In [1]:

```
import os
from pathlib import Path

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import matplotlib.pyplot as plt

import torch
from torch.utils.data import DataLoader
from torch.nn.utils.rnn import pad_sequence
from torch import nn

from tqdm.auto import tqdm,trange

from transformers import AdamW


BATCH_SIZE = 64
```

In [2]:

```
!rm -rf PoS-Tagging
!git clone https://github.com/Janluke0/PoS-Tagging/
os.chdir('PoS-Tagging')
out_dir = Path('/kaggle/working/')
out_dir.mkdir(exist_ok=True)
```

```
Cloning into 'PoS-Tagging'...
remote: Enumerating objects: 77, done.
remote: Counting objects: 100% (77/77), done.
remote: Compressing objects: 100% (49/49), done.
remote: Total 77 (delta 27), reused 71 (delta 21), pack-reused 0
Unpacking objects: 100% (77/77), 658.28 KiB | 837.00 KiB/s, done.
```

In [3]:

```
from model.transformers.italian import ItELECTRACasedPos,ItELECTRAXXLCasedPos
from dataset import TWITADS
```

Common

this part should be adde to the repo, it's time to go lighting

In [4]:

```
def train_model(model, dl_train, dl_test, cuda=False, lr=0.001, epochs=10, show_plots=F
alse, save_dir=None):
    loss_function = nn.NLLLoss()
    optimizer = AdamW(model.parameters(), lr=lr,weight_decay=0.01)

    if cuda:
        model = model.cuda()
    if save_dir is not None:
        save_dir.mkdir(exist_ok=True)

    losses = []
    accuracies = []
    best_acc = 0
    best_loss = float('inf')
    pbar = trange(epochs)
    for epoch in pbar:
        model.train()
        for sample in tqdm(iter(dl_train), desc=f"Training {epoch}° epoch", leave=False
):
            x,m,y = sample['input_ids'],sample['attention_mask'], sample['labels']
            if cuda:
                x, m, y = x.cuda(), m.cuda(), y.cuda()
            optimizer.zero_grad()

            tag_scores =  model(input_ids=x,attention_mask=m)
            loss = loss_function(tag_scores.transpose(1, 2),y)

            loss.backward()
            optimizer.step()

        acc = []
        los = []
        ## evaluation
        model.eval()
        with torch.no_grad():
            for sample in tqdm(iter(dl_test), desc=f"Eval {epoch}° epoch", leave=False
):
                x,m,y = sample['input_ids'],sample['attention_mask'], sample['labels']
                if cuda:
                    x, m, y = x.cuda(), m.cuda(), y.cuda()

                tag_scores =  model(input_ids=x,attention_mask=m)
                if hasattr(tag_scores,'logits'):
                    tag_scores = tag_scores.logits

                loss = loss_function(tag_scores.transpose(1, 2),y)
                los.append(loss.cpu().item())

                acc.append(((tag_scores.argmax(2))==y)[m==1].float())

        acc = torch.cat(acc).mean().item()
        los = np.array(los).mean()

        losses.append(los)
        accuracies.append(acc)
        #show epoch results
        pbar.set_description(f"Loss:{los}\tAccurancy:{acc}")
        if show_plots:
            plt.subplot(121)
```

```
            plt.title("Test loss")
            plt.plot(losses)

            plt.subplot(122)
            plt.title("Test accuracy")
            plt.plot(accuracies)
        if save_dir is not None and acc >= best_acc:
            torch.save(model.state_dict(),save_dir/f"model_best_acc.pth")
        if save_dir is not None and loss <= best_loss:
            torch.save(model.state_dict(),save_dir/f"model_best_loss.pth")

        best_acc = max(acc,best_acc)
        best_loss = max(los,best_loss)

    return losses,accuracies

def show_pred(model, ds, i):
    REVTAG = {v:k for k,v in ds._TAGS.items()}
    model.cpu()
    sample = ds.collate([ds[i]])
    x,m,y = sample['input_ids'],sample['attention_mask'], sample['labels']
    with torch.no_grad():
        pred = model(input_ids=x,attention_mask=m)
    tkns = ds.tokenizer.convert_ids_to_tokens(x[0,1:-1])
    return list(zip(tkns,[REVTAG[v.item()] for v in pred[0].argmax(1)[1:-1]],[REVTAG[v.
item()] for v in y[0][1:-1]]))
```

In [5]:

```
def collate_fn(batch):
    input_ids, token_type_ids, attention_mask, labels = [[] for _ in range(4)]
    for sample in batch:
        input_ids.append(sample['input_ids'])
        token_type_ids.append(sample['token_type_ids'])
        attention_mask.append(sample['attention_mask'])
        labels.append(sample['labels'])
    return {
        'input_ids':pad_sequence(input_ids,batch_first=True),
        'token_type_ids': pad_sequence(token_type_ids,batch_first=True),
        'labels':pad_sequence(labels, padding_value=-100,batch_first=True),
        'attention_mask':pad_sequence(attention_mask,batch_first=True),
    }
```

In [6]:

```
def tokenize_and_align_labels(tokenizer, tokens, tags):
    tokens = list(tokens)
    tokenized_inputs = tokenizer(tokens, truncation=True, is_split_into_words=True)

    word_ids = tokenized_inputs.word_ids(batch_index=0)  # Map tokens to their respecti
ve word.
    previous_word_idx = None
    label_ids = []
    for word_idx in word_ids:                            # Set the special tokens to -1
00
        if word_idx is None:
            label_ids.append(-100)
        elif word_idx != previous_word_idx:              # Only label the first token o
f a given word.
            label_ids.append(tags[word_idx])

    tokenized_inputs["labels"] = label_ids

    return {k:torch.tensor(v) for k,v in tokenized_inputs.items()}
```

mc4 model

In [7]:

```
mc4_model = ItELECTRACasedPos(23)
```

Downloading: 100% 686/686 [00:00<00:00, 26.5kB/s]

Downloading: 100% 419M/419M [00:18<00:00, 24.8MB/s]

```
Some weights of the model checkpoint at dbmdz/electra-base-italian-mc4-cas
ed-discriminator were not used when initializing ElectraForTokenClassifica
tion: ['discriminator_predictions.dense.weight', 'discriminator_prediction
s.dense_prediction.weight', 'discriminator_predictions.dense_prediction.bi
as', 'discriminator_predictions.dense.bias']
- This IS expected if you are initializing ElectraForTokenClassification f
rom the checkpoint of a model trained on another task or with another arch
itecture (e.g. initializing a BertForSequenceClassification model from a B
ertForPreTraining model).
- This IS NOT expected if you are initializing ElectraForTokenClassificati
on from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a BertForSequence
Classification model).
Some weights of ElectraForTokenClassification were not initialized from th
e model checkpoint at dbmdz/electra-base-italian-mc4-cased-discriminator a
nd are newly initialized: ['classifier.weight', 'classifier.bias']
You should probably TRAIN this model on a down-stream task to be able to u
se it for predictions and inference.
```

In [8]:

```
tokenizer = ItELECTRACasedPos.tokenizer()
ds_train = TWITADS('resampled_train',
                   lambda w:[w],
                   transform=lambda a,b: tokenize_and_align_labels(tokenizer,a,b)
)
ds_val = TWITADS('resampled_validation',
                   lambda w:[w],
                   transform=lambda a,b: tokenize_and_align_labels(tokenizer,a,b)
)
```

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Downloading: 230k/230k [00:00<00:00, 320kB/s]

In [9]:

```
dl_train = DataLoader(ds_train, shuffle=True, batch_size=BATCH_SIZE, collate_fn=collate
_fn)
dl_val  = DataLoader(ds_val, shuffle=True, batch_size=BATCH_SIZE, collate_fn=collate_fn
)
```

In [10]:

```
torch.manual_seed(42)
train_model(mc4_model,dl_train,dl_val,cuda=torch.cuda.is_available(), lr=2e-5, epochs=4
0, show_plots=True, save_dir=out_dir/"mc4_model")
```

Loss:1.6618884563446046 Accurancy:0.9054461121559143: 100% 40/40 [23:13<00:00, 34.32s/it]

Training 0° epoch: 100% 91/91 [00:35<00:00, 3.16it/s]

Eval 0° epoch: 100% 10/10 [00:01<00:00, 7.38it/s]

Training 1° epoch: 100% 91/91 [00:32<00:00, 3.40it/s]

Eval 1° epoch: 100% 10/10 [00:01<00:00, 9.28it/s]

Training 2° epoch: 100% 91/91 [00:32<00:00, 3.18it/s]

Eval 2° epoch: 90% 9/10 [00:01<00:00, 8.38it/s]

Training 3° epoch: 100% 91/91 [00:32<00:00, 3.66it/s]

Eval 3° epoch: 90% 9/10 [00:01<00:00, 8.31it/s]

Training 4° epoch: 100% 91/91 [00:32<00:00, 3.42it/s]

Eval 4° epoch: 100% 10/10 [00:01<00:00, 8.72it/s]

Training 5° epoch: 100% 91/91 [00:32<00:00, 3.34it/s]

Eval 5° epoch: 90% 9/10 [00:01<00:00, 9.05it/s]

Training 6° epoch: 100% 91/91 [00:32<00:00, 3.47it/s]

Eval 6° epoch: 90% 9/10 [00:01<00:00, 8.87it/s]

Training 7° epoch: 100% 91/91 [00:32<00:00, 3.05it/s]

Eval 7° epoch: 100% 10/10 [00:01<00:00, 9.07it/s]

Training 8° epoch: 100% 91/91 [00:32<00:00, 3.61it/s]

Eval 8° epoch: 90% 9/10 [00:01<00:00, 8.67it/s]

Training 9° epoch: 100% 91/91 [00:32<00:00, 3.36it/s]

Eval 9° epoch: 90% 9/10 [00:01<00:00, 8.77it/s]

Training 10° epoch: 100% 91/91 [00:32<00:00, 3.15it/s]

Eval 10° epoch: 100% 10/10 [00:01<00:00, 8.94it/s]

Training 11° epoch: 100% 91/91 [00:32<00:00, 3.26it/s]

Eval 11° epoch: 100% 10/10 [00:01<00:00, 8.84it/s]

Training 12° epoch: 100% 91/91 [00:31<00:00, 3.25it/s]

Eval 12° epoch: 100% 10/10 [00:01<00:00, 8.53it/s]

Training 13° epoch: 100% 91/91 [00:31<00:00, 2.92it/s]

Eval 13° epoch: 100% 10/10 [00:01<00:00, 8.87it/s]

Training 14° epoch: 100% 91/91 [00:32<00:00, 3.12it/s]

Eval 14° epoch: 100% 10/10 [00:01<00:00, 8.84it/s]

Training 15° epoch: 100% 91/91 [00:31<00:00, 3.34it/s]

Eval 15° epoch: 100% 10/10 [00:01<00:00, 8.92it/s]

Training 16° epoch: 100% 91/91 [00:32<00:00, 3.46it/s]

Eval 16° epoch: 90% 9/10 [00:01<00:00, 8.86it/s]

Training 17° epoch: 100% 91/91 [00:32<00:00, 3.34it/s]

Eval 17° epoch: 90% 9/10 [00:01<00:00, 8.39it/s]

Training 18° epoch: 100% 91/91 [00:32<00:00, 3.30it/s]

Eval 18° epoch: 90% 9/10 [00:01<00:00, 8.68it/s]

Training 19° epoch: 100% 91/91 [00:32<00:00, 3.15it/s]

Eval 19° epoch: 100% 10/10 [00:01<00:00, 8.98it/s]

Training 20° epoch: 100% 91/91 [00:31<00:00, 3.20it/s]

Eval 20° epoch: 100% 10/10 [00:01<00:00, 8.81it/s]

Training 21° epoch: 100% 91/91 [00:32<00:00, 3.07it/s]

Eval 21° epoch: 100% 10/10 [00:01<00:00, 8.45it/s]

Training 22° epoch: 100% 91/91 [00:32<00:00, 3.17it/s]

Eval 22° epoch: 90% 9/10 [00:01<00:00, 8.57it/s]

Training 23° epoch: 100% 91/91 [00:31<00:00, 3.08it/s]

Eval 23° epoch: 100% 10/10 [00:01<00:00, 8.82it/s]

Training 24° epoch: 100% 91/91 [00:32<00:00, 3.25it/s]

Eval 24° epoch: 100% 10/10 [00:01<00:00, 9.15it/s]

Training 25° epoch: 100% 91/91 [00:32<00:00, 3.11it/s]

Eval 25° epoch: 100% 10/10 [00:01<00:00, 9.10it/s]

Training 26° epoch: 100% 91/91 [00:32<00:00, 3.42it/s]

Eval 26° epoch: 100% 10/10 [00:01<00:00, 9.30it/s]

Training 27° epoch: 100% 91/91 [00:32<00:00, 3.38it/s]

Eval 27° epoch: 100% 10/10 [00:01<00:00, 9.32it/s]

Training 28° epoch: 100% 91/91 [00:31<00:00, 3.54it/s]

Eval 28° epoch: 100% 10/10 [00:01<00:00, 8.79it/s]

Training 29° epoch: 100% 91/91 [00:32<00:00, 3.29it/s]

Eval 29° epoch: 90% 9/10 [00:01<00:00, 8.80it/s]

Training 30° epoch: 100% 91/91 [00:31<00:00, 3.30it/s]

Eval 30° epoch: 100% 10/10 [00:01<00:00, 9.14it/s]

Training 31° epoch: 100% 91/91 [00:31<00:00, 3.21it/s]

Eval 31° epoch: 90% 9/10 [00:01<00:00, 8.47it/s]

Training 32° epoch: 100% 91/91 [00:31<00:00, 3.50it/s]

Eval 32° epoch: 100% 10/10 [00:01<00:00, 8.88it/s]

Training 33° epoch: 100% 91/91 [00:32<00:00, 3.27it/s]

Eval 33° epoch: 90% 9/10 [00:01<00:00, 8.72it/s]

Training 34° epoch: 100% 91/91 [00:32<00:00, 3.31it/s]

Eval 34° epoch: 100% 10/10 [00:01<00:00, 8.98it/s]

Training 35° epoch: 100% 91/91 [00:31<00:00, 3.29it/s]

Eval 35° epoch: 100% 10/10 [00:01<00:00, 8.97it/s]

Training 36° epoch: 100% 91/91 [00:32<00:00, 3.27it/s]

Eval 36° epoch: 90% 9/10 [00:01<00:00, 8.60it/s]

Training 37° epoch: 100% 91/91 [00:32<00:00, 3.35it/s]

Eval 37° epoch: 100% 10/10 [00:01<00:00, 9.01it/s]

Training 38° epoch: 100% 91/91 [00:31<00:00, 3.14it/s]

Eval 38° epoch: 100% 10/10 [00:01<00:00, 9.30it/s]

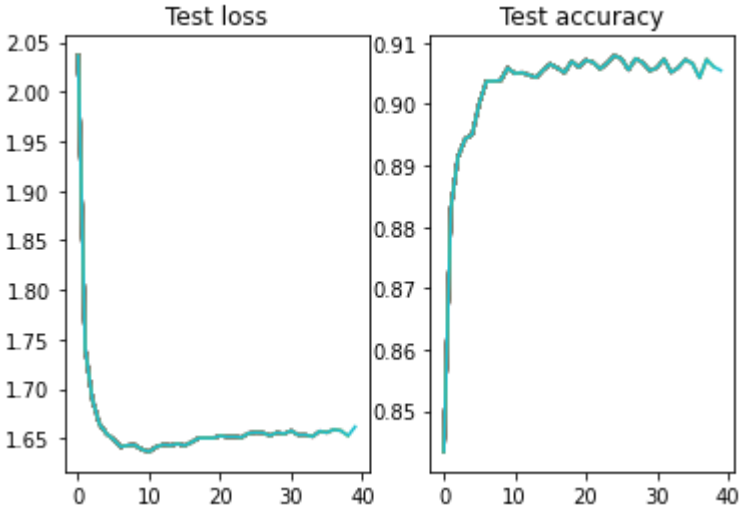
Training 39° epoch: 100% 91/91 [00:32<00:00, 3.19it/s]

Eval 39° epoch: 100% 10/10 [00:01<00:00, 8.77it/s]

Out[10]:

```
([2.03640501499176,
  1.7408401489257812,
  1.6898200631141662,
  1.664677894115448,
  1.6550066471099854,
  1.6488304495811463,
  1.641623079776764,
  1.6431013941764832,
  1.643381667137146,
  1.6387795448303222,
  1.63668555021286,
  1.6415698170661925,
  1.6437358736991883,
  1.6430535554885863,
  1.6445921182632446,
  1.6428797125816346,
  1.6463431239128112,
  1.6504170298576355,
  1.6505876898765564,
  1.650406789779663,
  1.6526689291000367,
  1.6517019391059875,
  1.6518890380859375,
  1.6510832071304322,
  1.655223000049591,
  1.6560324430465698,
  1.6557697892189025,
  1.6530117630958556,
  1.6559265017509461,
  1.6547646045684814,
  1.657817280292511,
  1.653559148311615,
  1.653713059425354,
  1.6519393086433412,
  1.6572758078575134,
  1.6560091733932496,
  1.6590068221092225,
  1.6578777313232422,
  1.6527382850646972,
  1.6618884563446046],
 [0.8433812260627747,
  0.8830790519714355,
  0.8913741111755371,
  0.8942872881889343,
  0.8950278759002686,
  0.900113582611084,
  0.9036685824394226,
  0.9037179946899414,
  0.9038166999816895,
  0.9058411121368408,
  0.904952347278595,
  0.9051004648208618,
  0.9047054648399353,
  0.9043104648590088,
  0.9055448770523071,
  0.906482994556427,
  0.9058411121368408,
  0.9051004648208618,
  0.9069273471832275,
```

```
0.9059892296791077,
0.9071248769760132,
0.9067792296409607,
0.905692994594574,
0.9066311120986938,
0.9078655242919922,
0.9073717594146729,
0.9055448770523071,
0.9073717594146729,
0.9067298769950867,
0.9053967595100403,
0.9058904647827148,
0.907322347164154,
0.9051498770713806,
0.9058904647827148,
0.907223641872406,
0.9065817594528198,
0.9042611122131348,
0.907223641872406,
0.9060386419296265,
0.9054461121559143])
```



Uncased model

In [11]:

```
xxl_model =ItELECTRAXXLCasedPos(23)
```

Downloading: 467/467 [00:00<00:00, 18.0kB/s]

Downloading: 419M/419M [00:18<00:00, 24.8MB/s]

```
Some weights of the model checkpoint at dbmdz/electra-base-italian-xxl-cas
ed-discriminator were not used when initializing ElectraForTokenClassifica
tion: ['discriminator_predictions.dense.weight', 'discriminator_prediction
s.dense_prediction.weight', 'discriminator_predictions.dense_prediction.bi
as', 'discriminator_predictions.dense.bias']
- This IS expected if you are initializing ElectraForTokenClassification f
rom the checkpoint of a model trained on another task or with another arch
itecture (e.g. initializing a BertForSequenceClassification model from a B
ertForPreTraining model).
- This IS NOT expected if you are initializing ElectraForTokenClassificati
on from the checkpoint of a model that you expect to be exactly identical
(initializing a BertForSequenceClassification model from a BertForSequence
Classification model).
Some weights of ElectraForTokenClassification were not initialized from th
e model checkpoint at dbmdz/electra-base-italian-xxl-cased-discriminator a
nd are newly initialized: ['classifier.weight', 'classifier.bias']
You should probably TRAIN this model on a down-stream task to be able to u
se it for predictions and inference.
```

In [12]:

```
tokenizer = ItELECTRAXXLCasedPos.tokenizer()
ds_train = TWITADS('resampled_train',
                   lambda w:[w],
                   transform=lambda a,b: tokenize_and_align_labels(tokenizer,a,b)
)
ds_val = TWITADS('resampled_validation',
                   lambda w:[w],
                   transform=lambda a,b: tokenize_and_align_labels(tokenizer,a,b)
)
```

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Downloading: 230k/230k [00:00<00:00, 329kB/s]

In [13]:

```
dl_train = DataLoader(ds_train, shuffle=True, batch_size=BATCH_SIZE, collate_fn=collate
_fn)
dl_val  = DataLoader(ds_val, shuffle=True, batch_size=BATCH_SIZE, collate_fn=collate_fn
)
```

In [14]:

```
torch.manual_seed(42)
train_model(xxl_model,dl_train,dl_val,cuda=torch.cuda.is_available(), lr=2e-5, epochs=4
0, show_plots=True,save_dir=out_dir/"xxl_model")
```

Loss:1.6585968017578125 Accurancy:0.9071742296218872: 100% 40/40 [23:08<00:00, 34.28s/it]

Training 0° epoch: 100% 91/91 [00:34<00:00, 3.15it/s]

Eval 0° epoch: 100% 10/10 [00:01<00:00, 7.09it/s]

Training 1° epoch: 100% 91/91 [00:32<00:00, 3.36it/s]

Eval 1° epoch: 100% 10/10 [00:01<00:00, 9.28it/s]

Training 2° epoch: 100% 91/91 [00:32<00:00, 3.15it/s]

Eval 2° epoch: 90% 9/10 [00:01<00:00, 8.39it/s]

Training 3° epoch: 100% 91/91 [00:32<00:00, 3.64it/s]

Eval 3° epoch: 90% 9/10 [00:01<00:00, 8.30it/s]

Training 4° epoch: 100% 91/91 [00:32<00:00, 3.41it/s]

Eval 4° epoch: 100% 10/10 [00:01<00:00, 9.04it/s]

Training 5° epoch: 100% 91/91 [00:32<00:00, 3.37it/s]

Eval 5° epoch: 90% 9/10 [00:01<00:00, 9.01it/s]

Training 6° epoch: 100% 91/91 [00:32<00:00, 3.46it/s]

Eval 6° epoch: 90% 9/10 [00:01<00:00, 9.08it/s]

Training 7° epoch: 100% 91/91 [00:32<00:00, 3.03it/s]

Eval 7° epoch: 100% 10/10 [00:01<00:00, 9.03it/s]

Training 8° epoch: 100% 91/91 [00:32<00:00, 3.62it/s]

Eval 8° epoch: 90% 9/10 [00:01<00:00, 8.59it/s]

Training 9° epoch: 100% 91/91 [00:32<00:00, 3.35it/s]

Eval 9° epoch: 90% 9/10 [00:01<00:00, 8.75it/s]

Training 10° epoch: 100% 91/91 [00:32<00:00, 3.15it/s]

Eval 10° epoch: 100% 10/10 [00:01<00:00, 8.95it/s]

Training 11° epoch: 100% 91/91 [00:32<00:00, 3.28it/s]

Eval 11° epoch: 100% 10/10 [00:01<00:00, 8.96it/s]

Training 12° epoch: 100% 91/91 [00:31<00:00, 3.25it/s]

Eval 12° epoch: 100% 10/10 [00:01<00:00, 8.49it/s]

Training 13° epoch: 100% 91/91 [00:31<00:00, 2.92it/s]

Eval 13° epoch: 100% 10/10 [00:01<00:00, 8.86it/s]

Training 14° epoch: 100% 91/91 [00:32<00:00, 3.13it/s]

Eval 14° epoch: 100% 10/10 [00:01<00:00, 8.83it/s]

Training 15° epoch: 100% 91/91 [00:31<00:00, 3.33it/s]

Eval 15° epoch: 100% 10/10 [00:01<00:00, 8.95it/s]

Training 16° epoch: 100% 91/91 [00:32<00:00, 3.37it/s]

Eval 16° epoch: 90% 9/10 [00:01<00:00, 8.87it/s]

Training 17° epoch: 100% 91/91 [00:32<00:00, 3.32it/s]

Eval 17° epoch: 90% 9/10 [00:01<00:00, 8.40it/s]

Training 18° epoch: 100% 91/91 [00:32<00:00, 3.30it/s]

Eval 18° epoch: 90% 9/10 [00:01<00:00, 8.64it/s]

Training 19° epoch: 100% 91/91 [00:32<00:00, 3.16it/s]

Eval 19° epoch: 100% 10/10 [00:01<00:00, 8.96it/s]

Training 20° epoch: 100% 91/91 [00:32<00:00, 3.20it/s]

Eval 20° epoch: 100% 10/10 [00:01<00:00, 8.91it/s]

Training 21° epoch: 100% 91/91 [00:32<00:00, 3.07it/s]

Eval 21° epoch: 100% 10/10 [00:01<00:00, 8.65it/s]

Training 22° epoch: 100% 91/91 [00:32<00:00, 3.25it/s]

Eval 22° epoch: 90% 9/10 [00:01<00:00, 8.56it/s]

Training 23° epoch: 100% 91/91 [00:32<00:00, 3.13it/s]

Eval 23° epoch: 100% 10/10 [00:01<00:00, 8.78it/s]

Training 24° epoch: 100% 91/91 [00:32<00:00, 3.25it/s]

Eval 24° epoch: 100% 10/10 [00:01<00:00, 9.07it/s]

Training 25° epoch: 100% 91/91 [00:32<00:00, 3.11it/s]

Eval 25° epoch: 100% 10/10 [00:01<00:00, 9.07it/s]

Training 26° epoch: 100% 91/91 [00:32<00:00, 3.37it/s]

Eval 26° epoch: 100% 10/10 [00:01<00:00, 9.28it/s]

Training 27° epoch: 100% 91/91 [00:32<00:00, 3.36it/s]

Eval 27° epoch: 100% 10/10 [00:01<00:00, 9.26it/s]

Training 28° epoch: 100% 91/91 [00:32<00:00, 3.51it/s]

Eval 28° epoch: 100% 10/10 [00:01<00:00, 8.70it/s]

Training 29° epoch: 100% 91/91 [00:32<00:00, 3.28it/s]

Eval 29° epoch: 90% 9/10 [00:01<00:00, 8.84it/s]

Training 30° epoch: 100% 91/91 [00:32<00:00, 3.30it/s]

Eval 30° epoch: 100% 10/10 [00:01<00:00, 9.14it/s]

Training 31° epoch: 100% 91/91 [00:31<00:00, 3.22it/s]

Eval 31° epoch: 90% 9/10 [00:01<00:00, 8.62it/s]

Training 32° epoch: 100% 91/91 [00:31<00:00, 3.56it/s]

Eval 32° epoch: 100% 10/10 [00:01<00:00, 8.90it/s]

Training 33° epoch: 100% 91/91 [00:32<00:00, 3.28it/s]

Eval 33° epoch: 90% 9/10 [00:01<00:00, 8.67it/s]

Training 34° epoch: 100% 91/91 [00:32<00:00, 3.31it/s]

Eval 34° epoch: 100% 10/10 [00:01<00:00, 8.48it/s]

Training 35° epoch: 100% 91/91 [00:32<00:00, 3.12it/s]

Eval 35° epoch: 100% 10/10 [00:01<00:00, 8.82it/s]

Training 36° epoch: 100% 91/91 [00:32<00:00, 3.22it/s]

Eval 36° epoch: 90% 9/10 [00:01<00:00, 8.69it/s]

Training 37° epoch: 100% 91/91 [00:32<00:00, 3.34it/s]

Eval 37° epoch: 100% 10/10 [00:01<00:00, 9.01it/s]

Training 38° epoch: 100% 91/91 [00:32<00:00, 3.12it/s]

Eval 38° epoch: 100% 10/10 [00:01<00:00, 9.28it/s]

Training 39° epoch: 100% 91/91 [00:32<00:00, 3.19it/s]

Eval 39° epoch: 90% 9/10 [00:01<00:00, 8.53it/s]

Out[14]:

```
([1.8941421389579773,
  1.697704815864563,
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  1.635600733757019,
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  1.6401451706886292,
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  1.6433884739875793,
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  1.645556092262268,
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  1.6501785159111022,
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  1.6511274218559264,
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  0.8928554058074951,
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  0.8976941704750061,
  0.900162935256958,
  0.9028292298316956,
  0.9036192297935486,
  0.9029773473739624,
  0.9046561121940613,
  0.9048535823822021,
  0.9020885825157166,
  0.904211699962616,
  0.9036685824394226,
  0.9054461121559143,
  0.9063842296600342,
  0.9054461121559143,
  0.906433641910553,
```
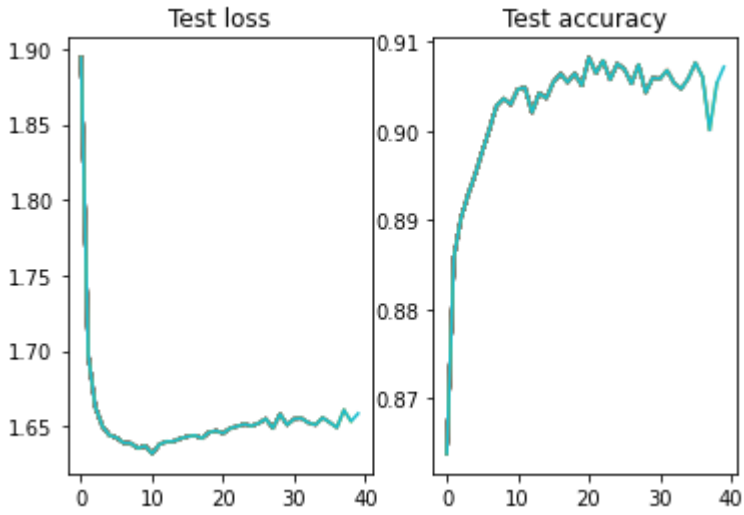

```
 0.9051004648208618,
 0.9082111120223999,
 0.906482994556427,
 0.9078655242919922,
 0.905742347240448,
 0.9075198769569397,
 0.9069273471832275,
 0.9052979946136475,
 0.9074211120605469,
 0.9043104648590088,
 0.9059398770332336,
 0.9058411121368408,
 0.9067792296409607,
 0.9053473472595215,
 0.9047054648399353,
 0.9058904647827148,
 0.9076186418533325,
 0.9060386419296265,
 0.900113582611084,
 0.9053473472595215,
 0.9071742296218872])
```



In [15]:

```
#remove repo from saved output
!rm -rf /kagle/working/PoS-Tagging
```

```
huggingface/tokenizers: The current process just got forked, after paralle
lism has already been used. Disabling parallelism to avoid deadlocks...
To disable this warning, you can either:
        - Avoid using `tokenizers` before the fork if possible
        - Explicitly set the environment variable TOKENIZERS_PARALLELISM=
(true | false)
```