In [1]:
```
# -*- coding: utf-8 -*-
import random
import torch
from torch.autograd import Variable


class DynamicNet(torch.nn.Module):
    def __init__(self, D_in, H, D_out):
        """
        In the constructor we construct three nn.Linear instances that we
will use
        in the forward pass.
        """
        super(DynamicNet, self).__init__()
        self.input_linear = torch.nn.Linear(D_in, H)
        self.middle_linear = torch.nn.Linear(H, H)
        self.output_linear = torch.nn.Linear(H, D_out)

    def forward(self, x):
        """
        For the forward pass of the model, we randomly choose either 0, 1,
 2, or 3
        and reuse the middle_linear Module that many times to compute hidd
en layer
        representations.

        Since each forward pass builds a dynamic computation graph, we can
 use normal
        Python control-flow operators like loops or conditional statements
 when
        defining the forward pass of the model.

        Here we also see that it is perfectly safe to reuse the same Modul
e many
        times when defining a computational graph. This is a big improveme
nt from Lua
        Torch, where each Module could be used only once.
        """
        h_relu = self.input_linear(x).clamp(min=0)
        for _ in range(random.randint(0, 3)):
            h_relu = self.middle_linear(h_relu).clamp(min=0)
        y_pred = self.output_linear(h_relu)
        return y_pred


# N is batch size; D_in is input dimension;
# H is hidden dimension; D_out is output dimension.
N, D_in, H, D_out = 64, 1000, 100, 10

# Create random Tensors to hold inputs and outputs, and wrap them in Varia
bles
x = Variable(torch.randn(N, D_in))
y = Variable(torch.randn(N, D_out), requires_grad=False)
```

```
# Construct our model by instantiating the class defined above
model = DynamicNet(D_in, H, D_out)

# Construct our loss function and an Optimizer. Training this strange mode
l with
# vanilla stochastic gradient descent is tough, so we use momentum
criterion = torch.nn.MSELoss(size_average=False)
optimizer = torch.optim.SGD(model.parameters(), lr=1e-4, momentum=0.9)
for t in range(500):
    # Forward pass: Compute predicted y by passing x to the model
    y_pred = model(x)

    # Compute and print loss
    loss = criterion(y_pred, y)
    print(t, loss.data[0])

    # Zero gradients, perform a backward pass, and update the weights.
    optimizer.zero_grad()
    loss.backward()
    optimizer.step()
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