Date of the Session:__/__/___ **Time of the Session:___to_____**

SKILLING-6:

Implement Random -mini-batch evaluations for the above program 2-class classification neural network with two hidden layers .

```
import torch
import torch.nn as nn
import torch.optim as optim
from torch.utils.data import DataLoader, TensorDataset

X = torch.randn(1000, 2)
y = (X[:, 0] + X[:, 1] > 0).long()
data_loader = DataLoader(TensorDataset(X, y), batch_size=32, shuffle=True)

class TwoLayerNN(nn.Module):
   def __init__(self):
      super().__init__()
      self.model = nn.Sequential(
         nn.Linear(2, 16), nn.ReLU(),
         nn.Linear(16, 8), nn.ReLU(),
         nn.Linear(8, 2)
      )


   def forward(self, x): return self.model(x)

model, loss_fn, optimizer = TwoLayerNN(), nn.CrossEntropyLoss(),
optim.Adam(TwoLayerNN().parameters(), lr=0.01)



for epoch in range(10):
   for i, (batch_X, batch_y) in enumerate(data_loader):
      optimizer.zero_grad()
      loss = loss_fn(model(batch_X), batch_y)
      loss.backward()
      optimizer.step()
```

```
        if i % 10 == 0:
            acc = (model(batch_X).argmax(dim=1) == batch_y).float().mean()
            print(f"Epoch [{epoch+1}/10], Step [{i+1}], Loss: {loss:.4f}, Acc: {acc:.4f}")

print("Training complete!")
```

Output:

```
Epoch [1/10], Step [1/32], Loss: 0.6902, Accuracy: 0.5312
Epoch [1/10], Step [11/32], Loss: 0.5835, Accuracy: 0.6875
Epoch [1/10], Step [21/32], Loss: 0.3743, Accuracy: 0.9062
Epoch [1/10], Step [31/32], Loss: 0.2152, Accuracy: 1.0000
Epoch [2/10], Step [1/32], Loss: 0.1239, Accuracy: 1.0000
Epoch [2/10], Step [11/32], Loss: 0.0637, Accuracy: 0.9688
Epoch [2/10], Step [21/32], Loss: 0.0658, Accuracy: 0.9688
Epoch [2/10], Step [31/32], Loss: 0.0466, Accuracy: 0.9688
Epoch [3/10], Step [1/32], Loss: 0.0453, Accuracy: 0.9688
Epoch [3/10], Step [11/32], Loss: 0.0045, Accuracy: 1.0000
Epoch [3/10], Step [21/32], Loss: 0.0258, Accuracy: 1.0000
Epoch [3/10], Step [31/32], Loss: 0.0744, Accuracy: 0.9375
Epoch [4/10], Step [1/32], Loss: 0.0053, Accuracy: 1.0000
Epoch [4/10], Step [11/32], Loss: 0.0261, Accuracy: 1.0000
Epoch [4/10], Step [21/32], Loss: 0.0801, Accuracy: 0.9062
Epoch [4/10], Step [31/32], Loss: 0.0260, Accuracy: 1.0000
Epoch [5/10], Step [1/32], Loss: 0.0193, Accuracy: 1.0000
Epoch [5/10], Step [11/32], Loss: 0.0128, Accuracy: 1.0000
Epoch [5/10], Step [21/32], Loss: 0.0099, Accuracy: 1.0000
Epoch [5/10], Step [31/32], Loss: 0.0137, Accuracy: 1.0000
Epoch [6/10], Step [1/32], Loss: 0.0177, Accuracy: 1.0000
Epoch [6/10], Step [11/32], Loss: 0.0006, Accuracy: 1.0000
Epoch [6/10], Step [21/32], Loss: 0.0205, Accuracy: 1.0000
Epoch [6/10], Step [31/32], Loss: 0.0199, Accuracy: 1.0000
Epoch [7/10], Step [1/32], Loss: 0.0009, Accuracy: 1.0000
Epoch [7/10], Step [11/32], Loss: 0.0207, Accuracy: 1.0000
Epoch [7/10], Step [21/32], Loss: 0.0109, Accuracy: 1.0000
Epoch [7/10], Step [31/32], Loss: 0.0086, Accuracy: 1.0000
Epoch [8/10], Step [1/32], Loss: 0.0003, Accuracy: 1.0000
Epoch [8/10], Step [11/32], Loss: 0.0005, Accuracy: 1.0000
```

```
Epoch [8/10], Step [21/32], Loss: 0.0279, Accuracy: 0.9688
Epoch [8/10], Step [31/32], Loss: 0.0169, Accuracy: 1.0000
Epoch [9/10], Step [1/32], Loss: 0.0201, Accuracy: 1.0000
Epoch [9/10], Step [11/32], Loss: 0.0004, Accuracy: 1.0000
Epoch [9/10], Step [21/32], Loss: 0.0013, Accuracy: 1.0000
Epoch [9/10], Step [31/32], Loss: 0.0212, Accuracy: 1.0000
Epoch [10/10], Step [1/32], Loss: 0.0095, Accuracy: 1.0000
Epoch [10/10], Step [11/32], Loss: 0.0003, Accuracy: 1.0000
Epoch [10/10], Step [21/32], Loss: 0.0329, Accuracy: 0.9688
Epoch [10/10], Step [31/32], Loss: 0.0003, Accuracy: 1.0000
Training complete!
```

Comment of the Evaluator (if Any)	Evaluator's Observation MarksSecured:_____outof_____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation: