# LLM Assignment 3 Pulkit Nargotra 2021273

### Q1. Accuracy comparison between the pretrained and fine-tuned models on the test set:

Accuracy before fine-tuning: 44.0 Accuracy after fine-tuning: 93.0

#### Q2. Time taken to fine-tune the model using QLoRA.

Time taken to fine-tune the model (seconds): 2407.14

### Q3. Total parameters in the model and the number of parameters fine-tuned.

Trainable Parameters: 20971520 Total Parameters: 1542364160

Percentage of Trainable Parameters: 1.36%

#### Q4. Resources used (e.g., hardware, memory) during fine-tuning.

Peak Memory Usage (GB): 3.29

## Q5. Failure cases of the pre-trained model that were corrected by the fine-tuned model, as well as those that were not corrected. Provide possible explanations for both.

Hypothesis: Two sad men climbing on a wooden scaffold.  Label: 1  Pretrained Label: 0  Finetuned Label: 1
Premise: many children play in the water. Hypothesis: The children are playing mini golf. Label: 2 Pretrained Label: 0 Finetuned Label: 2
Premise: A group of people stand near and on a large black square on the ground with some yellow writing on it.  Hypothesis: a group of people wait Label: 1  Pretrained Label: 0  Finetuned Label: 1
Number of cases that were not corrected by the fine-tuned model: 5
Premise: Children bathe in water from large drums. Hypothesis: The kids are wet. Label: 0 Pretrained Label: 1 Finetuned Label: 1
Premise: A woman is standing near three stores, two have beautiful artwork and the other store has Largo written on it.  Hypothesis: A woman standing on a street corner outside beside three different stores, two of which contain beautiful artwork and one with a Largo sign.  Label: 0  Pretrained Label: 1  Finetuned Label: 1
Premise: An Ambulance is passing a man wearing a bandanna and girl. Hypothesis: The man in the bandana is running after the ambulance Label: 2 Pretrained Label: 1 Finetuned Label: 1
Premise: An older gentleman wearing a hat is walking on crutches next to a busy street. Hypothesis: A man with a walking stick is next to the street.  Label: 2  Pretrained Label: 1  Finetuned Label: 1

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Premise: Two middle-aged police officers watch over a parking lot, at night.

Hypothesis: The officers are actually security guards.

Label: 2

Pretrained Label: 0 Finetuned Label: 1

#### References:

https://dassum.medium.com/fine-tune-large-language-model-llm-on-a-custom-dataset-with-qlora-fb60abdeba07,

https://www.kaggle.com/code/hari31416/downloading-file-and-directory-from-kaggle

GITHUB repo link: