflow.com/questions/31777169/python-how-to-read-images-from-zip-file-in-memory

Equation generator:

- Most sources already inside equation_generator.py
- https://www.omnicalculator.com/math/modulo-of-negative-numbers (used this to learn about strange ways of modulating my negative numbers

Image Sources for training images/test cases (I only use image online for training AI and testing my code)

1. letter_B.jpeg :https://www.printableparadise.com/printable-letter-b-outline.html
2. Printable-letter-b-silhouette.jpeg:
   https://www.printableparadise.com/printable-letter-b-silhouette.html
3. printable-letter-b-silhouette.png:
   https://www.printableparadise.com/printable-letter-b-silhouette.html

4. gmsniper.jpeg:https://gunpla.fandom.com/wiki/MG_RGM-79SP_GM_Sniper_II (might be wrong)

Image and Sound Sources for Front End

1. https://giphy.com/stickers/Popcore-transparent-FJaKqj9YG8cw6FeW8b (the confetti when you got something correct)
2. https://pixabay.com/sound-effects/correct-6033/ (sound effect for correct), but ultimately did not use because can not get sound to work
3. Also, thanks to Sergio Leal for giving me the idea for confetti and sound while talking him about my TP

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