In [ ]:
```
import torch
from torch import nn
from torch.nn import functional as F
from torch.utils import data
from torchvision.datasets import MNIST
from torchvision import transforms as tfs

import numpy as np
from matplotlib import pyplot as plt

from tqdm import tqdm
import itertools
from IPython.display import Audio
import librosa
import librosa.display as dsp
import pandas as pd
from random import shuffle

import os
gpu_boole = torch.cuda.is_available()
```

In [ ]:
```
from google.colab import files
files.upload()
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

Out[ ]: {}

In [ ]:
```
from torchvision.datasets import MNIST
from torchvision import transforms as tfs
mnist = MNIST('./data', train=True, transform=tfs.Compose([tfs.ToTensor()]), download=Tr
```

```
Downloading http://yann.lecun.com/exdb/mnist/train-images-idx3-ubyte.gz
Failed to download (trying next):
HTTP Error 403: Forbidden

Downloading https://ossci-datasets.s3.amazonaws.com/mnist/train-images-idx3-ubyte.gz
Downloading https://ossci-datasets.s3.amazonaws.com/mnist/train-images-idx3-ubyte.gz to
./data/MNIST/raw/train-images-idx3-ubyte.gz
100%|██████████| 9.91M/9.91M [00:11<00:00, 901kB/s]
Extracting ./data/MNIST/raw/train-images-idx3-ubyte.gz to ./data/MNIST/raw

Downloading http://yann.lecun.com/exdb/mnist/train-labels-idx1-ubyte.gz
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Downloading https://ossci-datasets.s3.amazonaws.com/mnist/train-labels-idx1-ubyte.gz
Downloading https://ossci-datasets.s3.amazonaws.com/mnist/train-labels-idx1-ubyte.gz to
./data/MNIST/raw/train-labels-idx1-ubyte.gz
100%|██████████| 28.9k/28.9k [00:00<00:00, 57.2kB/s]
```

```
Extracting ./data/MNIST/raw/train-labels-idx1-ubyte.gz to ./data/MNIST/raw

Downloading http://yann.lecun.com/exdb/mnist/t10k-images-idx3-ubyte.gz
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Downloading https://ossci-datasets.s3.amazonaws.com/mnist/t10k-images-idx3-ubyte.gz
Downloading https://ossci-datasets.s3.amazonaws.com/mnist/t10k-images-idx3-ubyte.gz to ./
data/MNIST/raw/t10k-images-idx3-ubyte.gz
100%|██████████| 1.65M/1.65M [00:06<00:00, 243kB/s]
Extracting ./data/MNIST/raw/t10k-images-idx3-ubyte.gz to ./data/MNIST/raw

Downloading http://yann.lecun.com/exdb/mnist/t10k-labels-idx1-ubyte.gz
Failed to download (trying next):
HTTP Error 403: Forbidden

Downloading https://ossci-datasets.s3.amazonaws.com/mnist/t10k-labels-idx1-ubyte.gz
Downloading https://ossci-datasets.s3.amazonaws.com/mnist/t10k-labels-idx1-ubyte.gz to ./
data/MNIST/raw/t10k-labels-idx1-ubyte.gz
100%|██████████| 4.54k/4.54k [00:00<00:00, 3.75MB/s]
Extracting ./data/MNIST/raw/t10k-labels-idx1-ubyte.gz to ./data/MNIST/raw
```

In [ ]:
```python
import kagglehub

# Download latest version
path = kagglehub.dataset_download("sripaadsrinivasan/audio-mnist")

print("Path to dataset files:", path)
```

```
Downloading from https://www.kaggle.com/api/v1/datasets/download/sripaadsrinivasan/audio-
mnist?dataset_version_number=1...
100%|██████████| 948M/948M [00:52<00:00, 18.9MB/s]
Extracting files...
Path to dataset files: /root/.cache/kagglehub/datasets/sripaadsrinivasan/audio-mnist/vers
ions/1
```

In [ ]:
```python
# preprocessing reference: https://www.kaggle.com/code/padmanabhanporaiyar/audio-mnist-c

def get_audio(digit=0):
    # Audio Sample Directory
    sample = np.random.randint(1,60)
    # Index of Audio
    index = np.random.randint(1,5)

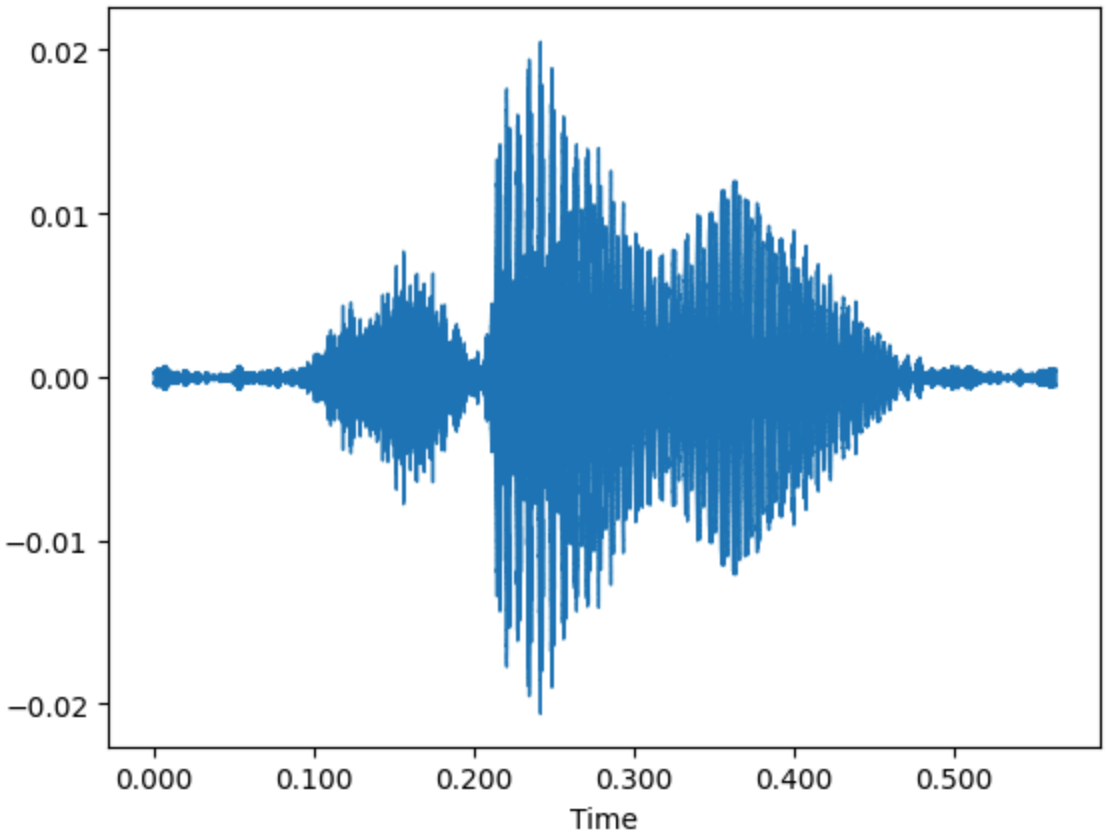
    # Modified file location
    if sample<10:
        file = f"{path}/data/{sample}/{digit}_0{sample}_{index}.wav"
    else:
        file = f"{path}/data/{sample}/{digit}_{sample}_{index}.wav"


    # Get Audio from the location
    data,sample_rate = librosa.load(file)

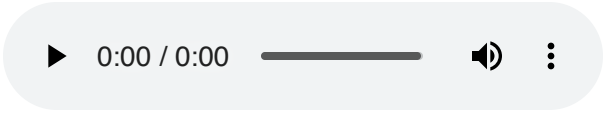
    # Plot the audio wave
    dsp.waveshow(data,sr=sample_rate)
    plt.show()
```

```
    # Show the widget
    return Audio(data=data,rate=sample_rate)
```

In [ ]:
```
get_audio(0)
```



Out[ ]:



In [ ]:
```
def extract_features(file):
    # Load audio and sample rate of audio
    audio,sample_rate = librosa.load(file)
    # Extract features using mel-frequency coefficient
    extracted_features = librosa.feature.mfcc(y=audio,
                                              sr=sample_rate,
                                              n_mfcc=40)

    # Scale the extracted features
    extracted_features = np.mean(extracted_features.T,axis=0)
    # Return the extracted features
    return extracted_features


def preprocess_and_create_dataset():
    # Path of folder where the audio files are present
    root_folder_path = path + "/data/"
    # Empth List to create dataset
    dataset = []

    # Iterating through folders where each folder has audio of each digit
    for folder in tqdm(range(1,61),colour='green'):
        if folder<10:
```

```
            # Path of the folder
            folder = os.path.join(root_folder_path,"0"+str(folder))
        else:
            folder = os.path.join(root_folder_path,str(folder))

        # Iterate through each file of the present folder
        for file in tqdm(os.listdir(folder),colour='blue'):
            # Path of the file
            abs_file_path = os.path.join(folder,file)
            # Pass path of file to extracted_features() function to create features
            extracted_features = extract_features(abs_file_path)
            # Class of the audio,i.e., the digit it represents
            class_label = file[0]

            # Append a list where the feature represents a column and class of the digit
            dataset.append([extracted_features,class_label])

    # After iterating through all the folder convert the list to a dataframe
    print("Extracted Features and Created Dataset Successfully !!")
    return pd.DataFrame(dataset,columns=['features','class'])
```

In [ ]:
```
dataset = preprocess_and_create_dataset()
```

```
  0%|          | 0/60 [00:00<?, ?it/s]
  0%|          | 0/500 [00:00<?, ?it/s]
  0%|          | 1/500 [00:01<11:49,  1.42s/it]
  2%|▏         | 12/500 [00:01<00:46, 10.49it/s]
  5%|▍         | 24/500 [00:01<00:20, 22.89it/s]
  7%|▋         | 34/500 [00:01<00:13, 33.63it/s]
  9%|▉         | 46/500 [00:01<00:09, 47.57it/s]
 12%|█▏        | 60/500 [00:01<00:06, 64.40it/s]
 14%|█▍        | 72/500 [00:02<00:05, 76.03it/s]
 17%|█▋        | 85/500 [00:02<00:04, 87.37it/s]
 20%|█▉        | 98/500 [00:02<00:04, 96.28it/s]
 22%|██▏       | 110/500 [00:02<00:03, 100.47it/s]
 24%|██▍       | 122/500 [00:02<00:03, 101.63it/s]
 27%|██▋       | 134/500 [00:02<00:03, 101.09it/s]
 29%|██▉       | 146/500 [00:02<00:03, 105.55it/s]
 32%|███▏      | 158/500 [00:02<00:03, 106.47it/s]
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 36%|███▋      | 182/500 [00:03<00:02, 111.49it/s]
 39%|███▉      | 195/500 [00:03<00:02, 116.54it/s]
 42%|████▏     | 208/500 [00:03<00:02, 119.57it/s]
 44%|████▍     | 221/500 [00:03<00:02, 120.24it/s]
 47%|████▋     | 234/500 [00:03<00:02, 115.16it/s]
 49%|████▉     | 246/500 [00:03<00:02, 111.71it/s]
 52%|█████▏    | 258/500 [00:03<00:02, 112.96it/s]
 54%|█████▍    | 271/500 [00:03<00:01, 117.69it/s]
 57%|█████▋    | 283/500 [00:03<00:01, 117.81it/s]
 59%|█████▉    | 296/500 [00:03<00:01, 120.26it/s]
 62%|██████▏   | 309/500 [00:04<00:01, 122.42it/s]
 64%|██████▍   | 322/500 [00:04<00:01, 120.17it/s]
 67%|██████▋   | 335/500 [00:04<00:01, 120.93it/s]
 70%|██████▉   | 348/500 [00:04<00:01, 121.71it/s]
 72%|███████▏  | 361/500 [00:04<00:01, 116.24it/s]
 75%|███████▍  | 373/500 [00:04<00:01, 111.42it/s]
 77%|███████▋  | 386/500 [00:04<00:00, 116.13it/s]
 80%|███████▉  | 398/500 [00:04<00:00, 115.34it/s]
 82%|████████▏ | 412/500 [00:04<00:00, 121.14it/s]
 85%|████████▍ | 425/500 [00:05<00:00, 118.72it/s]
 88%|████████▊ | 438/500 [00:05<00:00, 121.50it/s]
 90%|█████████ | 451/500 [00:05<00:00, 123.42it/s]
 93%|█████████▎| 464/500 [00:05<00:00, 118.90it/s]
 95%|█████████▌| 477/500 [00:05<00:00, 120.20it/s]
100%|██████████| 500/500 [00:05<00:00, 87.70it/s]
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  6%|▌         | 28/500 [00:00<00:03, 126.81it/s]
  8%|▊         | 41/500 [00:00<00:03, 121.32it/s]
 11%|█         | 54/500 [00:00<00:03, 116.74it/s]
 13%|█▎        | 67/500 [00:00<00:03, 120.32it/s]
 16%|█▌        | 80/500 [00:00<00:03, 123.18it/s]
 19%|█▊        | 93/500 [00:00<00:03, 120.52it/s]
 21%|██        | 107/500 [00:00<00:03, 124.01it/s]
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 27%|██▋       | 133/500 [00:01<00:03, 120.97it/s]
 29%|██▉       | 146/500 [00:01<00:02, 121.41it/s]
 32%|███▏      | 159/500 [00:01<00:02, 117.09it/s]
 34%|███▍      | 171/500 [00:01<00:02, 113.85it/s]
 37%|███▋      | 183/500 [00:01<00:02, 115.50it/s]
 39%|███▉      | 196/500 [00:01<00:02, 117.31it/s]
```

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 42%|████▏     | 208/500 [00:01<00:02, 114.80it/s]
 44%|████▍     | 222/500 [00:01<00:02, 118.36it/s]
 47%|████▋     | 235/500 [00:01<00:02, 121.49it/s]
 50%|████▉     | 248/500 [00:02<00:02, 114.17it/s]
 52%|█████▏    | 260/500 [00:02<00:02, 113.60it/s]
 54%|█████▍    | 272/500 [00:02<00:01, 114.37it/s]
 57%|█████▋    | 284/500 [00:02<00:01, 112.78it/s]
 59%|█████▉    | 296/500 [00:02<00:01, 113.86it/s]
 62%|██████▏   | 310/500 [00:02<00:01, 119.32it/s]
 64%|██████▍   | 322/500 [00:02<00:01, 118.82it/s]
 67%|██████▋   | 334/500 [00:02<00:01, 118.72it/s]
 70%|██████▉   | 348/500 [00:02<00:01, 123.25it/s]
 72%|███████▏  | 362/500 [00:03<00:01, 126.84it/s]
 75%|███████▌  | 375/500 [00:03<00:01, 120.05it/s]
 78%|███████▊  | 388/500 [00:03<00:00, 120.11it/s]
 80%|████████  | 401/500 [00:03<00:00, 120.96it/s]
 83%|████████▎ | 414/500 [00:03<00:00, 122.04it/s]
 85%|████████▌ | 427/500 [00:03<00:00, 123.02it/s]
 88%|████████▊ | 440/500 [00:03<00:00, 121.35it/s]
 91%|█████████ | 453/500 [00:03<00:00, 117.04it/s]
 93%|█████████▎| 466/500 [00:03<00:00, 120.05it/s]
 96%|█████████▌| 479/500 [00:04<00:00, 122.74it/s]
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 13%|█▎        | 65/500 [00:00<00:04, 87.47it/s]
 15%|█▌        | 75/500 [00:00<00:04, 85.81it/s]
 17%|█▋        | 85/500 [00:00<00:04, 88.53it/s]
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 22%|██▏       | 112/500 [00:01<00:05, 74.36it/s]
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 27%|██▋       | 137/500 [00:01<00:05, 67.38it/s]
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 31%|███       | 153/500 [00:01<00:05, 68.33it/s]
 33%|███▎      | 163/500 [00:02<00:04, 75.27it/s]
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 37%|███▋      | 184/500 [00:02<00:03, 88.20it/s]
 39%|███▉      | 193/500 [00:02<00:03, 87.03it/s]
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 42%|████▏     | 210/500 [00:02<00:04, 68.50it/s]
 44%|████▍     | 218/500 [00:02<00:04, 68.02it/s]
 45%|████▌     | 226/500 [00:02<00:04, 67.59it/s]
 47%|████▋     | 233/500 [00:03<00:04, 61.38it/s]
 48%|████▊     | 240/500 [00:03<00:04, 61.51it/s]
 50%|█████     | 250/500 [00:03<00:03, 70.03it/s]
 52%|█████▏    | 259/500 [00:03<00:03, 73.25it/s]
 53%|█████▎    | 267/500 [00:03<00:03, 70.51it/s]
 55%|█████▌    | 275/500 [00:03<00:03, 72.54it/s]
 57%|█████▋    | 283/500 [00:03<00:03, 69.24it/s]
 58%|█████▊    | 292/500 [00:03<00:02, 74.44it/s]
 60%|██████    | 300/500 [00:03<00:02, 74.61it/s]
 62%|██████▏   | 308/500 [00:04<00:02, 67.22it/s]
 63%|██████▎   | 315/500 [00:04<00:02, 65.53it/s]
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 64%|▋      | 322/500 [00:04<00:02, 61.38it/s]
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 70%|▋      | 349/500 [00:04<00:02, 58.83it/s]
 71%|▋      | 357/500 [00:04<00:02, 61.56it/s]
 73%|▋      | 364/500 [00:05<00:02, 60.83it/s]
 74%|▋      | 371/500 [00:05<00:02, 59.85it/s]
 76%|▊      | 378/500 [00:05<00:02, 57.35it/s]
 77%|▊      | 386/500 [00:05<00:01, 62.94it/s]
 79%|▊      | 393/500 [00:05<00:01, 64.26it/s]
 81%|▊      | 403/500 [00:05<00:01, 73.95it/s]
 83%|▊      | 417/500 [00:05<00:00, 91.28it/s]
 86%|▊      | 431/500 [00:05<00:00, 103.70it/s]
 89%|▉      | 445/500 [00:05<00:00, 112.82it/s]
 91%|▉      | 457/500 [00:05<00:00, 112.49it/s]
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 96%|▉      | 482/500 [00:06<00:00, 116.54it/s]
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  5%|▏      | 3/60 [00:16<05:16,  5.55s/it]
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  7%|▏      | 33/500 [00:00<00:04, 106.92it/s]
  9%|▏      | 47/500 [00:00<00:03, 115.99it/s]
 12%|▏      | 60/500 [00:00<00:03, 120.23it/s]
 15%|▏      | 74/500 [00:00<00:03, 125.95it/s]
 18%|▏      | 88/500 [00:00<00:03, 129.34it/s]
 20%|▏      | 101/500 [00:00<00:03, 126.15it/s]
 23%|▏      | 114/500 [00:00<00:03, 122.41it/s]
 25%|▎      | 127/500 [00:01<00:03, 117.06it/s]
 28%|▎      | 139/500 [00:01<00:03, 111.89it/s]
 30%|▎      | 151/500 [00:01<00:03, 112.21it/s]
 33%|▎      | 164/500 [00:01<00:02, 117.16it/s]
 35%|▎      | 177/500 [00:01<00:02, 120.61it/s]
 38%|▍      | 191/500 [00:01<00:02, 124.24it/s]
 41%|▍      | 205/500 [00:01<00:02, 126.57it/s]
 44%|▍      | 218/500 [00:01<00:02, 124.95it/s]
 46%|▍      | 231/500 [00:01<00:02, 121.71it/s]
 49%|▍      | 244/500 [00:02<00:02, 112.84it/s]
 51%|▌      | 256/500 [00:02<00:02, 114.28it/s]
 54%|▌      | 270/500 [00:02<00:01, 120.46it/s]
 57%|▌      | 285/500 [00:02<00:01, 126.42it/s]
 60%|▌      | 299/500 [00:02<00:01, 129.82it/s]
 63%|▋      | 313/500 [00:02<00:01, 129.93it/s]
 65%|▋      | 327/500 [00:02<00:01, 131.25it/s]
 68%|▋      | 341/500 [00:02<00:01, 130.16it/s]
 71%|▋      | 355/500 [00:02<00:01, 128.85it/s]
 74%|▋      | 368/500 [00:03<00:01, 123.53it/s]
 76%|▊      | 381/500 [00:03<00:00, 120.81it/s]
 79%|▊      | 396/500 [00:03<00:00, 126.68it/s]
 82%|▊      | 410/500 [00:03<00:00, 129.37it/s]
 85%|▊      | 424/500 [00:03<00:00, 131.08it/s]
 88%|▉      | 438/500 [00:03<00:00, 128.26it/s]
 90%|▉      | 451/500 [00:03<00:00, 127.32it/s]
 93%|▉      | 465/500 [00:03<00:00, 130.12it/s]
 96%|▉      | 479/500 [00:03<00:00, 131.02it/s]
100%|▉      | 500/500 [00:04<00:00, 123.31it/s]
  7%|▏      | 4/60 [00:20<04:37,  4.96s/it]
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  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 12/500 [00:00<00:04, 111.84it/s]
  5%|▍         | 24/500 [00:00<00:04, 114.13it/s]
  7%|▋         | 36/500 [00:00<00:04, 114.97it/s]
 10%|▉         | 48/500 [00:00<00:03, 115.63it/s]
 12%|█▏        | 61/500 [00:00<00:03, 119.57it/s]
 15%|█▍        | 74/500 [00:00<00:03, 122.83it/s]
 17%|█▋        | 87/500 [00:00<00:03, 121.47it/s]
 20%|██        | 101/500 [00:00<00:03, 124.91it/s]
 23%|██▎       | 114/500 [00:00<00:03, 125.92it/s]
 25%|██▌       | 127/500 [00:01<00:03, 123.38it/s]
 28%|██▊       | 140/500 [00:01<00:03, 115.12it/s]
 30%|███       | 152/500 [00:01<00:02, 116.47it/s]
 33%|███▎      | 164/500 [00:01<00:02, 114.79it/s]
 35%|███▌      | 176/500 [00:01<00:02, 116.15it/s]
 38%|███▊      | 189/500 [00:01<00:02, 118.33it/s]
 40%|████      | 202/500 [00:01<00:02, 121.46it/s]
 43%|████▎     | 215/500 [00:01<00:02, 123.84it/s]
 46%|████▌     | 229/500 [00:01<00:02, 128.50it/s]
 48%|████▊     | 242/500 [00:02<00:02, 125.31it/s]
 51%|█████     | 255/500 [00:02<00:01, 124.52it/s]
 54%|█████▎    | 268/500 [00:02<00:01, 122.21it/s]
 56%|█████▋    | 282/500 [00:02<00:01, 126.30it/s]
 59%|█████▉    | 295/500 [00:02<00:01, 126.85it/s]
 62%|██████▏   | 308/500 [00:02<00:01, 127.24it/s]
 64%|██████▍   | 321/500 [00:02<00:01, 126.38it/s]
 67%|██████▋   | 334/500 [00:02<00:01, 126.26it/s]
 69%|██████▉   | 347/500 [00:02<00:01, 126.49it/s]
 72%|███████▏  | 361/500 [00:02<00:01, 130.32it/s]
 75%|███████▌  | 375/500 [00:03<00:00, 128.89it/s]
 78%|███████▊  | 388/500 [00:03<00:00, 128.44it/s]
 80%|████████  | 401/500 [00:03<00:00, 118.83it/s]
 83%|████████▎ | 414/500 [00:03<00:00, 118.61it/s]
 85%|████████▌ | 427/500 [00:03<00:00, 119.99it/s]
 88%|████████▊ | 440/500 [00:03<00:00, 122.22it/s]
 91%|█████████ | 454/500 [00:03<00:00, 126.02it/s]
 93%|█████████▎| 467/500 [00:03<00:00, 125.13it/s]
 96%|█████████▌| 481/500 [00:03<00:00, 127.35it/s]
100%|██████████| 500/500 [00:04<00:00, 121.83it/s]
  8%|▊         | 5/60 [00:24<04:16,  4.66s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  3%|▎         | 14/500 [00:00<00:03, 124.84it/s]
  5%|▌         | 27/500 [00:00<00:03, 120.55it/s]
  8%|▊         | 40/500 [00:00<00:03, 123.37it/s]
 11%|█         | 53/500 [00:00<00:03, 125.18it/s]
 13%|█▎        | 66/500 [00:00<00:03, 125.25it/s]
 16%|█▌        | 80/500 [00:00<00:03, 126.17it/s]
 19%|█▉        | 93/500 [00:00<00:03, 127.07it/s]
 21%|██        | 106/500 [00:00<00:03, 120.20it/s]
 24%|██▍       | 119/500 [00:01<00:03, 98.17it/s]
 26%|██▌       | 130/500 [00:01<00:03, 94.81it/s]
 28%|██▊       | 140/500 [00:01<00:03, 95.36it/s]
 30%|███       | 151/500 [00:01<00:03, 96.12it/s]
 32%|███▏      | 161/500 [00:01<00:04, 81.80it/s]
 34%|███▍      | 170/500 [00:01<00:03, 83.34it/s]
 36%|███▌      | 179/500 [00:01<00:04, 78.88it/s]
 38%|███▊      | 188/500 [00:01<00:04, 72.37it/s]
 39%|███▉      | 196/500 [00:02<00:04, 66.70it/s]
 41%|████      | 204/500 [00:02<00:04, 68.51it/s]
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 42%|████▏     | 212/500 [00:02<00:04, 70.87it/s]
 44%|████▍     | 221/500 [00:02<00:03, 74.63it/s]
 46%|████▌     | 229/500 [00:02<00:03, 71.82it/s]
 47%|████▋     | 237/500 [00:02<00:04, 64.90it/s]
 49%|████▉     | 244/500 [00:02<00:03, 64.82it/s]
 50%|█████     | 251/500 [00:02<00:03, 64.18it/s]
 52%|█████▏    | 258/500 [00:03<00:04, 59.67it/s]
 53%|█████▎    | 265/500 [00:03<00:03, 59.96it/s]
 54%|█████▍    | 272/500 [00:03<00:03, 59.03it/s]
 56%|█████▌    | 279/500 [00:03<00:03, 59.94it/s]
 57%|█████▋    | 287/500 [00:03<00:03, 61.75it/s]
 59%|█████▉    | 294/500 [00:03<00:03, 63.11it/s]
 60%|██████    | 302/500 [00:03<00:02, 67.29it/s]
 62%|██████▏   | 312/500 [00:03<00:02, 76.01it/s]
 64%|██████▍   | 320/500 [00:03<00:02, 68.05it/s]
 66%|██████▌   | 331/500 [00:04<00:02, 78.41it/s]
 68%|██████▊   | 340/500 [00:04<00:01, 80.22it/s]
 70%|██████▉   | 349/500 [00:04<00:01, 82.42it/s]
 72%|███████▏  | 358/500 [00:04<00:01, 79.64it/s]
 73%|███████▎  | 367/500 [00:04<00:01, 74.54it/s]
 75%|███████▌  | 376/500 [00:04<00:01, 77.94it/s]
 77%|███████▋  | 384/500 [00:04<00:01, 72.15it/s]
 78%|███████▊  | 392/500 [00:04<00:01, 68.12it/s]
 80%|███████▉  | 399/500 [00:05<00:01, 65.34it/s]
 81%|████████  | 406/500 [00:05<00:01, 63.58it/s]
 83%|████████▎ | 413/500 [00:05<00:01, 61.33it/s]
 84%|████████▍ | 420/500 [00:05<00:01, 58.43it/s]
 86%|████████▌ | 428/500 [00:05<00:01, 62.81it/s]
 87%|████████▋ | 435/500 [00:05<00:01, 62.22it/s]
 88%|████████▊ | 442/500 [00:05<00:00, 62.11it/s]
 90%|████████▉ | 449/500 [00:05<00:00, 62.29it/s]
 91%|█████████ | 456/500 [00:05<00:00, 61.45it/s]
 93%|█████████▎| 467/500 [00:06<00:00, 73.60it/s]
 96%|█████████▌| 479/500 [00:06<00:00, 85.39it/s]
100%|██████████| 500/500 [00:06<00:00, 78.64it/s]
 10%|▉         | 6/60 [00:30<04:43,  5.24s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  3%|▎         | 15/500 [00:00<00:03, 143.26it/s]
  6%|▌         | 30/500 [00:00<00:03, 132.71it/s]
  9%|▉         | 44/500 [00:00<00:03, 132.25it/s]
 12%|█▏        | 58/500 [00:00<00:03, 130.42it/s]
 14%|█▍        | 72/500 [00:00<00:03, 113.17it/s]
 17%|█▋        | 84/500 [00:00<00:03, 114.89it/s]
 19%|█▉        | 96/500 [00:00<00:03, 115.29it/s]
 22%|██▏       | 108/500 [00:00<00:03, 115.08it/s]
 24%|██▍       | 121/500 [00:01<00:03, 118.11it/s]
 27%|██▋       | 134/500 [00:01<00:03, 120.12it/s]
 30%|██▉       | 148/500 [00:01<00:02, 125.65it/s]
 32%|███▏      | 161/500 [00:01<00:02, 118.76it/s]
 35%|███▍      | 174/500 [00:01<00:02, 121.61it/s]
 37%|███▋      | 187/500 [00:01<00:02, 111.92it/s]
 40%|████      | 201/500 [00:01<00:02, 119.05it/s]
 43%|████▎     | 214/500 [00:01<00:02, 121.83it/s]
 46%|████▌     | 228/500 [00:01<00:02, 124.20it/s]
 48%|████▊     | 241/500 [00:01<00:02, 123.93it/s]
 51%|█████     | 254/500 [00:02<00:01, 124.88it/s]
 54%|█████▎    | 268/500 [00:02<00:01, 129.10it/s]
 56%|█████▌    | 281/500 [00:02<00:01, 123.72it/s]
 59%|█████▉    | 294/500 [00:02<00:01, 123.15it/s]
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 61%|██████▏     | 307/500 [00:02<00:01, 115.48it/s]
 64%|██████▍     | 319/500 [00:02<00:01, 115.20it/s]
 67%|██████▋     | 333/500 [00:02<00:01, 121.43it/s]
 69%|██████▉     | 347/500 [00:02<00:01, 126.65it/s]
 72%|███████▏    | 360/500 [00:02<00:01, 127.12it/s]
 75%|███████▍    | 374/500 [00:03<00:00, 128.39it/s]
 77%|███████▋    | 387/500 [00:03<00:00, 127.42it/s]
 80%|████████    | 401/500 [00:03<00:00, 129.93it/s]
 83%|████████▎   | 415/500 [00:03<00:00, 119.14it/s]
 86%|████████▌   | 428/500 [00:03<00:00, 116.94it/s]
 88%|████████▊   | 440/500 [00:03<00:00, 117.06it/s]
 91%|█████████   | 453/500 [00:03<00:00, 118.89it/s]
 93%|█████████▎  | 467/500 [00:03<00:00, 124.12it/s]
 96%|█████████▌  | 480/500 [00:03<00:00, 125.71it/s]
100%|██████████| 500/500 [00:04<00:00, 121.72it/s]
 12%|█▏          | 7/60 [00:35<04:18,  4.88s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  3%|▎           | 15/500 [00:00<00:03, 145.16it/s]
  6%|▌           | 30/500 [00:00<00:03, 139.56it/s]
  9%|▉           | 44/500 [00:00<00:03, 119.18it/s]
 11%|█           | 57/500 [00:00<00:04, 105.38it/s]
 14%|█▍          | 70/500 [00:00<00:03, 112.67it/s]
 17%|█▋          | 84/500 [00:00<00:03, 119.04it/s]
 19%|█▉          | 97/500 [00:00<00:03, 119.26it/s]
 22%|██▏         | 110/500 [00:00<00:03, 120.21it/s]
 25%|██▍         | 123/500 [00:01<00:03, 121.33it/s]
 27%|██▋         | 136/500 [00:01<00:02, 122.38it/s]
 30%|██▉         | 149/500 [00:01<00:02, 121.18it/s]
 32%|███▏        | 162/500 [00:01<00:02, 116.06it/s]
 35%|███▍        | 174/500 [00:01<00:03, 108.52it/s]
 38%|███▊        | 188/500 [00:01<00:02, 114.95it/s]
 40%|████        | 201/500 [00:01<00:02, 117.00it/s]
 43%|████▎       | 214/500 [00:01<00:02, 119.11it/s]
 45%|████▌       | 227/500 [00:01<00:02, 122.06it/s]
 48%|████▊       | 240/500 [00:02<00:02, 121.33it/s]
 51%|█████       | 254/500 [00:02<00:01, 125.72it/s]
 53%|█████▎      | 267/500 [00:02<00:01, 125.81it/s]
 56%|█████▌      | 280/500 [00:02<00:01, 123.39it/s]
 59%|█████▊      | 293/500 [00:02<00:01, 108.86it/s]
 61%|██████      | 305/500 [00:02<00:01, 111.53it/s]
 64%|██████▎     | 318/500 [00:02<00:01, 115.76it/s]
 66%|██████▌     | 331/500 [00:02<00:01, 117.61it/s]
 69%|██████▉     | 344/500 [00:02<00:01, 117.90it/s]
 71%|███████▏    | 356/500 [00:03<00:01, 117.46it/s]
 74%|███████▍    | 370/500 [00:03<00:01, 122.10it/s]
 77%|███████▋    | 383/500 [00:03<00:00, 120.53it/s]
 79%|███████▉    | 396/500 [00:03<00:00, 122.37it/s]
 82%|████████▏   | 409/500 [00:03<00:00, 111.46it/s]
 84%|████████▍   | 422/500 [00:03<00:00, 114.10it/s]
 87%|████████▋   | 436/500 [00:03<00:00, 119.86it/s]
 90%|████████▉   | 449/500 [00:03<00:00, 122.02it/s]
 92%|█████████▏  | 462/500 [00:03<00:00, 124.02it/s]
 95%|█████████▍  | 475/500 [00:03<00:00, 123.71it/s]
100%|██████████| 500/500 [00:04<00:00, 119.25it/s]
 13%|█▎          | 8/60 [00:39<04:02,  4.67s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  3%|▎           | 13/500 [00:00<00:03, 128.33it/s]
  5%|▌           | 26/500 [00:00<00:03, 126.14it/s]
  8%|▊           | 39/500 [00:00<00:04, 113.63it/s]
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 10%|          | 52/500 [00:00<00:03, 118.43it/s]
 13%|          | 65/500 [00:00<00:03, 121.09it/s]
 16%|          | 78/500 [00:00<00:03, 109.88it/s]
 18%|          | 90/500 [00:00<00:03, 112.09it/s]
 21%|          | 103/500 [00:00<00:03, 116.63it/s]
 23%|          | 116/500 [00:00<00:03, 119.00it/s]
 26%|          | 129/500 [00:01<00:03, 118.94it/s]
 28%|          | 141/500 [00:01<00:03, 117.73it/s]
 31%|          | 153/500 [00:01<00:03, 104.58it/s]
 33%|          | 164/500 [00:01<00:03, 98.81it/s]
 35%|          | 175/500 [00:01<00:03, 92.91it/s]
 37%|          | 185/500 [00:01<00:03, 83.28it/s]
 39%|          | 194/500 [00:01<00:03, 78.23it/s]
 41%|          | 203/500 [00:02<00:04, 69.73it/s]
 42%|          | 211/500 [00:02<00:04, 65.09it/s]
 44%|          | 218/500 [00:02<00:04, 63.52it/s]
 45%|          | 225/500 [00:02<00:04, 60.69it/s]
 46%|          | 232/500 [00:02<00:04, 58.93it/s]
 48%|          | 238/500 [00:02<00:04, 56.61it/s]
 49%|          | 245/500 [00:02<00:04, 58.17it/s]
 50%|          | 252/500 [00:02<00:04, 60.13it/s]
 52%|          | 259/500 [00:03<00:03, 61.06it/s]
 53%|          | 266/500 [00:03<00:03, 62.53it/s]
 55%|          | 273/500 [00:03<00:03, 59.84it/s]
 56%|          | 280/500 [00:03<00:03, 58.51it/s]
 57%|          | 287/500 [00:03<00:03, 59.32it/s]
 59%|          | 293/500 [00:03<00:03, 58.95it/s]
 60%|          | 300/500 [00:03<00:03, 59.93it/s]
 62%|          | 309/500 [00:03<00:02, 67.58it/s]
 64%|          | 318/500 [00:03<00:02, 71.22it/s]
 65%|          | 326/500 [00:04<00:02, 64.82it/s]
 67%|          | 334/500 [00:04<00:02, 67.64it/s]
 68%|          | 341/500 [00:04<00:02, 64.86it/s]
 70%|          | 348/500 [00:04<00:02, 63.80it/s]
 71%|          | 355/500 [00:04<00:02, 60.77it/s]
 72%|          | 362/500 [00:04<00:02, 63.09it/s]
 75%|          | 373/500 [00:04<00:01, 74.31it/s]
 77%|          | 383/500 [00:04<00:01, 78.86it/s]
 78%|          | 391/500 [00:05<00:01, 69.28it/s]
 80%|          | 399/500 [00:05<00:01, 64.79it/s]
 81%|          | 406/500 [00:05<00:01, 61.05it/s]
 83%|          | 413/500 [00:05<00:01, 61.66it/s]
 84%|          | 420/500 [00:05<00:01, 59.24it/s]
 85%|          | 427/500 [00:05<00:01, 59.17it/s]
 88%|          | 438/500 [00:05<00:00, 71.87it/s]
 90%|          | 452/500 [00:05<00:00, 88.66it/s]
 93%|          | 465/500 [00:05<00:00, 98.58it/s]
 96%|          | 478/500 [00:06<00:00, 106.31it/s]
 98%|          | 489/500 [00:06<00:00, 103.15it/s]
100%|          | 500/500 [00:06<00:00, 79.18it/s]
 15%|          | 9/60 [00:45<04:24,  5.18s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  3%|          | 13/500 [00:00<00:03, 128.49it/s]
  5%|          | 26/500 [00:00<00:03, 123.34it/s]
  8%|          | 39/500 [00:00<00:04, 110.34it/s]
 10%|          | 52/500 [00:00<00:03, 114.42it/s]
 13%|          | 64/500 [00:00<00:03, 113.92it/s]
 15%|          | 76/500 [00:00<00:03, 114.74it/s]
 18%|          | 89/500 [00:00<00:03, 116.58it/s]
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 20%|██          | 101/500 [00:00<00:03, 113.91it/s]
 23%|██          | 113/500 [00:00<00:03, 113.69it/s]
 25%|██          | 126/500 [00:01<00:03, 116.08it/s]
 28%|██          | 138/500 [00:01<00:03, 114.27it/s]
 30%|███         | 150/500 [00:01<00:03, 113.09it/s]
 32%|███         | 162/500 [00:01<00:03, 111.20it/s]
 35%|███         | 175/500 [00:01<00:02, 116.31it/s]
 37%|███         | 187/500 [00:01<00:02, 116.54it/s]
 40%|████        | 200/500 [00:01<00:02, 119.85it/s]
 43%|████        | 213/500 [00:01<00:02, 114.08it/s]
 45%|████        | 225/500 [00:01<00:02, 110.28it/s]
 47%|████        | 237/500 [00:02<00:02, 109.30it/s]
 50%|█████       | 250/500 [00:02<00:02, 114.49it/s]
 53%|█████       | 263/500 [00:02<00:02, 116.66it/s]
 55%|█████       | 275/500 [00:02<00:01, 114.56it/s]
 57%|█████       | 287/500 [00:02<00:01, 113.15it/s]
 60%|██████      | 300/500 [00:02<00:01, 117.78it/s]
 63%|██████      | 313/500 [00:02<00:01, 119.50it/s]
 65%|██████      | 325/500 [00:02<00:01, 117.95it/s]
 67%|██████      | 337/500 [00:02<00:01, 115.63it/s]
 70%|███████     | 350/500 [00:03<00:01, 117.49it/s]
 72%|███████     | 362/500 [00:03<00:01, 117.76it/s]
 75%|███████     | 374/500 [00:03<00:01, 116.03it/s]
 77%|███████     | 386/500 [00:03<00:01, 112.80it/s]
 80%|████████    | 398/500 [00:03<00:00, 106.24it/s]
 82%|████████    | 411/500 [00:03<00:00, 111.53it/s]
 85%|████████    | 423/500 [00:03<00:00, 113.46it/s]
 87%|████████    | 435/500 [00:03<00:00, 114.51it/s]
 89%|████████    | 447/500 [00:03<00:00, 111.32it/s]
 92%|█████████   | 460/500 [00:04<00:00, 115.55it/s]
 95%|█████████   | 473/500 [00:04<00:00, 118.82it/s]
 97%|█████████   | 486/500 [00:04<00:00, 121.95it/s]
100%|██████████| 500/500 [00:04<00:00, 115.17it/s]
 17%|▏           | 10/60 [00:49<04:06,  4.93s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  2%|▏           | 12/500 [00:00<00:04, 110.01it/s]
  5%|▍           | 24/500 [00:00<00:04, 114.00it/s]
  7%|▋           | 37/500 [00:00<00:03, 117.99it/s]
 10%|▉           | 50/500 [00:00<00:03, 121.18it/s]
 13%|▉           | 63/500 [00:00<00:04, 106.58it/s]
 15%|█▍          | 76/500 [00:00<00:03, 112.76it/s]
 18%|█▍          | 88/500 [00:00<00:03, 112.59it/s]
 20%|██          | 101/500 [00:00<00:03, 117.49it/s]
 23%|██          | 113/500 [00:00<00:03, 115.92it/s]
 25%|██          | 126/500 [00:01<00:03, 119.95it/s]
 28%|██          | 139/500 [00:01<00:03, 114.74it/s]
 31%|███         | 153/500 [00:01<00:02, 119.60it/s]
 33%|███         | 167/500 [00:01<00:02, 122.90it/s]
 36%|███         | 180/500 [00:01<00:02, 120.42it/s]
 39%|███         | 194/500 [00:01<00:02, 124.20it/s]
 41%|████        | 207/500 [00:01<00:02, 120.63it/s]
 44%|████        | 220/500 [00:01<00:02, 116.01it/s]
 47%|████        | 233/500 [00:01<00:02, 118.26it/s]
 49%|████        | 246/500 [00:02<00:02, 120.86it/s]
 52%|█████       | 259/500 [00:02<00:02, 116.44it/s]
 54%|█████       | 271/500 [00:02<00:01, 116.61it/s]
 57%|█████       | 284/500 [00:02<00:01, 118.78it/s]
 59%|█████       | 296/500 [00:02<00:01, 105.20it/s]
 61%|██████      | 307/500 [00:02<00:01, 102.61it/s]
```

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 64%|                  | 319/500 [00:02<00:01, 106.68it/s]
 66%|                  | 332/500 [00:02<00:01, 111.55it/s]
 69%|                  | 345/500 [00:02<00:01, 116.02it/s]
 72%|                  | 358/500 [00:03<00:01, 117.74it/s]
 74%|                  | 372/500 [00:03<00:01, 120.25it/s]
 77%|                  | 385/500 [00:03<00:00, 119.57it/s]
 80%|                  | 399/500 [00:03<00:00, 123.46it/s]
 82%|                  | 412/500 [00:03<00:00, 114.00it/s]
 85%|                  | 425/500 [00:03<00:00, 117.57it/s]
 88%|                  | 438/500 [00:03<00:00, 119.34it/s]
 90%|                  | 451/500 [00:03<00:00, 121.04it/s]
 93%|                  | 464/500 [00:03<00:00, 119.21it/s]
 95%|                  | 476/500 [00:04<00:00, 119.05it/s]
100%|                  | 500/500 [00:04<00:00, 116.68it/s]
 18%|                  | 11/60 [00:54<03:52,  4.74s/it]
  0%|                  | 0/500 [00:00<?, ?it/s]
  2%|                  | 12/500 [00:00<00:04, 118.84it/s]
  5%|                  | 24/500 [00:00<00:04, 96.64it/s]
  7%|                  | 37/500 [00:00<00:04, 107.44it/s]
 10%|                  | 50/500 [00:00<00:03, 115.27it/s]
 13%|                  | 63/500 [00:00<00:03, 119.67it/s]
 15%|                  | 76/500 [00:00<00:03, 123.01it/s]
 18%|                  | 89/500 [00:00<00:03, 106.90it/s]
 20%|                  | 101/500 [00:00<00:04, 90.21it/s]
 22%|                  | 111/500 [00:01<00:04, 80.58it/s]
 24%|                  | 120/500 [00:01<00:04, 77.27it/s]
 26%|                  | 129/500 [00:01<00:05, 73.36it/s]
 28%|                  | 138/500 [00:01<00:04, 75.51it/s]
 29%|                  | 146/500 [00:01<00:05, 67.42it/s]
 31%|                  | 153/500 [00:01<00:05, 64.17it/s]
 33%|                  | 164/500 [00:01<00:04, 71.40it/s]
 34%|                  | 172/500 [00:02<00:05, 64.94it/s]
 36%|                  | 179/500 [00:02<00:05, 64.03it/s]
 37%|                  | 186/500 [00:02<00:04, 63.68it/s]
 39%|                  | 193/500 [00:02<00:05, 60.54it/s]
 40%|                  | 200/500 [00:02<00:05, 59.39it/s]
 41%|                  | 207/500 [00:02<00:04, 60.97it/s]
 43%|                  | 214/500 [00:02<00:04, 61.73it/s]
 44%|                  | 221/500 [00:02<00:04, 63.31it/s]
 46%|                  | 228/500 [00:03<00:04, 63.32it/s]
 47%|                  | 235/500 [00:03<00:04, 62.98it/s]
 48%|                  | 242/500 [00:03<00:04, 59.93it/s]
 50%|                  | 249/500 [00:03<00:04, 60.58it/s]
 51%|                  | 257/500 [00:03<00:03, 63.35it/s]
 53%|                  | 264/500 [00:03<00:03, 60.82it/s]
 54%|                  | 272/500 [00:03<00:03, 64.27it/s]
 56%|                  | 279/500 [00:03<00:03, 65.29it/s]
 57%|                  | 287/500 [00:03<00:03, 66.89it/s]
 59%|                  | 294/500 [00:04<00:03, 65.27it/s]
 60%|                  | 302/500 [00:04<00:03, 65.00it/s]
 62%|                  | 309/500 [00:04<00:03, 60.26it/s]
 63%|                  | 316/500 [00:04<00:03, 59.48it/s]
 65%|                  | 323/500 [00:04<00:02, 60.09it/s]
 66%|                  | 330/500 [00:04<00:02, 60.33it/s]
 67%|                  | 337/500 [00:04<00:02, 59.92it/s]
 69%|                  | 344/500 [00:04<00:02, 60.43it/s]
 70%|                  | 351/500 [00:04<00:02, 60.69it/s]
 72%|                  | 358/500 [00:05<00:02, 60.41it/s]
 73%|                  | 365/500 [00:05<00:02, 59.75it/s]
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 74%|███████▍  | 371/500 [00:05<00:02, 56.90it/s]
 76%|███████▌  | 378/500 [00:05<00:02, 59.38it/s]
 77%|███████▋  | 385/500 [00:05<00:01, 61.62it/s]
 78%|███████▊  | 392/500 [00:05<00:01, 59.39it/s]
 81%|████████  | 405/500 [00:05<00:01, 77.31it/s]
 84%|████████▍ | 419/500 [00:05<00:00, 93.80it/s]
 86%|████████▌ | 431/500 [00:05<00:00, 100.32it/s]
 89%|████████▊ | 443/500 [00:06<00:00, 105.64it/s]
 91%|█████████ | 454/500 [00:06<00:00, 97.21it/s]
 93%|█████████▎| 467/500 [00:06<00:00, 104.11it/s]
 96%|█████████▌| 478/500 [00:06<00:00, 99.80it/s]
100%|██████████| 500/500 [00:06<00:00, 75.33it/s]
 20%|██        | 12/60 [01:00<04:15,  5.32s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 12/500 [00:00<00:04, 115.29it/s]
  5%|▍         | 25/500 [00:00<00:03, 122.99it/s]
  8%|▊         | 38/500 [00:00<00:03, 122.02it/s]
 10%|▉         | 51/500 [00:00<00:03, 122.62it/s]
 13%|█▎        | 64/500 [00:00<00:03, 118.09it/s]
 15%|█▍        | 76/500 [00:00<00:03, 114.84it/s]
 18%|█▊        | 88/500 [00:00<00:03, 109.50it/s]
 20%|█▉        | 99/500 [00:00<00:03, 108.77it/s]
 22%|██▏       | 111/500 [00:00<00:03, 110.00it/s]
 25%|██▍       | 124/500 [00:01<00:03, 115.14it/s]
 27%|██▋       | 136/500 [00:01<00:03, 115.09it/s]
 30%|██▉       | 149/500 [00:01<00:02, 118.29it/s]
 32%|███▏      | 161/500 [00:01<00:02, 117.91it/s]
 35%|███▍      | 174/500 [00:01<00:02, 120.48it/s]
 37%|███▋      | 187/500 [00:01<00:02, 113.63it/s]
 40%|███▉      | 200/500 [00:01<00:02, 117.50it/s]
 42%|████▏     | 212/500 [00:01<00:02, 110.47it/s]
 45%|████▍     | 224/500 [00:01<00:02, 109.39it/s]
 47%|████▋     | 236/500 [00:02<00:02, 109.74it/s]
 50%|████▉     | 248/500 [00:02<00:02, 112.46it/s]
 52%|█████▏    | 261/500 [00:02<00:02, 115.54it/s]
 55%|█████▍    | 273/500 [00:02<00:01, 115.11it/s]
 57%|█████▋    | 286/500 [00:02<00:01, 116.78it/s]
 60%|█████▉    | 298/500 [00:02<00:01, 105.78it/s]
 62%|██████▏   | 309/500 [00:02<00:01, 106.19it/s]
 64%|██████▍   | 321/500 [00:02<00:01, 106.05it/s]
 66%|██████▋   | 332/500 [00:02<00:01, 100.48it/s]
 69%|██████▉   | 345/500 [00:03<00:01, 108.32it/s]
 72%|███████▏  | 358/500 [00:03<00:01, 114.08it/s]
 74%|███████▍  | 372/500 [00:03<00:01, 120.39it/s]
 77%|███████▋  | 385/500 [00:03<00:00, 120.85it/s]
 80%|███████▉  | 398/500 [00:03<00:00, 118.36it/s]
 82%|████████▏ | 410/500 [00:03<00:00, 106.40it/s]
 85%|████████▍ | 423/500 [00:03<00:00, 110.94it/s]
 87%|████████▋ | 435/500 [00:03<00:00, 111.90it/s]
 89%|████████▉ | 447/500 [00:03<00:00, 108.97it/s]
 92%|█████████▏| 460/500 [00:04<00:00, 112.81it/s]
 95%|█████████▍| 473/500 [00:04<00:00, 115.84it/s]
 97%|█████████▋| 486/500 [00:04<00:00, 118.35it/s]
100%|██████████| 500/500 [00:04<00:00, 113.46it/s]
 22%|██▏       | 13/60 [01:05<03:57,  5.05s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 10/500 [00:00<00:05, 93.02it/s]
  4%|▍         | 21/500 [00:00<00:04, 99.99it/s]
  7%|▋         | 34/500 [00:00<00:04, 110.17it/s]
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  9%|▉         | 46/500 [00:00<00:03, 113.89it/s]
 12%|█▏        | 58/500 [00:00<00:04, 108.28it/s]
 14%|█▍        | 70/500 [00:00<00:03, 109.61it/s]
 17%|█▋        | 83/500 [00:00<00:03, 113.05it/s]
 19%|█▉        | 96/500 [00:00<00:03, 116.91it/s]
 22%|██▏       | 108/500 [00:00<00:03, 115.23it/s]
 24%|██▍       | 121/500 [00:01<00:03, 118.04it/s]
 27%|██▋       | 133/500 [00:01<00:03, 113.13it/s]
 29%|██▉       | 146/500 [00:01<00:03, 116.25it/s]
 32%|███▏      | 158/500 [00:01<00:02, 114.49it/s]
 34%|███▍      | 170/500 [00:01<00:02, 114.54it/s]
 36%|███▋      | 182/500 [00:01<00:02, 108.35it/s]
 39%|███▉      | 194/500 [00:01<00:02, 109.81it/s]
 41%|████      | 206/500 [00:01<00:02, 110.46it/s]
 44%|████▍     | 218/500 [00:01<00:02, 112.92it/s]
 46%|████▌     | 230/500 [00:02<00:02, 113.39it/s]
 48%|████▊     | 242/500 [00:02<00:02, 112.90it/s]
 51%|█████     | 254/500 [00:02<00:02, 111.13it/s]
 53%|█████▎    | 266/500 [00:02<00:02, 106.42it/s]
 56%|█████▌    | 278/500 [00:02<00:02, 108.25it/s]
 58%|█████▊    | 289/500 [00:02<00:02, 103.57it/s]
 60%|██████    | 300/500 [00:02<00:02, 99.43it/s]
 62%|██████▏   | 311/500 [00:02<00:01, 101.00it/s]
 64%|██████▍   | 322/500 [00:02<00:01, 103.26it/s]
 67%|██████▋   | 336/500 [00:03<00:01, 112.32it/s]
 70%|██████▉   | 348/500 [00:03<00:01, 107.30it/s]
 72%|███████▏  | 361/500 [00:03<00:01, 111.81it/s]
 75%|███████▍  | 375/500 [00:03<00:01, 117.25it/s]
 78%|███████▊  | 388/500 [00:03<00:00, 118.87it/s]
 80%|████████  | 400/500 [00:03<00:00, 119.04it/s]
 82%|████████▏ | 412/500 [00:03<00:00, 110.22it/s]
 85%|████████▍ | 424/500 [00:03<00:00, 111.61it/s]
 87%|████████▋ | 436/500 [00:03<00:00, 112.79it/s]
 90%|████████▉ | 448/500 [00:04<00:00, 110.39it/s]
 92%|█████████▏| 460/500 [00:04<00:00, 99.19it/s]
 94%|█████████▍| 472/500 [00:04<00:00, 103.08it/s]
 97%|█████████▋| 483/500 [00:04<00:00, 100.55it/s]
100%|██████████| 500/500 [00:04<00:00, 109.25it/s]
 23%|██▎       | 14/60 [01:09<03:46,  4.92s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|▏         | 7/500 [00:00<00:07, 66.04it/s]
  3%|▎         | 15/500 [00:00<00:06, 73.64it/s]
  5%|▍         | 23/500 [00:00<00:06, 69.89it/s]
  6%|▌         | 31/500 [00:00<00:07, 62.08it/s]
  8%|▊         | 38/500 [00:00<00:07, 59.17it/s]
  9%|▉         | 45/500 [00:00<00:07, 60.18it/s]
 10%|▉         | 52/500 [00:00<00:07, 59.32it/s]
 12%|█▏        | 58/500 [00:00<00:07, 57.63it/s]
 13%|█▎        | 64/500 [00:01<00:07, 57.98it/s]
 14%|█▍        | 71/500 [00:01<00:07, 59.75it/s]
 16%|█▌        | 78/500 [00:01<00:06, 61.61it/s]
 17%|█▋        | 85/500 [00:01<00:06, 61.82it/s]
 18%|█▊        | 92/500 [00:01<00:06, 59.74it/s]
 20%|█▉        | 99/500 [00:01<00:06, 58.72it/s]
 21%|██        | 105/500 [00:01<00:06, 57.67it/s]
 22%|██▏       | 111/500 [00:01<00:06, 58.14it/s]
 24%|██▎       | 118/500 [00:01<00:06, 59.23it/s]
 25%|██▍       | 125/500 [00:02<00:06, 61.13it/s]
 26%|██▌       | 132/500 [00:02<00:05, 63.01it/s]
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 28%|███         | 139/500 [00:02<00:05, 64.88it/s]
 29%|███         | 146/500 [00:02<00:05, 63.56it/s]
 31%|███         | 153/500 [00:02<00:05, 63.41it/s]
 32%|███         | 160/500 [00:02<00:05, 60.69it/s]
 34%|███         | 168/500 [00:02<00:05, 65.22it/s]
 35%|███         | 176/500 [00:02<00:04, 65.68it/s]
 37%|███         | 183/500 [00:02<00:04, 63.63it/s]
 38%|███         | 190/500 [00:03<00:04, 63.29it/s]
 40%|███         | 200/500 [00:03<00:04, 71.02it/s]
 42%|███         | 208/500 [00:03<00:04, 69.23it/s]
 43%|███         | 215/500 [00:03<00:04, 67.81it/s]
 44%|███         | 222/500 [00:03<00:04, 67.27it/s]
 46%|███         | 232/500 [00:03<00:03, 73.87it/s]
 49%|███         | 243/500 [00:03<00:03, 83.07it/s]
 51%|███         | 253/500 [00:03<00:02, 87.27it/s]
 52%|███         | 262/500 [00:03<00:02, 80.27it/s]
 54%|███         | 271/500 [00:04<00:03, 75.52it/s]
 56%|███         | 279/500 [00:04<00:03, 68.46it/s]
 57%|███         | 287/500 [00:04<00:03, 69.72it/s]
 59%|███         | 295/500 [00:04<00:02, 68.47it/s]
 60%|███         | 302/500 [00:04<00:03, 65.86it/s]
 62%|███         | 309/500 [00:04<00:02, 65.32it/s]
 64%|███         | 319/500 [00:04<00:02, 73.78it/s]
 66%|███         | 330/500 [00:04<00:02, 83.47it/s]
 69%|███         | 343/500 [00:05<00:01, 95.61it/s]
 71%|███         | 355/500 [00:05<00:01, 102.54it/s]
 74%|███         | 368/500 [00:05<00:01, 110.07it/s]
 76%|███         | 381/500 [00:05<00:01, 113.86it/s]
 79%|███         | 393/500 [00:05<00:00, 112.01it/s]
 81%|███         | 405/500 [00:05<00:00, 105.28it/s]
 83%|███         | 417/500 [00:05<00:00, 107.47it/s]
 86%|███         | 429/500 [00:05<00:00, 109.75it/s]
 88%|███         | 441/500 [00:05<00:00, 111.89it/s]
 91%|███         | 453/500 [00:05<00:00, 112.52it/s]
 93%|███         | 465/500 [00:06<00:00, 112.73it/s]
 96%|███         | 479/500 [00:06<00:00, 118.65it/s]
100%|███         | 500/500 [00:06<00:00, 78.29it/s]
 25%|▍           | 15/60 [01:16<04:01,  5.37s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  2%|            | 9/500 [00:00<00:05, 87.77it/s]
  4%|▏           | 20/500 [00:00<00:04, 97.61it/s]
  6%|▏           | 30/500 [00:00<00:04, 98.34it/s]
  8%|▏           | 42/500 [00:00<00:04, 104.87it/s]
 11%|▏           | 54/500 [00:00<00:04, 108.56it/s]
 13%|▏           | 67/500 [00:00<00:03, 115.25it/s]
 16%|▏           | 81/500 [00:00<00:03, 120.66it/s]
 19%|▏           | 94/500 [00:00<00:03, 123.19it/s]
 21%|▏           | 107/500 [00:00<00:03, 121.70it/s]
 24%|▏           | 120/500 [00:01<00:03, 112.91it/s]
 26%|▏           | 132/500 [00:01<00:03, 114.30it/s]
 29%|▏           | 144/500 [00:01<00:03, 113.60it/s]
 31%|▏           | 157/500 [00:01<00:02, 116.87it/s]
 34%|▏           | 169/500 [00:01<00:02, 115.38it/s]
 36%|▏           | 181/500 [00:01<00:02, 114.98it/s]
 39%|▏           | 193/500 [00:01<00:02, 113.61it/s]
 41%|▏           | 206/500 [00:01<00:02, 116.44it/s]
 44%|▏           | 218/500 [00:01<00:02, 115.47it/s]
 46%|▏           | 230/500 [00:02<00:02, 114.28it/s]
 48%|▏           | 242/500 [00:02<00:02, 100.48it/s]
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 51%|     | 253/500 [00:02<00:02, 98.78it/s]
 53%|     | 264/500 [00:02<00:02, 96.91it/s]
 55%|     | 274/500 [00:02<00:02, 94.86it/s]
 57%|     | 286/500 [00:02<00:02, 99.75it/s]
 60%|     | 299/500 [00:02<00:01, 106.12it/s]
 62%|     | 312/500 [00:02<00:01, 109.72it/s]
 65%|     | 324/500 [00:02<00:01, 110.56it/s]
 67%|     | 336/500 [00:03<00:01, 105.78it/s]
 69%|     | 347/500 [00:03<00:01, 98.48it/s]
 72%|     | 358/500 [00:03<00:01, 101.50it/s]
 74%|     | 370/500 [00:03<00:01, 103.25it/s]
 76%|     | 381/500 [00:03<00:01, 88.87it/s]
 78%|     | 391/500 [00:03<00:01, 91.47it/s]
 80%|     | 402/500 [00:03<00:01, 95.98it/s]
 83%|     | 415/500 [00:03<00:00, 103.13it/s]
 85%|     | 427/500 [00:04<00:00, 106.97it/s]
 88%|     | 438/500 [00:04<00:00, 105.05it/s]
 90%|     | 449/500 [00:04<00:00, 95.80it/s]
 92%|     | 460/500 [00:04<00:00, 98.57it/s]
 94%|     | 471/500 [00:04<00:00, 100.77it/s]
 97%|     | 484/500 [00:04<00:00, 107.22it/s]
100%|     | 500/500 [00:04<00:00, 106.32it/s]
 27%|     | 16/60 [01:21<03:47,  5.17s/it]
  0%|     | 0/500 [00:00<?, ?it/s]
  2%|     | 12/500 [00:00<00:04, 119.29it/s]
  5%|     | 24/500 [00:00<00:04, 118.09it/s]
  7%|     | 36/500 [00:00<00:03, 117.63it/s]
 10%|     | 48/500 [00:00<00:04, 99.54it/s]
 12%|     | 59/500 [00:00<00:04, 97.37it/s]
 14%|     | 71/500 [00:00<00:04, 102.22it/s]
 16%|     | 82/500 [00:00<00:04, 102.24it/s]
 19%|     | 93/500 [00:00<00:04, 100.25it/s]
 21%|     | 105/500 [00:01<00:03, 104.77it/s]
 23%|     | 116/500 [00:01<00:03, 104.19it/s]
 26%|     | 128/500 [00:01<00:03, 106.93it/s]
 28%|     | 140/500 [00:01<00:03, 108.94it/s]
 30%|     | 151/500 [00:01<00:03, 100.76it/s]
 32%|     | 162/500 [00:01<00:03, 99.47it/s]
 35%|     | 174/500 [00:01<00:03, 103.40it/s]
 37%|     | 186/500 [00:01<00:02, 106.60it/s]
 39%|     | 197/500 [00:01<00:02, 107.47it/s]
 42%|     | 210/500 [00:01<00:02, 113.04it/s]
 45%|     | 224/500 [00:02<00:02, 118.77it/s]
 47%|     | 237/500 [00:02<00:02, 119.72it/s]
 50%|     | 249/500 [00:02<00:02, 117.55it/s]
 52%|     | 261/500 [00:02<00:02, 106.00it/s]
 55%|     | 274/500 [00:02<00:02, 111.98it/s]
 57%|     | 286/500 [00:02<00:01, 110.18it/s]
 60%|     | 298/500 [00:02<00:01, 110.74it/s]
 62%|     | 310/500 [00:02<00:01, 111.18it/s]
 65%|     | 323/500 [00:02<00:01, 114.57it/s]
 67%|     | 336/500 [00:03<00:01, 117.16it/s]
 70%|     | 349/500 [00:03<00:01, 118.61it/s]
 72%|     | 361/500 [00:03<00:01, 118.52it/s]
 75%|     | 373/500 [00:03<00:01, 101.68it/s]
 77%|     | 384/500 [00:03<00:01, 91.74it/s]
 79%|     | 394/500 [00:03<00:01, 86.68it/s]
 81%|     | 404/500 [00:03<00:01, 87.45it/s]
 83%|     | 414/500 [00:03<00:00, 88.89it/s]
```

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 85%|████████▌  | 424/500 [00:04<00:00, 80.13it/s]
 87%|████████▋  | 433/500 [00:04<00:00, 71.34it/s]
 88%|████████▊  | 441/500 [00:04<00:00, 66.77it/s]
 90%|████████▉  | 448/500 [00:04<00:00, 61.06it/s]
 91%|█████████  | 455/500 [00:04<00:00, 60.92it/s]
 92%|█████████▏ | 462/500 [00:04<00:00, 55.35it/s]
 94%|█████████▎ | 468/500 [00:04<00:00, 52.31it/s]
 95%|█████████▍ | 474/500 [00:05<00:00, 52.80it/s]
 96%|█████████▌ | 482/500 [00:05<00:00, 58.44it/s]
 98%|█████████▊ | 490/500 [00:05<00:00, 62.71it/s]
100%|██████████| 500/500 [00:05<00:00, 90.88it/s]
 28%|██▊        | 17/60 [01:26<03:46,  5.28s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
  1%|▏          | 7/500 [00:00<00:07, 63.05it/s]
  3%|▎          | 14/500 [00:00<00:07, 61.76it/s]
  4%|▍          | 21/500 [00:00<00:08, 59.12it/s]
  5%|▌          | 27/500 [00:00<00:07, 59.33it/s]
  7%|▋          | 33/500 [00:00<00:08, 54.98it/s]
  8%|▊          | 42/500 [00:00<00:07, 63.39it/s]
 10%|▉          | 49/500 [00:00<00:07, 61.20it/s]
 11%|█          | 56/500 [00:00<00:07, 56.89it/s]
 13%|█▎         | 64/500 [00:01<00:06, 62.54it/s]
 15%|█▍         | 73/500 [00:01<00:06, 69.79it/s]
 16%|█▋         | 81/500 [00:01<00:06, 65.87it/s]
 18%|█▊         | 88/500 [00:01<00:06, 63.13it/s]
 19%|█▉         | 96/500 [00:01<00:06, 67.26it/s]
 21%|██         | 106/500 [00:01<00:05, 74.94it/s]
 23%|██▎        | 114/500 [00:01<00:05, 67.60it/s]
 24%|██▍        | 121/500 [00:01<00:06, 62.39it/s]
 26%|██▌        | 128/500 [00:02<00:06, 57.02it/s]
 27%|██▋        | 134/500 [00:02<00:06, 55.10it/s]
 28%|██▊        | 140/500 [00:02<00:06, 53.00it/s]
 29%|██▉        | 146/500 [00:02<00:06, 53.37it/s]
 32%|███▏       | 158/500 [00:02<00:04, 69.52it/s]
 34%|███▍       | 169/500 [00:02<00:04, 80.23it/s]
 36%|███▌       | 182/500 [00:02<00:03, 92.35it/s]
 39%|███▉       | 194/500 [00:02<00:03, 98.18it/s]
 41%|████       | 206/500 [00:02<00:02, 102.97it/s]
 44%|████▍      | 219/500 [00:03<00:02, 110.26it/s]
 47%|████▋      | 233/500 [00:03<00:02, 116.38it/s]
 49%|████▉      | 245/500 [00:03<00:02, 114.30it/s]
 51%|█████      | 257/500 [00:03<00:02, 110.89it/s]
 54%|█████▍     | 269/500 [00:03<00:02, 107.50it/s]
 56%|█████▌     | 280/500 [00:03<00:02, 106.37it/s]
 58%|█████▊     | 291/500 [00:03<00:02, 104.27it/s]
 61%|██████     | 303/500 [00:03<00:01, 105.90it/s]
 63%|██████▎    | 314/500 [00:03<00:01, 106.11it/s]
 65%|██████▌    | 326/500 [00:04<00:01, 109.84it/s]
 68%|██████▊    | 338/500 [00:04<00:01, 111.43it/s]
 70%|██████▉    | 350/500 [00:04<00:01, 109.55it/s]
 72%|███████▏   | 362/500 [00:04<00:01, 111.41it/s]
 75%|███████▍   | 374/500 [00:04<00:01, 112.84it/s]
 77%|███████▋   | 386/500 [00:04<00:01, 105.00it/s]
 79%|███████▉   | 397/500 [00:04<00:00, 104.17it/s]
 82%|████████▏  | 408/500 [00:04<00:00, 103.72it/s]
 84%|████████▍  | 419/500 [00:04<00:00, 99.62it/s]
 86%|████████▌  | 430/500 [00:05<00:00, 100.88it/s]
 88%|████████▊  | 441/500 [00:05<00:00, 101.16it/s]
 90%|████████▉  | 452/500 [00:05<00:00, 100.84it/s]
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 93%|▉| 463/500 [00:05<00:00, 98.08it/s]
 95%|▉| 474/500 [00:05<00:00, 100.99it/s]
 97%|▉| 485/500 [00:05<00:00, 98.69it/s]
100%|▉| 500/500 [00:05<00:00, 87.34it/s]
 30%|▎| 18/60 [01:32<03:47,  5.42s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  2%|▏| 8/500 [00:00<00:06, 78.01it/s]
  4%|▏| 19/500 [00:00<00:05, 95.28it/s]
  6%|▏| 32/500 [00:00<00:04, 107.85it/s]
  9%|▏| 45/500 [00:00<00:03, 113.92it/s]
 11%|▏| 57/500 [00:00<00:03, 112.67it/s]
 14%|▏| 69/500 [00:00<00:03, 113.29it/s]
 16%|▏| 81/500 [00:00<00:03, 112.47it/s]
 19%|▏| 93/500 [00:00<00:03, 109.12it/s]
 21%|▏| 104/500 [00:00<00:03, 108.01it/s]
 23%|▏| 115/500 [00:01<00:03, 106.32it/s]
 25%|▎| 126/500 [00:01<00:03, 104.48it/s]
 27%|▎| 137/500 [00:01<00:03, 105.74it/s]
 30%|▎| 149/500 [00:01<00:03, 109.13it/s]
 32%|▎| 160/500 [00:01<00:03, 108.64it/s]
 34%|▎| 171/500 [00:01<00:03, 108.11it/s]
 36%|▎| 182/500 [00:01<00:02, 108.03it/s]
 39%|▍| 195/500 [00:01<00:02, 113.38it/s]
 41%|▍| 207/500 [00:01<00:02, 107.32it/s]
 44%|▍| 218/500 [00:02<00:02, 105.81it/s]
 46%|▍| 229/500 [00:02<00:02, 96.29it/s]
 48%|▍| 239/500 [00:02<00:02, 96.72it/s]
 50%|▌| 252/500 [00:02<00:02, 105.65it/s]
 53%|▌| 264/500 [00:02<00:02, 108.09it/s]
 55%|▌| 276/500 [00:02<00:02, 110.17it/s]
 58%|▌| 288/500 [00:02<00:01, 112.70it/s]
 60%|▌| 300/500 [00:02<00:01, 113.54it/s]
 63%|▋| 313/500 [00:02<00:01, 117.63it/s]
 65%|▋| 325/500 [00:03<00:01, 112.85it/s]
 67%|▋| 337/500 [00:03<00:01, 108.74it/s]
 70%|▋| 349/500 [00:03<00:01, 110.68it/s]
 72%|▋| 361/500 [00:03<00:01, 113.17it/s]
 75%|▊| 374/500 [00:03<00:01, 116.45it/s]
 77%|▊| 386/500 [00:03<00:00, 115.38it/s]
 80%|▊| 398/500 [00:03<00:00, 110.60it/s]
 82%|▊| 410/500 [00:03<00:00, 110.67it/s]
 84%|▊| 422/500 [00:03<00:00, 112.63it/s]
 87%|▊| 434/500 [00:04<00:00, 104.34it/s]
 89%|▉| 445/500 [00:04<00:00, 101.95it/s]
 91%|▉| 456/500 [00:04<00:00, 95.94it/s]
 93%|▉| 467/500 [00:04<00:00, 97.87it/s]
 96%|▉| 479/500 [00:04<00:00, 102.15it/s]
100%|▉| 500/500 [00:04<00:00, 107.49it/s]
 32%|▎| 19/60 [01:36<03:32,  5.19s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  2%|▏| 11/500 [00:00<00:04, 102.84it/s]
  4%|▏| 22/500 [00:00<00:04, 104.01it/s]
  7%|▏| 33/500 [00:00<00:05, 89.32it/s]
  9%|▏| 44/500 [00:00<00:04, 94.71it/s]
 11%|▏| 57/500 [00:00<00:04, 103.93it/s]
 14%|▏| 70/500 [00:00<00:03, 110.79it/s]
 17%|▏| 83/500 [00:00<00:03, 115.70it/s]
 19%|▏| 95/500 [00:00<00:03, 115.70it/s]
 21%|▏| 107/500 [00:00<00:03, 115.61it/s]
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 24%|██▍       | 120/500 [00:01<00:03, 117.84it/s]
 27%|██▋       | 133/500 [00:01<00:03, 119.04it/s]
 29%|██▉       | 145/500 [00:01<00:03, 116.03it/s]
 31%|███       | 157/500 [00:01<00:03, 97.25it/s]
 34%|███▎      | 169/500 [00:01<00:03, 101.27it/s]
 36%|███▌      | 181/500 [00:01<00:03, 104.63it/s]
 39%|███▊      | 193/500 [00:01<00:02, 107.57it/s]
 41%|████      | 205/500 [00:01<00:02, 108.14it/s]
 43%|████▎     | 216/500 [00:02<00:02, 101.78it/s]
 45%|████▌     | 227/500 [00:02<00:02, 92.95it/s]
 47%|████▋     | 237/500 [00:02<00:03, 80.91it/s]
 49%|████▉     | 246/500 [00:02<00:03, 72.96it/s]
 51%|█████     | 254/500 [00:02<00:03, 71.57it/s]
 53%|█████▎    | 264/500 [00:02<00:03, 76.89it/s]
 54%|█████▍    | 272/500 [00:02<00:03, 69.11it/s]
 56%|█████▌    | 280/500 [00:03<00:03, 65.23it/s]
 57%|█████▋    | 287/500 [00:03<00:03, 64.53it/s]
 59%|█████▉    | 294/500 [00:03<00:03, 63.49it/s]
 60%|██████    | 301/500 [00:03<00:03, 62.19it/s]
 62%|██████▏   | 308/500 [00:03<00:03, 56.47it/s]
 64%|██████▎   | 318/500 [00:03<00:02, 66.41it/s]
 65%|██████▌   | 325/500 [00:03<00:02, 64.58it/s]
 66%|██████▋   | 332/500 [00:03<00:02, 64.13it/s]
 68%|██████▊   | 339/500 [00:03<00:02, 63.02it/s]
 69%|██████▉   | 346/500 [00:04<00:02, 62.95it/s]
 71%|███████   | 353/500 [00:04<00:02, 63.59it/s]
 72%|███████▏  | 360/500 [00:04<00:02, 63.30it/s]
 74%|███████▎  | 368/500 [00:04<00:01, 66.45it/s]
 75%|███████▌  | 375/500 [00:04<00:01, 64.76it/s]
 76%|███████▋  | 382/500 [00:04<00:01, 61.69it/s]
 78%|███████▊  | 389/500 [00:04<00:01, 58.05it/s]
 79%|███████▉  | 395/500 [00:04<00:01, 54.48it/s]
 81%|████████  | 403/500 [00:05<00:01, 60.38it/s]
 82%|████████▏ | 411/500 [00:05<00:01, 64.38it/s]
 84%|████████▎ | 418/500 [00:05<00:01, 64.69it/s]
 85%|████████▌ | 426/500 [00:05<00:01, 68.52it/s]
 87%|████████▋ | 435/500 [00:05<00:00, 73.89it/s]
 89%|████████▉ | 445/500 [00:05<00:00, 79.86it/s]
 91%|█████████ | 454/500 [00:05<00:00, 78.03it/s]
 92%|█████████▏| 462/500 [00:05<00:00, 69.45it/s]
 94%|█████████▍| 471/500 [00:05<00:00, 74.33it/s]
 96%|█████████▌| 481/500 [00:06<00:00, 79.87it/s]
 98%|█████████▊| 490/500 [00:06<00:00, 80.11it/s]
100%|██████████| 500/500 [00:06<00:00, 79.15it/s]
 33%|███▎      | 20/60 [01:43<03:41,  5.53s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|▏         | 7/500 [00:00<00:07, 62.99it/s]
  3%|▎         | 14/500 [00:00<00:09, 53.20it/s]
  4%|▍         | 21/500 [00:00<00:08, 55.55it/s]
  6%|▌         | 30/500 [00:00<00:07, 66.23it/s]
  8%|▊         | 42/500 [00:00<00:05, 82.05it/s]
 11%|█         | 53/500 [00:00<00:04, 90.47it/s]
 13%|█▎        | 65/500 [00:00<00:04, 97.74it/s]
 16%|█▌        | 78/500 [00:00<00:04, 105.29it/s]
 18%|█▊        | 90/500 [00:01<00:03, 109.05it/s]
 20%|██        | 101/500 [00:01<00:04, 98.78it/s]
 22%|██▏       | 112/500 [00:01<00:03, 101.52it/s]
 25%|██▍       | 124/500 [00:01<00:03, 105.37it/s]
 27%|██▋       | 135/500 [00:01<00:03, 106.59it/s]
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 29%|███         | 146/500 [00:01<00:03, 101.09it/s]
 31%|███         | 157/500 [00:01<00:03, 89.49it/s]
 34%|███         | 168/500 [00:01<00:03, 93.71it/s]
 36%|███         | 180/500 [00:01<00:03, 99.30it/s]
 38%|███         | 192/500 [00:02<00:02, 104.06it/s]
 41%|███         | 203/500 [00:02<00:03, 94.42it/s]
 43%|███         | 215/500 [00:02<00:02, 100.78it/s]
 46%|███         | 228/500 [00:02<00:02, 107.95it/s]
 48%|███         | 240/500 [00:02<00:02, 110.82it/s]
 50%|███         | 252/500 [00:02<00:02, 102.75it/s]
 53%|███         | 263/500 [00:02<00:02, 103.50it/s]
 55%|███         | 276/500 [00:02<00:02, 109.69it/s]
 58%|███         | 288/500 [00:02<00:01, 111.05it/s]
 60%|███         | 301/500 [00:03<00:01, 115.10it/s]
 63%|███         | 313/500 [00:03<00:01, 103.74it/s]
 65%|███         | 325/500 [00:03<00:01, 108.03it/s]
 68%|███         | 338/500 [00:03<00:01, 112.52it/s]
 70%|███         | 351/500 [00:03<00:01, 115.73it/s]
 73%|███         | 363/500 [00:03<00:01, 111.48it/s]
 75%|███         | 375/500 [00:03<00:01, 112.17it/s]
 78%|███         | 388/500 [00:03<00:00, 115.88it/s]
 80%|███         | 400/500 [00:03<00:00, 115.26it/s]
 82%|███         | 412/500 [00:04<00:00, 115.45it/s]
 85%|███         | 424/500 [00:04<00:00, 103.90it/s]
 87%|███         | 436/500 [00:04<00:00, 106.39it/s]
 90%|███         | 449/500 [00:04<00:00, 110.87it/s]
 92%|███         | 461/500 [00:04<00:00, 110.42it/s]
 95%|███         | 473/500 [00:04<00:00, 108.80it/s]
 97%|███         | 484/500 [00:04<00:00, 106.97it/s]
100%|███         | 500/500 [00:04<00:00, 103.03it/s]
 35%|███         | 21/60 [01:48<03:28,  5.33s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  2%|            | 10/500 [00:00<00:05, 96.06it/s]
  4%|            | 22/500 [00:00<00:04, 102.93it/s]
  7%|            | 33/500 [00:00<00:05, 86.95it/s]
  9%|            | 44/500 [00:00<00:04, 93.89it/s]
 11%|            | 57/500 [00:00<00:04, 102.93it/s]
 14%|            | 68/500 [00:00<00:04, 104.25it/s]
 16%|            | 79/500 [00:00<00:04, 104.06it/s]
 18%|            | 90/500 [00:00<00:04, 99.37it/s]
 20%|            | 101/500 [00:01<00:03, 101.08it/s]
 22%|            | 112/500 [00:01<00:03, 102.45it/s]
 25%|            | 123/500 [00:01<00:03, 100.37it/s]
 27%|            | 134/500 [00:01<00:03, 98.40it/s]
 29%|            | 144/500 [00:01<00:03, 95.77it/s]
 31%|            | 155/500 [00:01<00:03, 99.24it/s]
 33%|            | 167/500 [00:01<00:03, 102.82it/s]
 36%|            | 179/500 [00:01<00:03, 106.24it/s]
 38%|            | 190/500 [00:01<00:03, 101.98it/s]
 40%|            | 201/500 [00:02<00:02, 101.10it/s]
 42%|            | 212/500 [00:02<00:02, 102.94it/s]
 45%|            | 223/500 [00:02<00:02, 101.28it/s]
 47%|            | 234/500 [00:02<00:02, 97.08it/s]
 49%|            | 246/500 [00:02<00:02, 103.15it/s]
 51%|            | 257/500 [00:02<00:02, 103.33it/s]
 54%|            | 268/500 [00:02<00:02, 99.91it/s]
 56%|            | 279/500 [00:02<00:02, 98.87it/s]
 58%|            | 290/500 [00:02<00:02, 101.69it/s]
 60%|            | 301/500 [00:03<00:02, 98.49it/s]
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 63%|██████▎   | 313/500 [00:03<00:01, 103.20it/s]
 65%|██████▍   | 324/500 [00:03<00:01, 102.05it/s]
 67%|██████▋   | 335/500 [00:03<00:01, 95.08it/s]
 69%|██████▉   | 346/500 [00:03<00:01, 97.18it/s]
 71%|███████   | 356/500 [00:03<00:01, 95.99it/s]
 73%|███████▎  | 366/500 [00:03<00:01, 95.13it/s]
 75%|███████▌  | 376/500 [00:03<00:01, 96.02it/s]
 77%|███████▋  | 386/500 [00:03<00:01, 96.74it/s]
 79%|███████▉  | 397/500 [00:03<00:01, 100.43it/s]
 82%|████████▏ | 408/500 [00:04<00:00, 98.39it/s]
 84%|████████▍ | 420/500 [00:04<00:00, 101.76it/s]
 86%|████████▌ | 431/500 [00:04<00:00, 100.10it/s]
 89%|████████▊ | 443/500 [00:04<00:00, 105.39it/s]
 91%|█████████ | 454/500 [00:04<00:00, 104.62it/s]
 93%|█████████▎| 465/500 [00:04<00:00, 104.71it/s]
 95%|█████████▌| 477/500 [00:04<00:00, 107.77it/s]
 98%|█████████▊| 489/500 [00:04<00:00, 108.95it/s]
100%|██████████| 500/500 [00:04<00:00, 100.97it/s]
 37%|███▋      | 22/60 [01:53<03:18,  5.22s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 7/500 [00:00<00:07, 69.84it/s]
  4%|▎         | 18/500 [00:00<00:05, 90.83it/s]
  6%|▌         | 28/500 [00:00<00:05, 80.67it/s]
  8%|▊         | 38/500 [00:00<00:05, 85.55it/s]
 10%|▉         | 51/500 [00:00<00:04, 96.40it/s]
 12%|█▏        | 61/500 [00:00<00:05, 84.93it/s]
 14%|█▍        | 70/500 [00:00<00:05, 75.78it/s]
 16%|█▌        | 78/500 [00:00<00:05, 75.29it/s]
 17%|█▋        | 86/500 [00:01<00:06, 68.33it/s]
 19%|█▉        | 94/500 [00:01<00:06, 66.32it/s]
 20%|██        | 101/500 [00:01<00:06, 61.15it/s]
 22%|██▏       | 108/500 [00:01<00:06, 61.63it/s]
 23%|██▎       | 115/500 [00:01<00:06, 62.59it/s]
 24%|██▍       | 122/500 [00:01<00:06, 62.14it/s]
 26%|██▌       | 129/500 [00:01<00:05, 62.06it/s]
 27%|██▋       | 136/500 [00:01<00:06, 59.76it/s]
 29%|██▊       | 143/500 [00:02<00:05, 60.16it/s]
 30%|███       | 150/500 [00:02<00:05, 60.42it/s]
 31%|███▏      | 157/500 [00:02<00:05, 57.23it/s]
 33%|███▎      | 164/500 [00:02<00:05, 59.00it/s]
 34%|███▍      | 171/500 [00:02<00:05, 61.14it/s]
 36%|███▌      | 178/500 [00:02<00:05, 62.23it/s]
 37%|███▋      | 185/500 [00:02<00:05, 62.41it/s]
 38%|███▊      | 192/500 [00:02<00:04, 61.89it/s]
 40%|███▉      | 199/500 [00:02<00:04, 62.30it/s]
 42%|████▏     | 208/500 [00:03<00:04, 67.67it/s]
 43%|████▎     | 215/500 [00:03<00:04, 65.49it/s]
 44%|████▍     | 222/500 [00:03<00:04, 59.89it/s]
 46%|████▌     | 229/500 [00:03<00:04, 58.23it/s]
 48%|████▊     | 238/500 [00:03<00:03, 65.77it/s]
 49%|████▉     | 245/500 [00:03<00:03, 65.21it/s]
 51%|█████     | 253/500 [00:03<00:03, 68.98it/s]
 52%|█████▏    | 261/500 [00:03<00:03, 68.74it/s]
 54%|█████▎    | 268/500 [00:04<00:03, 67.53it/s]
 55%|█████▌    | 275/500 [00:04<00:03, 64.87it/s]
 57%|█████▋    | 283/500 [00:04<00:03, 65.86it/s]
 58%|█████▊    | 290/500 [00:04<00:03, 60.15it/s]
 59%|█████▉    | 297/500 [00:04<00:03, 59.85it/s]
 61%|██████    | 304/500 [00:04<00:03, 61.83it/s]
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 62%|▋      | 311/500 [00:04<00:03, 60.82it/s]
 64%|▋      | 318/500 [00:04<00:03, 60.18it/s]
 65%|▋      | 325/500 [00:04<00:02, 58.96it/s]
 66%|▋      | 331/500 [00:05<00:02, 57.23it/s]
 68%|▋      | 338/500 [00:05<00:02, 57.93it/s]
 69%|▋      | 344/500 [00:05<00:02, 55.68it/s]
 71%|▋      | 355/500 [00:05<00:02, 68.02it/s]
 73%|▋      | 364/500 [00:05<00:01, 73.74it/s]
 75%|▊      | 375/500 [00:05<00:01, 82.57it/s]
 77%|▊      | 386/500 [00:05<00:01, 89.00it/s]
 80%|▊      | 398/500 [00:05<00:01, 96.07it/s]
 82%|▊      | 410/500 [00:05<00:00, 102.71it/s]
 84%|▊      | 422/500 [00:06<00:00, 106.80it/s]
 87%|▊      | 434/500 [00:06<00:00, 109.20it/s]
 89%|▉      | 445/500 [00:06<00:00, 102.41it/s]
 91%|▉      | 456/500 [00:06<00:00, 98.29it/s]
 94%|▉      | 469/500 [00:06<00:00, 102.99it/s]
 96%|▉      | 480/500 [00:06<00:00, 104.37it/s]
100%|▉      | 500/500 [00:06<00:00, 72.90it/s]
 38%|▍      | 23/60 [02:00<03:31,  5.72s/it]
  0%|       | 0/500 [00:00<?, ?it/s]
  2%|       | 12/500 [00:00<00:04, 113.80it/s]
  5%|       | 24/500 [00:00<00:04, 104.07it/s]
  7%|       | 36/500 [00:00<00:04, 107.71it/s]
  9%|       | 47/500 [00:00<00:04, 99.13it/s]
 12%|▏      | 61/500 [00:00<00:03, 110.53it/s]
 15%|▏      | 73/500 [00:00<00:03, 111.50it/s]
 17%|▏      | 85/500 [00:00<00:03, 104.78it/s]
 20%|▏      | 98/500 [00:00<00:03, 110.25it/s]
 22%|▏      | 110/500 [00:01<00:03, 111.82it/s]
 25%|▏      | 124/500 [00:01<00:03, 117.80it/s]
 27%|▎      | 136/500 [00:01<00:03, 118.13it/s]
 30%|▎      | 149/500 [00:01<00:02, 120.77it/s]
 32%|▎      | 162/500 [00:01<00:02, 113.21it/s]
 35%|▎      | 175/500 [00:01<00:02, 117.41it/s]
 38%|▍      | 188/500 [00:01<00:02, 118.47it/s]
 40%|▍      | 200/500 [00:01<00:02, 112.79it/s]
 42%|▍      | 212/500 [00:01<00:02, 110.92it/s]
 45%|▍      | 224/500 [00:02<00:02, 109.97it/s]
 47%|▍      | 237/500 [00:02<00:02, 113.63it/s]
 50%|▍      | 249/500 [00:02<00:02, 109.98it/s]
 52%|▌      | 261/500 [00:02<00:02, 108.01it/s]
 54%|▌      | 272/500 [00:02<00:02, 99.72it/s]
 57%|▌      | 283/500 [00:02<00:02, 100.16it/s]
 59%|▌      | 294/500 [00:02<00:02, 100.98it/s]
 61%|▌      | 305/500 [00:02<00:02, 96.61it/s]
 63%|▋      | 316/500 [00:02<00:01, 99.37it/s]
 66%|▋      | 328/500 [00:03<00:01, 104.53it/s]
 68%|▋      | 341/500 [00:03<00:01, 110.54it/s]
 71%|▋      | 353/500 [00:03<00:01, 110.53it/s]
 73%|▋      | 365/500 [00:03<00:01, 106.23it/s]
 75%|▊      | 376/500 [00:03<00:01, 95.81it/s]
 77%|▊      | 386/500 [00:03<00:01, 96.62it/s]
 79%|▊      | 397/500 [00:03<00:01, 98.99it/s]
 82%|▊      | 409/500 [00:03<00:00, 103.78it/s]
 84%|▊      | 420/500 [00:03<00:00, 100.54it/s]
 87%|▊      | 433/500 [00:04<00:00, 107.02it/s]
 89%|▉      | 446/500 [00:04<00:00, 111.71it/s]
 92%|▉      | 458/500 [00:04<00:00, 111.01it/s]
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 94%|▉| 470/500 [00:04<00:00, 105.85it/s]
 96%|▉| 481/500 [00:04<00:00, 100.80it/s]
100%|▉| 500/500 [00:04<00:00, 106.81it/s]
 40%|▍| 24/60 [02:04<03:14,  5.41s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  2%|▏| 12/500 [00:00<00:04, 118.94it/s]
  5%|▏| 24/500 [00:00<00:04, 98.41it/s]
  7%|▏| 35/500 [00:00<00:04, 101.84it/s]
  9%|▏| 47/500 [00:00<00:04, 107.18it/s]
 12%|▏| 58/500 [00:00<00:04, 103.84it/s]
 14%|▏| 69/500 [00:00<00:04, 97.60it/s]
 16%|▏| 79/500 [00:00<00:04, 96.19it/s]
 18%|▏| 92/500 [00:00<00:03, 105.06it/s]
 21%|▏| 105/500 [00:00<00:03, 110.97it/s]
 23%|▏| 117/500 [00:01<00:03, 112.76it/s]
 26%|▎| 129/500 [00:01<00:03, 104.78it/s]
 28%|▎| 140/500 [00:01<00:03, 103.14it/s]
 30%|▎| 152/500 [00:01<00:03, 107.21it/s]
 33%|▎| 165/500 [00:01<00:03, 111.47it/s]
 35%|▎| 177/500 [00:01<00:02, 111.67it/s]
 38%|▍| 189/500 [00:01<00:02, 110.19it/s]
 40%|▍| 202/500 [00:01<00:02, 115.03it/s]
 43%|▍| 216/500 [00:01<00:02, 120.42it/s]
 46%|▍| 229/500 [00:02<00:02, 119.04it/s]
 48%|▍| 241/500 [00:02<00:02, 116.95it/s]
 51%|▌| 253/500 [00:02<00:02, 106.74it/s]
 53%|▌| 266/500 [00:02<00:02, 111.96it/s]
 56%|▌| 278/500 [00:02<00:02, 109.47it/s]
 58%|▌| 290/500 [00:02<00:02, 103.08it/s]
 60%|▌| 302/500 [00:02<00:01, 105.67it/s]
 63%|▋| 314/500 [00:02<00:01, 109.08it/s]
 65%|▋| 326/500 [00:03<00:01, 109.10it/s]
 67%|▋| 337/500 [00:03<00:01, 108.28it/s]
 70%|▋| 349/500 [00:03<00:01, 111.00it/s]
 72%|▋| 361/500 [00:03<00:01, 103.84it/s]
 75%|▋| 374/500 [00:03<00:01, 108.71it/s]
 77%|▊| 386/500 [00:03<00:01, 110.26it/s]
 80%|▊| 398/500 [00:03<00:00, 112.58it/s]
 82%|▊| 410/500 [00:03<00:00, 113.43it/s]
 84%|▊| 422/500 [00:03<00:00, 109.62it/s]
 87%|▊| 434/500 [00:04<00:00, 91.09it/s]
 89%|▉| 444/500 [00:04<00:00, 84.21it/s]
 91%|▉| 453/500 [00:04<00:00, 76.62it/s]
 92%|▉| 462/500 [00:04<00:00, 70.69it/s]
 94%|▉| 470/500 [00:04<00:00, 68.29it/s]
 96%|▉| 478/500 [00:04<00:00, 65.27it/s]
 97%|▉| 487/500 [00:04<00:00, 69.85it/s]
100%|▉| 500/500 [00:05<00:00, 99.13it/s]
 42%|▍| 25/60 [02:09<03:05,  5.31s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  1%|▏| 7/500 [00:00<00:08, 61.61it/s]
  3%|▏| 16/500 [00:00<00:06, 74.99it/s]
  5%|▏| 24/500 [00:00<00:06, 72.46it/s]
  6%|▏| 32/500 [00:00<00:06, 67.11it/s]
  8%|▏| 39/500 [00:00<00:07, 61.84it/s]
  9%|▏| 46/500 [00:00<00:07, 60.18it/s]
 11%|▏| 53/500 [00:00<00:07, 57.19it/s]
 12%|▏| 59/500 [00:00<00:08, 53.46it/s]
 13%|▏| 65/500 [00:01<00:08, 53.42it/s]
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 14%|▏          | 71/500 [00:01<00:07, 54.93it/s]
 16%|▏          | 78/500 [00:01<00:07, 58.26it/s]
 17%|▏          | 85/500 [00:01<00:06, 60.79it/s]
 18%|▏          | 92/500 [00:01<00:06, 59.84it/s]
 20%|▏          | 99/500 [00:01<00:06, 57.70it/s]
 21%|▏          | 105/500 [00:01<00:07, 55.09it/s]
 22%|▏          | 111/500 [00:01<00:06, 55.73it/s]
 24%|▏          | 118/500 [00:02<00:06, 58.49it/s]
 25%|▏          | 124/500 [00:02<00:06, 56.89it/s]
 26%|▏          | 130/500 [00:02<00:06, 56.44it/s]
 28%|▏          | 139/500 [00:02<00:05, 64.93it/s]
 29%|▏          | 146/500 [00:02<00:05, 65.25it/s]
 31%|▏          | 154/500 [00:02<00:05, 68.88it/s]
 32%|▏          | 162/500 [00:02<00:04, 71.49it/s]
 35%|▏          | 173/500 [00:02<00:04, 81.30it/s]
 36%|▏          | 182/500 [00:02<00:03, 83.26it/s]
 38%|▏          | 191/500 [00:02<00:04, 75.43it/s]
 40%|▏          | 199/500 [00:03<00:04, 72.58it/s]
 41%|▏          | 207/500 [00:03<00:04, 68.81it/s]
 43%|▏          | 214/500 [00:03<00:04, 65.64it/s]
 44%|▏          | 221/500 [00:03<00:04, 63.60it/s]
 46%|▏          | 228/500 [00:03<00:04, 60.18it/s]
 47%|▏          | 235/500 [00:03<00:04, 56.32it/s]
 48%|▏          | 241/500 [00:03<00:04, 56.27it/s]
 50%|▏          | 248/500 [00:03<00:04, 58.57it/s]
 51%|▏          | 254/500 [00:04<00:04, 58.51it/s]
 52%|▏          | 260/500 [00:04<00:04, 58.17it/s]
 53%|▏          | 266/500 [00:04<00:04, 58.35it/s]
 55%|▏          | 275/500 [00:04<00:03, 65.19it/s]
 56%|▏          | 282/500 [00:04<00:03, 63.22it/s]
 58%|▏          | 289/500 [00:04<00:03, 63.62it/s]
 59%|▏          | 297/500 [00:04<00:03, 66.99it/s]
 61%|▏          | 305/500 [00:04<00:02, 70.62it/s]
 63%|▏          | 314/500 [00:04<00:02, 75.34it/s]
 65%|▏          | 325/500 [00:05<00:02, 84.33it/s]
 67%|▏          | 336/500 [00:05<00:01, 89.75it/s]
 69%|▏          | 346/500 [00:05<00:01, 92.51it/s]
 71%|▏          | 356/500 [00:05<00:01, 94.27it/s]
 73%|▏          | 367/500 [00:05<00:01, 98.26it/s]
 75%|▏          | 377/500 [00:05<00:01, 84.20it/s]
 77%|▏          | 386/500 [00:05<00:01, 82.92it/s]
 79%|▏          | 397/500 [00:05<00:01, 88.71it/s]
 81%|▏          | 407/500 [00:05<00:01, 91.50it/s]
 84%|▏          | 419/500 [00:06<00:00, 98.94it/s]
 86%|▏          | 430/500 [00:06<00:00, 100.88it/s]
 88%|▏          | 441/500 [00:06<00:00, 102.75it/s]
 91%|▏          | 454/500 [00:06<00:00, 109.17it/s]
 93%|▏          | 466/500 [00:06<00:00, 112.06it/s]
 96%|▏          | 478/500 [00:06<00:00, 109.91it/s]
100%|▏          | 500/500 [00:06<00:00, 73.67it/s]
 43%|▏          | 26/60 [02:16<03:15,  5.76s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
  2%|▏          | 11/500 [00:00<00:04, 98.66it/s]
  5%|▏          | 23/500 [00:00<00:04, 106.91it/s]
  7%|▏          | 34/500 [00:00<00:04, 105.54it/s]
  9%|▏          | 46/500 [00:00<00:04, 110.88it/s]
 12%|▏          | 58/500 [00:00<00:03, 111.93it/s]
 14%|▏          | 70/500 [00:00<00:03, 112.25it/s]
 16%|▏          | 82/500 [00:00<00:03, 108.88it/s]
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 19%|██          | 93/500 [00:00<00:03, 103.89it/s]
 21%|██          | 104/500 [00:00<00:03, 102.73it/s]
 23%|██          | 116/500 [00:01<00:03, 105.85it/s]
 25%|██          | 127/500 [00:01<00:03, 103.52it/s]
 28%|██          | 138/500 [00:01<00:03, 103.17it/s]
 30%|██          | 149/500 [00:01<00:03, 103.25it/s]
 32%|██          | 160/500 [00:01<00:03, 102.90it/s]
 34%|██          | 172/500 [00:01<00:03, 105.79it/s]
 37%|██          | 184/500 [00:01<00:02, 109.60it/s]
 39%|██          | 195/500 [00:01<00:02, 108.36it/s]
 41%|██          | 207/500 [00:01<00:02, 111.31it/s]
 44%|██          | 220/500 [00:02<00:02, 115.36it/s]
 46%|██          | 232/500 [00:02<00:02, 116.13it/s]
 49%|██          | 244/500 [00:02<00:02, 107.97it/s]
 51%|██          | 257/500 [00:02<00:02, 112.80it/s]
 54%|██          | 270/500 [00:02<00:01, 116.62it/s]
 57%|██          | 283/500 [00:02<00:01, 117.54it/s]
 59%|██          | 296/500 [00:02<00:01, 118.85it/s]
 62%|██          | 308/500 [00:02<00:01, 117.05it/s]
 64%|██          | 320/500 [00:02<00:01, 111.16it/s]
 67%|██          | 334/500 [00:03<00:01, 118.29it/s]
 69%|██          | 347/500 [00:03<00:01, 120.68it/s]
 72%|██          | 360/500 [00:03<00:01, 110.39it/s]
 74%|██          | 372/500 [00:03<00:01, 105.94it/s]
 77%|██          | 385/500 [00:03<00:01, 111.09it/s]
 79%|██          | 397/500 [00:03<00:00, 112.64it/s]
 82%|██          | 409/500 [00:03<00:00, 114.41it/s]
 84%|██          | 421/500 [00:03<00:00, 112.86it/s]
 87%|██          | 433/500 [00:03<00:00, 106.62it/s]
 89%|██          | 444/500 [00:04<00:00, 106.86it/s]
 91%|██          | 455/500 [00:04<00:00, 103.48it/s]
 93%|██          | 466/500 [00:04<00:00, 101.66it/s]
 95%|██          | 477/500 [00:04<00:00, 100.90it/s]
100%|██          | 500/500 [00:04<00:00, 109.59it/s]
 45%|██          | 27/60 [02:21<02:58,  5.40s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  2%|            | 9/500 [00:00<00:05, 85.88it/s]
  4%|            | 20/500 [00:00<00:04, 97.49it/s]
  6%|            | 30/500 [00:00<00:05, 88.35it/s]
  8%|            | 42/500 [00:00<00:04, 98.94it/s]
 11%|            | 53/500 [00:00<00:04, 100.53it/s]
 13%|            | 64/500 [00:00<00:04, 98.70it/s]
 15%|            | 74/500 [00:00<00:04, 93.12it/s]
 17%|            | 87/500 [00:00<00:04, 102.45it/s]
 20%|            | 99/500 [00:00<00:03, 105.55it/s]
 22%|            | 110/500 [00:01<00:03, 105.59it/s]
 24%|            | 121/500 [00:01<00:03, 105.96it/s]
 26%|            | 132/500 [00:01<00:03, 95.41it/s]
 29%|            | 144/500 [00:01<00:03, 101.50it/s]
 31%|            | 155/500 [00:01<00:03, 101.78it/s]
 33%|            | 166/500 [00:01<00:03, 99.14it/s]
 35%|            | 177/500 [00:01<00:03, 101.39it/s]
 38%|            | 188/500 [00:01<00:03, 100.00it/s]
 40%|            | 200/500 [00:01<00:02, 104.68it/s]
 42%|            | 211/500 [00:02<00:02, 101.92it/s]
 44%|            | 222/500 [00:02<00:02, 94.83it/s]
 46%|            | 232/500 [00:02<00:02, 94.10it/s]
 49%|            | 243/500 [00:02<00:02, 96.96it/s]
 51%|            | 254/500 [00:02<00:02, 100.47it/s]
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 53%|          | 265/500 [00:02<00:02, 96.15it/s]
 55%|          | 277/500 [00:02<00:02, 102.58it/s]
 58%|          | 288/500 [00:02<00:02, 100.15it/s]
 60%|          | 299/500 [00:03<00:01, 100.63it/s]
 62%|          | 310/500 [00:03<00:01, 103.22it/s]
 64%|          | 322/500 [00:03<00:01, 105.80it/s]
 67%|          | 333/500 [00:03<00:01, 103.61it/s]
 69%|          | 344/500 [00:03<00:01, 97.02it/s]
 71%|          | 354/500 [00:03<00:01, 87.14it/s]
 73%|          | 363/500 [00:03<00:01, 76.31it/s]
 74%|          | 371/500 [00:03<00:01, 68.25it/s]
 76%|          | 379/500 [00:04<00:01, 65.37it/s]
 77%|          | 387/500 [00:04<00:01, 67.69it/s]
 79%|          | 394/500 [00:04<00:01, 67.77it/s]
 80%|          | 401/500 [00:04<00:01, 64.07it/s]
 82%|          | 408/500 [00:04<00:01, 60.83it/s]
 83%|          | 415/500 [00:04<00:01, 60.63it/s]
 84%|          | 422/500 [00:04<00:01, 58.06it/s]
 86%|          | 428/500 [00:04<00:01, 57.10it/s]
 87%|          | 434/500 [00:04<00:01, 57.71it/s]
 88%|          | 442/500 [00:05<00:00, 60.48it/s]
 90%|          | 449/500 [00:05<00:00, 59.98it/s]
 91%|          | 456/500 [00:05<00:00, 58.26it/s]
 92%|          | 462/500 [00:05<00:00, 55.68it/s]
 94%|          | 469/500 [00:05<00:00, 58.37it/s]
 95%|          | 476/500 [00:05<00:00, 60.74it/s]
 97%|          | 483/500 [00:05<00:00, 62.62it/s]
 98%|          | 491/500 [00:05<00:00, 65.17it/s]
100%|          | 500/500 [00:06<00:00, 82.96it/s]
 47%|          | 28/60 [02:27<02:59,  5.60s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 7/500 [00:00<00:07, 67.57it/s]
  3%|          | 14/500 [00:00<00:07, 64.88it/s]
  4%|          | 21/500 [00:00<00:07, 66.14it/s]
  6%|          | 31/500 [00:00<00:06, 77.32it/s]
  8%|          | 42/500 [00:00<00:05, 87.72it/s]
 10%|          | 51/500 [00:00<00:05, 79.91it/s]
 12%|          | 60/500 [00:00<00:05, 76.37it/s]
 14%|          | 68/500 [00:00<00:05, 75.55it/s]
 15%|          | 76/500 [00:01<00:06, 70.28it/s]
 17%|          | 84/500 [00:01<00:06, 67.89it/s]
 18%|          | 91/500 [00:01<00:06, 62.59it/s]
 20%|          | 98/500 [00:01<00:06, 57.53it/s]
 21%|          | 104/500 [00:01<00:07, 55.40it/s]
 22%|          | 110/500 [00:01<00:07, 55.60it/s]
 23%|          | 117/500 [00:01<00:06, 57.27it/s]
 25%|          | 123/500 [00:01<00:06, 55.63it/s]
 26%|          | 129/500 [00:02<00:06, 56.44it/s]
 27%|          | 135/500 [00:02<00:06, 56.60it/s]
 28%|          | 141/500 [00:02<00:06, 55.30it/s]
 30%|          | 151/500 [00:02<00:05, 67.42it/s]
 32%|          | 158/500 [00:02<00:05, 66.03it/s]
 33%|          | 165/500 [00:02<00:05, 65.96it/s]
 34%|          | 172/500 [00:02<00:05, 63.68it/s]
 36%|          | 179/500 [00:02<00:05, 63.51it/s]
 38%|          | 189/500 [00:02<00:04, 72.97it/s]
 40%|          | 200/500 [00:02<00:03, 81.72it/s]
 42%|          | 211/500 [00:03<00:03, 88.92it/s]
 44%|          | 222/500 [00:03<00:02, 92.90it/s]
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 47%|████▋     | 233/500 [00:03<00:02, 97.30it/s]
 49%|████▉     | 245/500 [00:03<00:02, 102.52it/s]
 51%|█████     | 256/500 [00:03<00:02, 104.01it/s]
 54%|█████▍    | 269/500 [00:03<00:02, 109.18it/s]
 56%|█████▌    | 281/500 [00:03<00:01, 111.47it/s]
 59%|█████▊    | 293/500 [00:03<00:01, 107.84it/s]
 61%|██████    | 306/500 [00:03<00:01, 112.75it/s]
 64%|██████▎   | 318/500 [00:04<00:01, 113.10it/s]
 66%|██████▌   | 330/500 [00:04<00:01, 114.80it/s]
 68%|██████▊   | 342/500 [00:04<00:01, 115.43it/s]
 71%|███████   | 355/500 [00:04<00:01, 117.43it/s]
 73%|███████▎  | 367/500 [00:04<00:01, 108.93it/s]
 76%|███████▌  | 379/500 [00:04<00:01, 109.70it/s]
 78%|███████▊  | 391/500 [00:04<00:01, 106.98it/s]
 81%|████████  | 403/500 [00:04<00:00, 108.55it/s]
 83%|████████▎ | 415/500 [00:04<00:00, 111.19it/s]
 85%|████████▌ | 427/500 [00:05<00:00, 108.66it/s]
 88%|████████▊ | 439/500 [00:05<00:00, 110.14it/s]
 90%|█████████ | 451/500 [00:05<00:00, 108.08it/s]
 93%|█████████▎| 463/500 [00:05<00:00, 109.87it/s]
 95%|█████████▌| 475/500 [00:05<00:00, 104.79it/s]
 97%|█████████▋| 486/500 [00:05<00:00, 105.30it/s]
100%|██████████| 500/500 [00:05<00:00, 87.27it/s]
 48%|████▊     | 29/60 [02:32<02:54,  5.64s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 10/500 [00:00<00:04, 99.13it/s]
  4%|▍         | 22/500 [00:00<00:04, 106.11it/s]
  7%|▋         | 35/500 [00:00<00:04, 114.02it/s]
  9%|▉         | 47/500 [00:00<00:04, 108.16it/s]
 12%|█▏        | 58/500 [00:00<00:04, 96.79it/s]
 14%|█▍        | 68/500 [00:00<00:04, 94.78it/s]
 16%|█▌        | 78/500 [00:00<00:04, 94.60it/s]
 18%|█▊        | 91/500 [00:00<00:03, 104.15it/s]
 20%|██        | 102/500 [00:00<00:03, 104.11it/s]
 23%|██▎       | 114/500 [00:01<00:03, 108.35it/s]
 25%|██▌       | 127/500 [00:01<00:03, 113.85it/s]
 28%|██▊       | 139/500 [00:01<00:03, 111.58it/s]
 30%|███       | 152/500 [00:01<00:03, 114.77it/s]
 33%|███▎      | 164/500 [00:01<00:02, 115.52it/s]
 35%|███▌      | 177/500 [00:01<00:02, 118.65it/s]
 38%|███▊      | 190/500 [00:01<00:02, 120.29it/s]
 41%|████      | 203/500 [00:01<00:02, 116.04it/s]
 43%|████▎     | 215/500 [00:01<00:02, 113.30it/s]
 45%|████▌     | 227/500 [00:02<00:02, 112.97it/s]
 48%|████▊     | 240/500 [00:02<00:02, 117.21it/s]
 50%|█████     | 252/500 [00:02<00:02, 115.71it/s]
 53%|█████▎    | 264/500 [00:02<00:02, 110.11it/s]
 55%|█████▌    | 276/500 [00:02<00:02, 109.92it/s]
 58%|█████▊    | 288/500 [00:02<00:01, 112.12it/s]
 60%|██████    | 302/500 [00:02<00:01, 117.91it/s]
 63%|██████▎   | 314/500 [00:02<00:01, 117.94it/s]
 65%|██████▌   | 326/500 [00:02<00:01, 110.05it/s]
 68%|██████▊   | 338/500 [00:03<00:01, 109.87it/s]
 70%|███████   | 351/500 [00:03<00:01, 113.26it/s]
 73%|███████▎  | 364/500 [00:03<00:01, 116.95it/s]
 75%|███████▌  | 377/500 [00:03<00:01, 118.51it/s]
 78%|███████▊  | 389/500 [00:03<00:00, 113.35it/s]
 80%|████████  | 401/500 [00:03<00:00, 111.24it/s]
 83%|████████▎ | 413/500 [00:03<00:00, 109.72it/s]
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 85%|████████▌ | 425/500 [00:03<00:00, 109.53it/s]
 87%|████████▋ | 436/500 [00:03<00:00, 103.94it/s]
 89%|████████▊ | 447/500 [00:04<00:00, 102.71it/s]
 92%|████████▉ | 458/500 [00:04<00:00, 103.93it/s]
 94%|█████████ | 469/500 [00:04<00:00, 105.44it/s]
 96%|█████████▏| 481/500 [00:04<00:00, 108.35it/s]
100%|█████████▉| 500/500 [00:04<00:00, 110.19it/s]
 50%|████▉     | 30/60 [02:37<02:39,  5.32s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  3%|▏         | 13/500 [00:00<00:03, 122.58it/s]
  5%|▍         | 26/500 [00:00<00:03, 120.23it/s]
  8%|▋         | 39/500 [00:00<00:03, 116.36it/s]
 10%|▉         | 51/500 [00:00<00:04, 107.75it/s]
 13%|█▏        | 63/500 [00:00<00:03, 110.05it/s]
 15%|█▍        | 76/500 [00:00<00:03, 114.43it/s]
 18%|█▋        | 88/500 [00:00<00:03, 113.36it/s]
 20%|█▉        | 100/500 [00:00<00:03, 107.22it/s]
 22%|██▏       | 111/500 [00:01<00:03, 102.20it/s]
 24%|██▍       | 122/500 [00:01<00:03, 103.83it/s]
 27%|██▋       | 133/500 [00:01<00:03, 104.45it/s]
 29%|██▉       | 144/500 [00:01<00:03, 104.45it/s]
 31%|███       | 155/500 [00:01<00:03, 101.51it/s]
 33%|███▎      | 166/500 [00:01<00:03, 103.63it/s]
 35%|███▌      | 177/500 [00:01<00:03, 103.75it/s]
 38%|███▊      | 188/500 [00:01<00:03, 103.51it/s]
 40%|███▉      | 199/500 [00:01<00:03, 98.05it/s]
 42%|████▏     | 209/500 [00:02<00:03, 93.75it/s]
 44%|████▍     | 219/500 [00:02<00:02, 95.20it/s]
 46%|████▌     | 230/500 [00:02<00:02, 98.72it/s]
 48%|████▊     | 240/500 [00:02<00:02, 96.59it/s]
 50%|████▉     | 250/500 [00:02<00:02, 96.74it/s]
 52%|█████▏    | 260/500 [00:02<00:02, 89.96it/s]
 54%|█████▍    | 270/500 [00:02<00:02, 84.94it/s]
 56%|█████▌    | 279/500 [00:02<00:02, 83.95it/s]
 58%|█████▊    | 288/500 [00:02<00:02, 76.47it/s]
 59%|█████▉    | 296/500 [00:03<00:03, 67.14it/s]
 61%|██████    | 303/500 [00:03<00:03, 62.62it/s]
 62%|██████▏   | 310/500 [00:03<00:03, 63.11it/s]
 63%|██████▎   | 317/500 [00:03<00:02, 61.58it/s]
 65%|██████▍   | 324/500 [00:03<00:02, 62.41it/s]
 66%|██████▌   | 331/500 [00:03<00:02, 64.07it/s]
 68%|██████▊   | 338/500 [00:03<00:02, 61.70it/s]
 69%|██████▉   | 345/500 [00:03<00:02, 61.60it/s]
 70%|███████   | 352/500 [00:04<00:02, 57.66it/s]
 72%|███████▏  | 358/500 [00:04<00:02, 55.96it/s]
 73%|███████▎  | 364/500 [00:04<00:02, 53.89it/s]
 74%|███████▍  | 372/500 [00:04<00:02, 60.36it/s]
 77%|███████▋  | 383/500 [00:04<00:01, 72.23it/s]
 78%|███████▊  | 391/500 [00:04<00:01, 70.63it/s]
 80%|███████▉  | 399/500 [00:04<00:01, 64.98it/s]
 81%|████████  | 406/500 [00:04<00:01, 64.70it/s]
 83%|████████▎ | 413/500 [00:05<00:01, 60.34it/s]
 84%|████████▍ | 420/500 [00:05<00:01, 57.77it/s]
 85%|████████▌ | 427/500 [00:05<00:01, 60.75it/s]
 87%|████████▋ | 435/500 [00:05<00:00, 65.59it/s]
 89%|████████▊ | 445/500 [00:05<00:00, 74.50it/s]
 91%|█████████ | 453/500 [00:05<00:00, 72.80it/s]
 92%|█████████▏| 461/500 [00:05<00:00, 69.71it/s]
 94%|█████████▍| 469/500 [00:05<00:00, 70.83it/s]
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```
 95%|| 477/500 [00:05<00:00, 69.41it/s]
 97%|| 485/500 [00:06<00:00, 64.93it/s]
100%|| 500/500 [00:06<00:00, 79.76it/s]
 52%|| 31/60 [02:43<02:42,  5.61s/it]
  0%|| 0/500 [00:00<?, ?it/s]
  1%|| 7/500 [00:00<00:07, 65.38it/s]
  3%|| 14/500 [00:00<00:07, 63.14it/s]
  4%|| 22/500 [00:00<00:06, 68.87it/s]
  6%|| 29/500 [00:00<00:06, 68.74it/s]
  7%|| 36/500 [00:00<00:07, 64.84it/s]
  9%|| 43/500 [00:00<00:07, 62.06it/s]
 10%|| 50/500 [00:00<00:07, 57.87it/s]
 11%|| 56/500 [00:00<00:07, 56.01it/s]
 12%|| 62/500 [00:01<00:08, 53.21it/s]
 14%|| 68/500 [00:01<00:08, 53.20it/s]
 15%|| 74/500 [00:01<00:08, 53.12it/s]
 16%|| 80/500 [00:01<00:07, 52.83it/s]
 17%|| 86/500 [00:01<00:07, 53.77it/s]
 18%|| 92/500 [00:01<00:07, 51.21it/s]
 20%|| 100/500 [00:01<00:06, 57.76it/s]
 21%|| 107/500 [00:01<00:06, 60.82it/s]
 23%|| 115/500 [00:01<00:05, 65.96it/s]
 25%|| 124/500 [00:02<00:05, 71.88it/s]
 27%|| 134/500 [00:02<00:04, 78.56it/s]
 29%|| 144/500 [00:02<00:04, 83.68it/s]
 31%|| 156/500 [00:02<00:03, 92.69it/s]
 33%|| 166/500 [00:02<00:03, 93.94it/s]
 36%|| 178/500 [00:02<00:03, 98.25it/s]
 38%|| 188/500 [00:02<00:03, 84.91it/s]
 40%|| 198/500 [00:02<00:03, 87.82it/s]
 42%|| 210/500 [00:02<00:03, 95.63it/s]
 44%|| 220/500 [00:03<00:02, 93.77it/s]
 46%|| 230/500 [00:03<00:02, 94.30it/s]
 48%|| 242/500 [00:03<00:02, 99.50it/s]
 51%|| 253/500 [00:03<00:02, 97.08it/s]
 53%|| 264/500 [00:03<00:02, 99.21it/s]
 55%|| 274/500 [00:03<00:02, 97.15it/s]
 57%|| 284/500 [00:03<00:02, 84.03it/s]
 59%|| 294/500 [00:03<00:02, 86.56it/s]
 61%|| 304/500 [00:03<00:02, 89.29it/s]
 63%|| 314/500 [00:04<00:02, 92.16it/s]
 65%|| 324/500 [00:04<00:01, 92.32it/s]
 67%|| 334/500 [00:04<00:01, 94.00it/s]
 69%|| 344/500 [00:04<00:01, 94.69it/s]
 71%|| 356/500 [00:04<00:01, 100.35it/s]
 73%|| 367/500 [00:04<00:01, 96.40it/s]
 76%|| 378/500 [00:04<00:01, 98.45it/s]
 78%|| 388/500 [00:04<00:01, 92.90it/s]
 80%|| 399/500 [00:04<00:01, 96.59it/s]
 82%|| 410/500 [00:05<00:00, 99.79it/s]
 84%|| 422/500 [00:05<00:00, 104.04it/s]
 87%|| 433/500 [00:05<00:00, 104.85it/s]
 89%|| 446/500 [00:05<00:00, 109.99it/s]
 92%|| 458/500 [00:05<00:00, 107.61it/s]
 94%|| 469/500 [00:05<00:00, 105.43it/s]
 96%|| 480/500 [00:05<00:00, 99.88it/s]
100%|| 500/500 [00:05<00:00, 84.22it/s]
 53%|| 32/60 [02:49<02:40,  5.71s/it]
  0%|| 0/500 [00:00<?, ?it/s]
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  2%|▏          | 8/500 [00:00<00:06, 76.53it/s]
  4%|▍          | 19/500 [00:00<00:05, 94.00it/s]
  6%|▌          | 31/500 [00:00<00:04, 103.45it/s]
  8%|▊          | 42/500 [00:00<00:04, 105.21it/s]
 11%|█          | 54/500 [00:00<00:04, 108.70it/s]
 13%|█▏         | 65/500 [00:00<00:04, 99.55it/s]
 15%|█▍         | 76/500 [00:00<00:04, 96.11it/s]
 17%|█▋         | 87/500 [00:00<00:04, 99.38it/s]
 20%|█▉         | 98/500 [00:00<00:04, 98.72it/s]
 22%|██▏        | 110/500 [00:01<00:03, 104.19it/s]
 24%|██▍        | 122/500 [00:01<00:03, 106.79it/s]
 27%|██▋        | 133/500 [00:01<00:03, 106.16it/s]
 29%|██▉        | 145/500 [00:01<00:03, 109.99it/s]
 32%|███▏       | 158/500 [00:01<00:03, 113.75it/s]
 34%|███▍       | 170/500 [00:01<00:02, 111.87it/s]
 36%|███▋       | 182/500 [00:01<00:02, 109.26it/s]
 39%|███▉       | 194/500 [00:01<00:02, 111.48it/s]
 41%|████▏      | 206/500 [00:01<00:02, 107.65it/s]
 43%|████▎      | 217/500 [00:02<00:02, 99.36it/s]
 46%|████▌      | 229/500 [00:02<00:02, 104.16it/s]
 48%|████▊      | 242/500 [00:02<00:02, 109.21it/s]
 51%|█████      | 255/500 [00:02<00:02, 112.22it/s]
 53%|█████▎     | 267/500 [00:02<00:02, 111.16it/s]
 56%|█████▌     | 279/500 [00:02<00:02, 106.41it/s]
 58%|█████▊     | 292/500 [00:02<00:01, 112.00it/s]
 61%|██████     | 304/500 [00:02<00:01, 113.54it/s]
 63%|██████▎    | 316/500 [00:02<00:01, 114.54it/s]
 66%|██████▌    | 328/500 [00:03<00:01, 107.86it/s]
 68%|██████▊    | 341/500 [00:03<00:01, 111.99it/s]
 71%|███████    | 354/500 [00:03<00:01, 114.19it/s]
 73%|███████▎   | 367/500 [00:03<00:01, 117.50it/s]
 76%|███████▌   | 379/500 [00:03<00:01, 115.18it/s]
 78%|███████▊   | 391/500 [00:03<00:00, 113.70it/s]
 81%|████████   | 403/500 [00:03<00:00, 106.94it/s]
 83%|████████▎  | 415/500 [00:03<00:00, 109.26it/s]
 86%|████████▌  | 428/500 [00:03<00:00, 113.11it/s]
 88%|████████▊  | 440/500 [00:04<00:00, 109.81it/s]
 91%|█████████  | 453/500 [00:04<00:00, 113.21it/s]
 93%|█████████▎ | 465/500 [00:04<00:00, 110.57it/s]
 95%|█████████▌ | 477/500 [00:04<00:00, 111.81it/s]
100%|██████████| 500/500 [00:04<00:00, 109.01it/s]
 55%|█████▌     | 33/60 [02:54<02:25,  5.38s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
  2%|▏          | 11/500 [00:00<00:04, 103.55it/s]
  5%|▍          | 23/500 [00:00<00:04, 110.77it/s]
  7%|▋          | 35/500 [00:00<00:04, 111.09it/s]
  9%|▉          | 47/500 [00:00<00:04, 107.12it/s]
 12%|█▏         | 58/500 [00:00<00:04, 101.33it/s]
 14%|█▍         | 69/500 [00:00<00:04, 101.61it/s]
 16%|█▋         | 81/500 [00:00<00:03, 106.48it/s]
 18%|█▊         | 92/500 [00:00<00:03, 102.87it/s]
 21%|██         | 104/500 [00:00<00:03, 105.45it/s]
 23%|██▎        | 115/500 [00:01<00:03, 104.62it/s]
 25%|██▌        | 127/500 [00:01<00:03, 107.71it/s]
 28%|██▊        | 138/500 [00:01<00:03, 93.84it/s]
 30%|██▉        | 148/500 [00:01<00:04, 87.96it/s]
 32%|███▏       | 158/500 [00:01<00:04, 80.20it/s]
 33%|███▎       | 167/500 [00:01<00:04, 79.67it/s]
 35%|███▌       | 176/500 [00:01<00:04, 75.42it/s]
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 37%|███▋      | 184/500 [00:02<00:04, 70.77it/s]
 38%|███▊      | 192/500 [00:02<00:04, 68.10it/s]
 40%|███▉      | 199/500 [00:02<00:04, 63.20it/s]
 41%|████      | 206/500 [00:02<00:04, 61.56it/s]
 43%|████▎     | 213/500 [00:02<00:04, 59.76it/s]
 44%|████▍     | 219/500 [00:02<00:04, 59.23it/s]
 45%|████▌     | 225/500 [00:02<00:04, 59.25it/s]
 46%|████▋     | 232/500 [00:02<00:04, 60.37it/s]
 48%|████▊     | 239/500 [00:02<00:04, 62.15it/s]
 49%|████▉     | 246/500 [00:03<00:04, 62.02it/s]
 51%|█████     | 253/500 [00:03<00:04, 60.43it/s]
 52%|█████▏    | 260/500 [00:03<00:03, 60.82it/s]
 53%|█████▎    | 267/500 [00:03<00:03, 61.50it/s]
 55%|█████▍    | 274/500 [00:03<00:03, 62.48it/s]
 56%|█████▌    | 281/500 [00:03<00:03, 63.22it/s]
 58%|█████▊    | 288/500 [00:03<00:03, 60.57it/s]
 59%|█████▉    | 295/500 [00:03<00:03, 60.63it/s]
 60%|██████    | 302/500 [00:03<00:03, 62.04it/s]
 62%|██████▏   | 309/500 [00:04<00:03, 60.49it/s]
 63%|██████▎   | 316/500 [00:04<00:02, 61.81it/s]
 65%|██████▍   | 323/500 [00:04<00:02, 61.81it/s]
 66%|██████▌   | 330/500 [00:04<00:02, 58.72it/s]
 67%|██████▋   | 337/500 [00:04<00:02, 61.65it/s]
 69%|██████▉   | 344/500 [00:04<00:02, 60.34it/s]
 70%|███████   | 351/500 [00:04<00:02, 62.42it/s]
 72%|███████▏  | 358/500 [00:04<00:02, 62.59it/s]
 73%|███████▎  | 367/500 [00:05<00:01, 69.42it/s]
 75%|███████▌  | 376/500 [00:05<00:01, 74.34it/s]
 77%|███████▋  | 384/500 [00:05<00:01, 71.94it/s]
 78%|███████▊  | 392/500 [00:05<00:01, 71.83it/s]
 80%|████████  | 400/500 [00:05<00:01, 67.67it/s]
 81%|████████  | 407/500 [00:05<00:01, 63.79it/s]
 83%|████████▎ | 414/500 [00:05<00:01, 63.63it/s]
 84%|████████▍ | 421/500 [00:05<00:01, 63.85it/s]
 86%|████████▌ | 428/500 [00:05<00:01, 60.50it/s]
 87%|████████▋ | 435/500 [00:06<00:01, 61.60it/s]
 88%|████████▊ | 442/500 [00:06<00:00, 58.67it/s]
 90%|████████▉ | 448/500 [00:06<00:00, 58.65it/s]
 91%|█████████ | 454/500 [00:06<00:00, 58.45it/s]
 92%|█████████▏| 460/500 [00:06<00:00, 58.44it/s]
 93%|█████████▎| 466/500 [00:06<00:00, 58.70it/s]
 94%|█████████▍| 472/500 [00:06<00:00, 58.04it/s]
 96%|█████████▌| 479/500 [00:06<00:00, 61.38it/s]
 97%|█████████▋| 486/500 [00:06<00:00, 61.05it/s]
100%|██████████| 500/500 [00:07<00:00, 70.43it/s]
 57%|█████▋    | 34/60 [03:01<02:33,  5.90s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 9/500 [00:00<00:05, 89.83it/s]
  4%|▍         | 20/500 [00:00<00:04, 98.26it/s]
  6%|▌         | 30/500 [00:00<00:04, 98.44it/s]
  8%|▊         | 40/500 [00:00<00:04, 93.83it/s]
 10%|▉         | 50/500 [00:00<00:04, 95.61it/s]
 12%|█▏        | 61/500 [00:00<00:04, 98.58it/s]
 14%|█▍        | 72/500 [00:00<00:04, 101.00it/s]
 17%|█▋        | 83/500 [00:00<00:04, 101.16it/s]
 19%|█▉        | 94/500 [00:00<00:04, 96.57it/s]
 21%|██        | 104/500 [00:01<00:04, 96.95it/s]
 23%|██▎       | 116/500 [00:01<00:03, 101.99it/s]
 25%|██▍       | 127/500 [00:01<00:03, 103.44it/s]
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 28%|███         | 138/500 [00:01<00:03, 101.93it/s]
 30%|███         | 149/500 [00:01<00:03, 102.49it/s]
 32%|███         | 161/500 [00:01<00:03, 106.34it/s]
 34%|███         | 172/500 [00:01<00:03, 106.59it/s]
 37%|███         | 183/500 [00:01<00:02, 105.74it/s]
 39%|███         | 194/500 [00:01<00:03, 99.84it/s]
 41%|███         | 205/500 [00:02<00:03, 96.25it/s]
 43%|███         | 216/500 [00:02<00:02, 98.35it/s]
 46%|███         | 228/500 [00:02<00:02, 102.56it/s]
 48%|███         | 239/500 [00:02<00:02, 99.66it/s]
 50%|███         | 251/500 [00:02<00:02, 103.42it/s]
 52%|███         | 262/500 [00:02<00:02, 104.33it/s]
 55%|███         | 273/500 [00:02<00:02, 105.24it/s]
 57%|███         | 284/500 [00:02<00:02, 101.26it/s]
 59%|███         | 295/500 [00:02<00:02, 102.12it/s]
 61%|███         | 306/500 [00:03<00:01, 97.05it/s]
 63%|███         | 316/500 [00:03<00:01, 94.61it/s]
 65%|███         | 326/500 [00:03<00:01, 93.42it/s]
 67%|███         | 336/500 [00:03<00:01, 94.89it/s]
 70%|███         | 348/500 [00:03<00:01, 100.77it/s]
 72%|███         | 360/500 [00:03<00:01, 105.09it/s]
 74%|███         | 371/500 [00:03<00:01, 101.49it/s]
 77%|███         | 383/500 [00:03<00:01, 105.29it/s]
 79%|███         | 394/500 [00:03<00:01, 102.48it/s]
 81%|███         | 405/500 [00:04<00:00, 100.54it/s]
 83%|███         | 416/500 [00:04<00:00, 100.94it/s]
 85%|███         | 427/500 [00:04<00:00, 103.08it/s]
 88%|███         | 438/500 [00:04<00:00, 100.90it/s]
 90%|███         | 449/500 [00:04<00:00, 101.88it/s]
 92%|███         | 460/500 [00:04<00:00, 103.35it/s]
 94%|███         | 471/500 [00:04<00:00, 102.25it/s]
 97%|███         | 483/500 [00:04<00:00, 105.14it/s]
100%|███         | 500/500 [00:04<00:00, 100.65it/s]
 58%|███         | 35/60 [03:06<02:20,  5.63s/it]
  0%|            | 0/500 [00:00<?, ?it/s]
  2%|            | 11/500 [00:00<00:04, 103.26it/s]
  4%|            | 22/500 [00:00<00:04, 102.88it/s]
  7%|            | 33/500 [00:00<00:04, 97.17it/s]
  9%|            | 44/500 [00:00<00:04, 100.34it/s]
 11%|            | 55/500 [00:00<00:04, 97.34it/s]
 13%|            | 65/500 [00:00<00:04, 96.24it/s]
 15%|            | 75/500 [00:00<00:04, 94.82it/s]
 17%|            | 86/500 [00:00<00:04, 97.88it/s]
 19%|            | 96/500 [00:00<00:04, 95.75it/s]
 22%|            | 108/500 [00:01<00:03, 100.90it/s]
 24%|            | 119/500 [00:01<00:03, 97.12it/s]
 26%|            | 129/500 [00:01<00:03, 96.31it/s]
 28%|            | 140/500 [00:01<00:03, 100.11it/s]
 30%|            | 151/500 [00:01<00:03, 101.46it/s]
 33%|            | 163/500 [00:01<00:03, 105.44it/s]
 35%|            | 174/500 [00:01<00:03, 101.99it/s]
 37%|            | 186/500 [00:01<00:02, 106.85it/s]
 39%|            | 197/500 [00:01<00:03, 98.47it/s]
 42%|            | 210/500 [00:02<00:02, 105.58it/s]
 44%|            | 222/500 [00:02<00:02, 106.82it/s]
 47%|            | 233/500 [00:02<00:02, 106.63it/s]
 49%|            | 246/500 [00:02<00:02, 111.46it/s]
 52%|            | 258/500 [00:02<00:02, 112.36it/s]
 54%|            | 270/500 [00:02<00:02, 110.03it/s]
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 56%|                  | 282/500 [00:02<00:02, 108.12it/s]
 59%|                  | 294/500 [00:02<00:01, 110.50it/s]
 61%|                  | 306/500 [00:02<00:01, 103.86it/s]
 64%|                  | 318/500 [00:03<00:01, 106.46it/s]
 66%|                  | 331/500 [00:03<00:01, 110.79it/s]
 69%|                  | 343/500 [00:03<00:01, 104.74it/s]
 71%|                  | 354/500 [00:03<00:01, 102.46it/s]
 73%|                  | 366/500 [00:03<00:01, 105.94it/s]
 76%|                  | 379/500 [00:03<00:01, 111.10it/s]
 78%|                  | 391/500 [00:03<00:01, 106.01it/s]
 80%|                  | 402/500 [00:03<00:00, 103.28it/s]
 83%|                  | 413/500 [00:03<00:00, 101.79it/s]
 85%|                  | 425/500 [00:04<00:00, 106.30it/s]
 87%|                  | 436/500 [00:04<00:00, 106.63it/s]
 89%|                  | 447/500 [00:04<00:00, 100.82it/s]
 92%|                  | 458/500 [00:04<00:00, 97.54it/s]
 94%|                  | 469/500 [00:04<00:00, 99.76it/s]
 96%|                  | 482/500 [00:04<00:00, 106.41it/s]
100%|                  | 500/500 [00:04<00:00, 103.32it/s]
 60%|                  | 36/60 [03:11<02:09,  5.40s/it]
  0%|                  | 0/500 [00:00<?, ?it/s]
  1%|                  | 7/500 [00:00<00:07, 69.03it/s]
  3%|                  | 14/500 [00:00<00:07, 63.05it/s]
  4%|                  | 22/500 [00:00<00:07, 68.18it/s]
  6%|                  | 29/500 [00:00<00:07, 62.32it/s]
  7%|                  | 36/500 [00:00<00:07, 59.63it/s]
  9%|                  | 43/500 [00:00<00:07, 58.35it/s]
 10%|                  | 50/500 [00:00<00:07, 60.38it/s]
 12%|                  | 58/500 [00:00<00:06, 64.86it/s]
 13%|                  | 66/500 [00:01<00:06, 69.15it/s]
 15%|                  | 73/500 [00:01<00:06, 66.43it/s]
 16%|                  | 80/500 [00:01<00:06, 64.87it/s]
 17%|                  | 87/500 [00:01<00:06, 65.63it/s]
 19%|                  | 94/500 [00:01<00:06, 64.38it/s]
 20%|                  | 101/500 [00:01<00:06, 63.07it/s]
 22%|                  | 108/500 [00:01<00:06, 63.21it/s]
 23%|                  | 115/500 [00:01<00:06, 63.28it/s]
 24%|                  | 122/500 [00:01<00:05, 63.15it/s]
 26%|                  | 129/500 [00:02<00:05, 64.10it/s]
 27%|                  | 136/500 [00:02<00:05, 62.83it/s]
 29%|                  | 143/500 [00:02<00:05, 62.24it/s]
 30%|                  | 151/500 [00:02<00:05, 65.05it/s]
 32%|                  | 158/500 [00:02<00:05, 64.99it/s]
 33%|                  | 166/500 [00:02<00:05, 66.69it/s]
 35%|                  | 173/500 [00:02<00:05, 62.42it/s]
 36%|                  | 182/500 [00:02<00:04, 68.72it/s]
 38%|                  | 189/500 [00:02<00:04, 66.82it/s]
 39%|                  | 196/500 [00:03<00:04, 66.26it/s]
 41%|                  | 203/500 [00:03<00:04, 65.56it/s]
 42%|                  | 210/500 [00:03<00:04, 66.64it/s]
 44%|                  | 218/500 [00:03<00:04, 70.02it/s]
 45%|                  | 226/500 [00:03<00:04, 67.60it/s]
 47%|                  | 233/500 [00:03<00:04, 66.21it/s]
 48%|                  | 240/500 [00:03<00:04, 64.95it/s]
 49%|                  | 247/500 [00:03<00:03, 63.53it/s]
 51%|                  | 254/500 [00:03<00:03, 62.11it/s]
 52%|                  | 261/500 [00:04<00:03, 63.91it/s]
 54%|                  | 272/500 [00:04<00:03, 74.74it/s]
 56%|                  | 280/500 [00:04<00:03, 72.28it/s]
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 58%|          | 288/500 [00:04<00:03, 69.70it/s]
 59%|          | 296/500 [00:04<00:03, 67.32it/s]
 61%|          | 303/500 [00:04<00:03, 61.15it/s]
 62%|          | 310/500 [00:04<00:03, 60.73it/s]
 63%|          | 317/500 [00:04<00:03, 59.70it/s]
 65%|          | 324/500 [00:05<00:03, 58.55it/s]
 66%|          | 330/500 [00:05<00:03, 54.73it/s]
 67%|          | 337/500 [00:05<00:02, 56.98it/s]
 69%|          | 345/500 [00:05<00:02, 60.99it/s]
 71%|          | 353/500 [00:05<00:02, 65.32it/s]
 73%|          | 364/500 [00:05<00:01, 77.06it/s]
 75%|          | 374/500 [00:05<00:01, 83.31it/s]
 77%|          | 385/500 [00:05<00:01, 90.05it/s]
 79%|          | 397/500 [00:05<00:01, 93.97it/s]
 81%|          | 407/500 [00:06<00:01, 92.86it/s]
 83%|          | 417/500 [00:06<00:00, 85.91it/s]
 86%|          | 428/500 [00:06<00:00, 91.50it/s]
 88%|          | 438/500 [00:06<00:00, 92.76it/s]
 90%|          | 449/500 [00:06<00:00, 97.36it/s]
 92%|          | 459/500 [00:06<00:00, 97.02it/s]
 94%|          | 470/500 [00:06<00:00, 99.64it/s]
 96%|          | 481/500 [00:06<00:00, 100.91it/s]
100%|          | 500/500 [00:06<00:00, 71.95it/s]
 62%|          | 37/60 [03:18<02:14,  5.87s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|          | 8/500 [00:00<00:06, 72.92it/s]
  3%|          | 16/500 [00:00<00:06, 70.90it/s]
  5%|          | 27/500 [00:00<00:05, 86.26it/s]
  8%|          | 39/500 [00:00<00:04, 97.13it/s]
 10%|          | 49/500 [00:00<00:04, 96.92it/s]
 12%|          | 61/500 [00:00<00:04, 102.86it/s]
 15%|          | 73/500 [00:00<00:04, 106.56it/s]
 17%|          | 85/500 [00:00<00:03, 110.28it/s]
 19%|          | 97/500 [00:00<00:03, 106.22it/s]
 22%|          | 108/500 [00:01<00:04, 95.63it/s]
 24%|          | 118/500 [00:01<00:04, 95.24it/s]
 26%|          | 129/500 [00:01<00:03, 98.25it/s]
 28%|          | 140/500 [00:01<00:03, 100.22it/s]
 30%|          | 151/500 [00:01<00:03, 95.24it/s]
 32%|          | 161/500 [00:01<00:03, 93.32it/s]
 35%|          | 173/500 [00:01<00:03, 98.74it/s]
 37%|          | 184/500 [00:01<00:03, 101.41it/s]
 39%|          | 195/500 [00:01<00:02, 102.53it/s]
 41%|          | 206/500 [00:02<00:02, 99.62it/s]
 43%|          | 217/500 [00:02<00:02, 97.97it/s]
 46%|          | 229/500 [00:02<00:02, 103.10it/s]
 48%|          | 240/500 [00:02<00:02, 104.04it/s]
 50%|          | 251/500 [00:02<00:02, 104.16it/s]
 53%|          | 263/500 [00:02<00:02, 106.71it/s]
 55%|          | 275/500 [00:02<00:02, 110.17it/s]
 57%|          | 287/500 [00:02<00:01, 110.14it/s]
 60%|          | 299/500 [00:02<00:01, 112.54it/s]
 62%|          | 311/500 [00:03<00:01, 112.89it/s]
 65%|          | 323/500 [00:03<00:01, 106.24it/s]
 67%|          | 334/500 [00:03<00:01, 103.52it/s]
 69%|          | 345/500 [00:03<00:01, 104.10it/s]
 71%|          | 356/500 [00:03<00:01, 98.12it/s]
 73%|          | 366/500 [00:03<00:01, 97.71it/s]
 75%|          | 376/500 [00:03<00:01, 97.51it/s]
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 77%|          | 386/500 [00:03<00:01, 97.91it/s]
 79%|          | 396/500 [00:03<00:01, 97.45it/s]
 81%|          | 406/500 [00:04<00:00, 95.35it/s]
 83%|          | 416/500 [00:04<00:00, 94.82it/s]
 85%|          | 426/500 [00:04<00:00, 90.77it/s]
 87%|          | 436/500 [00:04<00:00, 90.24it/s]
 89%|          | 447/500 [00:04<00:00, 95.00it/s]
 91%|          | 457/500 [00:04<00:00, 94.63it/s]
 93%|          | 467/500 [00:04<00:00, 95.61it/s]
 95%|          | 477/500 [00:04<00:00, 82.79it/s]
 97%|          | 486/500 [00:04<00:00, 79.72it/s]
100%|          | 500/500 [00:05<00:00, 96.88it/s]
 63%|          | 38/60 [03:23<02:04,  5.66s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|          | 8/500 [00:00<00:06, 77.54it/s]
  4%|          | 19/500 [00:00<00:05, 93.18it/s]
  6%|          | 31/500 [00:00<00:04, 103.54it/s]
  8%|          | 42/500 [00:00<00:04, 103.77it/s]
 11%|          | 53/500 [00:00<00:04, 101.62it/s]
 13%|          | 64/500 [00:00<00:04, 103.51it/s]
 15%|          | 75/500 [00:00<00:04, 101.58it/s]
 17%|          | 86/500 [00:00<00:04, 99.05it/s]
 19%|          | 96/500 [00:00<00:04, 97.88it/s]
 21%|          | 106/500 [00:01<00:04, 95.04it/s]
 23%|          | 116/500 [00:01<00:04, 92.36it/s]
 25%|          | 126/500 [00:01<00:04, 92.31it/s]
 27%|          | 136/500 [00:01<00:03, 93.56it/s]
 29%|          | 147/500 [00:01<00:03, 97.28it/s]
 32%|          | 158/500 [00:01<00:03, 99.64it/s]
 34%|          | 171/500 [00:01<00:03, 106.37it/s]
 37%|          | 184/500 [00:01<00:02, 111.88it/s]
 39%|          | 196/500 [00:01<00:02, 111.84it/s]
 42%|          | 208/500 [00:02<00:02, 109.00it/s]
 44%|          | 221/500 [00:02<00:02, 113.40it/s]
 47%|          | 233/500 [00:02<00:02, 105.32it/s]
 49%|          | 244/500 [00:02<00:02, 103.14it/s]
 51%|          | 256/500 [00:02<00:02, 106.17it/s]
 53%|          | 267/500 [00:02<00:02, 104.20it/s]
 56%|          | 280/500 [00:02<00:02, 109.96it/s]
 58%|          | 292/500 [00:02<00:01, 104.45it/s]
 61%|          | 303/500 [00:02<00:01, 105.60it/s]
 63%|          | 314/500 [00:03<00:01, 102.64it/s]
 65%|          | 325/500 [00:03<00:01, 101.17it/s]
 67%|          | 336/500 [00:03<00:01, 96.14it/s]
 69%|          | 346/500 [00:03<00:01, 89.71it/s]
 71%|          | 356/500 [00:03<00:01, 80.52it/s]
 73%|          | 365/500 [00:03<00:01, 75.45it/s]
 75%|          | 373/500 [00:03<00:01, 74.17it/s]
 76%|          | 381/500 [00:03<00:01, 68.28it/s]
 78%|          | 388/500 [00:04<00:01, 66.34it/s]
 79%|          | 395/500 [00:04<00:01, 65.80it/s]
 80%|          | 402/500 [00:04<00:01, 64.28it/s]
 82%|          | 409/500 [00:04<00:01, 63.03it/s]
 83%|          | 416/500 [00:04<00:01, 62.63it/s]
 85%|          | 423/500 [00:04<00:01, 64.17it/s]
 86%|          | 430/500 [00:04<00:01, 62.99it/s]
 87%|          | 437/500 [00:04<00:01, 61.38it/s]
 89%|          | 444/500 [00:05<00:00, 56.40it/s]
 90%|          | 450/500 [00:05<00:00, 56.70it/s]
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 91%|▉| 456/500 [00:05<00:00, 56.54it/s]
 92%|▉| 462/500 [00:05<00:00, 56.44it/s]
 94%|▉| 469/500 [00:05<00:00, 59.48it/s]
 95%|▉| 475/500 [00:05<00:00, 59.60it/s]
 96%|▉| 482/500 [00:05<00:00, 61.27it/s]
 98%|▉| 489/500 [00:05<00:00, 59.93it/s]
100%|▉| 500/500 [00:05<00:00, 83.78it/s]
 65%|▋| 39/60 [03:29<02:00,  5.76s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  1%| | 7/500 [00:00<00:07, 69.99it/s]
  3%| | 14/500 [00:00<00:07, 63.68it/s]
  4%| | 21/500 [00:00<00:07, 62.77it/s]
  6%| | 28/500 [00:00<00:08, 58.48it/s]
  7%| | 35/500 [00:00<00:07, 60.58it/s]
  8%| | 42/500 [00:00<00:07, 60.15it/s]
 10%| | 52/500 [00:00<00:06, 71.68it/s]
 12%| | 60/500 [00:00<00:06, 68.56it/s]
 13%| | 67/500 [00:01<00:06, 68.02it/s]
 15%| | 74/500 [00:01<00:06, 67.34it/s]
 16%| | 81/500 [00:01<00:06, 62.29it/s]
 18%| | 88/500 [00:01<00:06, 61.17it/s]
 19%| | 95/500 [00:01<00:06, 61.57it/s]
 20%| | 102/500 [00:01<00:06, 60.40it/s]
 22%| | 109/500 [00:01<00:06, 60.84it/s]
 23%| | 116/500 [00:01<00:06, 59.75it/s]
 24%| | 122/500 [00:01<00:06, 59.55it/s]
 26%| | 128/500 [00:02<00:06, 59.50it/s]
 27%| | 134/500 [00:02<00:06, 58.20it/s]
 28%| | 140/500 [00:02<00:06, 56.01it/s]
 29%| | 146/500 [00:02<00:06, 56.65it/s]
 30%| | 152/500 [00:02<00:06, 56.97it/s]
 32%| | 159/500 [00:02<00:05, 58.34it/s]
 33%| | 165/500 [00:02<00:05, 58.51it/s]
 35%| | 173/500 [00:02<00:05, 63.38it/s]
 36%| | 180/500 [00:02<00:05, 59.92it/s]
 38%| | 189/500 [00:03<00:04, 68.08it/s]
 40%| | 200/500 [00:03<00:03, 79.73it/s]
 42%| | 210/500 [00:03<00:03, 85.23it/s]
 44%| | 221/500 [00:03<00:03, 91.01it/s]
 47%| | 233/500 [00:03<00:02, 97.46it/s]
 49%| | 245/500 [00:03<00:02, 103.34it/s]
 52%| | 258/500 [00:03<00:02, 109.83it/s]
 54%| | 270/500 [00:03<00:02, 102.62it/s]
 57%| | 283/500 [00:03<00:01, 109.41it/s]
 59%| | 296/500 [00:04<00:01, 113.39it/s]
 62%| | 309/500 [00:04<00:01, 115.40it/s]
 64%| | 322/500 [00:04<00:01, 118.57it/s]
 67%| | 334/500 [00:04<00:01, 118.91it/s]
 69%| | 346/500 [00:04<00:01, 112.99it/s]
 72%| | 358/500 [00:04<00:01, 108.90it/s]
 74%| | 369/500 [00:04<00:01, 107.50it/s]
 76%| | 380/500 [00:04<00:01, 105.89it/s]
 78%| | 391/500 [00:04<00:01, 101.18it/s]
 80%| | 402/500 [00:04<00:00, 100.38it/s]
 83%| | 413/500 [00:05<00:00, 97.55it/s]
 85%| | 425/500 [00:05<00:00, 101.81it/s]
 87%| | 436/500 [00:05<00:00, 103.27it/s]
 89%| | 447/500 [00:05<00:00, 97.04it/s]
 91%| | 457/500 [00:05<00:00, 95.69it/s]
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 94%|▉| 468/500 [00:05<00:00, 98.47it/s]
 96%|▉| 478/500 [00:05<00:00, 94.12it/s]
 98%|▉| 488/500 [00:05<00:00, 88.66it/s]
100%|▉| 500/500 [00:06<00:00, 83.02it/s]
 67%|▋| 40/60 [03:35<01:56,  5.84s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  2%|▏| 12/500 [00:00<00:04, 113.64it/s]
  5%|▍| 24/500 [00:00<00:04, 115.52it/s]
  7%|▋| 36/500 [00:00<00:04, 93.18it/s]
  9%|▉| 46/500 [00:00<00:05, 89.63it/s]
 11%|▉| 57/500 [00:00<00:04, 93.99it/s]
 14%|▉| 68/500 [00:00<00:04, 98.17it/s]
 16%|▉| 78/500 [00:00<00:04, 95.42it/s]
 18%|▉| 88/500 [00:00<00:04, 90.04it/s]
 20%|▉| 98/500 [00:01<00:04, 88.29it/s]
 22%|▉| 110/500 [00:01<00:04, 95.75it/s]
 24%|▉| 122/500 [00:01<00:03, 102.39it/s]
 27%|▉| 133/500 [00:01<00:03, 103.97it/s]
 29%|▉| 145/500 [00:01<00:03, 108.29it/s]
 31%|▉| 156/500 [00:01<00:03, 103.64it/s]
 34%|▉| 168/500 [00:01<00:03, 107.35it/s]
 36%|▉| 179/500 [00:01<00:03, 106.35it/s]
 38%|▉| 190/500 [00:01<00:03, 100.48it/s]
 40%|▉| 201/500 [00:02<00:03, 99.33it/s]
 43%|▉| 213/500 [00:02<00:02, 104.31it/s]
 45%|▉| 225/500 [00:02<00:02, 107.94it/s]
 47%|▉| 237/500 [00:02<00:02, 110.24it/s]
 50%|▉| 249/500 [00:02<00:02, 110.64it/s]
 52%|▉| 261/500 [00:02<00:02, 110.43it/s]
 55%|▉| 273/500 [00:02<00:02, 110.13it/s]
 57%|▉| 285/500 [00:02<00:01, 108.54it/s]
 59%|▉| 296/500 [00:02<00:01, 106.84it/s]
 61%|▉| 307/500 [00:03<00:01, 96.58it/s]
 63%|▉| 317/500 [00:03<00:02, 90.06it/s]
 66%|▉| 328/500 [00:03<00:01, 94.80it/s]
 68%|▉| 339/500 [00:03<00:01, 97.29it/s]
 70%|▉| 350/500 [00:03<00:01, 99.84it/s]
 72%|▉| 361/500 [00:03<00:01, 101.29it/s]
 74%|▉| 372/500 [00:03<00:01, 101.65it/s]
 77%|▉| 383/500 [00:03<00:01, 99.59it/s]
 79%|▉| 394/500 [00:03<00:01, 95.23it/s]
 81%|▉| 405/500 [00:04<00:00, 97.39it/s]
 83%|▉| 415/500 [00:04<00:00, 95.84it/s]
 85%|▉| 425/500 [00:04<00:00, 95.05it/s]
 87%|▉| 435/500 [00:04<00:00, 93.86it/s]
 89%|▉| 445/500 [00:04<00:00, 92.86it/s]
 91%|▉| 455/500 [00:04<00:00, 93.15it/s]
 93%|▉| 467/500 [00:04<00:00, 98.86it/s]
 96%|▉| 478/500 [00:04<00:00, 100.84it/s]
 98%|▉| 489/500 [00:04<00:00, 99.45it/s]
100%|▉| 500/500 [00:05<00:00, 99.29it/s]
 68%|▋| 41/60 [03:40<01:46,  5.60s/it]
  0%| | 0/500 [00:00<?, ?it/s]
  1%|▏| 7/500 [00:00<00:07, 68.93it/s]
  3%|▎| 15/500 [00:00<00:06, 71.30it/s]
  5%|▍| 26/500 [00:00<00:05, 88.35it/s]
  7%|▋| 37/500 [00:00<00:04, 95.34it/s]
  9%|▉| 47/500 [00:00<00:04, 92.89it/s]
 12%|▉| 59/500 [00:00<00:04, 100.86it/s]
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 14%|▏          | 70/500 [00:00<00:04, 102.65it/s]
 16%|▏          | 81/500 [00:00<00:04, 99.86it/s]
 18%|▏          | 92/500 [00:00<00:04, 92.44it/s]
 20%|▏          | 102/500 [00:01<00:04, 92.49it/s]
 22%|▏          | 112/500 [00:01<00:04, 86.96it/s]
 25%|▎          | 123/500 [00:01<00:04, 92.68it/s]
 27%|▎          | 133/500 [00:01<00:04, 90.56it/s]
 29%|▎          | 144/500 [00:01<00:03, 95.71it/s]
 31%|▎          | 154/500 [00:01<00:03, 96.68it/s]
 33%|▎          | 164/500 [00:01<00:03, 90.67it/s]
 35%|▎          | 174/500 [00:01<00:03, 83.41it/s]
 37%|▎          | 183/500 [00:02<00:03, 80.73it/s]
 38%|▍          | 192/500 [00:02<00:03, 80.61it/s]
 40%|▍          | 201/500 [00:02<00:04, 73.34it/s]
 42%|▍          | 209/500 [00:02<00:04, 71.01it/s]
 43%|▍          | 217/500 [00:02<00:04, 67.90it/s]
 45%|▍          | 226/500 [00:02<00:03, 72.51it/s]
 47%|▍          | 234/500 [00:02<00:03, 72.00it/s]
 48%|▍          | 242/500 [00:02<00:03, 69.57it/s]
 50%|▌          | 250/500 [00:03<00:03, 63.07it/s]
 51%|▌          | 257/500 [00:03<00:03, 63.38it/s]
 53%|▌          | 264/500 [00:03<00:03, 62.24it/s]
 54%|▌          | 271/500 [00:03<00:03, 59.17it/s]
 56%|▌          | 278/500 [00:03<00:03, 59.72it/s]
 57%|▌          | 285/500 [00:03<00:03, 58.89it/s]
 58%|▌          | 291/500 [00:03<00:03, 56.82it/s]
 60%|▌          | 298/500 [00:03<00:03, 59.03it/s]
 61%|▌          | 304/500 [00:03<00:03, 56.87it/s]
 62%|▌          | 310/500 [00:04<00:03, 54.86it/s]
 63%|▋          | 317/500 [00:04<00:03, 56.96it/s]
 65%|▋          | 323/500 [00:04<00:03, 57.02it/s]
 66%|▋          | 329/500 [00:04<00:03, 54.70it/s]
 67%|▋          | 335/500 [00:04<00:02, 55.57it/s]
 68%|▋          | 341/500 [00:04<00:02, 55.82it/s]
 69%|▋          | 347/500 [00:04<00:02, 56.89it/s]
 71%|▋          | 353/500 [00:04<00:02, 55.31it/s]
 72%|▋          | 359/500 [00:04<00:02, 53.23it/s]
 73%|▋          | 365/500 [00:05<00:02, 51.77it/s]
 74%|▋          | 372/500 [00:05<00:02, 54.85it/s]
 76%|▊          | 379/500 [00:05<00:02, 57.40it/s]
 77%|▊          | 386/500 [00:05<00:01, 60.59it/s]
 79%|▊          | 393/500 [00:05<00:01, 60.03it/s]
 80%|▊          | 400/500 [00:05<00:01, 62.72it/s]
 81%|▊          | 407/500 [00:05<00:01, 60.73it/s]
 83%|▊          | 414/500 [00:05<00:01, 59.08it/s]
 84%|▊          | 420/500 [00:06<00:01, 55.05it/s]
 85%|▊          | 426/500 [00:06<00:01, 55.13it/s]
 87%|▊          | 433/500 [00:06<00:01, 57.66it/s]
 88%|▉          | 441/500 [00:06<00:00, 63.26it/s]
 90%|▉          | 449/500 [00:06<00:00, 66.65it/s]
 91%|▉          | 456/500 [00:06<00:00, 67.10it/s]
 93%|▉          | 463/500 [00:06<00:00, 66.28it/s]
 94%|▉          | 470/500 [00:06<00:00, 66.77it/s]
 95%|▉          | 477/500 [00:06<00:00, 63.80it/s]
 97%|▉          | 484/500 [00:07<00:00, 57.41it/s]
 98%|▉          | 490/500 [00:07<00:00, 57.82it/s]
100%|▉          | 500/500 [00:07<00:00, 68.25it/s]
 70%|▋          | 42/60 [03:47<01:50,  6.13s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
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  1%|          | 7/500 [00:00<00:07, 62.44it/s]
  3%|          | 14/500 [00:00<00:07, 62.08it/s]
  4%|          | 21/500 [00:00<00:08, 59.22it/s]
  6%|          | 30/500 [00:00<00:06, 68.73it/s]
  7%|          | 37/500 [00:00<00:07, 63.10it/s]
  9%|          | 44/500 [00:00<00:07, 57.16it/s]
 10%|          | 50/500 [00:00<00:08, 53.66it/s]
 12%|          | 58/500 [00:00<00:07, 60.08it/s]
 14%|          | 68/500 [00:01<00:06, 69.87it/s]
 15%|          | 77/500 [00:01<00:05, 74.39it/s]
 17%|          | 86/500 [00:01<00:05, 78.29it/s]
 19%|          | 94/500 [00:01<00:05, 77.76it/s]
 20%|          | 102/500 [00:01<00:05, 76.29it/s]
 22%|          | 111/500 [00:01<00:04, 79.13it/s]
 24%|          | 119/500 [00:01<00:05, 76.16it/s]
 26%|          | 128/500 [00:01<00:04, 79.44it/s]
 28%|          | 139/500 [00:01<00:04, 86.50it/s]
 30%|          | 148/500 [00:02<00:04, 87.08it/s]
 32%|          | 158/500 [00:02<00:03, 89.98it/s]
 34%|          | 168/500 [00:02<00:03, 87.93it/s]
 36%|          | 179/500 [00:02<00:03, 93.16it/s]
 38%|          | 190/500 [00:02<00:03, 96.96it/s]
 40%|          | 200/500 [00:02<00:03, 86.79it/s]
 42%|          | 209/500 [00:02<00:03, 78.62it/s]
 44%|          | 219/500 [00:02<00:03, 83.18it/s]
 46%|          | 228/500 [00:02<00:03, 83.10it/s]
 48%|          | 239/500 [00:03<00:02, 89.80it/s]
 50%|          | 249/500 [00:03<00:02, 90.90it/s]
 52%|          | 259/500 [00:03<00:02, 87.24it/s]
 54%|          | 269/500 [00:03<00:02, 90.12it/s]
 56%|          | 279/500 [00:03<00:02, 88.80it/s]
 58%|          | 288/500 [00:03<00:02, 85.05it/s]
 60%|          | 298/500 [00:03<00:02, 89.10it/s]
 62%|          | 308/500 [00:03<00:02, 91.62it/s]
 64%|          | 318/500 [00:03<00:01, 93.01it/s]
 66%|          | 328/500 [00:04<00:01, 94.21it/s]
 68%|          | 339/500 [00:04<00:01, 97.43it/s]
 70%|          | 349/500 [00:04<00:01, 97.69it/s]
 72%|          | 359/500 [00:04<00:01, 95.64it/s]
 74%|          | 369/500 [00:04<00:01, 93.61it/s]
 76%|          | 379/500 [00:04<00:01, 87.62it/s]
 78%|          | 388/500 [00:04<00:01, 83.51it/s]
 80%|          | 400/500 [00:04<00:01, 92.03it/s]
 82%|          | 410/500 [00:04<00:00, 93.18it/s]
 84%|          | 420/500 [00:05<00:00, 94.78it/s]
 86%|          | 430/500 [00:05<00:00, 94.26it/s]
 88%|          | 441/500 [00:05<00:00, 97.90it/s]
 90%|          | 452/500 [00:05<00:00, 100.87it/s]
 93%|          | 463/500 [00:05<00:00, 97.42it/s]
 95%|          | 473/500 [00:05<00:00, 92.69it/s]
 97%|          | 483/500 [00:05<00:00, 86.72it/s]
100%|          | 500/500 [00:05<00:00, 84.74it/s]
 72%|          | 43/60 [03:53<01:43,  6.06s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|          | 11/500 [00:00<00:04, 102.11it/s]
  4%|          | 22/500 [00:00<00:04, 105.16it/s]
  7%|          | 33/500 [00:00<00:04, 104.20it/s]
  9%|          | 44/500 [00:00<00:04, 105.02it/s]
 11%|          | 55/500 [00:00<00:04, 104.63it/s]
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 13%|▉          | 66/500 [00:00<00:04, 93.67it/s]
 15%|▉          | 76/500 [00:00<00:04, 92.38it/s]
 17%|▉          | 86/500 [00:00<00:04, 83.24it/s]
 20%|▉          | 98/500 [00:01<00:04, 91.21it/s]
 22%|▉          | 108/500 [00:01<00:04, 90.10it/s]
 24%|▉          | 118/500 [00:01<00:04, 90.09it/s]
 26%|▉          | 130/500 [00:01<00:03, 97.30it/s]
 28%|▉          | 141/500 [00:01<00:03, 100.08it/s]
 30%|▉          | 152/500 [00:01<00:03, 95.92it/s]
 32%|▉          | 162/500 [00:01<00:04, 79.76it/s]
 34%|▉          | 171/500 [00:01<00:04, 75.67it/s]
 36%|▉          | 180/500 [00:02<00:04, 78.66it/s]
 38%|▉          | 189/500 [00:02<00:03, 79.53it/s]
 40%|▉          | 200/500 [00:02<00:03, 86.41it/s]
 42%|▉          | 211/500 [00:02<00:03, 92.51it/s]
 45%|▉          | 223/500 [00:02<00:02, 98.95it/s]
 47%|▉          | 234/500 [00:02<00:02, 96.89it/s]
 49%|▉          | 244/500 [00:02<00:02, 87.39it/s]
 51%|▉          | 253/500 [00:02<00:03, 78.75it/s]
 52%|▉          | 262/500 [00:02<00:03, 77.76it/s]
 54%|▉          | 270/500 [00:03<00:02, 78.22it/s]
 56%|▉          | 280/500 [00:03<00:02, 83.57it/s]
 58%|▉          | 291/500 [00:03<00:02, 89.16it/s]
 60%|▉          | 301/500 [00:03<00:02, 91.37it/s]
 62%|▉          | 312/500 [00:03<00:01, 94.28it/s]
 64%|▉          | 322/500 [00:03<00:01, 95.12it/s]
 66%|▉          | 332/500 [00:03<00:01, 86.86it/s]
 68%|▉          | 342/500 [00:03<00:01, 89.62it/s]
 70%|▉          | 352/500 [00:03<00:01, 91.93it/s]
 72%|▉          | 362/500 [00:04<00:01, 87.55it/s]
 75%|▉          | 373/500 [00:04<00:01, 92.85it/s]
 77%|▉          | 383/500 [00:04<00:01, 92.82it/s]
 79%|▉          | 393/500 [00:04<00:01, 91.59it/s]
 81%|▉          | 403/500 [00:04<00:01, 93.74it/s]
 83%|▉          | 414/500 [00:04<00:00, 96.24it/s]
 85%|▉          | 424/500 [00:04<00:00, 88.33it/s]
 87%|▉          | 433/500 [00:04<00:00, 86.91it/s]
 88%|▉          | 442/500 [00:04<00:00, 86.37it/s]
 90%|▉          | 451/500 [00:05<00:00, 78.75it/s]
 92%|▉          | 460/500 [00:05<00:00, 79.86it/s]
 94%|▉          | 469/500 [00:05<00:00, 76.12it/s]
 96%|▉          | 478/500 [00:05<00:00, 78.10it/s]
 97%|▉          | 486/500 [00:05<00:00, 74.01it/s]
100%|▉          | 500/500 [00:05<00:00, 87.39it/s]
 73%|▉          | 44/60 [03:59<01:35,  5.97s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
  2%|           | 9/500 [00:00<00:05, 89.62it/s]
  4%|           | 18/500 [00:00<00:06, 74.02it/s]
  5%|           | 26/500 [00:00<00:07, 62.63it/s]
  7%|           | 33/500 [00:00<00:07, 62.43it/s]
  8%|           | 40/500 [00:00<00:07, 62.91it/s]
 10%|           | 48/500 [00:00<00:06, 65.79it/s]
 11%|           | 55/500 [00:00<00:06, 64.29it/s]
 13%|           | 65/500 [00:00<00:05, 73.43it/s]
 15%|           | 76/500 [00:01<00:05, 82.60it/s]
 17%|           | 85/500 [00:01<00:05, 79.45it/s]
 19%|           | 94/500 [00:01<00:05, 71.94it/s]
 20%|           | 102/500 [00:01<00:05, 66.96it/s]
 22%|           | 109/500 [00:01<00:06, 65.01it/s]
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 23%|██▎       | 116/500 [00:01<00:06, 61.57it/s]
 25%|██▍       | 123/500 [00:01<00:06, 60.07it/s]
 26%|██▌       | 132/500 [00:01<00:05, 67.66it/s]
 28%|██▊       | 142/500 [00:02<00:04, 75.04it/s]
 30%|██▉       | 152/500 [00:02<00:04, 78.87it/s]
 32%|███▏      | 161/500 [00:02<00:04, 72.53it/s]
 34%|███▎      | 169/500 [00:02<00:04, 69.91it/s]
 35%|███▌      | 177/500 [00:02<00:04, 65.20it/s]
 37%|███▋      | 184/500 [00:02<00:05, 62.75it/s]
 38%|███▊      | 191/500 [00:02<00:04, 62.56it/s]
 40%|███▉      | 198/500 [00:02<00:05, 58.65it/s]
 41%|████      | 204/500 [00:03<00:05, 53.98it/s]
 42%|████▏     | 210/500 [00:03<00:05, 52.75it/s]
 43%|████▎     | 216/500 [00:03<00:05, 52.91it/s]
 44%|████▍     | 222/500 [00:03<00:05, 53.64it/s]
 46%|████▌     | 229/500 [00:03<00:04, 57.39it/s]
 48%|████▊     | 238/500 [00:03<00:04, 65.32it/s]
 49%|████▉     | 245/500 [00:03<00:03, 65.28it/s]
 50%|█████     | 252/500 [00:03<00:03, 62.77it/s]
 53%|█████▎    | 263/500 [00:03<00:03, 75.49it/s]
 54%|█████▍    | 272/500 [00:04<00:03, 75.25it/s]
 56%|█████▌    | 280/500 [00:04<00:03, 67.22it/s]
 57%|█████▋    | 287/500 [00:04<00:03, 65.85it/s]
 59%|█████▉    | 294/500 [00:04<00:03, 64.81it/s]
 60%|██████    | 301/500 [00:04<00:03, 62.53it/s]
 62%|██████▏   | 308/500 [00:04<00:03, 60.81it/s]
 63%|██████▎   | 315/500 [00:04<00:03, 58.13it/s]
 64%|██████▍   | 321/500 [00:04<00:03, 52.67it/s]
 65%|██████▌   | 327/500 [00:05<00:03, 51.03it/s]
 67%|██████▋   | 333/500 [00:05<00:03, 53.07it/s]
 68%|██████▊   | 339/500 [00:05<00:02, 54.66it/s]
 69%|██████▉   | 345/500 [00:05<00:02, 55.32it/s]
 70%|███████   | 351/500 [00:05<00:02, 55.90it/s]
 72%|███████▏  | 358/500 [00:05<00:02, 58.72it/s]
 73%|███████▎  | 364/500 [00:05<00:02, 57.93it/s]
 74%|███████▍  | 370/500 [00:05<00:02, 52.93it/s]
 75%|███████▌  | 376/500 [00:06<00:02, 50.30it/s]
 76%|███████▋  | 382/500 [00:06<00:02, 48.56it/s]
 78%|███████▊  | 389/500 [00:06<00:02, 52.26it/s]
 79%|███████▉  | 395/500 [00:06<00:01, 53.29it/s]
 81%|████████  | 404/500 [00:06<00:01, 62.13it/s]
 83%|████████▎ | 414/500 [00:06<00:01, 71.98it/s]
 85%|████████▍ | 423/500 [00:06<00:01, 76.42it/s]
 87%|████████▋ | 433/500 [00:06<00:00, 81.06it/s]
 88%|████████▊ | 442/500 [00:06<00:00, 71.39it/s]
 90%|████████▉ | 450/500 [00:07<00:00, 70.37it/s]
 92%|█████████▏| 460/500 [00:07<00:00, 77.69it/s]
 94%|█████████▍| 469/500 [00:07<00:00, 78.69it/s]
 96%|█████████▌| 479/500 [00:07<00:00, 83.22it/s]
 98%|█████████▊| 490/500 [00:07<00:00, 89.25it/s]
100%|██████████| 500/500 [00:07<00:00, 65.85it/s]
 75%|███████▌  | 45/60 [04:07<01:36,  6.46s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 10/500 [00:00<00:05, 90.28it/s]
  4%|▍         | 20/500 [00:00<00:05, 94.18it/s]
  6%|▌         | 30/500 [00:00<00:06, 70.14it/s]
  8%|▊         | 38/500 [00:00<00:06, 68.75it/s]
  9%|▉         | 46/500 [00:00<00:06, 71.47it/s]
 11%|█         | 55/500 [00:00<00:05, 75.45it/s]
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 13%|          | 64/500 [00:00<00:05, 77.83it/s]
 15%|          | 73/500 [00:00<00:05, 80.22it/s]
 17%|          | 85/500 [00:01<00:04, 90.67it/s]
 19%|          | 95/500 [00:01<00:04, 88.91it/s]
 21%|          | 104/500 [00:01<00:04, 83.21it/s]
 23%|          | 113/500 [00:01<00:05, 70.83it/s]
 24%|          | 121/500 [00:01<00:05, 66.63it/s]
 26%|          | 130/500 [00:01<00:05, 71.61it/s]
 28%|          | 140/500 [00:01<00:04, 78.57it/s]
 30%|          | 151/500 [00:01<00:04, 85.48it/s]
 32%|          | 161/500 [00:02<00:03, 87.77it/s]
 34%|          | 171/500 [00:02<00:03, 89.56it/s]
 36%|          | 181/500 [00:02<00:03, 86.26it/s]
 38%|          | 190/500 [00:02<00:04, 76.60it/s]
 40%|          | 198/500 [00:02<00:04, 65.94it/s]
 41%|          | 207/500 [00:02<00:04, 70.67it/s]
 43%|          | 217/500 [00:02<00:03, 76.99it/s]
 46%|          | 229/500 [00:02<00:03, 86.75it/s]
 48%|          | 239/500 [00:03<00:03, 85.19it/s]
 50%|          | 249/500 [00:03<00:02, 87.66it/s]
 52%|          | 258/500 [00:03<00:02, 84.44it/s]
 53%|          | 267/500 [00:03<00:02, 80.77it/s]
 55%|          | 276/500 [00:03<00:02, 80.97it/s]
 57%|          | 287/500 [00:03<00:02, 86.94it/s]
 59%|          | 296/500 [00:03<00:02, 85.34it/s]
 61%|          | 306/500 [00:03<00:02, 88.31it/s]
 63%|          | 316/500 [00:03<00:02, 91.46it/s]
 65%|          | 326/500 [00:04<00:01, 91.61it/s]
 67%|          | 336/500 [00:04<00:01, 92.38it/s]
 69%|          | 346/500 [00:04<00:01, 91.38it/s]
 71%|          | 357/500 [00:04<00:01, 94.99it/s]
 73%|          | 367/500 [00:04<00:01, 93.47it/s]
 75%|          | 377/500 [00:04<00:01, 91.76it/s]
 77%|          | 387/500 [00:04<00:01, 81.89it/s]
 80%|          | 398/500 [00:04<00:01, 88.08it/s]
 82%|          | 409/500 [00:04<00:00, 92.34it/s]
 84%|          | 420/500 [00:05<00:00, 95.82it/s]
 86%|          | 431/500 [00:05<00:00, 98.15it/s]
 88%|          | 441/500 [00:05<00:00, 91.00it/s]
 90%|          | 451/500 [00:05<00:00, 82.94it/s]
 92%|          | 460/500 [00:05<00:00, 78.79it/s]
 94%|          | 469/500 [00:05<00:00, 79.90it/s]
 96%|          | 478/500 [00:05<00:00, 80.05it/s]
 98%|          | 488/500 [00:05<00:00, 84.65it/s]
100%|          | 500/500 [00:05<00:00, 83.39it/s]
 77%|          | 46/60 [04:13<01:28,  6.32s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|          | 10/500 [00:00<00:05, 93.93it/s]
  4%|          | 20/500 [00:00<00:06, 73.49it/s]
  6%|          | 28/500 [00:00<00:06, 72.04it/s]
  7%|          | 36/500 [00:00<00:06, 70.48it/s]
  9%|          | 44/500 [00:00<00:06, 69.34it/s]
 11%|          | 53/500 [00:00<00:05, 74.61it/s]
 12%|          | 61/500 [00:00<00:06, 72.48it/s]
 14%|          | 69/500 [00:00<00:05, 73.49it/s]
 16%|          | 80/500 [00:01<00:05, 83.54it/s]
 18%|          | 91/500 [00:01<00:04, 90.07it/s]
 20%|          | 101/500 [00:01<00:04, 90.93it/s]
 22%|          | 111/500 [00:01<00:04, 93.01it/s]
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 24%|██▍       | 121/500 [00:01<00:04, 82.62it/s]
 26%|██▌       | 130/500 [00:01<00:04, 82.06it/s]
 28%|██▊       | 141/500 [00:01<00:04, 88.67it/s]
 30%|██▉       | 151/500 [00:01<00:04, 86.08it/s]
 32%|███▏      | 162/500 [00:01<00:03, 90.57it/s]
 34%|███▎      | 172/500 [00:02<00:03, 86.12it/s]
 36%|███▌      | 181/500 [00:02<00:03, 86.07it/s]
 38%|███▊      | 190/500 [00:02<00:03, 83.79it/s]
 40%|███▉      | 201/500 [00:02<00:03, 89.45it/s]
 42%|████▏     | 211/500 [00:02<00:03, 90.92it/s]
 45%|████▍     | 223/500 [00:02<00:02, 97.29it/s]
 47%|████▋     | 233/500 [00:02<00:02, 97.66it/s]
 49%|████▊     | 243/500 [00:02<00:03, 85.40it/s]
 50%|█████     | 252/500 [00:03<00:03, 80.53it/s]
 52%|█████▏    | 261/500 [00:03<00:03, 76.92it/s]
 54%|█████▍    | 269/500 [00:03<00:03, 72.66it/s]
 55%|█████▌    | 277/500 [00:03<00:03, 66.32it/s]
 57%|█████▋    | 284/500 [00:03<00:03, 60.97it/s]
 58%|█████▊    | 291/500 [00:03<00:03, 58.11it/s]
 59%|█████▉    | 297/500 [00:03<00:03, 57.35it/s]
 61%|██████    | 304/500 [00:03<00:03, 59.48it/s]
 62%|██████▏   | 311/500 [00:04<00:03, 58.99it/s]
 63%|██████▎   | 317/500 [00:04<00:03, 57.76it/s]
 65%|██████▍   | 324/500 [00:04<00:02, 58.89it/s]
 66%|██████▌   | 330/500 [00:04<00:03, 53.66it/s]
 67%|██████▋   | 336/500 [00:04<00:03, 49.98it/s]
 68%|██████▊   | 342/500 [00:04<00:03, 48.58it/s]
 70%|██████▉   | 348/500 [00:04<00:02, 50.82it/s]
 71%|███████   | 355/500 [00:04<00:02, 54.74it/s]
 72%|███████▏  | 361/500 [00:04<00:02, 55.72it/s]
 73%|███████▎  | 367/500 [00:05<00:02, 55.72it/s]
 75%|███████▍  | 373/500 [00:05<00:02, 56.25it/s]
 76%|███████▌  | 380/500 [00:05<00:02, 58.82it/s]
 77%|███████▋  | 386/500 [00:05<00:01, 57.51it/s]
 78%|███████▊  | 392/500 [00:05<00:02, 53.60it/s]
 80%|███████▉  | 398/500 [00:05<00:02, 49.72it/s]
 81%|████████  | 404/500 [00:05<00:01, 49.74it/s]
 82%|████████▏ | 410/500 [00:05<00:01, 52.12it/s]
 83%|████████▎ | 417/500 [00:06<00:01, 54.70it/s]
 85%|████████▍ | 424/500 [00:06<00:01, 56.86it/s]
 86%|████████▌ | 431/500 [00:06<00:01, 58.52it/s]
 87%|████████▋ | 437/500 [00:06<00:01, 56.93it/s]
 89%|████████▊ | 443/500 [00:06<00:01, 55.02it/s]
 90%|████████▉ | 449/500 [00:06<00:00, 54.15it/s]
 91%|█████████ | 455/500 [00:06<00:00, 55.17it/s]
 92%|█████████▏| 461/500 [00:06<00:00, 56.44it/s]
 94%|█████████▍| 468/500 [00:06<00:00, 58.47it/s]
 95%|█████████▍| 475/500 [00:07<00:00, 59.99it/s]
 96%|█████████▌| 482/500 [00:07<00:00, 58.43it/s]
 98%|█████████▊| 488/500 [00:07<00:00, 56.75it/s]
 99%|█████████▉| 494/500 [00:07<00:00, 53.00it/s]
100%|██████████| 500/500 [00:07<00:00, 66.38it/s]
 78%|███████▊  | 47/60 [04:20<01:26,  6.69s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 5/500 [00:00<00:10, 47.59it/s]
  2%|▏         | 10/500 [00:00<00:10, 45.34it/s]
  3%|▎         | 15/500 [00:00<00:10, 46.44it/s]
  4%|▍         | 21/500 [00:00<00:09, 51.13it/s]
  6%|▌         | 28/500 [00:00<00:08, 56.34it/s]
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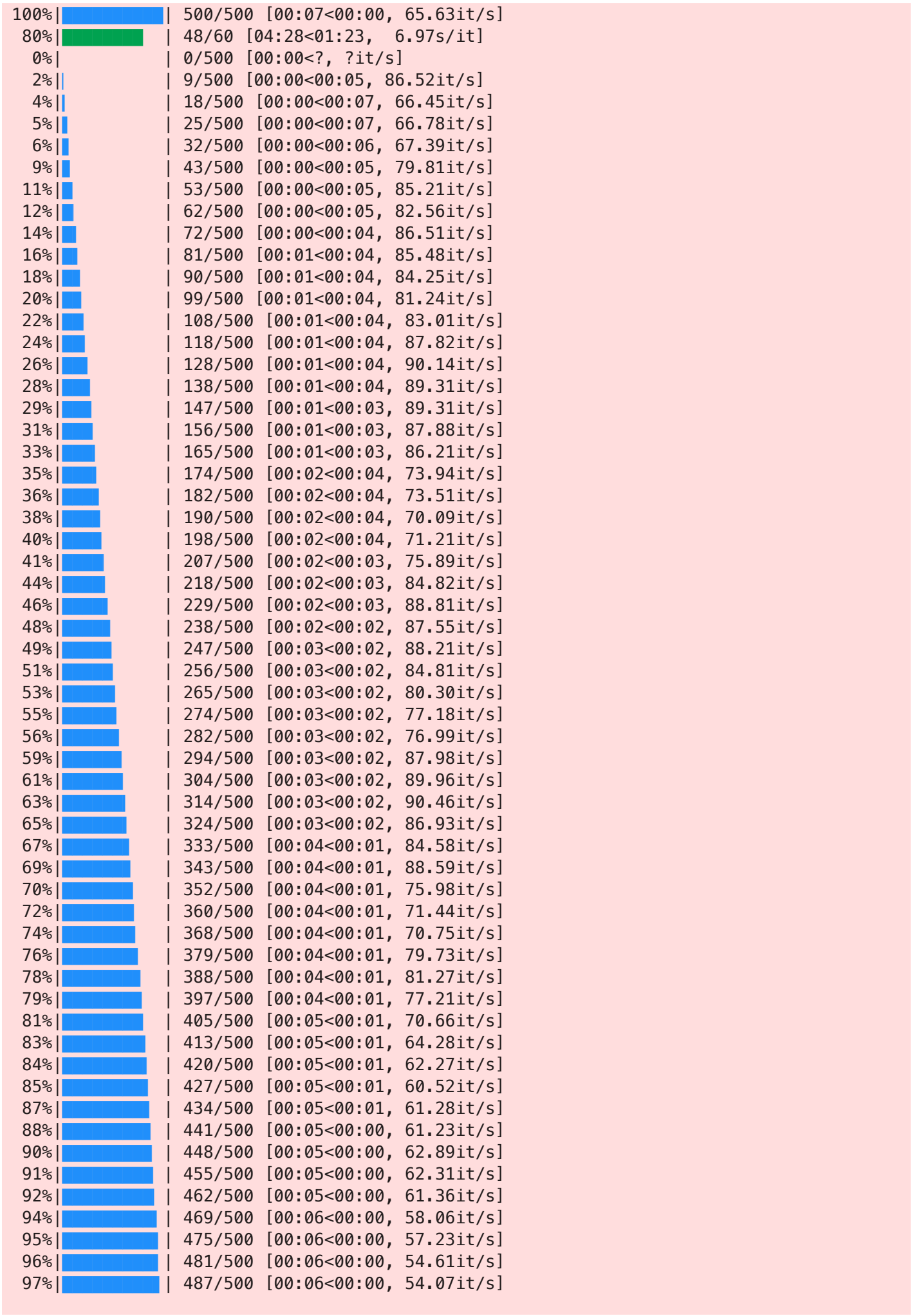
  7%|▋         | 34/500 [00:00<00:08, 53.94it/s]
  8%|▊         | 40/500 [00:00<00:08, 51.88it/s]
  9%|▉         | 46/500 [00:00<00:08, 50.78it/s]
 10%|▉         | 52/500 [00:01<00:09, 46.64it/s]
 12%|█▏        | 58/500 [00:01<00:09, 48.98it/s]
 13%|█▎        | 64/500 [00:01<00:08, 51.16it/s]
 14%|█▍        | 70/500 [00:01<00:08, 52.76it/s]
 15%|█▌        | 76/500 [00:01<00:07, 54.14it/s]
 16%|█▋        | 82/500 [00:01<00:07, 54.90it/s]
 18%|█▊        | 88/500 [00:01<00:07, 55.98it/s]
 19%|█▉        | 94/500 [00:01<00:07, 52.37it/s]
 20%|██        | 100/500 [00:02<00:09, 44.24it/s]
 21%|██        | 105/500 [00:02<00:09, 43.00it/s]
 22%|██▏       | 111/500 [00:02<00:08, 45.35it/s]
 23%|██▎       | 116/500 [00:02<00:08, 46.43it/s]
 24%|██▍       | 122/500 [00:02<00:07, 47.41it/s]
 26%|██▌       | 129/500 [00:02<00:07, 52.22it/s]
 27%|██▋       | 135/500 [00:02<00:07, 49.98it/s]
 28%|██▊       | 141/500 [00:02<00:07, 50.52it/s]
 30%|███       | 150/500 [00:02<00:05, 59.03it/s]
 32%|███▏      | 158/500 [00:03<00:05, 63.32it/s]
 33%|███▎      | 165/500 [00:03<00:05, 65.08it/s]
 35%|███▍      | 174/500 [00:03<00:04, 71.68it/s]
 36%|███▋      | 182/500 [00:03<00:04, 67.99it/s]
 38%|███▊      | 189/500 [00:03<00:04, 65.05it/s]
 39%|███▉      | 196/500 [00:03<00:04, 63.34it/s]
 41%|████      | 203/500 [00:03<00:04, 62.96it/s]
 42%|████▏     | 210/500 [00:03<00:04, 60.20it/s]
 43%|████▎     | 217/500 [00:03<00:04, 61.93it/s]
 45%|████▍     | 224/500 [00:04<00:04, 61.87it/s]
 46%|████▋     | 232/500 [00:04<00:04, 66.27it/s]
 48%|████▊     | 241/500 [00:04<00:03, 71.42it/s]
 50%|█████     | 250/500 [00:04<00:03, 75.78it/s]
 52%|█████▏    | 259/500 [00:04<00:03, 78.21it/s]
 53%|█████▎    | 267/500 [00:04<00:03, 75.88it/s]
 55%|█████▌    | 276/500 [00:04<00:02, 78.33it/s]
 57%|█████▋    | 284/500 [00:04<00:03, 68.14it/s]
 58%|█████▊    | 292/500 [00:05<00:03, 66.73it/s]
 60%|█████▉    | 299/500 [00:05<00:02, 67.52it/s]
 61%|██████▏   | 306/500 [00:05<00:02, 65.81it/s]
 63%|██████▎   | 316/500 [00:05<00:02, 74.08it/s]
 65%|██████▌   | 327/500 [00:05<00:02, 83.43it/s]
 67%|██████▋   | 336/500 [00:05<00:01, 83.23it/s]
 69%|██████▉   | 345/500 [00:05<00:01, 79.59it/s]
 71%|███████   | 354/500 [00:05<00:02, 72.95it/s]
 72%|███████▏  | 362/500 [00:05<00:02, 65.38it/s]
 74%|███████▍  | 369/500 [00:06<00:02, 63.92it/s]
 76%|███████▌  | 379/500 [00:06<00:01, 72.20it/s]
 77%|███████▋  | 387/500 [00:06<00:01, 69.71it/s]
 80%|███████▉  | 398/500 [00:06<00:01, 79.13it/s]
 82%|████████▏ | 408/500 [00:06<00:01, 83.63it/s]
 83%|████████▎ | 417/500 [00:06<00:00, 84.39it/s]
 85%|████████▌ | 426/500 [00:06<00:00, 82.55it/s]
 87%|████████▋ | 435/500 [00:06<00:00, 76.81it/s]
 89%|████████▉ | 443/500 [00:06<00:00, 73.66it/s]
 90%|█████████ | 451/500 [00:07<00:00, 73.06it/s]
 92%|█████████▏| 461/500 [00:07<00:00, 78.86it/s]
 94%|█████████▍| 470/500 [00:07<00:00, 79.52it/s]
 96%|█████████▌| 480/500 [00:07<00:00, 84.63it/s]
```


100%| | 500/500 [00:07<00:00, 65.63it/s]
80%| | 48/60 [04:28<01:23, 6.97s/it]
0%| | 0/500 [00:00<?, ?it/s]
2%| | 9/500 [00:00<00:05, 86.52it/s]
4%| | 18/500 [00:00<00:07, 66.45it/s]
5%| | 25/500 [00:00<00:07, 66.78it/s]
6%| | 32/500 [00:00<00:06, 67.39it/s]
9%| | 43/500 [00:00<00:05, 79.81it/s]
11%| | 53/500 [00:00<00:05, 85.21it/s]
12%| | 62/500 [00:00<00:05, 82.56it/s]
14%| | 72/500 [00:00<00:04, 86.51it/s]
16%| | 81/500 [00:01<00:04, 85.48it/s]
18%| | 90/500 [00:01<00:04, 84.25it/s]
20%| | 99/500 [00:01<00:04, 81.24it/s]
22%| | 108/500 [00:01<00:04, 83.01it/s]
24%| | 118/500 [00:01<00:04, 87.82it/s]
26%| | 128/500 [00:01<00:04, 90.14it/s]
28%| | 138/500 [00:01<00:04, 89.31it/s]
29%| | 147/500 [00:01<00:03, 89.31it/s]
31%| | 156/500 [00:01<00:03, 87.88it/s]
33%| | 165/500 [00:01<00:03, 86.21it/s]
35%| | 174/500 [00:02<00:04, 73.94it/s]
36%| | 182/500 [00:02<00:04, 73.51it/s]
38%| | 190/500 [00:02<00:04, 70.09it/s]
40%| | 198/500 [00:02<00:04, 71.21it/s]
41%| | 207/500 [00:02<00:03, 75.89it/s]
44%| | 218/500 [00:02<00:03, 84.82it/s]
46%| | 229/500 [00:02<00:03, 88.81it/s]
48%| | 238/500 [00:02<00:02, 87.55it/s]
49%| | 247/500 [00:03<00:02, 88.21it/s]
51%| | 256/500 [00:03<00:02, 84.81it/s]
53%| | 265/500 [00:03<00:02, 80.30it/s]
55%| | 274/500 [00:03<00:02, 77.18it/s]
56%| | 282/500 [00:03<00:02, 76.99it/s]
59%| | 294/500 [00:03<00:02, 87.98it/s]
61%| | 304/500 [00:03<00:02, 89.96it/s]
63%| | 314/500 [00:03<00:02, 90.46it/s]
65%| | 324/500 [00:03<00:02, 86.93it/s]
67%| | 333/500 [00:04<00:01, 84.58it/s]
69%| | 343/500 [00:04<00:01, 88.59it/s]
70%| | 352/500 [00:04<00:01, 75.98it/s]
72%| | 360/500 [00:04<00:01, 71.44it/s]
74%| | 368/500 [00:04<00:01, 70.75it/s]
76%| | 379/500 [00:04<00:01, 79.73it/s]
78%| | 388/500 [00:04<00:01, 81.27it/s]
79%| | 397/500 [00:04<00:01, 77.21it/s]
81%| | 405/500 [00:05<00:01, 70.66it/s]
83%| | 413/500 [00:05<00:01, 64.28it/s]
84%| | 420/500 [00:05<00:01, 62.27it/s]
85%| | 427/500 [00:05<00:01, 60.52it/s]
87%| | 434/500 [00:05<00:01, 61.28it/s]
88%| | 441/500 [00:05<00:00, 61.23it/s]
90%| | 448/500 [00:05<00:00, 62.89it/s]
91%| | 455/500 [00:05<00:00, 62.31it/s]
92%| | 462/500 [00:05<00:00, 61.36it/s]
94%| | 469/500 [00:06<00:00, 58.06it/s]
95%| | 475/500 [00:06<00:00, 57.23it/s]
96%| | 481/500 [00:06<00:00, 54.61it/s]
97%| | 487/500 [00:06<00:00, 54.07it/s]

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 99%|▉| 493/500 [00:06<00:00, 55.34it/s]
100%|▉| 500/500 [00:06<00:00, 74.63it/s]
 82%|▊ | 49/60 [04:35<01:15,  6.90s/it]
  0%|  | 0/500 [00:00<?, ?it/s]
  1%|  | 7/500 [00:00<00:07, 62.62it/s]
  3%|  | 14/500 [00:00<00:07, 62.59it/s]
  4%|  | 21/500 [00:00<00:08, 59.77it/s]
  6%|  | 28/500 [00:00<00:07, 60.97it/s]
  7%|  | 35/500 [00:00<00:09, 49.77it/s]
  8%|  | 41/500 [00:00<00:09, 47.06it/s]
  9%|  | 47/500 [00:00<00:09, 49.10it/s]
 11%|  | 53/500 [00:01<00:08, 51.92it/s]
 12%|  | 60/500 [00:01<00:07, 56.07it/s]
 13%|  | 67/500 [00:01<00:07, 59.78it/s]
 15%|  | 74/500 [00:01<00:07, 60.05it/s]
 16%|  | 81/500 [00:01<00:07, 56.17it/s]
 18%|  | 89/500 [00:01<00:06, 60.64it/s]
 19%|  | 96/500 [00:01<00:06, 59.03it/s]
 21%|  | 104/500 [00:01<00:06, 62.60it/s]
 22%|  | 111/500 [00:01<00:06, 61.65it/s]
 24%|  | 118/500 [00:02<00:06, 59.86it/s]
 25%|  | 125/500 [00:02<00:06, 58.13it/s]
 26%|  | 132/500 [00:02<00:06, 61.16it/s]
 28%|  | 139/500 [00:02<00:06, 59.08it/s]
 29%|  | 145/500 [00:02<00:06, 56.85it/s]
 30%|  | 151/500 [00:02<00:06, 54.13it/s]
 31%|  | 157/500 [00:02<00:06, 52.59it/s]
 33%|  | 163/500 [00:02<00:06, 53.59it/s]
 34%|  | 169/500 [00:02<00:06, 55.13it/s]
 35%|  | 176/500 [00:03<00:05, 58.56it/s]
 37%|  | 185/500 [00:03<00:04, 66.19it/s]
 39%|  | 195/500 [00:03<00:04, 74.22it/s]
 41%|  | 203/500 [00:03<00:04, 66.27it/s]
 42%|  | 210/500 [00:03<00:04, 60.41it/s]
 43%|  | 217/500 [00:03<00:04, 57.27it/s]
 45%|  | 223/500 [00:03<00:04, 57.35it/s]
 46%|  | 230/500 [00:03<00:04, 59.48it/s]
 47%|  | 237/500 [00:04<00:04, 59.83it/s]
 49%|  | 244/500 [00:04<00:04, 60.91it/s]
 50%|  | 251/500 [00:04<00:04, 61.56it/s]
 52%|  | 258/500 [00:04<00:03, 62.55it/s]
 53%|  | 265/500 [00:04<00:04, 57.53it/s]
 54%|  | 271/500 [00:04<00:04, 55.27it/s]
 55%|  | 277/500 [00:04<00:04, 53.34it/s]
 57%|  | 283/500 [00:04<00:04, 51.11it/s]
 58%|  | 290/500 [00:05<00:03, 54.18it/s]
 60%|  | 298/500 [00:05<00:03, 60.45it/s]
 61%|  | 307/500 [00:05<00:02, 67.19it/s]
 63%|  | 316/500 [00:05<00:02, 72.45it/s]
 65%|  | 324/500 [00:05<00:02, 64.52it/s]
 66%|  | 331/500 [00:05<00:02, 59.15it/s]
 68%|  | 340/500 [00:05<00:02, 66.46it/s]
 69%|  | 347/500 [00:05<00:02, 63.76it/s]
 71%|  | 354/500 [00:05<00:02, 64.92it/s]
 72%|  | 361/500 [00:06<00:02, 64.89it/s]
 74%|  | 370/500 [00:06<00:01, 70.08it/s]
 76%|  | 378/500 [00:06<00:01, 71.43it/s]
 77%|  | 387/500 [00:06<00:01, 75.15it/s]
 79%|  | 395/500 [00:06<00:01, 74.12it/s]
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 81%|████████▏  | 403/500 [00:06<00:01, 74.02it/s]
 82%|████████▏  | 411/500 [00:06<00:01, 70.40it/s]
 84%|████████▍  | 419/500 [00:06<00:01, 71.02it/s]
 85%|████████▍  | 427/500 [00:06<00:01, 72.93it/s]
 87%|████████▋  | 435/500 [00:07<00:00, 73.36it/s]
 89%|████████▊  | 443/500 [00:07<00:00, 74.50it/s]
 90%|█████████  | 451/500 [00:07<00:00, 73.30it/s]
 92%|█████████▏ | 460/500 [00:07<00:00, 77.52it/s]
 94%|█████████▍ | 468/500 [00:07<00:00, 76.62it/s]
 95%|█████████▌ | 476/500 [00:07<00:00, 74.50it/s]
 97%|█████████▋ | 485/500 [00:07<00:00, 78.55it/s]
100%|██████████| 500/500 [00:07<00:00, 63.47it/s]
 83%|████████▎  | 50/60 [04:42<01:11,  7.20s/it]
  0%|           | 0/500 [00:00<?, ?it/s]
  2%|▏          | 10/500 [00:00<00:05, 90.34it/s]
  4%|▍          | 20/500 [00:00<00:06, 77.48it/s]
  6%|▌          | 30/500 [00:00<00:05, 84.36it/s]
  8%|▊          | 41/500 [00:00<00:05, 91.24it/s]
 10%|▉          | 51/500 [00:00<00:05, 82.91it/s]
 12%|█▏         | 60/500 [00:00<00:05, 79.34it/s]
 14%|█▍         | 69/500 [00:00<00:05, 77.03it/s]
 16%|█▌         | 79/500 [00:00<00:05, 82.73it/s]
 18%|█▊         | 90/500 [00:01<00:04, 89.09it/s]
 20%|██         | 100/500 [00:01<00:04, 84.81it/s]
 22%|██▏        | 109/500 [00:01<00:04, 83.08it/s]
 24%|██▍        | 119/500 [00:01<00:04, 87.37it/s]
 26%|██▌        | 129/500 [00:01<00:04, 87.47it/s]
 28%|██▊        | 138/500 [00:01<00:04, 83.83it/s]
 29%|██▉        | 147/500 [00:01<00:04, 82.87it/s]
 31%|███        | 156/500 [00:01<00:04, 79.38it/s]
 33%|███▎       | 165/500 [00:01<00:04, 81.49it/s]
 35%|███▍       | 174/500 [00:02<00:04, 81.29it/s]
 37%|███▋       | 183/500 [00:02<00:04, 76.23it/s]
 38%|███▊       | 192/500 [00:02<00:03, 78.55it/s]
 41%|████       | 204/500 [00:02<00:03, 88.18it/s]
 43%|████▎      | 213/500 [00:02<00:03, 88.63it/s]
 45%|████▍      | 223/500 [00:02<00:03, 90.31it/s]
 47%|████▋      | 235/500 [00:02<00:02, 98.70it/s]
 49%|████▉      | 247/500 [00:02<00:02, 104.21it/s]
 52%|█████▏     | 258/500 [00:02<00:02, 103.55it/s]
 54%|█████▍     | 269/500 [00:03<00:02, 100.01it/s]
 56%|█████▌     | 280/500 [00:03<00:02, 96.88it/s]
 58%|█████▊     | 290/500 [00:03<00:02, 90.01it/s]
 60%|██████     | 301/500 [00:03<00:02, 93.55it/s]
 62%|██████▏    | 311/500 [00:03<00:02, 89.53it/s]
 64%|██████▍    | 321/500 [00:03<00:02, 83.42it/s]
 66%|██████▌    | 330/500 [00:03<00:02, 82.49it/s]
 68%|██████▊    | 339/500 [00:03<00:01, 80.81it/s]
 70%|██████▉    | 348/500 [00:04<00:01, 83.13it/s]
 72%|███████▏   | 359/500 [00:04<00:01, 88.90it/s]
 74%|███████▍   | 368/500 [00:04<00:01, 86.68it/s]
 75%|███████▌   | 377/500 [00:04<00:01, 86.22it/s]
 77%|███████▋   | 386/500 [00:04<00:01, 77.35it/s]
 79%|███████▉   | 394/500 [00:04<00:01, 66.69it/s]
 80%|████████   | 401/500 [00:04<00:01, 66.12it/s]
 82%|████████▏  | 408/500 [00:04<00:01, 66.51it/s]
 84%|████████▍  | 418/500 [00:04<00:01, 74.26it/s]
 85%|████████▌  | 427/500 [00:05<00:00, 77.14it/s]
 87%|████████▋  | 437/500 [00:05<00:00, 83.13it/s]
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 89%|████████▉ | 446/500 [00:05<00:00, 82.16it/s]
 91%|█████████ | 455/500 [00:05<00:00, 78.50it/s]
 93%|█████████▎| 463/500 [00:05<00:00, 75.36it/s]
 94%|█████████▍| 471/500 [00:05<00:00, 72.93it/s]
 96%|█████████▌| 480/500 [00:05<00:00, 77.29it/s]
 98%|█████████▊| 489/500 [00:05<00:00, 79.91it/s]
100%|██████████| 500/500 [00:06<00:00, 82.80it/s]
 85%|████████▌ | 51/60 [04:49<01:01,  6.85s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 10/500 [00:00<00:05, 86.04it/s]
  4%|▍         | 20/500 [00:00<00:05, 86.30it/s]
  6%|▌         | 29/500 [00:00<00:05, 82.61it/s]
  8%|▊         | 38/500 [00:00<00:05, 78.60it/s]
  9%|▉         | 46/500 [00:00<00:06, 71.17it/s]
 11%|█         | 54/500 [00:00<00:06, 66.97it/s]
 12%|█▏        | 61/500 [00:00<00:07, 58.10it/s]
 14%|█▎        | 68/500 [00:01<00:07, 60.10it/s]
 15%|█▌        | 75/500 [00:01<00:07, 58.94it/s]
 17%|█▋        | 84/500 [00:01<00:06, 65.25it/s]
 18%|█▊        | 91/500 [00:01<00:06, 63.23it/s]
 20%|█▉        | 98/500 [00:01<00:06, 63.14it/s]
 21%|██        | 106/500 [00:01<00:05, 67.17it/s]
 23%|██▎       | 114/500 [00:01<00:05, 70.21it/s]
 25%|██▍       | 123/500 [00:01<00:05, 73.76it/s]
 27%|██▋       | 134/500 [00:01<00:04, 83.92it/s]
 29%|██▊       | 143/500 [00:02<00:04, 80.01it/s]
 30%|███       | 152/500 [00:02<00:04, 73.44it/s]
 32%|███▏      | 160/500 [00:02<00:04, 71.22it/s]
 34%|███▎      | 168/500 [00:02<00:04, 69.46it/s]
 35%|███▌      | 176/500 [00:02<00:04, 70.60it/s]
 37%|███▋      | 187/500 [00:02<00:03, 79.38it/s]
 39%|███▉      | 197/500 [00:02<00:03, 83.20it/s]
 41%|████      | 207/500 [00:02<00:03, 86.65it/s]
 43%|████▎     | 216/500 [00:02<00:03, 85.01it/s]
 45%|████▌     | 225/500 [00:03<00:03, 75.90it/s]
 47%|████▋     | 233/500 [00:03<00:03, 73.17it/s]
 48%|████▊     | 241/500 [00:03<00:03, 72.84it/s]
 50%|████▉     | 249/500 [00:03<00:03, 73.83it/s]
 52%|█████▏    | 259/500 [00:03<00:03, 78.78it/s]
 53%|█████▎    | 267/500 [00:03<00:03, 76.99it/s]
 55%|█████▌    | 277/500 [00:03<00:02, 82.69it/s]
 57%|█████▋    | 286/500 [00:03<00:02, 83.62it/s]
 59%|█████▉    | 295/500 [00:03<00:02, 80.66it/s]
 61%|██████    | 304/500 [00:04<00:02, 74.21it/s]
 62%|██████▏   | 312/500 [00:04<00:02, 72.55it/s]
 64%|██████▍   | 321/500 [00:04<00:02, 75.85it/s]
 66%|██████▌   | 329/500 [00:04<00:02, 74.05it/s]
 68%|██████▊   | 338/500 [00:04<00:02, 75.02it/s]
 70%|██████▉   | 349/500 [00:04<00:01, 83.97it/s]
 72%|███████▏  | 358/500 [00:04<00:02, 67.50it/s]
 73%|███████▎  | 366/500 [00:05<00:02, 61.11it/s]
 75%|███████▍  | 373/500 [00:05<00:02, 61.16it/s]
 76%|███████▌  | 380/500 [00:05<00:01, 60.81it/s]
 77%|███████▋  | 387/500 [00:05<00:01, 61.18it/s]
 79%|███████▉  | 394/500 [00:05<00:01, 57.06it/s]
 80%|████████  | 400/500 [00:05<00:01, 54.03it/s]
 81%|████████  | 407/500 [00:05<00:01, 56.95it/s]
 83%|████████▎ | 413/500 [00:05<00:01, 56.25it/s]
 84%|████████▍ | 419/500 [00:05<00:01, 55.91it/s]
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 85%|████████▌ | 425/500 [00:06<00:01, 53.14it/s]
 86%|████████▌ | 431/500 [00:06<00:01, 53.84it/s]
 87%|████████▋ | 437/500 [00:06<00:01, 54.50it/s]
 89%|████████▊ | 443/500 [00:06<00:01, 54.17it/s]
 90%|████████▉ | 449/500 [00:06<00:00, 53.07it/s]
 91%|█████████ | 455/500 [00:06<00:00, 51.27it/s]
 92%|█████████▏| 461/500 [00:06<00:00, 50.72it/s]
 93%|█████████▎| 467/500 [00:06<00:00, 50.78it/s]
 95%|█████████▍| 473/500 [00:07<00:00, 51.61it/s]
 96%|█████████▌| 479/500 [00:07<00:00, 51.74it/s]
 97%|█████████▋| 485/500 [00:07<00:00, 51.02it/s]
 98%|█████████▊| 491/500 [00:07<00:00, 53.42it/s]
100%|██████████| 500/500 [00:07<00:00, 66.15it/s]
 87%|████████▋ | 52/60 [04:56<00:56,  7.07s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 7/500 [00:00<00:07, 62.12it/s]
  3%|▎         | 14/500 [00:00<00:07, 63.24it/s]
  4%|▍         | 21/500 [00:00<00:07, 63.89it/s]
  6%|▌         | 28/500 [00:00<00:07, 63.58it/s]
  7%|▋         | 35/500 [00:00<00:07, 63.90it/s]
  8%|▊         | 42/500 [00:00<00:07, 62.91it/s]
 10%|▉         | 49/500 [00:00<00:07, 62.70it/s]
 11%|█         | 56/500 [00:00<00:07, 59.61it/s]
 12%|█▏        | 62/500 [00:01<00:08, 54.67it/s]
 14%|█▎        | 68/500 [00:01<00:08, 50.39it/s]
 15%|█▍        | 75/500 [00:01<00:07, 54.70it/s]
 16%|█▌        | 81/500 [00:01<00:07, 54.62it/s]
 17%|█▋        | 87/500 [00:01<00:07, 53.45it/s]
 19%|█▊        | 93/500 [00:01<00:07, 54.75it/s]
 21%|██        | 104/500 [00:01<00:05, 68.52it/s]
 22%|██▏       | 111/500 [00:01<00:06, 63.28it/s]
 24%|██▎       | 118/500 [00:01<00:06, 61.04it/s]
 25%|██▌       | 125/500 [00:02<00:06, 58.48it/s]
 26%|██▋       | 132/500 [00:02<00:06, 59.68it/s]
 28%|██▊       | 142/500 [00:02<00:05, 68.90it/s]
 30%|███       | 150/500 [00:02<00:04, 70.92it/s]
 32%|███▏      | 158/500 [00:02<00:04, 70.20it/s]
 33%|███▎      | 166/500 [00:02<00:04, 69.42it/s]
 35%|███▍      | 173/500 [00:02<00:05, 64.79it/s]
 36%|███▌      | 180/500 [00:02<00:05, 62.81it/s]
 37%|███▋      | 187/500 [00:03<00:04, 63.56it/s]
 39%|███▉      | 195/500 [00:03<00:04, 66.60it/s]
 41%|████      | 205/500 [00:03<00:03, 75.49it/s]
 43%|████▎     | 213/500 [00:03<00:03, 72.37it/s]
 44%|████▍     | 221/500 [00:03<00:03, 73.97it/s]
 46%|████▌     | 231/500 [00:03<00:03, 79.50it/s]
 48%|████▊     | 240/500 [00:03<00:03, 76.32it/s]
 50%|████▉     | 248/500 [00:03<00:03, 72.70it/s]
 51%|█████     | 256/500 [00:03<00:03, 64.12it/s]
 53%|█████▎    | 263/500 [00:04<00:03, 65.30it/s]
 54%|█████▍    | 270/500 [00:04<00:03, 64.31it/s]
 56%|█████▌    | 281/500 [00:04<00:02, 75.69it/s]
 59%|█████▊    | 293/500 [00:04<00:02, 86.98it/s]
 61%|██████    | 303/500 [00:04<00:02, 89.17it/s]
 63%|██████▎   | 313/500 [00:04<00:02, 89.33it/s]
 65%|██████▍   | 324/500 [00:04<00:01, 94.78it/s]
 67%|██████▋   | 334/500 [00:04<00:01, 86.98it/s]
 69%|██████▊   | 343/500 [00:04<00:01, 82.94it/s]
 70%|██████▉   | 352/500 [00:05<00:01, 79.28it/s]
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 72%|███████▏  | 361/500 [00:05<00:01, 78.53it/s]
 74%|███████▍  | 370/500 [00:05<00:01, 80.50it/s]
 76%|███████▌  | 379/500 [00:05<00:01, 78.34it/s]
 78%|███████▊  | 389/500 [00:05<00:01, 83.23it/s]
 80%|███████▉  | 398/500 [00:05<00:01, 82.75it/s]
 81%|████████  | 407/500 [00:05<00:01, 83.74it/s]
 83%|████████▎ | 416/500 [00:05<00:01, 77.72it/s]
 85%|████████▍ | 424/500 [00:06<00:01, 75.98it/s]
 87%|████████▋ | 434/500 [00:06<00:00, 82.01it/s]
 89%|████████▊ | 444/500 [00:06<00:00, 86.35it/s]
 91%|█████████ | 453/500 [00:06<00:00, 85.14it/s]
 93%|█████████▎| 463/500 [00:06<00:00, 88.42it/s]
 95%|█████████▍| 473/500 [00:06<00:00, 90.68it/s]
 97%|█████████▋| 483/500 [00:06<00:00, 90.87it/s]
100%|██████████| 500/500 [00:06<00:00, 72.64it/s]
 88%|████████▊ | 53/60 [05:03<00:49,  7.02s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 7/500 [00:00<00:07, 66.76it/s]
  4%|▍         | 19/500 [00:00<00:05, 95.49it/s]
  6%|▌         | 29/500 [00:00<00:05, 89.77it/s]
  8%|▊         | 39/500 [00:00<00:05, 91.20it/s]
 10%|▉         | 49/500 [00:00<00:05, 89.93it/s]
 12%|█▏        | 60/500 [00:00<00:04, 94.41it/s]
 14%|█▍        | 72/500 [00:00<00:04, 100.53it/s]
 17%|█▋        | 83/500 [00:00<00:04, 98.49it/s]
 19%|█▉        | 93/500 [00:01<00:04, 92.14it/s]
 21%|██        | 104/500 [00:01<00:04, 94.39it/s]
 23%|██▎       | 115/500 [00:01<00:03, 97.46it/s]
 25%|██▌       | 125/500 [00:01<00:03, 97.23it/s]
 27%|██▋       | 136/500 [00:01<00:03, 100.03it/s]
 29%|██▉       | 147/500 [00:01<00:03, 96.17it/s]
 31%|███       | 157/500 [00:01<00:03, 90.12it/s]
 33%|███▎      | 167/500 [00:01<00:03, 88.51it/s]
 35%|███▌      | 176/500 [00:01<00:03, 82.91it/s]
 37%|███▋      | 187/500 [00:02<00:03, 88.39it/s]
 40%|███▉      | 199/500 [00:02<00:03, 94.63it/s]
 42%|████▏     | 209/500 [00:02<00:03, 94.77it/s]
 44%|████▍     | 220/500 [00:02<00:02, 94.57it/s]
 46%|████▌     | 230/500 [00:02<00:02, 93.32it/s]
 48%|████▊     | 240/500 [00:02<00:02, 92.11it/s]
 50%|█████     | 251/500 [00:02<00:02, 95.51it/s]
 52%|█████▏    | 261/500 [00:02<00:02, 94.54it/s]
 54%|█████▍    | 271/500 [00:02<00:02, 93.68it/s]
 56%|█████▋    | 282/500 [00:03<00:02, 96.89it/s]
 59%|█████▊    | 293/500 [00:03<00:02, 100.15it/s]
 61%|██████    | 304/500 [00:03<00:02, 93.74it/s]
 63%|██████▎   | 315/500 [00:03<00:01, 97.92it/s]
 65%|██████▌   | 325/500 [00:03<00:01, 97.54it/s]
 67%|██████▋   | 336/500 [00:03<00:01, 99.99it/s]
 69%|██████▉   | 347/500 [00:03<00:01, 98.43it/s]
 71%|███████   | 357/500 [00:03<00:01, 94.19it/s]
 74%|███████▎  | 368/500 [00:03<00:01, 98.26it/s]
 76%|███████▌  | 378/500 [00:03<00:01, 97.55it/s]
 78%|███████▊  | 390/500 [00:04<00:01, 102.60it/s]
 80%|███████▉  | 401/500 [00:04<00:00, 99.44it/s]
 82%|████████▏ | 411/500 [00:04<00:01, 85.97it/s]
 84%|████████▍ | 420/500 [00:04<00:00, 80.06it/s]
 86%|████████▌ | 429/500 [00:04<00:00, 73.64it/s]
 87%|████████▋ | 437/500 [00:04<00:00, 67.73it/s]
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 89%|████████▉ | 444/500 [00:04<00:00, 65.30it/s]
 90%|█████████ | 451/500 [00:05<00:00, 58.65it/s]
 92%|█████████▏| 458/500 [00:05<00:00, 54.67it/s]
 93%|█████████▎| 464/500 [00:05<00:00, 54.12it/s]
 94%|█████████▍| 470/500 [00:05<00:00, 51.10it/s]
 95%|█████████▌| 477/500 [00:05<00:00, 53.60it/s]
 97%|█████████▋| 483/500 [00:05<00:00, 54.83it/s]
 98%|█████████▊| 489/500 [00:05<00:00, 55.85it/s]
100%|██████████| 500/500 [00:06<00:00, 83.07it/s]
 90%|█████████ | 54/60 [05:09<00:40,  6.73s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 5/500 [00:00<00:11, 43.02it/s]
  2%|▏         | 12/500 [00:00<00:09, 53.86it/s]
  4%|▎         | 18/500 [00:00<00:08, 54.03it/s]
  5%|▍         | 24/500 [00:00<00:08, 53.93it/s]
  6%|▌         | 31/500 [00:00<00:08, 56.81it/s]
  8%|▊         | 38/500 [00:00<00:07, 59.38it/s]
  9%|▉         | 44/500 [00:00<00:07, 58.09it/s]
 10%|▉         | 50/500 [00:00<00:08, 55.88it/s]
 11%|█         | 56/500 [00:01<00:08, 51.15it/s]
 12%|█▏        | 62/500 [00:01<00:08, 51.23it/s]
 14%|█▎        | 68/500 [00:01<00:08, 52.00it/s]
 15%|█▍        | 74/500 [00:01<00:08, 52.79it/s]
 16%|█▌        | 80/500 [00:01<00:07, 53.62it/s]
 18%|█▊        | 88/500 [00:01<00:06, 59.72it/s]
 19%|█▉        | 96/500 [00:01<00:06, 64.12it/s]
 21%|██        | 103/500 [00:01<00:06, 62.98it/s]
 22%|██▏       | 112/500 [00:01<00:05, 68.53it/s]
 24%|██▍       | 121/500 [00:02<00:05, 72.87it/s]
 26%|██▌       | 129/500 [00:02<00:05, 73.05it/s]
 27%|██▋       | 137/500 [00:02<00:04, 73.13it/s]
 29%|██▉       | 145/500 [00:02<00:05, 68.10it/s]
 30%|███       | 152/500 [00:02<00:05, 64.92it/s]
 32%|███▏      | 159/500 [00:02<00:05, 63.12it/s]
 33%|███▎      | 166/500 [00:02<00:05, 60.57it/s]
 35%|███▍      | 173/500 [00:02<00:05, 60.21it/s]
 36%|███▌      | 180/500 [00:03<00:05, 53.61it/s]
 37%|███▋      | 186/500 [00:03<00:05, 54.10it/s]
 38%|███▊      | 192/500 [00:03<00:06, 51.11it/s]
 40%|███▉      | 198/500 [00:03<00:05, 51.93it/s]
 41%|████      | 204/500 [00:03<00:05, 51.56it/s]
 43%|████▎     | 213/500 [00:03<00:04, 60.47it/s]
 44%|████▍     | 220/500 [00:03<00:04, 62.51it/s]
 45%|████▌     | 227/500 [00:03<00:04, 59.02it/s]
 47%|████▋     | 234/500 [00:03<00:04, 57.92it/s]
 48%|████▊     | 240/500 [00:04<00:04, 57.59it/s]
 49%|████▉     | 247/500 [00:04<00:04, 60.51it/s]
 51%|█████     | 254/500 [00:04<00:03, 62.98it/s]
 53%|█████▎    | 266/500 [00:04<00:03, 77.93it/s]
 55%|█████▌    | 275/500 [00:04<00:02, 80.42it/s]
 57%|█████▋    | 284/500 [00:04<00:02, 80.13it/s]
 59%|█████▊    | 294/500 [00:04<00:02, 84.70it/s]
 61%|██████    | 303/500 [00:04<00:02, 84.10it/s]
 62%|██████▏   | 312/500 [00:04<00:02, 80.67it/s]
 64%|██████▍   | 321/500 [00:05<00:02, 78.72it/s]
 66%|██████▌   | 329/500 [00:05<00:02, 77.42it/s]
 67%|██████▋   | 337/500 [00:05<00:02, 75.74it/s]
 69%|██████▉   | 345/500 [00:05<00:02, 75.92it/s]
 71%|███████   | 353/500 [00:05<00:01, 76.89it/s]
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 72%|███████▏  | 361/500 [00:05<00:01, 76.69it/s]
 74%|███████▍  | 371/500 [00:05<00:01, 82.28it/s]
 76%|███████▌  | 380/500 [00:05<00:01, 79.63it/s]
 78%|███████▊  | 388/500 [00:05<00:01, 77.35it/s]
 79%|███████▉  | 396/500 [00:06<00:01, 75.87it/s]
 81%|████████  | 406/500 [00:06<00:01, 81.09it/s]
 83%|████████▎ | 416/500 [00:06<00:00, 85.94it/s]
 85%|████████▍ | 427/500 [00:06<00:00, 90.90it/s]
 87%|████████▋ | 437/500 [00:06<00:00, 92.82it/s]
 89%|████████▊ | 447/500 [00:06<00:00, 91.90it/s]
 91%|█████████ | 457/500 [00:06<00:00, 92.23it/s]
 93%|█████████▎| 467/500 [00:06<00:00, 94.05it/s]
 95%|█████████▍| 477/500 [00:06<00:00, 86.60it/s]
 97%|█████████▋| 486/500 [00:07<00:00, 83.06it/s]
100%|██████████| 500/500 [00:07<00:00, 68.96it/s]
 92%|█████████▏| 55/60 [05:16<00:34,  6.89s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  2%|▏         | 8/500 [00:00<00:07, 68.86it/s]
  4%|▎         | 18/500 [00:00<00:05, 83.13it/s]
  5%|▌         | 27/500 [00:00<00:05, 84.16it/s]
  7%|▋         | 37/500 [00:00<00:05, 88.18it/s]
  9%|▉         | 47/500 [00:00<00:04, 90.98it/s]
 11%|█         | 57/500 [00:00<00:05, 78.88it/s]
 13%|█▎        | 66/500 [00:00<00:05, 73.48it/s]
 15%|█▍        | 74/500 [00:00<00:05, 73.36it/s]
 16%|█▋        | 82/500 [00:01<00:06, 69.40it/s]
 19%|█▊        | 94/500 [00:01<00:05, 80.40it/s]
 21%|██        | 103/500 [00:01<00:04, 82.95it/s]
 22%|██▏       | 112/500 [00:01<00:04, 84.21it/s]
 24%|██▍       | 121/500 [00:01<00:04, 84.66it/s]
 26%|██▌       | 130/500 [00:01<00:04, 79.98it/s]
 28%|██▊       | 139/500 [00:01<00:04, 75.91it/s]
 30%|██▉       | 149/500 [00:01<00:04, 81.35it/s]
 32%|███▏      | 158/500 [00:01<00:04, 78.32it/s]
 33%|███▎      | 166/500 [00:02<00:04, 78.45it/s]
 35%|███▍      | 174/500 [00:02<00:04, 78.12it/s]
 36%|███▋      | 182/500 [00:02<00:04, 77.33it/s]
 38%|███▊      | 191/500 [00:02<00:03, 80.02it/s]
 40%|████      | 201/500 [00:02<00:03, 84.12it/s]
 42%|████▏     | 210/500 [00:02<00:03, 84.90it/s]
 44%|████▍     | 219/500 [00:02<00:03, 76.37it/s]
 45%|████▌     | 227/500 [00:02<00:03, 74.16it/s]
 47%|████▋     | 235/500 [00:02<00:03, 73.55it/s]
 49%|████▉     | 244/500 [00:03<00:03, 77.57it/s]
 51%|█████     | 253/500 [00:03<00:03, 79.65it/s]
 53%|█████▎    | 263/500 [00:03<00:02, 84.31it/s]
 54%|█████▍    | 272/500 [00:03<00:02, 85.78it/s]
 56%|█████▌    | 281/500 [00:03<00:02, 81.54it/s]
 58%|█████▊    | 290/500 [00:03<00:02, 80.60it/s]
 60%|█████▉    | 299/500 [00:03<00:02, 78.01it/s]
 61%|██████▏   | 307/500 [00:03<00:02, 72.24it/s]
 63%|██████▎   | 316/500 [00:03<00:02, 76.80it/s]
 65%|██████▌   | 326/500 [00:04<00:02, 82.72it/s]
 67%|██████▋   | 335/500 [00:04<00:02, 82.41it/s]
 69%|██████▉   | 344/500 [00:04<00:01, 79.01it/s]
 71%|███████   | 353/500 [00:04<00:01, 80.52it/s]
 72%|███████▏  | 362/500 [00:04<00:01, 82.56it/s]
 74%|███████▍  | 371/500 [00:04<00:01, 78.07it/s]
 76%|███████▌  | 379/500 [00:04<00:01, 74.69it/s]
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 77%|███████▋  | 387/500 [00:04<00:01, 72.95it/s]
 79%|███████▉  | 395/500 [00:05<00:01, 69.54it/s]
 81%|████████  | 404/500 [00:05<00:01, 73.68it/s]
 83%|████████▎ | 413/500 [00:05<00:01, 77.75it/s]
 84%|████████▍ | 421/500 [00:05<00:01, 73.65it/s]
 86%|████████▌ | 429/500 [00:05<00:00, 75.02it/s]
 87%|████████▋ | 437/500 [00:05<00:00, 75.04it/s]
 89%|████████▉ | 445/500 [00:05<00:00, 73.41it/s]
 91%|█████████ | 453/500 [00:05<00:00, 74.12it/s]
 92%|█████████▏| 461/500 [00:05<00:00, 75.47it/s]
 94%|█████████▍| 469/500 [00:06<00:00, 73.29it/s]
 96%|█████████▌| 481/500 [00:06<00:00, 84.87it/s]
 98%|█████████▊| 490/500 [00:06<00:00, 79.57it/s]
100%|██████████| 500/500 [00:06<00:00, 78.09it/s]
 93%|█████████▎| 56/60 [05:23<00:26,  6.75s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 7/500 [00:00<00:07, 65.72it/s]
  3%|▎         | 14/500 [00:00<00:08, 57.79it/s]
  4%|▍         | 20/500 [00:00<00:08, 54.58it/s]
  5%|▌         | 26/500 [00:00<00:08, 54.30it/s]
  6%|▌         | 32/500 [00:00<00:08, 54.96it/s]
  8%|▊         | 39/500 [00:00<00:07, 58.43it/s]
  9%|▉         | 46/500 [00:00<00:07, 61.48it/s]
 11%|█         | 53/500 [00:00<00:07, 63.08it/s]
 12%|█▏        | 60/500 [00:01<00:07, 62.01it/s]
 13%|█▎        | 67/500 [00:01<00:06, 62.37it/s]
 15%|█▍        | 74/500 [00:01<00:07, 60.40it/s]
 16%|█▌        | 81/500 [00:01<00:07, 56.41it/s]
 17%|█▋        | 87/500 [00:01<00:07, 56.08it/s]
 19%|█▊        | 93/500 [00:01<00:07, 56.68it/s]
 20%|█▉        | 99/500 [00:01<00:07, 56.51it/s]
 21%|██        | 105/500 [00:01<00:06, 57.16it/s]
 22%|██▏       | 112/500 [00:01<00:06, 58.74it/s]
 24%|██▎       | 118/500 [00:02<00:06, 58.20it/s]
 25%|██▍       | 124/500 [00:02<00:06, 57.13it/s]
 26%|██▌       | 130/500 [00:02<00:06, 55.71it/s]
 27%|██▋       | 136/500 [00:02<00:06, 53.46it/s]
 28%|██▊       | 142/500 [00:02<00:06, 55.15it/s]
 30%|██▉       | 148/500 [00:02<00:06, 56.27it/s]
 31%|███       | 154/500 [00:02<00:06, 57.00it/s]
 32%|███▏      | 160/500 [00:02<00:05, 57.22it/s]
 33%|███▎      | 166/500 [00:02<00:05, 57.00it/s]
 34%|███▍      | 172/500 [00:02<00:05, 57.37it/s]
 36%|███▌      | 178/500 [00:03<00:05, 57.67it/s]
 37%|███▋      | 185/500 [00:03<00:05, 58.70it/s]
 38%|███▊      | 191/500 [00:03<00:05, 56.05it/s]
 39%|███▉      | 197/500 [00:03<00:05, 56.00it/s]
 41%|████      | 204/500 [00:03<00:05, 57.42it/s]
 42%|████▏     | 211/500 [00:03<00:04, 58.65it/s]
 44%|████▎     | 218/500 [00:03<00:04, 60.11it/s]
 45%|████▍     | 225/500 [00:03<00:04, 62.59it/s]
 46%|████▋     | 232/500 [00:03<00:04, 61.63it/s]
 48%|████▊     | 239/500 [00:04<00:04, 60.21it/s]
 49%|████▉     | 246/500 [00:04<00:04, 59.63it/s]
 50%|█████     | 252/500 [00:04<00:04, 59.19it/s]
 52%|█████▏    | 258/500 [00:04<00:04, 58.19it/s]
 53%|█████▎    | 264/500 [00:04<00:04, 58.68it/s]
 54%|█████▍    | 270/500 [00:04<00:04, 57.03it/s]
 56%|█████▌    | 278/500 [00:04<00:03, 61.43it/s]
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 57%|          | 285/500 [00:04<00:03, 60.58it/s]
 58%|          | 292/500 [00:04<00:03, 61.17it/s]
 60%|          | 299/500 [00:05<00:03, 63.00it/s]
 61%|          | 306/500 [00:05<00:03, 61.09it/s]
 63%|          | 313/500 [00:05<00:03, 56.71it/s]
 64%|          | 319/500 [00:05<00:03, 53.66it/s]
 65%|          | 325/500 [00:05<00:03, 54.78it/s]
 66%|          | 332/500 [00:05<00:02, 57.26it/s]
 68%|          | 339/500 [00:05<00:02, 59.74it/s]
 70%|          | 348/500 [00:05<00:02, 66.40it/s]
 71%|          | 356/500 [00:06<00:02, 69.83it/s]
 73%|          | 364/500 [00:06<00:01, 72.64it/s]
 74%|          | 372/500 [00:06<00:01, 68.85it/s]
 76%|          | 379/500 [00:06<00:01, 61.36it/s]
 77%|          | 386/500 [00:06<00:01, 59.79it/s]
 79%|          | 395/500 [00:06<00:01, 67.07it/s]
 81%|          | 404/500 [00:06<00:01, 72.71it/s]
 83%|          | 413/500 [00:06<00:01, 76.04it/s]
 84%|          | 421/500 [00:06<00:01, 72.40it/s]
 86%|          | 430/500 [00:07<00:00, 75.32it/s]
 88%|          | 439/500 [00:07<00:00, 75.96it/s]
 89%|          | 447/500 [00:07<00:00, 71.58it/s]
 91%|          | 455/500 [00:07<00:00, 65.22it/s]
 92%|          | 462/500 [00:07<00:00, 66.36it/s]
 94%|          | 469/500 [00:07<00:00, 66.08it/s]
 95%|          | 477/500 [00:07<00:00, 66.58it/s]
 97%|          | 484/500 [00:07<00:00, 64.96it/s]
 98%|          | 492/500 [00:08<00:00, 68.97it/s]
100%|          | 500/500 [00:08<00:00, 61.46it/s]
 95%|          | 57/60 [05:31<00:21,  7.17s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 6/500 [00:00<00:08, 55.86it/s]
  2%|          | 12/500 [00:00<00:09, 50.88it/s]
  4%|          | 18/500 [00:00<00:09, 51.61it/s]
  5%|          | 26/500 [00:00<00:07, 59.82it/s]
  7%|          | 33/500 [00:00<00:07, 59.20it/s]
  9%|          | 43/500 [00:00<00:06, 70.89it/s]
 10%|          | 52/500 [00:00<00:05, 75.30it/s]
 12%|          | 62/500 [00:00<00:05, 81.06it/s]
 14%|          | 72/500 [00:00<00:05, 85.48it/s]
 16%|          | 81/500 [00:01<00:05, 80.95it/s]
 18%|          | 90/500 [00:01<00:05, 79.94it/s]
 20%|          | 99/500 [00:01<00:05, 78.87it/s]
 22%|          | 108/500 [00:01<00:04, 80.62it/s]
 24%|          | 118/500 [00:01<00:04, 84.45it/s]
 26%|          | 128/500 [00:01<00:04, 88.40it/s]
 28%|          | 138/500 [00:01<00:03, 91.68it/s]
 30%|          | 148/500 [00:01<00:03, 89.54it/s]
 32%|          | 158/500 [00:02<00:03, 87.66it/s]
 33%|          | 167/500 [00:02<00:03, 84.42it/s]
 35%|          | 176/500 [00:02<00:04, 74.04it/s]
 37%|          | 187/500 [00:02<00:03, 81.76it/s]
 39%|          | 196/500 [00:02<00:03, 80.77it/s]
 41%|          | 207/500 [00:02<00:03, 87.45it/s]
 44%|          | 218/500 [00:02<00:03, 93.01it/s]
 46%|          | 228/500 [00:02<00:02, 93.53it/s]
 48%|          | 238/500 [00:02<00:02, 94.79it/s]
 50%|          | 248/500 [00:03<00:02, 88.13it/s]
 51%|          | 257/500 [00:03<00:02, 81.72it/s]
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 53%|          | 266/500 [00:03<00:02, 82.60it/s]
 55%|          | 275/500 [00:03<00:02, 82.09it/s]
 57%|          | 284/500 [00:03<00:02, 78.52it/s]
 58%|          | 292/500 [00:03<00:02, 78.37it/s]
 61%|          | 303/500 [00:03<00:02, 86.23it/s]
 62%|          | 312/500 [00:03<00:02, 84.65it/s]
 64%|          | 321/500 [00:03<00:02, 81.96it/s]
 66%|          | 330/500 [00:04<00:02, 80.78it/s]
 68%|          | 340/500 [00:04<00:01, 83.33it/s]
 70%|          | 349/500 [00:04<00:01, 83.30it/s]
 72%|          | 358/500 [00:04<00:01, 83.72it/s]
 74%|          | 368/500 [00:04<00:01, 86.60it/s]
 75%|          | 377/500 [00:04<00:01, 85.82it/s]
 77%|          | 386/500 [00:04<00:01, 81.97it/s]
 79%|          | 395/500 [00:04<00:01, 82.93it/s]
 81%|          | 404/500 [00:04<00:01, 84.37it/s]
 83%|          | 414/500 [00:05<00:00, 87.23it/s]
 85%|          | 423/500 [00:05<00:00, 81.76it/s]
 86%|          | 432/500 [00:05<00:00, 82.17it/s]
 88%|          | 441/500 [00:05<00:00, 78.28it/s]
 90%|          | 451/500 [00:05<00:00, 84.08it/s]
 92%|          | 460/500 [00:05<00:00, 85.56it/s]
 94%|          | 469/500 [00:05<00:00, 85.83it/s]
 96%|          | 479/500 [00:05<00:00, 88.53it/s]
 98%|          | 488/500 [00:05<00:00, 85.64it/s]
100%|          | 500/500 [00:06<00:00, 81.61it/s]
 97%|          | 58/60 [05:37<00:13,  6.86s/it]
  0%|          | 0/500 [00:00<?, ?it/s]
  1%|          | 6/500 [00:00<00:08, 59.68it/s]
  3%|          | 15/500 [00:00<00:06, 75.58it/s]
  5%|          | 24/500 [00:00<00:05, 80.86it/s]
  7%|          | 34/500 [00:00<00:05, 85.61it/s]
  9%|          | 43/500 [00:00<00:05, 84.98it/s]
 11%|          | 53/500 [00:00<00:05, 88.13it/s]
 12%|          | 62/500 [00:00<00:05, 85.71it/s]
 14%|          | 72/500 [00:00<00:04, 88.91it/s]
 16%|          | 81/500 [00:00<00:05, 79.97it/s]
 18%|          | 90/500 [00:01<00:05, 76.92it/s]
 20%|          | 100/500 [00:01<00:04, 82.97it/s]
 22%|          | 110/500 [00:01<00:04, 86.72it/s]
 24%|          | 119/500 [00:01<00:04, 83.70it/s]
 26%|          | 129/500 [00:01<00:04, 86.71it/s]
 28%|          | 138/500 [00:01<00:04, 83.20it/s]
 29%|          | 147/500 [00:01<00:04, 77.42it/s]
 31%|          | 155/500 [00:01<00:04, 71.01it/s]
 33%|          | 163/500 [00:02<00:05, 65.84it/s]
 34%|          | 170/500 [00:02<00:05, 62.07it/s]
 35%|          | 177/500 [00:02<00:05, 59.24it/s]
 37%|          | 183/500 [00:02<00:05, 56.69it/s]
 38%|          | 190/500 [00:02<00:05, 58.42it/s]
 39%|          | 197/500 [00:02<00:05, 59.45it/s]
 41%|          | 203/500 [00:02<00:05, 59.38it/s]
 42%|          | 209/500 [00:02<00:04, 58.46it/s]
 43%|          | 215/500 [00:03<00:05, 56.70it/s]
 44%|          | 221/500 [00:03<00:05, 55.14it/s]
 45%|          | 227/500 [00:03<00:05, 54.19it/s]
 47%|          | 233/500 [00:03<00:04, 54.07it/s]
 48%|          | 240/500 [00:03<00:04, 56.29it/s]
 49%|          | 247/500 [00:03<00:04, 57.51it/s]
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 51%|     | 253/500 [00:03<00:04, 56.50it/s]
 52%|     | 259/500 [00:03<00:04, 53.53it/s]
 53%|     | 266/500 [00:03<00:04, 57.34it/s]
 54%|     | 272/500 [00:04<00:04, 56.07it/s]
 56%|     | 280/500 [00:04<00:03, 60.94it/s]
 57%|     | 287/500 [00:04<00:03, 58.33it/s]
 59%|     | 293/500 [00:04<00:03, 57.07it/s]
 60%|     | 299/500 [00:04<00:03, 57.00it/s]
 61%|     | 305/500 [00:04<00:03, 57.56it/s]
 62%|     | 311/500 [00:04<00:03, 58.20it/s]
 63%|     | 317/500 [00:04<00:03, 56.32it/s]
 65%|     | 323/500 [00:04<00:03, 55.47it/s]
 66%|     | 329/500 [00:05<00:03, 52.69it/s]
 67%|     | 336/500 [00:05<00:02, 55.41it/s]
 68%|     | 342/500 [00:05<00:02, 53.72it/s]
 70%|     | 348/500 [00:05<00:02, 51.91it/s]
 71%|     | 354/500 [00:05<00:02, 52.23it/s]
 72%|     | 360/500 [00:05<00:02, 52.92it/s]
 73%|     | 366/500 [00:05<00:02, 51.70it/s]
 74%|     | 372/500 [00:05<00:02, 51.30it/s]
 76%|     | 378/500 [00:06<00:02, 47.93it/s]
 77%|     | 384/500 [00:06<00:02, 49.95it/s]
 78%|     | 390/500 [00:06<00:02, 52.36it/s]
 79%|     | 396/500 [00:06<00:01, 52.38it/s]
 80%|     | 402/500 [00:06<00:01, 52.35it/s]
 82%|     | 409/500 [00:06<00:01, 55.16it/s]
 83%|     | 416/500 [00:06<00:01, 57.96it/s]
 84%|     | 422/500 [00:06<00:01, 57.36it/s]
 86%|     | 428/500 [00:06<00:01, 56.25it/s]
 87%|     | 434/500 [00:07<00:01, 52.36it/s]
 88%|     | 440/500 [00:07<00:01, 52.70it/s]
 89%|     | 447/500 [00:07<00:00, 54.93it/s]
 91%|     | 453/500 [00:07<00:00, 53.97it/s]
 92%|     | 459/500 [00:07<00:00, 55.41it/s]
 93%|     | 466/500 [00:07<00:00, 57.09it/s]
 94%|     | 472/500 [00:07<00:00, 57.53it/s]
 96%|     | 478/500 [00:07<00:00, 56.23it/s]
 97%|     | 484/500 [00:07<00:00, 55.25it/s]
 98%|     | 490/500 [00:08<00:00, 53.92it/s]
100%|     | 500/500 [00:08<00:00, 61.32it/s]
 98%|     | 59/60 [05:45<00:07,  7.26s/it]
  0%|     | 0/500 [00:00<?, ?it/s]
  2%|     | 10/500 [00:00<00:05, 85.50it/s]
  4%|     | 19/500 [00:00<00:05, 83.86it/s]
  6%|     | 28/500 [00:00<00:06, 70.38it/s]
  7%|     | 36/500 [00:00<00:06, 66.35it/s]
  9%|     | 43/500 [00:00<00:06, 66.53it/s]
 10%|     | 51/500 [00:00<00:06, 67.41it/s]
 12%|     | 58/500 [00:00<00:07, 61.14it/s]
 13%|     | 65/500 [00:01<00:07, 58.63it/s]
 14%|     | 71/500 [00:01<00:07, 58.90it/s]
 16%|     | 81/500 [00:01<00:06, 68.86it/s]
 18%|     | 91/500 [00:01<00:05, 76.16it/s]
 20%|     | 99/500 [00:01<00:05, 74.52it/s]
 22%|     | 109/500 [00:01<00:04, 80.90it/s]
 24%|     | 120/500 [00:01<00:04, 87.34it/s]
 26%|     | 129/500 [00:01<00:04, 84.77it/s]
 28%|     | 138/500 [00:01<00:04, 76.00it/s]
 29%|     | 146/500 [00:02<00:04, 75.71it/s]
```

```
 31%|███▏      | 155/500 [00:02<00:04, 78.70it/s]
 33%|███▎      | 165/500 [00:02<00:04, 83.16it/s]
 35%|███▍      | 175/500 [00:02<00:03, 86.25it/s]
 37%|███▋      | 185/500 [00:02<00:03, 88.04it/s]
 39%|███▊      | 194/500 [00:02<00:03, 77.77it/s]
 41%|████      | 203/500 [00:02<00:03, 80.83it/s]
 42%|████▏     | 212/500 [00:02<00:03, 78.19it/s]
 44%|████▍     | 220/500 [00:02<00:03, 72.75it/s]
 46%|████▌     | 231/500 [00:03<00:03, 82.17it/s]
 48%|████▊     | 242/500 [00:03<00:02, 89.10it/s]
 50%|████▉     | 252/500 [00:03<00:02, 90.90it/s]
 52%|█████▏    | 262/500 [00:03<00:02, 93.02it/s]
 54%|█████▍    | 272/500 [00:03<00:02, 90.07it/s]
 56%|█████▌    | 282/500 [00:03<00:02, 90.71it/s]
 58%|█████▊    | 292/500 [00:03<00:02, 87.97it/s]
 60%|█████▉    | 301/500 [00:03<00:02, 83.61it/s]
 62%|██████▏   | 310/500 [00:03<00:02, 82.96it/s]
 64%|██████▍   | 319/500 [00:04<00:02, 80.38it/s]
 66%|██████▌   | 328/500 [00:04<00:02, 78.98it/s]
 67%|██████▋   | 336/500 [00:04<00:02, 76.92it/s]
 69%|██████▉   | 346/500 [00:04<00:01, 83.17it/s]
 71%|███████   | 355/500 [00:04<00:01, 84.44it/s]
 73%|███████▎  | 365/500 [00:04<00:01, 88.06it/s]
 75%|███████▍  | 374/500 [00:04<00:01, 86.44it/s]
 77%|███████▋  | 383/500 [00:04<00:01, 84.57it/s]
 78%|███████▊  | 392/500 [00:04<00:01, 84.65it/s]
 80%|████████  | 401/500 [00:05<00:01, 79.10it/s]
 82%|████████▏ | 412/500 [00:05<00:01, 87.37it/s]
 84%|████████▍ | 421/500 [00:05<00:00, 87.57it/s]
 87%|████████▋ | 433/500 [00:05<00:00, 95.19it/s]
 89%|████████▊ | 443/500 [00:05<00:00, 89.41it/s]
 91%|█████████ | 453/500 [00:05<00:00, 91.31it/s]
 93%|█████████▎| 463/500 [00:05<00:00, 91.97it/s]
 95%|█████████▍| 473/500 [00:05<00:00, 84.69it/s]
 96%|█████████▌| 482/500 [00:05<00:00, 80.24it/s]
 98%|█████████▊| 491/500 [00:06<00:00, 78.28it/s]
100%|██████████| 500/500 [00:06<00:00, 80.30it/s]
100%|██████████| 60/60 [05:51<00:00,  5.87s/it]
Extracted Features and Created Dataset Successfully !!
```

In [ ]:
```
from sklearn.model_selection import train_test_split
train_df, temp_df = train_test_split(dataset, test_size=0.3, stratify=dataset['class'])
val_df, test_df = train_test_split(temp_df, test_size=0.5, stratify=temp_df['class'])

print(f'training size: {train_df.shape} \nvalidation size: {val_df.shape} \ntest size: {
```

```
training size: (21000, 2)
validation size: (4500, 2)
test size: (4500, 2)
```

In [ ]:
```
# check dataset
print(np.vstack(train_df['features'].values).shape)
train_df['features'].values.shape
```

```
(21000, 40)
```

Out[ ]: (21000,)

In [ ]:
```
from torch.utils.data import Dataset, DataLoader


class CustomDataset(Dataset):
    def __init__(self, data):
        self.features = torch.tensor(np.vstack(data['features'].values))

        self.labels = torch.tensor(np.vstack(data['class'].astype(np.float32).values))

    def __len__(self):
        return len(self.features)

    def __getitem__(self, idx):
        return self.features[idx], self.labels[idx]

train_dataset = CustomDataset(train_df)
val_dataset = CustomDataset(val_df)
test_dataset = CustomDataset(test_df)

train_loader = DataLoader(train_dataset, batch_size=32, shuffle=True)
val_loader = DataLoader(val_dataset, batch_size=100, shuffle=False)
test_loader = DataLoader(test_dataset, batch_size=32, shuffle=False)
```

In [ ]:
```
def ELBO(recon_x, x, z_mu, z_logvar):
    BCE = F.binary_cross_entropy(recon_x, x, reduction='sum')
    KLD = -0.5 * torch.sum(1 + z_logvar - z_mu.pow(2) - z_logvar.exp())
    elbo = BCE + KLD
    return elbo
```

In [ ]:
```
def accuracy(recon_x, model, label):
    y_pred = model(recon_x)
    _, label_pred = torch.max(y_pred, 1)
    correct = (label_pred == label.flatten()).sum().item()
    return correct
```

In [ ]:
```
# accuracy net reference: https://github.com/pytorch/examples/blob/main/mnist/main.py

class AccuracyNet(nn.Module):
    def __init__(self):
        super(AccuracyNet, self).__init__()
        self.conv1 = nn.Conv2d(1, 32, 3, 1)
        self.conv2 = nn.Conv2d(32, 64, 3, 1)
        self.dropout1 = nn.Dropout(0.25)
        self.dropout2 = nn.Dropout(0.5)
        self.fc1 = nn.Linear(9216, 128)
        self.fc2 = nn.Linear(128, 10)

    def forward(self, x):
        x = self.conv1(x)
        x = F.relu(x)
        x = self.conv2(x)
        x = F.relu(x)
        x = F.max_pool2d(x, 2)
        x = self.dropout1(x)
        x = torch.flatten(x, 1)
        x = self.fc1(x)
        x = F.relu(x)
        x = self.dropout2(x)
```

```
        x = self.fc2(x)
        output = F.log_softmax(x, dim=1)
        return output
```

In [ ]:
```
# 99% accuracy model for MNIST

accuracy_model = AccuracyNet()
# accuracy_model.load_state_dict(torch.load("mnist_cnn.pt", weights_only=True))
accuracy_model.load_state_dict(torch.load("accuracy_model.pt", weights_only=True)) #fine
```

Out[ ]:
```
<All keys matched successfully>
```

In [ ]:
```
class ATInet(nn.Module):

    def __init__(self,input_length, latent_length):
        super(ATInet, self).__init__()
        self.k = latent_length

        self.en_linear1 = nn.Linear(input_length, 512)
        self.en_linear2 = nn.Linear(512, 256)
        self.en_linear3 = nn.Linear(256, 128)
        self.en_linear4 = nn.Linear(128, self.k * 2)

        self.en_bn1 = nn.BatchNorm1d(512)
        self.en_bn2 = nn.BatchNorm1d(256)
        self.en_bn3 = nn.BatchNorm1d(128)

        self.de_conv1 = nn.ConvTranspose2d(self.k, 16, 4, 1, 1)
        self.de_conv2 = nn.ConvTranspose2d(16, 8, 4, 2, 0)
        self.de_conv3 = nn.ConvTranspose2d(8, 4, 4, 2, 0)
        self.de_conv4 = nn.ConvTranspose2d(4, 1, 4, 2, 1)

        self.de_bn1 = nn.BatchNorm2d(16)
        self.de_bn2 = nn.BatchNorm2d(8)
        self.de_bn3 = nn.BatchNorm2d(4)
        self.de_bn4 = nn.BatchNorm2d(1)

        self.relu = nn.ReLU()
        self.sigmoid = nn.Sigmoid()
        self.tanh = nn.Tanh()

    def encode(self, x):
        out = self.relu(self.en_bn1(self.en_linear1(x)))
        out = self.relu(self.en_bn2(self.en_linear2(out)))
        out = self.relu(self.en_bn3(self.en_linear3(out)))
        out = self.en_linear4(out)
        mu = out[:, :self.k]
        logvar = out[:, self.k:]
        return mu, logvar

    def decode(self, z):
        out = self.relu(self.de_bn1(self.de_conv1(z)))
        out = self.relu(self.de_bn2(self.de_conv2(out)))
        out = self.relu(self.de_bn3(self.de_conv3(out)))
        out = self.sigmoid(self.de_bn4(self.de_conv4(out)))
        return out

    def reparameterization(self, mean, var):
        epsilon = torch.randn_like(var)
```

```
        z = mean + var * epsilon
        return z

    def forward(self, x):
        z_mu, z_logvar = self.encode(x)
        z = self.reparameterization(z_mu, torch.exp(0.5 * z_logvar)).view(-1, self.k, 1,
        recon_x = self.decode(z)
        return recon_x, z_mu, z_logvar
```

In [ ]:
```
mnist = MNIST('./data', train=True, transform=tfs.Compose([tfs.ToTensor()]), download=Tr
```

In [ ]:
```
img_class = [[] for i in range(10)]

for i in range(60000):
    img, y = mnist.__getitem__(i)
    img_class[y].append(img)
```

In [ ]:
```
class Imgset():
    def __init__(self, labels, imgs):
        self.img_dict = {l: i for l, i in zip(labels, imgs)}

    def class2img(self, labels):
        imgs = []
        for label in labels.flatten():
            class_img = self.img_dict[label.cpu().data.numpy().item()]
            shuffle(class_img)
            imgs.append(class_img[0])
        return torch.stack(imgs)
```

In [ ]:
```
def train(model, optimizer, loss_func, acc_func, lr, num_epochs, mnist_img, acc_model):
    history = {'train_loss': [],  'val_acc': []}

    # Move model to the appropriate device
    if gpu_boole:
        model.cuda()
        acc_model.cuda()

    for epoch in range(num_epochs):
        print(f"Epoch {epoch+1}/{num_epochs}")

        # Training phase
        model.train()  # Set model to training mode
        train_loss_total = 0.0
        total_train_samples = 0

        for inputs, labels in train_loader:
            if gpu_boole:
                inputs, labels = inputs.cuda(), labels.cuda()

            # Zero the gradients
            optimizer.zero_grad()

            # Forward pass
            outputs, z_mu, z_logvar = model(inputs)
            targets = mnist_img.class2img(labels)
            if gpu_boole:
                targets = targets.cuda()
            loss = loss_func(outputs, targets, z_mu, z_logvar)
```

```
            # Backward pass and optimization
            loss.backward()
            optimizer.step()

            # Update metrics
            train_loss_total += loss.item()
            total_train_samples += labels.size(0)

        model.eval()
        val_total = 0
        val_correct = 0
        for inputs, labels in train_loader:
            if gpu_boole:
                inputs, labels = inputs.cuda(), labels.cuda()

            outputs, z_mu, z_logvar = model(inputs)
            targets = mnist_img.class2img(labels)
            if gpu_boole:
                targets = targets.cuda()
            correct = acc_func(outputs, acc_model, labels)

            val_correct += correct
            val_total += labels.size(0)
        train_loss = train_loss_total / total_train_samples
        val_acc = val_correct / val_total



        # Store metrics
        history['train_loss'].append(train_loss)
        history['val_acc'].append(val_acc)

        print('[%d/%d] - train_loss: %.3f, val_accuracy: %.3f' % ((num_epochs + 1), num_

    return history
```

In [ ]:

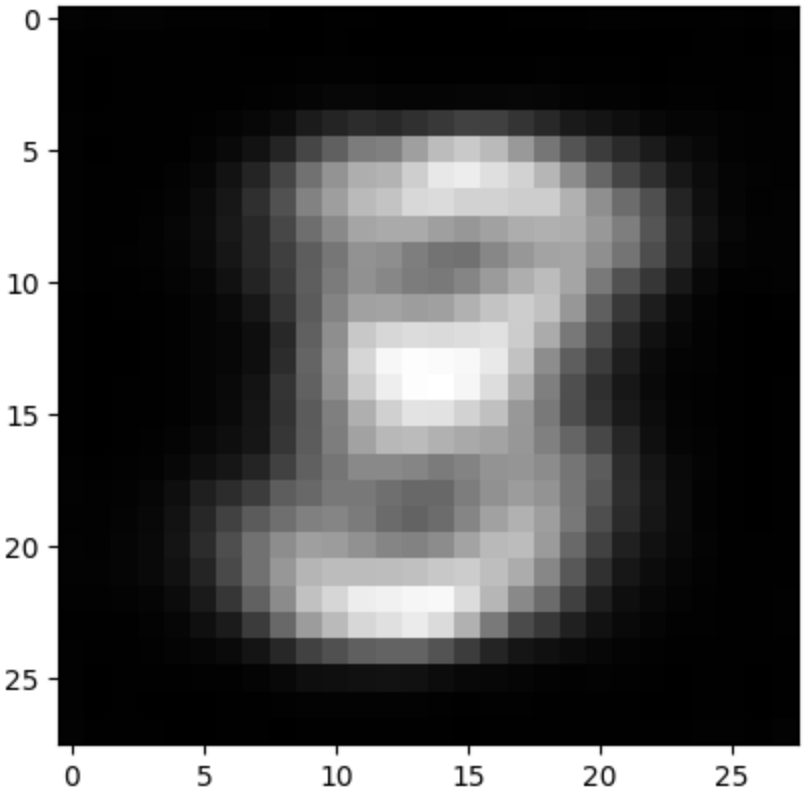
```
model = ATInet(input_length=40, latent_length=100)
lr = 0.001
num_epochs = 10
optimizer = torch.optim.Adam(model.parameters(), lr)
history = train(model, optimizer, ELBO, accuracy, lr, num_epochs, Imgset(range(10), img_
```

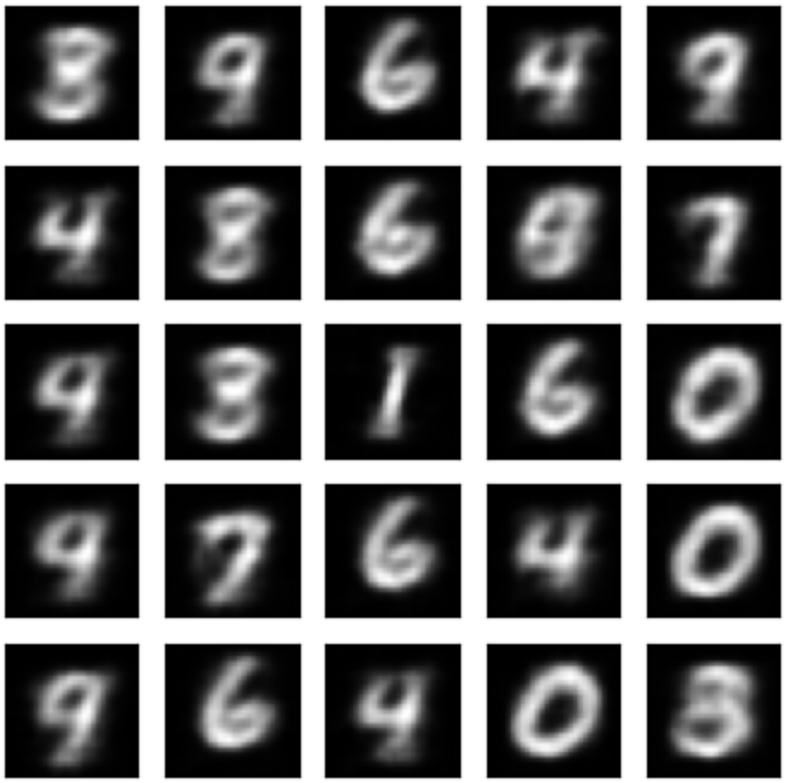
```
Epoch 1/10
[11/10] - train_loss: 433.301, val_accuracy: 0.291
Epoch 2/10
[11/10] - train_loss: 315.778, val_accuracy: 0.445
Epoch 3/10
[11/10] - train_loss: 260.830, val_accuracy: 0.543
Epoch 4/10
[11/10] - train_loss: 231.835, val_accuracy: 0.592
Epoch 5/10
[11/10] - train_loss: 215.556, val_accuracy: 0.583
Epoch 6/10
[11/10] - train_loss: 206.197, val_accuracy: 0.671
Epoch 7/10
[11/10] - train_loss: 199.803, val_accuracy: 0.681
Epoch 8/10
[11/10] - train_loss: 196.000, val_accuracy: 0.714
Epoch 9/10
[11/10] - train_loss: 192.964, val_accuracy: 0.739
Epoch 10/10
[11/10] - train_loss: 190.816, val_accuracy: 0.745
```

In [ ]:

```python
for inputs, labels in test_loader:
    if gpu_boole:
        inputs, labels = inputs.cuda(), labels.cuda()
    imgs, _, _ = model(inputs)
    imgs = imgs.cpu().data.numpy().reshape([32,28,28])
    plt.imshow(imgs[0],cmap='gray')
    print(labels)

    size_figure_grid = 5
    fig, ax = plt.subplots(size_figure_grid, size_figure_grid, figsize=(5, 5))
    for i, j in itertools.product(range(size_figure_grid), range(size_figure_grid)):
        ax[i, j].get_xaxis().set_visible(False)
        ax[i, j].get_yaxis().set_visible(False)

    for kr in range(5*5):
        i = kr // 5
        j = kr % 5
        ax[i, j].cla()
        ax[i, j].imshow(imgs[kr], cmap='gray')

    break
```

```
tensor([[8.],
        [9.],
        [6.],
        [4.],
        [7.],
        [4.],
        [8.],
        [6.],
        [7.],
        [7.],
        [4.],
        [8.],
        [1.],
        [6.],
        [7.],
        [4.],
        [7.],
        [6.],
        [4.],
        [0.],
        [4.],
        [6.],
        [4.],
        [0.],
        [3.],
        [9.],
        [5.],
        [9.],
        [6.],
        [5.],
        [1.],
        [5.]], device='cuda:0')
```





In [ ]:
```python
#fine-tuning accuracy model

for inputs, labels in val_loader:
    if gpu_boole:
        inputs, labels = inputs.cuda(), labels.cuda()
        accuracy_model.cuda()
    imgs, _, _ = model(inputs)
    break

imgs = imgs.cpu().data.numpy()
imgs = torch.Tensor(imgs)
acc_dataset = data.TensorDataset(imgs, labels)
acc_loader = DataLoader(acc_dataset, batch_size=10, shuffle=True)

accuracy_model.fc1 = nn.Linear(9216, 128)
accuracy_model.fc2 = nn.Linear(128, 10)
optimizer = torch.optim.Adam(list(accuracy_model.fc1.parameters()) + list(accuracy_model
loss_func = nn.CrossEntropyLoss()
for epoch in range(50):
    print(f"Epoch {epoch+1}/{50}")

    # Training phase
    accuracy_model.train()  # Set model to training mode
    accuracy_model = accuracy_model.cuda()
    for inputs, labels in acc_loader:
        labels = labels.type(torch.LongTensor).flatten()
        if gpu_boole:
            inputs, labels = inputs.cuda(), labels.cuda()


        # Zero the gradients
        optimizer.zero_grad()
        # Forward pass
        outputs = accuracy_model(inputs)
```

```
        acc_loss = loss_func(outputs, labels)

        # Backward pass and optimization
        acc_loss.backward()
        optimizer.step()

accuracy_model.eval()
torch.save(accuracy_model.state_dict(), "accuracy_model.pt")
```

```
Epoch 1/50
Epoch 2/50
Epoch 3/50
Epoch 4/50
Epoch 5/50
Epoch 6/50
Epoch 7/50
Epoch 8/50
Epoch 9/50
Epoch 10/50
Epoch 11/50
Epoch 12/50
Epoch 13/50
Epoch 14/50
Epoch 15/50
Epoch 16/50
Epoch 17/50
Epoch 18/50
Epoch 19/50
Epoch 20/50
Epoch 21/50
Epoch 22/50
Epoch 23/50
Epoch 24/50
Epoch 25/50
Epoch 26/50
Epoch 27/50
Epoch 28/50
Epoch 29/50
Epoch 30/50
Epoch 31/50
Epoch 32/50
Epoch 33/50
Epoch 34/50
Epoch 35/50
Epoch 36/50
Epoch 37/50
Epoch 38/50
Epoch 39/50
Epoch 40/50
Epoch 41/50
Epoch 42/50
Epoch 43/50
Epoch 44/50
Epoch 45/50
Epoch 46/50
Epoch 47/50
Epoch 48/50
Epoch 49/50
Epoch 50/50
```

In [ ]:
```
total = 0
correct = 0
for inputs, labels in test_loader:
    if gpu_boole:
        inputs, labels = inputs.cuda(), labels.cuda()
        accuracy_model.cuda()
    imgs, _, _ = model(inputs)
    correct += accuracy(imgs, accuracy_model, labels)
    total += labels.size(0)

print("Test Accuracy:", correct / total)
```

```
Test Accuracy: 0.8228888888888889
```