6.1 Dataset & DataLoader CLASS IN PyTorch

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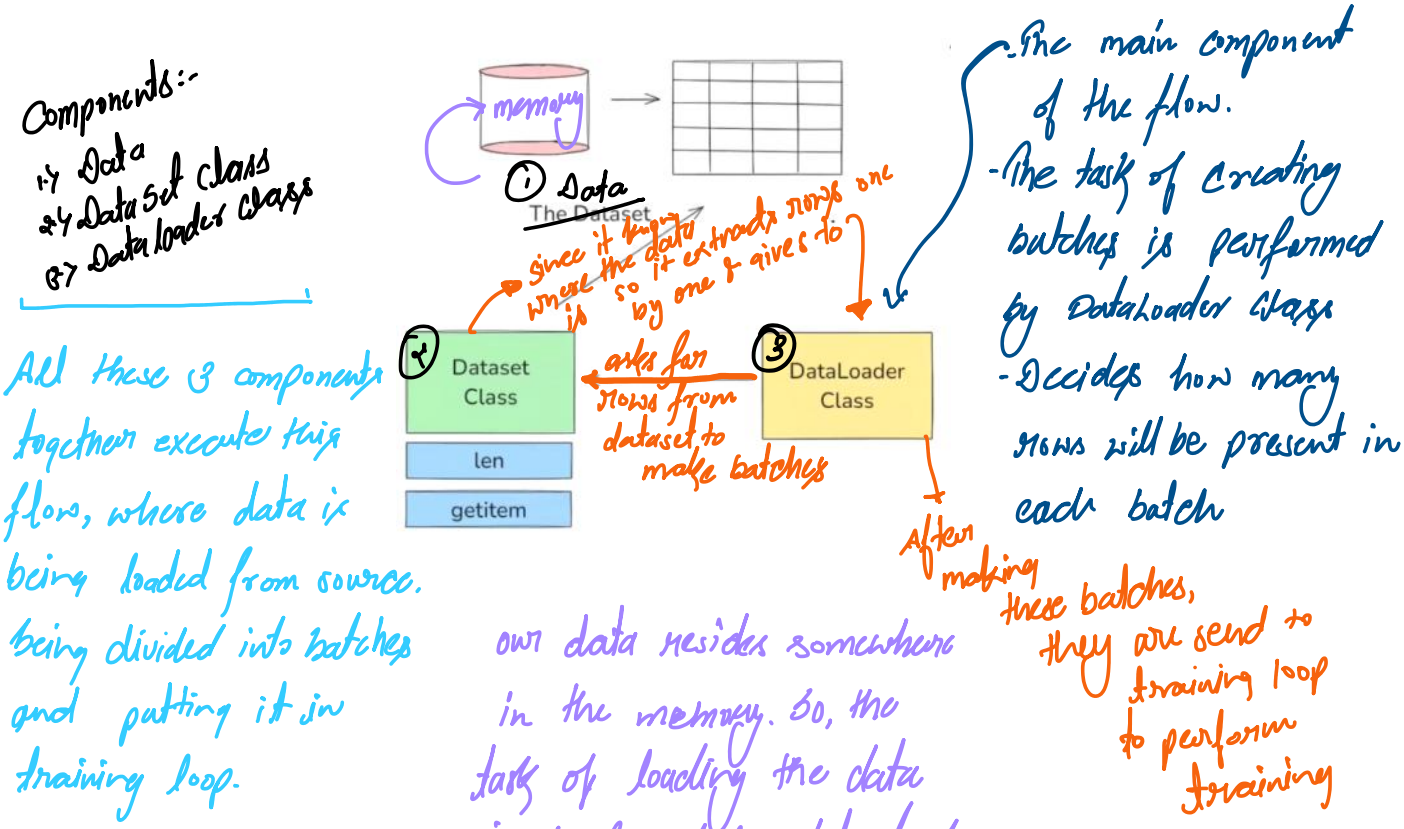
Dataset and **DataLoader** are core abstractions in PyTorch that **decouple how you define your data** **from how you efficiently iterate over it in training loops.**



1. Dataset Class

The Dataset class is essentially a blueprint. When you create a custom Dataset, you decide how data is loaded and returned.

```
CustomDataset(Dataset):
    __init__():
        # from where the data should be loaded
        # ex. csv, folder containing images etc.
```

--len--():
// returns length / no of rows presents
// in our dataset → with the help of
// this we can determine how many
// batches will be made ie. len/batch_size

--getitem()--(index):
// returns a particular row based on
// the provided index.

It defines:

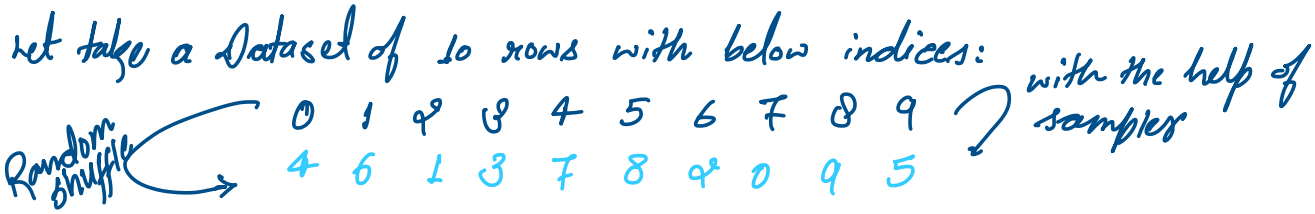
- *__init__()* which tells how data should be loaded.
- *__len__()* which returns the total number of samples.
- *__getitem__(index)* which returns the data (and label) at the given index.

2. DataLoader Class

The DataLoader **wraps a Dataset** and **handles batching, shuffling, and parallel loading** for you.

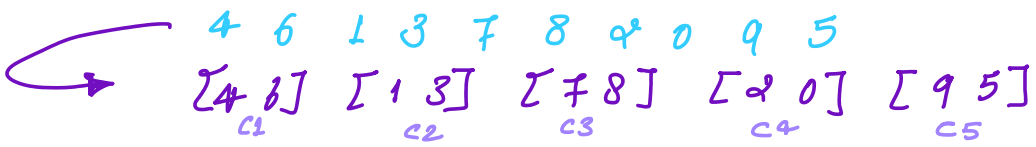
DataLoader Control Flow:

- **At the start of each epoch, the DataLoader (if *shuffle=True*) shuffles indices(using a sampler).**

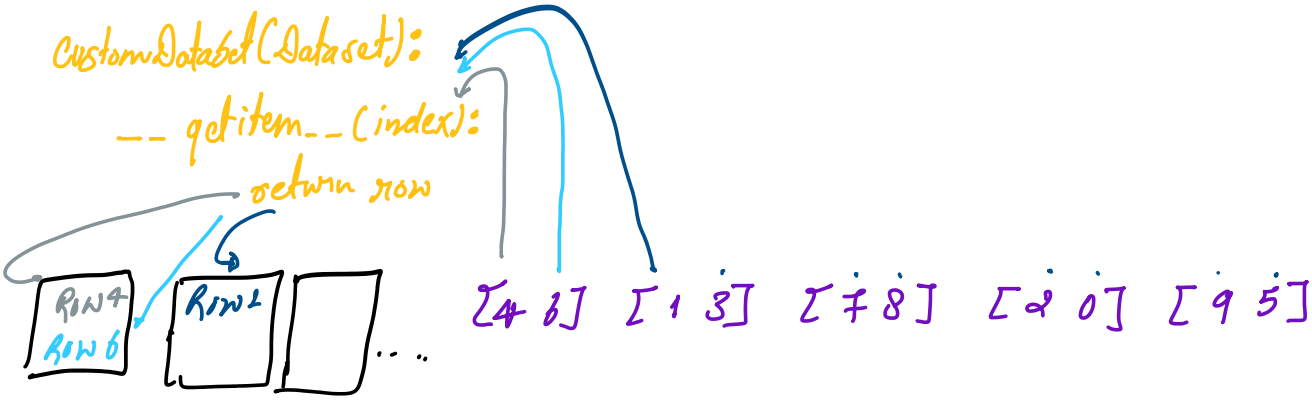


- **It divides the indices into chunks of *batch_size*.**

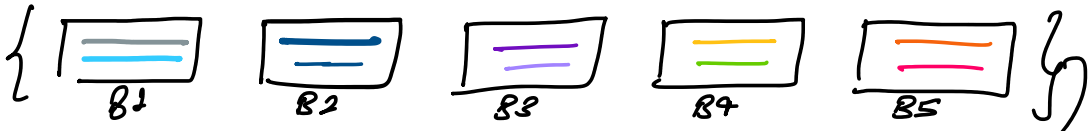
Let the batch_size be of 2.
∴ chunks are formed from the shuffled indices



- **For each index in the chunk, data samples are fetched from the Dataset object**



- **The samples are then collected and combined into a batch (using *collate_fn*)**



- **The batch is returned to the main training loop**