```
1 # Replace the average pooling with max-pooling.
```

```
1    import torch
2    !pip install d2l==1.0.0a0
```

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Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.8/dist-packages (from matplotlib->d2l==1.0.0a0) (2.8.
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Successfully installed d2l-1.0.0a0 jedi-0.18.2 jupyter-1.0.0 qtconsole-5.4.0 qtpy-2.3.0
```

```
1 !pip install matplotlib
2 %matplotlib inline
3 !pip install matplotlib-inline
4 import sys
5 !{sys.executable} -m pip install matplotlib
```

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Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: matplotlib in /usr/local/lib/python3.8/dist-packages (3.2.2)
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Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting matplotlib-inline
  Downloading matplotlib_inline-0.1.6-py3-none-any.whl (9.4 kB)
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Requirement already satisfied: traitlets in /usr/local/lib/python3.8/dist-packages (from matplotlib-inline) (5.7.1)
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Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.8/dist-packages (from python-dateutil>=2.1->matplotlib) (1.15.0)
```

```python
1  import time
2  import numpy as np
3  import torch
4  import torchvision
5  from torchvision import transforms
6  from torch import nn
7  from d2l import torch as d2l
8  from torch.optim import lr_scheduler
```

```python
1  def LeNet(num_classes=10):
2      net = nn.Sequential(nn.LazyConv2d(6, kernel_size=5, padding=2),
3              nn.Sigmoid(),
4              nn.MaxPool2d(kernel_size=2, stride=2),
5              nn.LazyConv2d(16, kernel_size=5),
6              nn.Sigmoid(),
7              nn.MaxPool2d(kernel_size=2, stride=2),
8              nn.Flatten(),
9              nn.Linear(400, 120),
10             nn.Sigmoid(),
11             nn.Linear(120, 84),
12             nn.Sigmoid(),
13             nn.Linear(84, num_classes))
14     return net
```

```python
1 def train(model, train_loader, test_loader, num_epochs, loss_fn, trainer):
2
3     animator = d2l.Animator(xlabel='epoch', xlim=[0, num_epochs], legend=['train loss', 'train accuracy', 'test accuracy'])
4     for epoch in range(num_epochs):
5         metric = d2l.Accumulator(3)
6         for i, (X, y) in enumerate(train_loader):
7             net.train()
8             trainer.zero_grad()
9             y_hat = net(X)
10            l = loss_fn(y_hat, y)
11            l.backward()
12            trainer.step()
13            with torch.no_grad():
14                metric.add(l * X.shape[0], d2l.accuracy(y_hat, y), X.shape[0])
15            train_loss = metric[0] / metric[2]
16            train_acc = metric[1] / metric[2]
17            if (i + 1) % 50 == 0:
18                animator.add(epoch + i / len(train_loader),
19                            (train_loss, train_acc, None))
20
21        test_acc = d2l.evaluate_accuracy_gpu(model, test_loader)
22        animator.add(epoch+1, (None, None, test_acc))
23
24    print(f'train loss {train_loss:.3f}, train accuracy {train_acc:.3f}, 'f'test accuracy {test_acc:.3f}')
```

```python
1 loss = nn.CrossEntropyLoss()
2 batch_size = 256
3 num_epochs = 10
4 lr=0.01
```

```python
1 train_loader, test_loader = d2l.load_data_fashion_mnist(batch_size=batch_size)
2 net= LeNet(num_classes=10)
3 trainer = torch.optim.Adam(net.parameters(), lr=lr)
```

```
1 train(net, train_loader, test_loader, num_epochs, loss, trainer)
```

train loss 0.230, train accuracy 0.913, test accuracy 0.895