

# ECE 285 final project notebook

May 26, 2024

## 1 Importing necessary libraries

```
[1]: # !unzip 'data.zip'
```

```
[2]: import numpy as np
import pandas as pd
import os
import pickle

import time
import matplotlib.pyplot as plt
import numpy as np
import torchvision.utils as vutils
from scipy import linalg
from torchvision import transforms, models

%matplotlib inline
import argparse
import random
import torch
import torch.nn as nn
import torch.nn.parallel
import torch.optim as optim
import torch.utils.data
import torchvision.datasets as dset
import torchvision.transforms as transforms
import torchvision.utils as vutils
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.animation as animation
from IPython.display import HTML
from torchvision import models
from scipy.stats import entropy
# from torchmetrics.image.fid import FrechetInceptionDistance
```

## 2 Directory to save models and losses

```
[3]: os.makedirs('diffusion_losses', exist_ok=True)
os.makedirs('diffusion_models', exist_ok=True)
os.makedirs('dc_gans_losses', exist_ok=True)
os.makedirs('dc_gans_models', exist_ok=True)
os.makedirs('best_models', exist_ok=True)
```

## 3 Setting a manual seed for reproducibility and other Hyper parameters

```
[4]: manualSeed = 999
print("Random Seed: ", manualSeed)
random.seed(manualSeed)
torch.manual_seed(manualSeed)
torch.use_deterministic_algorithms(True) # Needed for reproducible results
dataroot = "Covid19-dataset"
workers = 2
batch_size = 128
image_size = 64
nc = 3
nz = 100
ngf = 64
ndf = 64
num_epochs = 100
ngpu = 1
```

Random Seed: 999

## 4 Data Loading and Set up

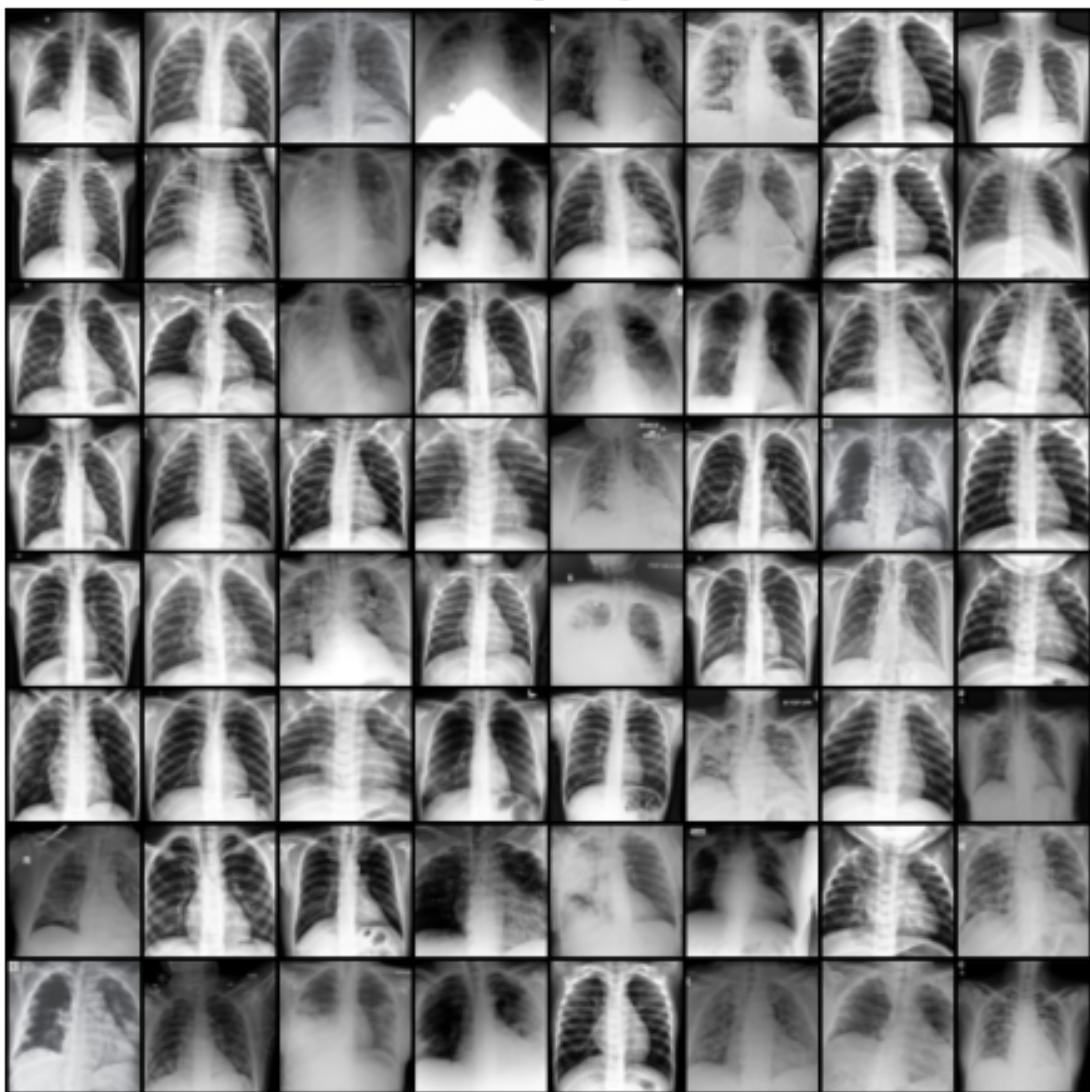
```
[5]: dataset = dset.ImageFolder(root=dataroot,
                               transform=transforms.Compose([
                                   transforms.Resize(image_size),
                                   transforms.CenterCrop(image_size),
                                   transforms.ToTensor(),
                                   transforms.Normalize((0.5, 0.5, 0.5), (0.5, 0.5,
                                         0.5)),
                               ]))
dataloader = torch.utils.data.DataLoader(dataset, batch_size=batch_size,
                                         shuffle=True, num_workers=workers)

device = torch.device("cuda:0" if (torch.cuda.is_available() and ngpu > 0) else
                     "cpu")
```

```
print("device", device)
# Visualization of training images
real_batch = next(iter(dataloader))
plt.figure(figsize=(8,8))
plt.axis("off")
plt.title("Training Images")
plt.imshow(np.transpose(vutils.make_grid(real_batch[0].to(device) [:64],  
    padding=2, normalize=True).cpu(),(1,2,0)))
plt.show()
```

device cuda:0

Training Images



## 5 Initialize weights

```
[6]: def weights_init(m):
    classname = m.__class__.__name__
    if classname.find('Conv') != -1:
        nn.init.normal_(m.weight.data, 0.0, 0.02)
    elif classname.find('BatchNorm') != -1:
        nn.init.normal_(m.weight.data, 1.0, 0.02)
        nn.init.constant_(m.bias.data, 0)
```

## 6 Define ResidualBlock and UNet

```
[7]: class ResidualBlock(nn.Module):
    def __init__(self, in_channels):
        super(ResidualBlock, self).__init__()
        self.conv1 = nn.Conv2d(in_channels, in_channels, kernel_size=3, padding=1)
        self.bn1 = nn.BatchNorm2d(in_channels)
        self.relu = nn.ReLU(inplace=True)
        self.conv2 = nn.Conv2d(in_channels, in_channels, kernel_size=3, padding=1)
        self.bn2 = nn.BatchNorm2d(in_channels)

    def forward(self, x):
        residual = x
        out = self.conv1(x)
        out = self.bn1(out)
        out = self.relu(out)
        out = self.conv2(out)
        out = self.bn2(out)
        out += residual
        out = self.relu(out)
        return out

class UNet(nn.Module):
    def __init__(self):
        super(UNet, self).__init__()
        self.enc1 = self.encoder_block(nc, ngf)
        self.enc2 = self.encoder_block(ngf, ngf * 2)
        self.enc3 = self.encoder_block(ngf * 2, ngf * 4)
        self.enc4 = self.encoder_block(ngf * 4, ngf * 8)

        self.res = ResidualBlock(ngf * 8)

        self.dec1 = self.decoder_block(ngf * 8, ngf * 4)
```

```

        self.dec2 = self.decoder_block(ngf * 4, ngf * 2)
        self.dec3 = self.decoder_block(ngf * 2, ngf)
        self.dec4 = nn.ConvTranspose2d(ngf, nc, kernel_size=4, stride=2, □
    ↪padding=1)

    def encoder_block(self, in_channels, out_channels):
        return nn.Sequential(
            nn.Conv2d(in_channels, out_channels, kernel_size=4, stride=2, □
    ↪padding=1),
            nn.BatchNorm2d(out_channels),
            nn.LeakyReLU(0.2, inplace=True)
        )

    def decoder_block(self, in_channels, out_channels):
        return nn.Sequential(
            nn.ConvTranspose2d(in_channels, out_channels, kernel_size=4, □
    ↪stride=2, padding=1),
            nn.BatchNorm2d(out_channels),
            nn.ReLU(inplace=True)
        )

    def forward(self, x):
        e1 = self.enc1(x)
        e2 = self.enc2(e1)
        e3 = self.enc3(e2)
        e4 = self.enc4(e3)

        r = self.res(e4)

        d1 = self.dec1(r)
        d2 = self.dec2(d1)
        d3 = self.dec3(d2)
        d4 = torch.tanh(self.dec4(d3))

    return d4

```

## 7 Define DiffusionModel

```
[8]: class DiffusionModel:
    def __init__(self, model, timesteps=1000):
        self.model = model.to(device)
        self.timesteps = timesteps
        self.betas = torch.linspace(1e-4, 0.02, timesteps).to(device)
        self.alphas = 1 - self.betas
        self.alpha_cumprod = torch.cumprod(self.alphas, dim=0)
```

```

        self.alpha_cumprod_prev = torch.cat([torch.tensor([1.0],  

device=device), self.alpha_cumprod[:-1]])
        self.sqrt_alpha_cumprod = torch.sqrt(self.alpha_cumprod)
        self.sqrt_one_minus_alpha_cumprod = torch.sqrt(1 - self.alpha_cumprod)

    def q_sample(self, x_start, t):
        noise = torch.randn_like(x_start)
        sqrt_alpha_cumprod_t = self.sqrt_alpha_cumprod[t].view(-1, 1, 1, 1)
        sqrt_one_minus_alpha_cumprod_t = self.sqrt_one_minus_alpha_cumprod[t].
view(-1, 1, 1, 1)
        return sqrt_alpha_cumprod_t * x_start + sqrt_one_minus_alpha_cumprod_t*
noise

    def p_sample(self, x_t, t):
        noise = torch.randn_like(x_t)
        return self.model(x_t) + noise * self.betas[t]

    def sample(self, x_start):
        x_t = x_start
        for t in reversed(range(self.timesteps)):
            x_t = self.p_sample(x_t, t)
        return x_t

```

## 8 Define PerceptualLoss

```
[9]: class PerceptualLoss(nn.Module):
    def __init__(self):
        super(PerceptualLoss, self).__init__()
        vgg = models.vgg16(pretrained=True).features
        self.layers = nn.Sequential(*list(vgg.children())[:16]).eval()
        for param in self.layers.parameters():
            param.requires_grad = False

    def forward(self, x, y):
        x_features = self.layers(x)
        y_features = self.layers(y)
        loss = nn.functional.mse_loss(x_features, y_features)
        return loss
```

## 9 Diffusion model training function

```
[10]: def train_diffusion_model_with_time(dataloader, model, diffusion_model,  

num_epochs, lr, beta1):
    optimizer = optim.Adam(model.parameters(), lr=lr, betas=(beta1, 0.999))
    scheduler = optim.lr_scheduler.StepLR(optimizer, step_size=15, gamma=0.8)
```

```

mse_criterion = nn.MSELoss()
perceptual_criterion = PerceptualLoss().to(device)

# Track time
start_time = time.time()

# Lists to keep track of progress
img_list = []
G_losses_epoch = []

for epoch in range(num_epochs):
    epoch_loss = 0
    for i, data in enumerate(dataloader, 0):
        model.zero_grad()
        real_cpu = data[0].to(device)
        b_size = real_cpu.size(0)
        noise = torch.randn(b_size, nc, image_size, image_size, □
device=device)
        t = torch.randint(0, diffusion_model.timesteps, (b_size,), □
device=device)

        x_t = diffusion_model.q_sample(real_cpu, t)
        output = model(x_t)

        mse_loss = mse_criterion(output, real_cpu)
        perceptual_loss = perceptual_criterion(output, real_cpu)
        loss = mse_loss + 0.1 * perceptual_loss

        loss.backward()
        optimizer.step()
        epoch_loss += loss.item()

        if i % 50 == 0:
            print(f'Epoch [{epoch+1}/{num_epochs}] Batch [{i}/
{len(dataloader)}] Loss: {loss.item()} MSE Loss: {mse_loss} Perceptual Loss:□
{perceptual_loss}')
            scheduler.step()

        # Store epoch loss
        G_losses_epoch.append(epoch_loss / len(dataloader))

    # Check how the generator is doing by saving G's output on fixed_noise
    with torch.no_grad():
        fake = model(noise).detach().cpu()
        img_list.append(vutils.make_grid(fake, padding=2, normalize=True))

end_time = time.time()

```

```

    training_time = end_time - start_time

    return G_losses_epoch, img_list, training_time

```

## 10 Calculate FID score

```
[11]: import torch
import torch.nn as nn
from torchvision import models, transforms
from scipy import linalg
import numpy as np
from PIL import Image

# Define the device
device = torch.device('cuda' if torch.cuda.is_available() else 'cpu')

# Load Inception v3 model
inception_model = models.inception_v3(pretrained=True, aux_logits=True) .
    to(device)
inception_model.eval()

# Modify Inception v3 to output features from an intermediate layer
class FeatureExtractor(nn.Module):
    def __init__(self, model):
        super(FeatureExtractor, self).__init__()
        self.features = nn.Sequential(*list(model.children())[:-1])

    def forward(self, x):
        x = self.features(x)
        return torch.flatten(x, start_dim=1)

feature_extractor = FeatureExtractor(inception_model).to(device)

# Helper function to get Inception v3 features
def get_inception_features(images, model, batch_size=32):
    features_list = []
    preprocess = transforms.Compose([
        transforms.Resize(299),
        transforms.CenterCrop(299),
        transforms.ToTensor(),
        transforms.Normalize(mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.
    ↪225]),
    ])

    for i in range(0, len(images), batch_size):
        batch = images[i:i+batch_size]
```

```

batch = torch.stack([preprocess(img) for img in batch]).to(device)
with torch.no_grad():
    features = model(batch).detach().cpu().numpy()
features_list.append(features)

return np.concatenate(features_list, axis=0)

# Calculate mean and covariance of features
def calculate_activation_statistics(features):
    mu = np.mean(features, axis=0)
    sigma = np.cov(features, rowvar=False)
    return mu, sigma

# Calculate FID score
def calculate_fid(real_images, generated_images, model, eps=1e-6):
    real_features = get_inception_features(real_images, model)
    gen_features = get_inception_features(generated_images, model)

    mu_real, sigma_real = calculate_activation_statistics(real_features)
    mu_gen, sigma_gen = calculate_activation_statistics(gen_features)

    # Calculate the Frechet distance
    diff = mu_real - mu_gen

    # Add small epsilon to the covariance matrices to ensure positive-definiteness
    covmean, _ = linalg.sqrtm(sigma_real.dot(sigma_gen) + np.eye(sigma_real.shape[0]) * eps, disp=False)

    # Check if covmean is complex and take the real part if necessary
    if np.iscomplexobj(covmean):
        covmean = covmean.real

    fid = np.sum(diff**2) + np.trace(sigma_real + sigma_gen - 2*covmean)

    # Ensure FID is non-negative
    return max(fid, 0)

```

/opt/conda/lib/python3.9/site-packages/torchvision/models/\_utils.py:208:  
UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be removed in the future, please use 'weights' instead.  
    warnings.warn(  
/opt/conda/lib/python3.9/site-packages/torchvision/models/\_utils.py:223:  
UserWarning: Arguments other than a weight enum or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=Inception\_V3\_Weights.IMAGENET1K\_V1`. You can also use `weights=Inception\_V3\_Weights.DEFAULT` to get the most up-to-date weights.

```
warnings.warn(msg)
```

## 11 Calculate Inception Score Function

```
[12]: def calculate_inception_score(images, model, splits=5):
    preprocess = transforms.Compose([
        transforms.Resize(299),
        transforms.CenterCrop(299),
        transforms.ToTensor(),
        transforms.Normalize(mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.
        ↪225]),
    ])

    processed_images = torch.stack([preprocess(img) for img in images]).to(device)
    with torch.no_grad():
        preds = model(processed_images).detach().cpu().numpy()

    preds = np.exp(preds) / np.sum(np.exp(preds), axis=1, keepdims=True)
    split_scores = []

    for k in range(splits):
        part = preds[k * (len(preds) // splits): (k + 1) * (len(preds) // splits), :]
        py = np.mean(part, axis=0)
        scores = [entropy(pyx, py) for pyx in part]
        split_scores.append(np.exp(np.mean(scores)))

    return np.mean(split_scores), np.std(split_scores)
```

## 12 Function to generate images

```
[13]: def generate_images(model, diffusion_model, num_images):
    with torch.no_grad():
        noise = torch.randn(num_images, nc, image_size, image_size, ↪device=device)
        generated_images = diffusion_model.sample(noise)
    return generated_images
```

## 13 Function to load losses from pickle files

```
[46]: def load_losses(directory):
    losses = []
    filenames = []
    for filename in os.listdir(directory):
        if filename.endswith('.pkl'):
            with open(os.path.join(directory, filename), 'rb') as f:
                losses.append(pickle.load(f))
                filenames.append(filename)
    return losses, filenames
```

## 14 Function to plot loss

```
[47]: def plot_losses(losses, filenames, model_name):
    for loss, filename in zip(losses, filenames):
        # Extract learning rate and beta1 from the filename
        parts = filename.split('_')
        lr = parts[1]
        beta1 = parts[2].replace('.pkl', '')

        plt.figure(figsize=(10, 5))
        plt.title(f'{model_name} Training Losses (lr={lr}, beta1={beta1})')
        plt.plot(loss['G_losses'], label='Generator Loss')
        if 'D_losses' in loss:
            plt.plot(loss['D_losses'], label='Discriminator Loss')
        plt.xlabel('Epochs')
        plt.ylabel('Loss')
        plt.legend()
        plt.show()
```

## 15 Setting up Hyperparameters

```
[14]: best_inception_score = 0
best_fid = float('inf')
best_model_params = None
hyperparams_list = [
    {'lr': 0.0001, 'beta1': 0.5},
    {'lr': 0.0001, 'beta1': 0.7},
    {'lr': 0.001, 'beta1': 0.5},
    {'lr': 0.001, 'beta1': 0.7},
]
```

## 16 Running training on hyperparameters to get best set of hyperparameters

```
[15]: num_epochs = 200
for idx, params in enumerate(hyperparams_list):
    print(f"Training with hyperparameters: {params}")
    print(params)

    model = UNet().apply(weights_init).to(device)
    diffusion_model = DiffusionModel(model)

    G_losses, img_list_diff, training_time_diff = \
    train_diffusion_model_with_time(dataloader, model, diffusion_model, \
    num_epochs, params['lr'], params['beta1'])
    print(f"Model's time taken - {training_time_diff}")
    with torch.no_grad():
        fake_images = generate_images(model, diffusion_model, len(dataloader.
    dataset))
        real_images = next(iter(dataloader))[0].to(device)

        # Convert to PIL images for Inception v3
        real_images_pil = [transforms.ToPILImage()(img.cpu()) for img in
    real_images]
        fake_images_pil = [transforms.ToPILImage()(img.cpu()) for img in
    fake_images]

        fid_score = calculate_fid(real_images_pil, fake_images_pil, \
    inception_model)
        inception_score, inception_std = \
    calculate_inception_score(fake_images_pil, inception_model)

        print(f"FID score: {fid_score}")
        print(f"Inception score: {inception_score} ± {inception_std}")

        # Save losses and model state
        with open(f'diffusion_losses/losses_{params["lr"]}_{params["beta1"]}.pkl', \
    'wb') as f:
            pickle.dump({'G_losses': G_losses, 'FID': fid_score, 'Inception Score': \
    inception_score, 'Inception Std': inception_std}, f)
            torch.save(model.state_dict(), f'diffusion_models/
    model_{params["lr"]}_{params["beta1"]}.pth')

        if fid_score < best_fid:
            best_fid = fid_score
            best_model_params = params
            torch.save(model.state_dict(), "best_models/best_model_diffusion.pth")
```

```

if inception_score > best_inception_score:
    best_inception_score = inception_score

print(f"Best hyperparameters: {best_model_params}")
print(f"Best Inception Score: {best_inception_score}")

```

Training with hyperparameters: {'lr': 0.0001, 'beta1': 0.5}  
{'lr': 0.0001, 'beta1': 0.5}

/opt/conda/lib/python3.9/site-packages/torchvision/models/\_utils.py:223:  
UserWarning: Arguments other than a weight enum or `None` for 'weights' are  
deprecated since 0.13 and may be removed in the future. The current behavior is  
equivalent to passing `weights=VGG16\_Weights.IMAGENET1K\_V1`. You can also use  
`weights=VGG16\_Weights.DEFAULT` to get the most up-to-date weights.  
warnings.warn(msg)

Epoch [1/200] Batch [0/3] Loss: 1.1640293598175049 MSE Loss: 0.31981176137924194  
Perceptual Loss: 8.44217586517334  
Epoch [2/200] Batch [0/3] Loss: 1.0439715385437012 MSE Loss: 0.31430017948150635  
Perceptual Loss: 7.296713829040527  
Epoch [3/200] Batch [0/3] Loss: 0.9872086048126221 MSE Loss: 0.30143067240715027  
Perceptual Loss: 6.857779502868652  
Epoch [4/200] Batch [0/3] Loss: 0.9607300162315369 MSE Loss: 0.28942710161209106  
Perceptual Loss: 6.713028907775879  
Epoch [5/200] Batch [0/3] Loss: 0.9472105503082275 MSE Loss: 0.28247103095054626  
Perceptual Loss: 6.647395133972168  
Epoch [6/200] Batch [0/3] Loss: 0.8947902321815491 MSE Loss: 0.27270960807800293  
Perceptual Loss: 6.220806121826172  
Epoch [7/200] Batch [0/3] Loss: 0.8659111261367798 MSE Loss: 0.25447410345077515  
Perceptual Loss: 6.114370346069336  
Epoch [8/200] Batch [0/3] Loss: 0.8344074487686157 MSE Loss: 0.24447783827781677  
Perceptual Loss: 5.899296283721924  
Epoch [9/200] Batch [0/3] Loss: 0.808632493019104 MSE Loss: 0.2310301661491394  
Perceptual Loss: 5.776022911071777  
Epoch [10/200] Batch [0/3] Loss: 0.7935056686401367 MSE Loss:  
0.22008423507213593 Perceptual Loss: 5.734213829040527  
Epoch [11/200] Batch [0/3] Loss: 0.7493340969085693 MSE Loss:  
0.20287761092185974 Perceptual Loss: 5.464564323425293  
Epoch [12/200] Batch [0/3] Loss: 0.7434489727020264 MSE Loss:  
0.19608049094676971 Perceptual Loss: 5.473684787750244  
Epoch [13/200] Batch [0/3] Loss: 0.7185314893722534 MSE Loss: 0.186324805021286  
Perceptual Loss: 5.322066783905029  
Epoch [14/200] Batch [0/3] Loss: 0.7275943756103516 MSE Loss:  
0.18804529309272766 Perceptual Loss: 5.395491123199463  
Epoch [15/200] Batch [0/3] Loss: 0.7044593691825867 MSE Loss:  
0.17480133473873138 Perceptual Loss: 5.296579837799072  
Epoch [16/200] Batch [0/3] Loss: 0.6894813776016235 MSE Loss: 0.1711060255765915

Perceptual Loss: 5.18375301361084  
Epoch [17/200] Batch [0/3] Loss: 0.6800158023834229 MSE Loss:  
0.16414590179920197 Perceptual Loss: 5.158699035644531  
Epoch [18/200] Batch [0/3] Loss: 0.6769269704818726 MSE Loss:  
0.16031286120414734 Perceptual Loss: 5.166140556335449  
Epoch [19/200] Batch [0/3] Loss: 0.6436842679977417 MSE Loss:  
0.15246737003326416 Perceptual Loss: 4.912168502807617  
Epoch [20/200] Batch [0/3] Loss: 0.6334161758422852 MSE Loss:  
0.14850035309791565 Perceptual Loss: 4.84915828704834  
Epoch [21/200] Batch [0/3] Loss: 0.6297447681427002 MSE Loss: 0.1451428085565567  
Perceptual Loss: 4.846019268035889  
Epoch [22/200] Batch [0/3] Loss: 0.6337448358535767 MSE Loss:  
0.14593881368637085 Perceptual Loss: 4.878060340881348  
Epoch [23/200] Batch [0/3] Loss: 0.6227142810821533 MSE Loss:  
0.14210335910320282 Perceptual Loss: 4.806109428405762  
Epoch [24/200] Batch [0/3] Loss: 0.6158126592636108 MSE Loss: 0.13857501745224  
Perceptual Loss: 4.77237606048584  
Epoch [25/200] Batch [0/3] Loss: 0.6025311946868896 MSE Loss:  
0.13381162285804749 Perceptual Loss: 4.687195777893066  
Epoch [26/200] Batch [0/3] Loss: 0.6081558465957642 MSE Loss:  
0.13168005645275116 Perceptual Loss: 4.7647576332092285  
Epoch [27/200] Batch [0/3] Loss: 0.601555347442627 MSE Loss: 0.1299736499786377  
Perceptual Loss: 4.715816497802734  
Epoch [28/200] Batch [0/3] Loss: 0.6019923686981201 MSE Loss: 0.1307859867811203  
Perceptual Loss: 4.712063789367676  
Epoch [29/200] Batch [0/3] Loss: 0.6045317053794861 MSE Loss:  
0.12683862447738647 Perceptual Loss: 4.776930809020996  
Epoch [30/200] Batch [0/3] Loss: 0.5878823399543762 MSE Loss:  
0.12601302564144135 Perceptual Loss: 4.618692874908447  
Epoch [31/200] Batch [0/3] Loss: 0.5874917507171631 MSE Loss:  
0.12171556800603867 Perceptual Loss: 4.657761573791504  
Epoch [32/200] Batch [0/3] Loss: 0.5842570066452026 MSE Loss: 0.1211932897567749  
Perceptual Loss: 4.630637168884277  
Epoch [33/200] Batch [0/3] Loss: 0.5814688801765442 MSE Loss: 0.1234058365225792  
Perceptual Loss: 4.580630302429199  
Epoch [34/200] Batch [0/3] Loss: 0.5922039747238159 MSE Loss: 0.124773308634758  
Perceptual Loss: 4.674306869506836  
Epoch [35/200] Batch [0/3] Loss: 0.5818352699279785 MSE Loss:  
0.11861233413219452 Perceptual Loss: 4.632229328155518  
Epoch [36/200] Batch [0/3] Loss: 0.5658611059188843 MSE Loss: 0.1157580241560936  
Perceptual Loss: 4.501030921936035  
Epoch [37/200] Batch [0/3] Loss: 0.5728468298912048 MSE Loss:  
0.11585675179958344 Perceptual Loss: 4.5699005126953125  
Epoch [38/200] Batch [0/3] Loss: 0.5627849102020264 MSE Loss:  
0.11333363503217697 Perceptual Loss: 4.494513034820557  
Epoch [39/200] Batch [0/3] Loss: 0.571377158164978 MSE Loss: 0.11735811084508896  
Perceptual Loss: 4.540190696716309  
Epoch [40/200] Batch [0/3] Loss: 0.5752303600311279 MSE Loss:

0.11683779954910278 Perceptual Loss: 4.583925247192383  
Epoch [41/200] Batch [0/3] Loss: 0.5590100288391113 MSE Loss:  
0.11573811620473862 Perceptual Loss: 4.4327192306518555  
Epoch [42/200] Batch [0/3] Loss: 0.5346202850341797 MSE Loss:  
0.10513009130954742 Perceptual Loss: 4.2949018478393555  
Epoch [43/200] Batch [0/3] Loss: 0.5552775263786316 MSE Loss:  
0.10834105312824249 Perceptual Loss: 4.469364643096924  
Epoch [44/200] Batch [0/3] Loss: 0.549641489982605 MSE Loss: 0.10859054327011108  
Perceptual Loss: 4.41050910949707  
Epoch [45/200] Batch [0/3] Loss: 0.529025673866272 MSE Loss: 0.10294332355260849  
Perceptual Loss: 4.2608232498168945  
Epoch [46/200] Batch [0/3] Loss: 0.5564907789230347 MSE Loss:  
0.11173999309539795 Perceptual Loss: 4.447507858276367  
Epoch [47/200] Batch [0/3] Loss: 0.5246201157569885 MSE Loss:  
0.10418222844600677 Perceptual Loss: 4.204378604888916  
Epoch [48/200] Batch [0/3] Loss: 0.5395848751068115 MSE Loss:  
0.10585656017065048 Perceptual Loss: 4.337283134460449  
Epoch [49/200] Batch [0/3] Loss: 0.5533922910690308 MSE Loss:  
0.11161303520202637 Perceptual Loss: 4.417792320251465  
Epoch [50/200] Batch [0/3] Loss: 0.5301475524902344 MSE Loss:  
0.10588445514440536 Perceptual Loss: 4.242630958557129  
Epoch [51/200] Batch [0/3] Loss: 0.5181446671485901 MSE Loss:  
0.10165166854858398 Perceptual Loss: 4.1649298667907715  
Epoch [52/200] Batch [0/3] Loss: 0.5491645932197571 MSE Loss:  
0.11146219819784164 Perceptual Loss: 4.377024173736572  
Epoch [53/200] Batch [0/3] Loss: 0.5346147418022156 MSE Loss:  
0.10693193972110748 Perceptual Loss: 4.276827812194824  
Epoch [54/200] Batch [0/3] Loss: 0.5415434837341309 MSE Loss: 0.1086052656173706  
Perceptual Loss: 4.329381942749023  
Epoch [55/200] Batch [0/3] Loss: 0.5321803092956543 MSE Loss:  
0.10308533906936646 Perceptual Loss: 4.29094934463501  
Epoch [56/200] Batch [0/3] Loss: 0.5289376378059387 MSE Loss:  
0.10275672376155853 Perceptual Loss: 4.2618088722229  
Epoch [57/200] Batch [0/3] Loss: 0.5278414487838745 MSE Loss:  
0.10265572369098663 Perceptual Loss: 4.251857280731201  
Epoch [58/200] Batch [0/3] Loss: 0.5101951360702515 MSE Loss:  
0.09666746854782104 Perceptual Loss: 4.135276794433594  
Epoch [59/200] Batch [0/3] Loss: 0.5372750163078308 MSE Loss:  
0.10455682128667831 Perceptual Loss: 4.327181816101074  
Epoch [60/200] Batch [0/3] Loss: 0.5284825563430786 MSE Loss:  
0.10117791593074799 Perceptual Loss: 4.273046493530273  
Epoch [61/200] Batch [0/3] Loss: 0.5146783590316772 MSE Loss:  
0.09969884157180786 Perceptual Loss: 4.1497955322265625  
Epoch [62/200] Batch [0/3] Loss: 0.537607729434967 MSE Loss: 0.1073383316397667  
Perceptual Loss: 4.302693843841553  
Epoch [63/200] Batch [0/3] Loss: 0.523263692855835 MSE Loss: 0.10089945793151855  
Perceptual Loss: 4.223642349243164  
Epoch [64/200] Batch [0/3] Loss: 0.511695146560669 MSE Loss: 0.09496866166591644

Perceptual Loss: 4.167264938354492  
Epoch [65/200] Batch [0/3] Loss: 0.5145083665847778 MSE Loss:  
0.09886308759450912 Perceptual Loss: 4.156452655792236  
Epoch [66/200] Batch [0/3] Loss: 0.49862995743751526 MSE Loss:  
0.09491806477308273 Perceptual Loss: 4.037118911743164  
Epoch [67/200] Batch [0/3] Loss: 0.5126852989196777 MSE Loss:  
0.09652596712112427 Perceptual Loss: 4.161593437194824  
Epoch [68/200] Batch [0/3] Loss: 0.5235016345977783 MSE Loss:  
0.09962078183889389 Perceptual Loss: 4.238808631896973  
Epoch [69/200] Batch [0/3] Loss: 0.5257852077484131 MSE Loss:  
0.10193115472793579 Perceptual Loss: 4.238540172576904  
Epoch [70/200] Batch [0/3] Loss: 0.5319926142692566 MSE Loss:  
0.10094647109508514 Perceptual Loss: 4.310461521148682  
Epoch [71/200] Batch [0/3] Loss: 0.5210353136062622 MSE Loss: 0.0999530777335167  
Perceptual Loss: 4.210822582244873  
Epoch [72/200] Batch [0/3] Loss: 0.5018694400787354 MSE Loss: 0.0951489731669426  
Perceptual Loss: 4.067204475402832  
Epoch [73/200] Batch [0/3] Loss: 0.5215124487876892 MSE Loss:  
0.09810172021389008 Perceptual Loss: 4.23410701751709  
Epoch [74/200] Batch [0/3] Loss: 0.4858487546443939 MSE Loss:  
0.09078898280858994 Perceptual Loss: 3.9505975246429443  
Epoch [75/200] Batch [0/3] Loss: 0.511925220489502 MSE Loss: 0.09751260280609131  
Perceptual Loss: 4.1441264152526855  
Epoch [76/200] Batch [0/3] Loss: 0.5036366581916809 MSE Loss:  
0.09499450773000717 Perceptual Loss: 4.086421489715576  
Epoch [77/200] Batch [0/3] Loss: 0.5036011338233948 MSE Loss:  
0.09656904637813568 Perceptual Loss: 4.0703206062316895  
Epoch [78/200] Batch [0/3] Loss: 0.4883323311805725 MSE Loss:  
0.09065719693899155 Perceptual Loss: 3.9767510890960693  
Epoch [79/200] Batch [0/3] Loss: 0.4924146831035614 MSE Loss:  
0.09080954641103745 Perceptual Loss: 4.016051292419434  
Epoch [80/200] Batch [0/3] Loss: 0.49030420184135437 MSE Loss:  
0.09156176447868347 Perceptual Loss: 3.987424373626709  
Epoch [81/200] Batch [0/3] Loss: 0.4913303554058075 MSE Loss:  
0.09421034902334213 Perceptual Loss: 3.9711999893188477  
Epoch [82/200] Batch [0/3] Loss: 0.5233912467956543 MSE Loss:  
0.10115402191877365 Perceptual Loss: 4.222372531890869  
Epoch [83/200] Batch [0/3] Loss: 0.4843999147415161 MSE Loss:  
0.08715192973613739 Perceptual Loss: 3.9724795818328857  
Epoch [84/200] Batch [0/3] Loss: 0.4830745458602905 MSE Loss:  
0.08997954428195953 Perceptual Loss: 3.9309496879577637  
Epoch [85/200] Batch [0/3] Loss: 0.4878941774368286 MSE Loss:  
0.08946822583675385 Perceptual Loss: 3.984259605407715  
Epoch [86/200] Batch [0/3] Loss: 0.5132536888122559 MSE Loss: 0.0973861813545227  
Perceptual Loss: 4.158675193786621  
Epoch [87/200] Batch [0/3] Loss: 0.4872208833694458 MSE Loss:  
0.09160642325878143 Perceptual Loss: 3.9561448097229004  
Epoch [88/200] Batch [0/3] Loss: 0.49317336082458496 MSE Loss:

0.09416099637746811 Perceptual Loss: 3.9901235103607178  
Epoch [89/200] Batch [0/3] Loss: 0.4971219599246979 MSE Loss:  
0.09314917773008347 Perceptual Loss: 4.039727687835693  
Epoch [90/200] Batch [0/3] Loss: 0.499195396900177 MSE Loss: 0.09393104910850525  
Perceptual Loss: 4.052643299102783  
Epoch [91/200] Batch [0/3] Loss: 0.4951475262641907 MSE Loss: 0.0911950096487999  
Perceptual Loss: 4.039525032043457  
Epoch [92/200] Batch [0/3] Loss: 0.5067709684371948 MSE Loss:  
0.09512007236480713 Perceptual Loss: 4.116508960723877  
Epoch [93/200] Batch [0/3] Loss: 0.4968271851539612 MSE Loss:  
0.09261908382177353 Perceptual Loss: 4.042080879211426  
Epoch [94/200] Batch [0/3] Loss: 0.4753042757511139 MSE Loss:  
0.08635538071393967 Perceptual Loss: 3.889488697052002  
Epoch [95/200] Batch [0/3] Loss: 0.48543781042099 MSE Loss: 0.09108243882656097  
Perceptual Loss: 3.943553924560547  
Epoch [96/200] Batch [0/3] Loss: 0.4905472993850708 MSE Loss: 0.0918591171503067  
Perceptual Loss: 3.986881971359253  
Epoch [97/200] Batch [0/3] Loss: 0.4945475161075592 MSE Loss:  
0.08921036124229431 Perceptual Loss: 4.053371429443359  
Epoch [98/200] Batch [0/3] Loss: 0.48466113209724426 MSE Loss:  
0.08887237310409546 Perceptual Loss: 3.957887649536133  
Epoch [99/200] Batch [0/3] Loss: 0.4757998585700989 MSE Loss: 0.0871150940656662  
Perceptual Loss: 3.886847734451294  
Epoch [100/200] Batch [0/3] Loss: 0.4927101731300354 MSE Loss:  
0.09284132719039917 Perceptual Loss: 3.9986884593963623  
Epoch [101/200] Batch [0/3] Loss: 0.46914082765579224 MSE Loss:  
0.08438283205032349 Perceptual Loss: 3.8475799560546875  
Epoch [102/200] Batch [0/3] Loss: 0.48245424032211304 MSE Loss:  
0.08948300778865814 Perceptual Loss: 3.9297125339508057  
Epoch [103/200] Batch [0/3] Loss: 0.4785875082015991 MSE Loss:  
0.08512511849403381 Perceptual Loss: 3.9346237182617188  
Epoch [104/200] Batch [0/3] Loss: 0.49213582277297974 MSE Loss:  
0.09230159223079681 Perceptual Loss: 3.9983420372009277  
Epoch [105/200] Batch [0/3] Loss: 0.4822016954421997 MSE Loss:  
0.08973338454961777 Perceptual Loss: 3.924683094024658  
Epoch [106/200] Batch [0/3] Loss: 0.4750790596008301 MSE Loss:  
0.08752237260341644 Perceptual Loss: 3.8755669593811035  
Epoch [107/200] Batch [0/3] Loss: 0.4929010272026062 MSE Loss:  
0.09111069142818451 Perceptual Loss: 4.0179033279418945  
Epoch [108/200] Batch [0/3] Loss: 0.4901726543903351 MSE Loss:  
0.0918293222784996 Perceptual Loss: 3.983433246612549  
Epoch [109/200] Batch [0/3] Loss: 0.4955264925956726 MSE Loss:  
0.09112035483121872 Perceptual Loss: 4.044061183929443  
Epoch [110/200] Batch [0/3] Loss: 0.49115946888923645 MSE Loss:  
0.0928429365158081 Perceptual Loss: 3.9831652641296387  
Epoch [111/200] Batch [0/3] Loss: 0.4978930950164795 MSE Loss:  
0.09152784198522568 Perceptual Loss: 4.063652515411377  
Epoch [112/200] Batch [0/3] Loss: 0.4661031663417816 MSE Loss:

0.08403009176254272 Perceptual Loss: 3.820730686187744  
Epoch [113/200] Batch [0/3] Loss: 0.47355711460113525 MSE Loss:  
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Epoch [114/200] Batch [0/3] Loss: 0.4841381907463074 MSE Loss:  
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Epoch [115/200] Batch [0/3] Loss: 0.4924773573875427 MSE Loss:  
0.09145723283290863 Perceptual Loss: 4.010201454162598  
Epoch [116/200] Batch [0/3] Loss: 0.4647867679595947 MSE Loss:  
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Epoch [117/200] Batch [0/3] Loss: 0.48265504837036133 MSE Loss:  
0.08898147195577621 Perceptual Loss: 3.9367356300354004  
Epoch [118/200] Batch [0/3] Loss: 0.5036539435386658 MSE Loss:  
0.09460355341434479 Perceptual Loss: 4.090503692626953  
Epoch [119/200] Batch [0/3] Loss: 0.48732060194015503 MSE Loss:  
0.08951769769191742 Perceptual Loss: 3.978029251098633  
Epoch [120/200] Batch [0/3] Loss: 0.49108338356018066 MSE Loss:  
0.09292702376842499 Perceptual Loss: 3.9815635681152344  
Epoch [121/200] Batch [0/3] Loss: 0.47383981943130493 MSE Loss:  
0.08588339388370514 Perceptual Loss: 3.8795642852783203  
Epoch [122/200] Batch [0/3] Loss: 0.4877033233642578 MSE Loss:  
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Epoch [123/200] Batch [0/3] Loss: 0.4616612493991852 MSE Loss:  
0.08174175024032593 Perceptual Loss: 3.7991950511932373  
Epoch [124/200] Batch [0/3] Loss: 0.488707035779953 MSE Loss:  
0.08973672240972519 Perceptual Loss: 3.9897029399871826  
Epoch [125/200] Batch [0/3] Loss: 0.47127819061279297 MSE Loss:  
0.08589862287044525 Perceptual Loss: 3.8537957668304443  
Epoch [126/200] Batch [0/3] Loss: 0.46232515573501587 MSE Loss:  
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Epoch [127/200] Batch [0/3] Loss: 0.48180919885635376 MSE Loss:  
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Epoch [128/200] Batch [0/3] Loss: 0.47862204909324646 MSE Loss:  
0.08737548440694809 Perceptual Loss: 3.9124655723571777  
Epoch [129/200] Batch [0/3] Loss: 0.46747714281082153 MSE Loss:  
0.08513759076595306 Perceptual Loss: 3.823395252227783  
Epoch [130/200] Batch [0/3] Loss: 0.4779331386089325 MSE Loss:  
0.08622157573699951 Perceptual Loss: 3.9171154499053955  
Epoch [131/200] Batch [0/3] Loss: 0.4568902850151062 MSE Loss:  
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Epoch [132/200] Batch [0/3] Loss: 0.4644956588745117 MSE Loss:  
0.0840597152709961 Perceptual Loss: 3.8043594360351562  
Epoch [133/200] Batch [0/3] Loss: 0.48465394973754883 MSE Loss:  
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Epoch [134/200] Batch [0/3] Loss: 0.47714656591415405 MSE Loss:  
0.0896134078502655 Perceptual Loss: 3.875331401824951  
Epoch [135/200] Batch [0/3] Loss: 0.4748358726501465 MSE Loss:  
0.08599357306957245 Perceptual Loss: 3.888422966003418  
Epoch [136/200] Batch [0/3] Loss: 0.49470043182373047 MSE Loss:

0.09269855916500092 Perceptual Loss: 4.020018577575684  
Epoch [156/200] Batch [0/3] Loss: 0.491847425699234 MSE Loss:  
0.09016281366348267 Perceptual Loss: 4.016846179962158  
Epoch [157/200] Batch [0/3] Loss: 0.48202067613601685 MSE Loss:  
0.08839689195156097 Perceptual Loss: 3.9362380504608154  
Epoch [158/200] Batch [0/3] Loss: 0.4786668121814728 MSE Loss:  
0.08766161650419235 Perceptual Loss: 3.9100518226623535  
Epoch [159/200] Batch [0/3] Loss: 0.4640786349773407 MSE Loss:  
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Epoch [160/200] Batch [0/3] Loss: 0.4910886287689209 MSE Loss:  
0.08928792178630829 Perceptual Loss: 4.018006801605225  
Epoch [161/200] Batch [0/3] Loss: 0.4539452791213989 MSE Loss:  
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Epoch [162/200] Batch [0/3] Loss: 0.46898767352104187 MSE Loss:  
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Epoch [163/200] Batch [0/3] Loss: 0.4787518382072449 MSE Loss:  
0.08479898422956467 Perceptual Loss: 3.939528465270996  
Epoch [164/200] Batch [0/3] Loss: 0.47122353315353394 MSE Loss:  
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Epoch [165/200] Batch [0/3] Loss: 0.4914326071739197 MSE Loss:  
0.09161971509456635 Perceptual Loss: 3.998128890991211  
Epoch [166/200] Batch [0/3] Loss: 0.46089503169059753 MSE Loss:  
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Epoch [167/200] Batch [0/3] Loss: 0.4715210795402527 MSE Loss:  
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Epoch [168/200] Batch [0/3] Loss: 0.46262067556381226 MSE Loss:  
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Epoch [169/200] Batch [0/3] Loss: 0.462272047996521 MSE Loss:  
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Epoch [170/200] Batch [0/3] Loss: 0.4703645706176758 MSE Loss:  
0.0851145014166832 Perceptual Loss: 3.8525004386901855  
Epoch [171/200] Batch [0/3] Loss: 0.48295488953590393 MSE Loss:  
0.08724465221166611 Perceptual Loss: 3.9571022987365723  
Epoch [172/200] Batch [0/3] Loss: 0.45768052339553833 MSE Loss:  
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Epoch [173/200] Batch [0/3] Loss: 0.47800084948539734 MSE Loss:  
0.08561458438634872 Perceptual Loss: 3.9238624572753906  
Epoch [174/200] Batch [0/3] Loss: 0.4843841791152954 MSE Loss:  
0.0883730873465538 Perceptual Loss: 3.960110664367676  
Epoch [175/200] Batch [0/3] Loss: 0.4442330002784729 MSE Loss:  
0.07866083085536957 Perceptual Loss: 3.655721664428711  
Epoch [176/200] Batch [0/3] Loss: 0.4633275866508484 MSE Loss:  
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Epoch [177/200] Batch [0/3] Loss: 0.4945109188556671 MSE Loss:  
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Epoch [178/200] Batch [0/3] Loss: 0.502546489238739 MSE Loss: 0.0930062085390091  
Perceptual Loss: 4.095402717590332  
Epoch [179/200] Batch [0/3] Loss: 0.49095189571380615 MSE Loss:

0.0886906236410141 Perceptual Loss: 4.022612571716309  
Epoch [180/200] Batch [0/3] Loss: 0.4707379639148712 MSE Loss:  
0.08508726209402084 Perceptual Loss: 3.856506824493408  
Epoch [181/200] Batch [0/3] Loss: 0.4772723317146301 MSE Loss:  
0.08593028783798218 Perceptual Loss: 3.9134204387664795  
Epoch [182/200] Batch [0/3] Loss: 0.4518054127693176 MSE Loss:  
0.07845184206962585 Perceptual Loss: 3.7335357666015625  
Epoch [183/200] Batch [0/3] Loss: 0.47988057136535645 MSE Loss:  
0.08750893175601959 Perceptual Loss: 3.9237160682678223  
Epoch [184/200] Batch [0/3] Loss: 0.473172128200531 MSE Loss:  
0.08667092025279999 Perceptual Loss: 3.8650121688842773  
Epoch [185/200] Batch [0/3] Loss: 0.471593976020813 MSE Loss:  
0.08590130507946014 Perceptual Loss: 3.856926679611206  
Epoch [186/200] Batch [0/3] Loss: 0.4689246714115143 MSE Loss:  
0.08540662378072739 Perceptual Loss: 3.8351802825927734  
Epoch [187/200] Batch [0/3] Loss: 0.4546470642089844 MSE Loss:  
0.08184289932250977 Perceptual Loss: 3.728041648864746  
Epoch [188/200] Batch [0/3] Loss: 0.47246307134628296 MSE Loss:  
0.08605940639972687 Perceptual Loss: 3.8640363216400146  
Epoch [189/200] Batch [0/3] Loss: 0.4623579978942871 MSE Loss:  
0.08407928794622421 Perceptual Loss: 3.7827868461608887  
Epoch [190/200] Batch [0/3] Loss: 0.45368409156799316 MSE Loss:  
0.08295704424381256 Perceptual Loss: 3.707270622253418  
Epoch [191/200] Batch [0/3] Loss: 0.47847580909729004 MSE Loss:  
0.09044834226369858 Perceptual Loss: 3.880274534225464  
Epoch [192/200] Batch [0/3] Loss: 0.47161591053009033 MSE Loss:  
0.0849558562040329 Perceptual Loss: 3.866600513458252  
Epoch [193/200] Batch [0/3] Loss: 0.46175554394721985 MSE Loss:  
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Epoch [194/200] Batch [0/3] Loss: 0.48121750354766846 MSE Loss:  
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Epoch [195/200] Batch [0/3] Loss: 0.45227646827697754 MSE Loss:  
0.08244816958904266 Perceptual Loss: 3.6982831954956055  
Epoch [196/200] Batch [0/3] Loss: 0.45067423582077026 MSE Loss:  
0.08078904449939728 Perceptual Loss: 3.6988518238067627  
Epoch [197/200] Batch [0/3] Loss: 0.4610550105571747 MSE Loss:  
0.08478814363479614 Perceptual Loss: 3.7626686096191406  
Epoch [198/200] Batch [0/3] Loss: 0.44100984930992126 MSE Loss:  
0.07856744527816772 Perceptual Loss: 3.6244239807128906  
Epoch [199/200] Batch [0/3] Loss: 0.48229557275772095 MSE Loss:  
0.0890560895204544 Perceptual Loss: 3.9323949813842773  
Epoch [200/200] Batch [0/3] Loss: 0.44494640827178955 MSE Loss:  
0.07789872586727142 Perceptual Loss: 3.6704769134521484  
Model's time taken - 951.816880941391  
FID score: 1503.5738637534178  
Inception score: 1.255021095275879 ± 0.0003925394266843796  
Training with hyperparameters: {'lr': 0.0001, 'beta1': 0.7}  
{'lr': 0.0001, 'beta1': 0.7}

Epoch [1/200] Batch [0/3] Loss: 1.0950984954833984 MSE Loss: 0.3169584274291992  
Perceptual Loss: 7.781399726867676

Epoch [2/200] Batch [0/3] Loss: 1.0002243518829346 MSE Loss: 0.30458521842956543  
Perceptual Loss: 6.95639181137085

Epoch [3/200] Batch [0/3] Loss: 0.9751625657081604 MSE Loss: 0.3004379868507385  
Perceptual Loss: 6.747245788574219

Epoch [4/200] Batch [0/3] Loss: 0.9396150708198547 MSE Loss: 0.28742098808288574  
Perceptual Loss: 6.5219407081604

Epoch [5/200] Batch [0/3] Loss: 0.9211578369140625 MSE Loss: 0.28115591406822205  
Perceptual Loss: 6.400019645690918

Epoch [6/200] Batch [0/3] Loss: 0.9097710251808167 MSE Loss: 0.27370649576187134  
Perceptual Loss: 6.360645294189453

Epoch [7/200] Batch [0/3] Loss: 0.8610572218894958 MSE Loss: 0.25633496046066284  
Perceptual Loss: 6.04722261428833

Epoch [8/200] Batch [0/3] Loss: 0.8074538111686707 MSE Loss: 0.23115938901901245  
Perceptual Loss: 5.762944221496582

Epoch [9/200] Batch [0/3] Loss: 0.8286511898040771 MSE Loss: 0.23532867431640625  
Perceptual Loss: 5.933225154876709

Epoch [10/200] Batch [0/3] Loss: 0.7768110036849976 MSE Loss:  
0.21694523096084595 Perceptual Loss: 5.598657608032227

Epoch [11/200] Batch [0/3] Loss: 0.736426830291748 MSE Loss: 0.19669495522975922  
Perceptual Loss: 5.397318363189697

Epoch [12/200] Batch [0/3] Loss: 0.7326968908309937 MSE Loss:  
0.19079110026359558 Perceptual Loss: 5.419057846069336

Epoch [13/200] Batch [0/3] Loss: 0.7167940735816956 MSE Loss:  
0.18442749977111816 Perceptual Loss: 5.323665618896484

Epoch [14/200] Batch [0/3] Loss: 0.7109700441360474 MSE Loss:  
0.17771369218826294 Perceptual Loss: 5.332563400268555

Epoch [15/200] Batch [0/3] Loss: 0.6958259344100952 MSE Loss: 0.1734607219696045  
Perceptual Loss: 5.223651885986328

Epoch [16/200] Batch [0/3] Loss: 0.6665445566177368 MSE Loss:  
0.16393280029296875 Perceptual Loss: 5.026117324829102

Epoch [17/200] Batch [0/3] Loss: 0.6657441854476929 MSE Loss: 0.1573226898908615  
Perceptual Loss: 5.084214687347412

Epoch [18/200] Batch [0/3] Loss: 0.6575144529342651 MSE Loss:  
0.16140016913414001 Perceptual Loss: 4.961142539978027

Epoch [19/200] Batch [0/3] Loss: 0.6402480602264404 MSE Loss:  
0.14778351783752441 Perceptual Loss: 4.92464542388916

Epoch [20/200] Batch [0/3] Loss: 0.6360381841659546 MSE Loss:  
0.14623823761940002 Perceptual Loss: 4.8979997634887695

Epoch [21/200] Batch [0/3] Loss: 0.6167887449264526 MSE Loss: 0.1403559446334839  
Perceptual Loss: 4.7643280029296875

Epoch [22/200] Batch [0/3] Loss: 0.6132417917251587 MSE Loss:  
0.13890507817268372 Perceptual Loss: 4.7433671951293945

Epoch [23/200] Batch [0/3] Loss: 0.6022863388061523 MSE Loss: 0.1330682337284088  
Perceptual Loss: 4.69218111038208

Epoch [24/200] Batch [0/3] Loss: 0.5876984000205994 MSE Loss:  
0.12557634711265564 Perceptual Loss: 4.621220588684082

Epoch [25/200] Batch [0/3] Loss: 0.5842095613479614 MSE Loss:  
0.12695562839508057 Perceptual Loss: 4.572539329528809  
Epoch [26/200] Batch [0/3] Loss: 0.6068814992904663 MSE Loss:  
0.13233479857444763 Perceptual Loss: 4.745467185974121  
Epoch [27/200] Batch [0/3] Loss: 0.5975624322891235 MSE Loss:  
0.12468264997005463 Perceptual Loss: 4.728797912597656  
Epoch [28/200] Batch [0/3] Loss: 0.5830235481262207 MSE Loss: 0.1230965256690979  
Perceptual Loss: 4.599269866943359  
Epoch [29/200] Batch [0/3] Loss: 0.571884274482727 MSE Loss: 0.11804474890232086  
Perceptual Loss: 4.538394927978516  
Epoch [30/200] Batch [0/3] Loss: 0.586033046245575 MSE Loss: 0.12310168147087097  
Perceptual Loss: 4.6293134689331055  
Epoch [31/200] Batch [0/3] Loss: 0.5805822014808655 MSE Loss:  
0.11972813308238983 Perceptual Loss: 4.6085405349731445  
Epoch [32/200] Batch [0/3] Loss: 0.5573393702507019 MSE Loss: 0.1119820773601532  
Perceptual Loss: 4.453572750091553  
Epoch [33/200] Batch [0/3] Loss: 0.5613955855369568 MSE Loss:  
0.11310149729251862 Perceptual Loss: 4.482940673828125  
Epoch [34/200] Batch [0/3] Loss: 0.5445238351821899 MSE Loss:  
0.10823490470647812 Perceptual Loss: 4.362889289855957  
Epoch [35/200] Batch [0/3] Loss: 0.5719703435897827 MSE Loss:  
0.11637628078460693 Perceptual Loss: 4.555940628051758  
Epoch [36/200] Batch [0/3] Loss: 0.5518505573272705 MSE Loss:  
0.10838973522186279 Perceptual Loss: 4.434608459472656  
Epoch [37/200] Batch [0/3] Loss: 0.5612347722053528 MSE Loss:  
0.11036275327205658 Perceptual Loss: 4.508720397949219  
Epoch [38/200] Batch [0/3] Loss: 0.5583285093307495 MSE Loss: 0.1109001636505127  
Perceptual Loss: 4.474283695220947  
Epoch [39/200] Batch [0/3] Loss: 0.5553809404373169 MSE Loss:  
0.10939954966306686 Perceptual Loss: 4.459814071655273  
Epoch [40/200] Batch [0/3] Loss: 0.543127179145813 MSE Loss: 0.10585683584213257  
Perceptual Loss: 4.3727030754089355  
Epoch [41/200] Batch [0/3] Loss: 0.5319470763206482 MSE Loss:  
0.10288544744253159 Perceptual Loss: 4.290616512298584  
Epoch [42/200] Batch [0/3] Loss: 0.5477569103240967 MSE Loss:  
0.10709880292415619 Perceptual Loss: 4.406580924987793  
Epoch [43/200] Batch [0/3] Loss: 0.5284852981567383 MSE Loss:  
0.10398884862661362 Perceptual Loss: 4.244964599609375  
Epoch [44/200] Batch [0/3] Loss: 0.523879885673523 MSE Loss: 0.10069038718938828  
Perceptual Loss: 4.2318949699401855  
Epoch [45/200] Batch [0/3] Loss: 0.537708580493927 MSE Loss: 0.1046895831823349  
Perceptual Loss: 4.330190181732178  
Epoch [46/200] Batch [0/3] Loss: 0.5222057104110718 MSE Loss:  
0.09949354827404022 Perceptual Loss: 4.227121353149414  
Epoch [47/200] Batch [0/3] Loss: 0.5292718410491943 MSE Loss:  
0.09888291358947754 Perceptual Loss: 4.30388879776001  
Epoch [48/200] Batch [0/3] Loss: 0.49743223190307617 MSE Loss:  
0.09415636956691742 Perceptual Loss: 4.032758712768555

Epoch [49/200] Batch [0/3] Loss: 0.5347716212272644 MSE Loss: 0.1017235741019249  
Perceptual Loss: 4.330480575561523

Epoch [50/200] Batch [0/3] Loss: 0.5114873647689819 MSE Loss:  
0.09500699490308762 Perceptual Loss: 4.164803981781006

Epoch [51/200] Batch [0/3] Loss: 0.5233699083328247 MSE Loss:  
0.10120052099227905 Perceptual Loss: 4.221693515777588

Epoch [52/200] Batch [0/3] Loss: 0.5112118721008301 MSE Loss:  
0.09664537757635117 Perceptual Loss: 4.145665168762207

Epoch [53/200] Batch [0/3] Loss: 0.513122022151947 MSE Loss: 0.09608685970306396  
Perceptual Loss: 4.170351505279541

Epoch [54/200] Batch [0/3] Loss: 0.532504141330719 MSE Loss: 0.10118313878774643  
Perceptual Loss: 4.3132100105285645

Epoch [55/200] Batch [0/3] Loss: 0.5204957723617554 MSE Loss:  
0.10076253861188889 Perceptual Loss: 4.197332382202148

Epoch [56/200] Batch [0/3] Loss: 0.5023033618927002 MSE Loss:  
0.09146406501531601 Perceptual Loss: 4.108392715454102

Epoch [57/200] Batch [0/3] Loss: 0.5057255029678345 MSE Loss: 0.0965837836265564  
Perceptual Loss: 4.09141731262207

Epoch [58/200] Batch [0/3] Loss: 0.5197218656539917 MSE Loss:  
0.10026382654905319 Perceptual Loss: 4.194580554962158

Epoch [59/200] Batch [0/3] Loss: 0.528008222579956 MSE Loss: 0.10049565881490707  
Perceptual Loss: 4.275125503540039

Epoch [60/200] Batch [0/3] Loss: 0.5101748704910278 MSE Loss:  
0.09286417067050934 Perceptual Loss: 4.173107147216797

Epoch [61/200] Batch [0/3] Loss: 0.5437226891517639 MSE Loss:  
0.10240292549133301 Perceptual Loss: 4.4131975173950195

Epoch [62/200] Batch [0/3] Loss: 0.4925106167793274 MSE Loss: 0.090387724339962  
Perceptual Loss: 4.021228790283203

Epoch [63/200] Batch [0/3] Loss: 0.5032185912132263 MSE Loss:  
0.09242750704288483 Perceptual Loss: 4.107910633087158

Epoch [64/200] Batch [0/3] Loss: 0.5021413564682007 MSE Loss:  
0.09470584988594055 Perceptual Loss: 4.074355125427246

Epoch [65/200] Batch [0/3] Loss: 0.5117670297622681 MSE Loss:  
0.09362735599279404 Perceptual Loss: 4.181396484375

Epoch [66/200] Batch [0/3] Loss: 0.48501309752464294 MSE Loss:  
0.08788454532623291 Perceptual Loss: 3.971285343170166

Epoch [67/200] Batch [0/3] Loss: 0.5171619057655334 MSE Loss: 0.0982624813914299  
Perceptual Loss: 4.188994407653809

Epoch [68/200] Batch [0/3] Loss: 0.49766039848327637 MSE Loss:  
0.09077539294958115 Perceptual Loss: 4.068850040435791

Epoch [69/200] Batch [0/3] Loss: 0.516182005405426 MSE Loss: 0.09579404443502426  
Perceptual Loss: 4.203879356384277

Epoch [70/200] Batch [0/3] Loss: 0.5033196806907654 MSE Loss:  
0.09425291419029236 Perceptual Loss: 4.090667724609375

Epoch [71/200] Batch [0/3] Loss: 0.49585288763046265 MSE Loss:  
0.09046991914510727 Perceptual Loss: 4.053829669952393

Epoch [72/200] Batch [0/3] Loss: 0.5064850449562073 MSE Loss: 0.0918392688035965  
Perceptual Loss: 4.146457672119141

Epoch [73/200] Batch [0/3] Loss: 0.5065715312957764 MSE Loss:  
0.09407525509595871 Perceptual Loss: 4.12496280670166  
Epoch [74/200] Batch [0/3] Loss: 0.49950823187828064 MSE Loss:  
0.09416940063238144 Perceptual Loss: 4.0533881187438965  
Epoch [75/200] Batch [0/3] Loss: 0.47735273838043213 MSE Loss:  
0.08438052982091904 Perceptual Loss: 3.9297218322753906  
Epoch [76/200] Batch [0/3] Loss: 0.4961189031600952 MSE Loss: 0.0933113694190979  
Perceptual Loss: 4.028075218200684  
Epoch [77/200] Batch [0/3] Loss: 0.5102587342262268 MSE Loss:  
0.09365449845790863 Perceptual Loss: 4.166042327880859  
Epoch [78/200] Batch [0/3] Loss: 0.5044565796852112 MSE Loss:  
0.09246043860912323 Perceptual Loss: 4.119961261749268  
Epoch [79/200] Batch [0/3] Loss: 0.46812111139297485 MSE Loss:  
0.08546419441699982 Perceptual Loss: 3.826569080352783  
Epoch [80/200] Batch [0/3] Loss: 0.47668007016181946 MSE Loss:  
0.0875765010714531 Perceptual Loss: 3.891035556793213  
Epoch [81/200] Batch [0/3] Loss: 0.4756687879562378 MSE Loss:  
0.08439411967992783 Perceptual Loss: 3.9127464294433594  
Epoch [82/200] Batch [0/3] Loss: 0.48515015840530396 MSE Loss:  
0.08851750940084457 Perceptual Loss: 3.9663262367248535  
Epoch [83/200] Batch [0/3] Loss: 0.5010419487953186 MSE Loss:  
0.08875353634357452 Perceptual Loss: 4.1228837966918945  
Epoch [84/200] Batch [0/3] Loss: 0.49610966444015503 MSE Loss:  
0.09190849959850311 Perceptual Loss: 4.042011737823486  
Epoch [85/200] Batch [0/3] Loss: 0.4878135621547699 MSE Loss:  
0.08705425262451172 Perceptual Loss: 4.007593154907227  
Epoch [86/200] Batch [0/3] Loss: 0.4736534059047699 MSE Loss:  
0.08604224771261215 Perceptual Loss: 3.8761115074157715  
Epoch [87/200] Batch [0/3] Loss: 0.47205179929733276 MSE Loss:  
0.0846041738986969 Perceptual Loss: 3.874476194381714  
Epoch [88/200] Batch [0/3] Loss: 0.4916301965713501 MSE Loss:  
0.08842305839061737 Perceptual Loss: 4.032071590423584  
Epoch [89/200] Batch [0/3] Loss: 0.49199196696281433 MSE Loss:  
0.08804931491613388 Perceptual Loss: 4.039426326751709  
Epoch [90/200] Batch [0/3] Loss: 0.48359841108322144 MSE Loss:  
0.0886075347661972 Perceptual Loss: 3.94990873336792  
Epoch [91/200] Batch [0/3] Loss: 0.4836246371269226 MSE Loss: 0.0866670310497284  
Perceptual Loss: 3.969575881958008  
Epoch [92/200] Batch [0/3] Loss: 0.49129176139831543 MSE Loss:  
0.08856455981731415 Perceptual Loss: 4.027271747589111  
Epoch [93/200] Batch [0/3] Loss: 0.4833810329437256 MSE Loss: 0.0866859182715416  
Perceptual Loss: 3.9669508934020996  
Epoch [94/200] Batch [0/3] Loss: 0.46542108058929443 MSE Loss:  
0.08189608156681061 Perceptual Loss: 3.835249900817871  
Epoch [95/200] Batch [0/3] Loss: 0.5246860980987549 MSE Loss: 0.096353679895401  
Perceptual Loss: 4.283324241638184  
Epoch [96/200] Batch [0/3] Loss: 0.4809782803058624 MSE Loss:  
0.08644211292266846 Perceptual Loss: 3.945361614227295

Epoch [97/200] Batch [0/3] Loss: 0.4772683382034302 MSE Loss:  
0.08718422055244446 Perceptual Loss: 3.900841236114502  
Epoch [98/200] Batch [0/3] Loss: 0.46046531200408936 MSE Loss:  
0.08137711882591248 Perceptual Loss: 3.790881872177124  
Epoch [99/200] Batch [0/3] Loss: 0.4890516996383667 MSE Loss:  
0.08725854009389877 Perceptual Loss: 4.0179314613342285  
Epoch [100/200] Batch [0/3] Loss: 0.4969458281993866 MSE Loss:  
0.08967149257659912 Perceptual Loss: 4.0727434158325195  
Epoch [101/200] Batch [0/3] Loss: 0.49092450737953186 MSE Loss:  
0.08864950388669968 Perceptual Loss: 4.022749900817871  
Epoch [102/200] Batch [0/3] Loss: 0.4745990037918091 MSE Loss:  
0.08613096177577972 Perceptual Loss: 3.8846802711486816  
Epoch [103/200] Batch [0/3] Loss: 0.48821741342544556 MSE Loss:  
0.08803640305995941 Perceptual Loss: 4.001810073852539  
Epoch [104/200] Batch [0/3] Loss: 0.49425646662712097 MSE Loss:  
0.09017764776945114 Perceptual Loss: 4.040788173675537  
Epoch [105/200] Batch [0/3] Loss: 0.4770697355270386 MSE Loss:  
0.08627095073461533 Perceptual Loss: 3.907987594604492  
Epoch [106/200] Batch [0/3] Loss: 0.482160747051239 MSE Loss:  
0.08578439801931381 Perceptual Loss: 3.9637632369995117  
Epoch [107/200] Batch [0/3] Loss: 0.4669850170612335 MSE Loss:  
0.08482390642166138 Perceptual Loss: 3.821610927581787  
Epoch [127/200] Batch [0/3] Loss: 0.4925043284893036 MSE Loss:  
0.09047442674636841 Perceptual Loss: 4.020298957824707  
Epoch [128/200] Batch [0/3] Loss: 0.46710070967674255 MSE Loss:  
0.08302941173315048 Perceptual Loss: 3.840712785720825  
Epoch [129/200] Batch [0/3] Loss: 0.4642283320426941 MSE Loss:  
0.08149129897356033 Perceptual Loss: 3.8273704051971436  
Epoch [130/200] Batch [0/3] Loss: 0.45858776569366455 MSE Loss:  
0.08087097853422165 Perceptual Loss: 3.777167797088623  
Epoch [131/200] Batch [0/3] Loss: 0.4963628053665161 MSE Loss:  
0.08931400626897812 Perceptual Loss: 4.070487976074219  
Epoch [132/200] Batch [0/3] Loss: 0.45710277557373047 MSE Loss:  
0.08159735053777695 Perceptual Loss: 3.755053997039795  
Epoch [133/200] Batch [0/3] Loss: 0.4619095027446747 MSE Loss:  
0.08159846067428589 Perceptual Loss: 3.803110361099243  
Epoch [134/200] Batch [0/3] Loss: 0.4507333040237427 MSE Loss:  
0.07917110621929169 Perceptual Loss: 3.7156221866607666  
Epoch [135/200] Batch [0/3] Loss: 0.47467103600502014 MSE Loss:  
0.0863526463508606 Perceptual Loss: 3.8831839561462402  
Epoch [136/200] Batch [0/3] Loss: 0.45640796422958374 MSE Loss:  
0.0798364132642746 Perceptual Loss: 3.7657155990600586  
Epoch [137/200] Batch [0/3] Loss: 0.43909212946891785 MSE Loss:  
0.07514464855194092 Perceptual Loss: 3.639474868774414  
Epoch [138/200] Batch [0/3] Loss: 0.4623395800590515 MSE Loss:  
0.07944951951503754 Perceptual Loss: 3.8289008140563965  
Epoch [139/200] Batch [0/3] Loss: 0.4466986060142517 MSE Loss:  
0.07592751085758209 Perceptual Loss: 3.7077109813690186

Epoch [140/200] Batch [0/3] Loss: 0.4434426724910736 MSE Loss:  
0.07609209418296814 Perceptual Loss: 3.6735057830810547  
Epoch [141/200] Batch [0/3] Loss: 0.49993422627449036 MSE Loss:  
0.09112408012151718 Perceptual Loss: 4.088101387023926  
Epoch [142/200] Batch [0/3] Loss: 0.4766765534877777 MSE Loss:  
0.08514794707298279 Perceptual Loss: 3.915286064147949  
Epoch [143/200] Batch [0/3] Loss: 0.4744224548339844 MSE Loss:  
0.08563090860843658 Perceptual Loss: 3.8879151344299316  
Epoch [144/200] Batch [0/3] Loss: 0.4501934051513672 MSE Loss:  
0.07874266803264618 Perceptual Loss: 3.7145071029663086  
Epoch [145/200] Batch [0/3] Loss: 0.47109153866767883 MSE Loss:  
0.08365728706121445 Perceptual Loss: 3.874342441558838  
Epoch [146/200] Batch [0/3] Loss: 0.47165822982788086 MSE Loss:  
0.08360092341899872 Perceptual Loss: 3.88057279586792  
Epoch [147/200] Batch [0/3] Loss: 0.4536744952201843 MSE Loss:  
0.07769577205181122 Perceptual Loss: 3.759787082672119  
Epoch [148/200] Batch [0/3] Loss: 0.4404646158218384 MSE Loss:  
0.07632531970739365 Perceptual Loss: 3.641392707824707  
Epoch [149/200] Batch [0/3] Loss: 0.48276785016059875 MSE Loss:  
0.08367642760276794 Perceptual Loss: 3.9909141063690186  
Epoch [150/200] Batch [0/3] Loss: 0.4703749716281891 MSE Loss:  
0.0837600827217102 Perceptual Loss: 3.8661489486694336  
Epoch [151/200] Batch [0/3] Loss: 0.46792155504226685 MSE Loss:  
0.08389787375926971 Perceptual Loss: 3.8402366638183594  
Epoch [152/200] Batch [0/3] Loss: 0.45274507999420166 MSE Loss:  
0.07873370498418808 Perceptual Loss: 3.7401134967803955  
Epoch [153/200] Batch [0/3] Loss: 0.4720967411994934 MSE Loss:  
0.08279306441545486 Perceptual Loss: 3.8930368423461914  
Epoch [154/200] Batch [0/3] Loss: 0.45314013957977295 MSE Loss:  
0.08045272529125214 Perceptual Loss: 3.7268738746643066  
Epoch [155/200] Batch [0/3] Loss: 0.47287416458129883 MSE Loss:  
0.0840773805975914 Perceptual Loss: 3.887967586517334  
Epoch [156/200] Batch [0/3] Loss: 0.44998037815093994 MSE Loss:  
0.07824832201004028 Perceptual Loss: 3.717320442199707  
Epoch [157/200] Batch [0/3] Loss: 0.460239052772522 MSE Loss: 0.0808958038687706  
Perceptual Loss: 3.7934324741363525  
Epoch [158/200] Batch [0/3] Loss: 0.46243464946746826 MSE Loss:  
0.08537308871746063 Perceptual Loss: 3.770615339279175  
Epoch [159/200] Batch [0/3] Loss: 0.4819149971008301 MSE Loss:  
0.08705906569957733 Perceptual Loss: 3.948559284210205  
Epoch [160/200] Batch [0/3] Loss: 0.4749925434589386 MSE Loss:  
0.08464223146438599 Perceptual Loss: 3.903502941131592  
Epoch [161/200] Batch [0/3] Loss: 0.474870502948761 MSE Loss:  
0.08308681100606918 Perceptual Loss: 3.9178366661071777  
Epoch [162/200] Batch [0/3] Loss: 0.4577667713165283 MSE Loss:  
0.07891610264778137 Perceptual Loss: 3.788506507873535  
Epoch [163/200] Batch [0/3] Loss: 0.4525882303714752 MSE Loss:  
0.07764541357755661 Perceptual Loss: 3.7494280338287354

Epoch [164/200] Batch [0/3] Loss: 0.45189177989959717 MSE Loss:  
0.08090557903051376 Perceptual Loss: 3.7098617553710938  
Epoch [165/200] Batch [0/3] Loss: 0.44798678159713745 MSE Loss:  
0.08054926991462708 Perceptual Loss: 3.674375057220459  
Epoch [166/200] Batch [0/3] Loss: 0.4511215090751648 MSE Loss:  
0.07956715673208237 Perceptual Loss: 3.715543508529663  
Epoch [167/200] Batch [0/3] Loss: 0.48790740966796875 MSE Loss:  
0.09000556170940399 Perceptual Loss: 3.979018211364746  
Epoch [168/200] Batch [0/3] Loss: 0.4607623219490051 MSE Loss:  
0.08298133313655853 Perceptual Loss: 3.7778098583221436  
Epoch [169/200] Batch [0/3] Loss: 0.464724063873291 MSE Loss:  
0.08293893188238144 Perceptual Loss: 3.8178513050079346  
Epoch [170/200] Batch [0/3] Loss: 0.46570950746536255 MSE Loss:  
0.08188626170158386 Perceptual Loss: 3.8382325172424316  
Epoch [171/200] Batch [0/3] Loss: 0.44441652297973633 MSE Loss:  
0.07950975000858307 Perceptual Loss: 3.6490678787231445  
Epoch [172/200] Batch [0/3] Loss: 0.47143104672431946 MSE Loss:  
0.08356811851263046 Perceptual Loss: 3.878629207611084  
Epoch [173/200] Batch [0/3] Loss: 0.45501384139060974 MSE Loss:  
0.08018416166305542 Perceptual Loss: 3.7482967376708984  
Epoch [174/200] Batch [0/3] Loss: 0.4764372706413269 MSE Loss:  
0.0845971331000328 Perceptual Loss: 3.9184012413024902  
Epoch [175/200] Batch [0/3] Loss: 0.46850448846817017 MSE Loss:  
0.0850272998213768 Perceptual Loss: 3.8347718715667725  
Epoch [176/200] Batch [0/3] Loss: 0.4601707458496094 MSE Loss:  
0.08132250607013702 Perceptual Loss: 3.788482189178467  
Epoch [177/200] Batch [0/3] Loss: 0.46050703525543213 MSE Loss:  
0.0809648185968399 Perceptual Loss: 3.795422077178955  
Epoch [178/200] Batch [0/3] Loss: 0.45458757877349854 MSE Loss:  
0.07978107780218124 Perceptual Loss: 3.7480649948120117  
Epoch [179/200] Batch [0/3] Loss: 0.44683557748794556 MSE Loss:  
0.07706855237483978 Perceptual Loss: 3.6976702213287354  
Epoch [180/200] Batch [0/3] Loss: 0.46541479229927063 MSE Loss:  
0.0816635712981224 Perceptual Loss: 3.8375120162963867  
Epoch [181/200] Batch [0/3] Loss: 0.44478049874305725 MSE Loss:  
0.0757734403014183 Perceptual Loss: 3.690070390701294  
Epoch [182/200] Batch [0/3] Loss: 0.44090282917022705 MSE Loss:  
0.07708672434091568 Perceptual Loss: 3.6381611824035645  
Epoch [183/200] Batch [0/3] Loss: 0.4628694951534271 MSE Loss:  
0.08174466341733932 Perceptual Loss: 3.8112480640411377  
Epoch [184/200] Batch [0/3] Loss: 0.4670006334781647 MSE Loss:  
0.0809715986251831 Perceptual Loss: 3.860290288925171  
Epoch [185/200] Batch [0/3] Loss: 0.4492638111114502 MSE Loss:  
0.07831565290689468 Perceptual Loss: 3.7094814777374268  
Epoch [186/200] Batch [0/3] Loss: 0.4849529266357422 MSE Loss:  
0.08583228290081024 Perceptual Loss: 3.991206169128418  
Epoch [187/200] Batch [0/3] Loss: 0.4736023545265198 MSE Loss:  
0.08519898355007172 Perceptual Loss: 3.884033679962158

Epoch [188/200] Batch [0/3] Loss: 0.4652867317199707 MSE Loss:  
0.08181792497634888 Perceptual Loss: 3.8346879482269287  
Epoch [189/200] Batch [0/3] Loss: 0.45712941884994507 MSE Loss:  
0.08057431876659393 Perceptual Loss: 3.7655510902404785  
Epoch [190/200] Batch [0/3] Loss: 0.45447197556495667 MSE Loss:  
0.08169881254434586 Perceptual Loss: 3.727731704711914  
Epoch [191/200] Batch [0/3] Loss: 0.4551774263381958 MSE Loss:  
0.08116854727268219 Perceptual Loss: 3.740088701248169  
Epoch [192/200] Batch [0/3] Loss: 0.4623926877975464 MSE Loss:  
0.08045525848865509 Perceptual Loss: 3.8193740844726562  
Epoch [193/200] Batch [0/3] Loss: 0.4408288598060608 MSE Loss:  
0.07692839205265045 Perceptual Loss: 3.639004707336426  
Epoch [194/200] Batch [0/3] Loss: 0.44452667236328125 MSE Loss:  
0.07817739248275757 Perceptual Loss: 3.6634926795959473  
Epoch [195/200] Batch [0/3] Loss: 0.46448370814323425 MSE Loss:  
0.08222924917936325 Perceptual Loss: 3.822544574737549  
Epoch [196/200] Batch [0/3] Loss: 0.43994373083114624 MSE Loss:  
0.07581649720668793 Perceptual Loss: 3.64127254486084  
Epoch [197/200] Batch [0/3] Loss: 0.45892176032066345 MSE Loss:  
0.0844653844833374 Perceptual Loss: 3.7445638179779053  
Epoch [198/200] Batch [0/3] Loss: 0.45435237884521484 MSE Loss:  
0.08144848048686981 Perceptual Loss: 3.729039192199707  
Epoch [199/200] Batch [0/3] Loss: 0.45735931396484375 MSE Loss:  
0.08074241876602173 Perceptual Loss: 3.7661688327789307  
Epoch [200/200] Batch [0/3] Loss: 0.44102951884269714 MSE Loss:  
0.07464254647493362 Perceptual Loss: 3.663869857788086  
Model's time taken - 962.4527230262756  
FID score: 1531.4423638640328  
Inception score: 1.5695348978042603 ± 0.017648113891482353  
Training with hyperparameters: {'lr': 0.001, 'beta1': 0.5}  
{'lr': 0.001, 'beta1': 0.5}  
Epoch [1/200] Batch [0/3] Loss: 1.1969969272613525 MSE Loss: 0.32341447472572327  
Perceptual Loss: 8.735824584960938  
Epoch [2/200] Batch [0/3] Loss: 1.0859837532043457 MSE Loss: 0.3391675353050232  
Perceptual Loss: 7.4681620597839355  
Epoch [3/200] Batch [0/3] Loss: 1.0260792970657349 MSE Loss: 0.32668811082839966  
Perceptual Loss: 6.9939117431640625  
Epoch [4/200] Batch [0/3] Loss: 0.929360032081604 MSE Loss: 0.29065537452697754  
Perceptual Loss: 6.3870463371276855  
Epoch [5/200] Batch [0/3] Loss: 0.9270455837249756 MSE Loss: 0.27320173382759094  
Perceptual Loss: 6.538437843322754  
Epoch [6/200] Batch [0/3] Loss: 0.8778468370437622 MSE Loss: 0.24567902088165283  
Perceptual Loss: 6.321678161621094  
Epoch [7/200] Batch [0/3] Loss: 0.8666179180145264 MSE Loss: 0.2357565015554428  
Perceptual Loss: 6.3086137771606445  
Epoch [8/200] Batch [0/3] Loss: 0.7755106091499329 MSE Loss: 0.19568544626235962  
Perceptual Loss: 5.798251628875732  
Epoch [9/200] Batch [0/3] Loss: 0.7383805513381958 MSE Loss: 0.16757318377494812

Perceptual Loss: 5.708073616027832  
Epoch [10/200] Batch [0/3] Loss: 0.7156822085380554 MSE Loss:  
0.14784030616283417 Perceptual Loss: 5.6784186363220215  
Epoch [11/200] Batch [0/3] Loss: 0.695069432258606 MSE Loss: 0.13676758110523224  
Perceptual Loss: 5.5830183029174805  
Epoch [12/200] Batch [0/3] Loss: 0.6359395980834961 MSE Loss:  
0.12219808995723724 Perceptual Loss: 5.137414932250977  
Epoch [13/200] Batch [0/3] Loss: 0.6357523798942566 MSE Loss:  
0.11583521217107773 Perceptual Loss: 5.199172019958496  
Epoch [14/200] Batch [0/3] Loss: 0.6213935017585754 MSE Loss:  
0.10560836642980576 Perceptual Loss: 5.157851219177246  
Epoch [15/200] Batch [0/3] Loss: 0.623446524143219 MSE Loss: 0.10992223024368286  
Perceptual Loss: 5.135242938995361  
Epoch [16/200] Batch [0/3] Loss: 0.600090503692627 MSE Loss: 0.10436584055423737  
Perceptual Loss: 4.95724630355835  
Epoch [17/200] Batch [0/3] Loss: 0.5697645545005798 MSE Loss:  
0.09746380150318146 Perceptual Loss: 4.7230072021484375  
Epoch [18/200] Batch [0/3] Loss: 0.5603103041648865 MSE Loss:  
0.09615805000066757 Perceptual Loss: 4.641522407531738  
Epoch [19/200] Batch [0/3] Loss: 0.5442537069320679 MSE Loss: 0.0912240669131279  
Perceptual Loss: 4.530296325683594  
Epoch [20/200] Batch [0/3] Loss: 0.5894910097122192 MSE Loss:  
0.09739707410335541 Perceptual Loss: 4.9209394454956055  
Epoch [21/200] Batch [0/3] Loss: 0.5678443908691406 MSE Loss:  
0.09909796714782715 Perceptual Loss: 4.687463760375977  
Epoch [22/200] Batch [0/3] Loss: 0.5374658107757568 MSE Loss:  
0.09198567271232605 Perceptual Loss: 4.454801559448242  
Epoch [23/200] Batch [0/3] Loss: 0.5421299934387207 MSE Loss:  
0.09081009030342102 Perceptual Loss: 4.5131988525390625  
Epoch [24/200] Batch [0/3] Loss: 0.5052953958511353 MSE Loss: 0.082380510866642  
Perceptual Loss: 4.229148864746094  
Epoch [25/200] Batch [0/3] Loss: 0.555567741394043 MSE Loss: 0.08920499682426453  
Perceptual Loss: 4.6636271476745605  
Epoch [26/200] Batch [0/3] Loss: 0.5907320976257324 MSE Loss:  
0.08642318844795227 Perceptual Loss: 5.043088912963867  
Epoch [27/200] Batch [0/3] Loss: 0.5305266976356506 MSE Loss: 0.0834137424826622  
Perceptual Loss: 4.471129417419434  
Epoch [28/200] Batch [0/3] Loss: 0.5198314189910889 MSE Loss:  
0.08387607336044312 Perceptual Loss: 4.359553337097168  
Epoch [29/200] Batch [0/3] Loss: 0.514640212059021 MSE Loss: 0.08874577283859253  
Perceptual Loss: 4.258944511413574  
Epoch [30/200] Batch [0/3] Loss: 0.496768057346344 MSE Loss: 0.08395176380872726  
Perceptual Loss: 4.128162860870361  
Epoch [31/200] Batch [0/3] Loss: 0.524255633354187 MSE Loss: 0.08808913081884384  
Perceptual Loss: 4.361664772033691  
Epoch [32/200] Batch [0/3] Loss: 0.4788476824760437 MSE Loss:  
0.07794494926929474 Perceptual Loss: 4.009027481079102  
Epoch [33/200] Batch [0/3] Loss: 0.4851965308189392 MSE Loss:

0.07963335514068604 Perceptual Loss: 4.055631637573242  
Epoch [34/200] Batch [0/3] Loss: 0.47950854897499084 MSE Loss:  
0.07692820578813553 Perceptual Loss: 4.025803565979004  
Epoch [35/200] Batch [0/3] Loss: 0.48570188879966736 MSE Loss:  
0.08014586567878723 Perceptual Loss: 4.055560111999512  
Epoch [36/200] Batch [0/3] Loss: 0.5012242794036865 MSE Loss:  
0.08420413732528687 Perceptual Loss: 4.170201778411865  
Epoch [37/200] Batch [0/3] Loss: 0.4872381091117859 MSE Loss:  
0.08170096576213837 Perceptual Loss: 4.055371284484863  
Epoch [38/200] Batch [0/3] Loss: 0.47651952505111694 MSE Loss:  
0.07817289233207703 Perceptual Loss: 3.983466148376465  
Epoch [39/200] Batch [0/3] Loss: 0.47956833243370056 MSE Loss:  
0.07976102083921432 Perceptual Loss: 3.998073101043701  
Epoch [40/200] Batch [0/3] Loss: 0.4625188708305359 MSE Loss:  
0.07517179846763611 Perceptual Loss: 3.8734705448150635  
Epoch [41/200] Batch [0/3] Loss: 0.4983499050140381 MSE Loss: 0.0866398960351944  
Perceptual Loss: 4.117100238800049  
Epoch [42/200] Batch [0/3] Loss: 0.46300196647644043 MSE Loss:  
0.07717141509056091 Perceptual Loss: 3.8583054542541504  
Epoch [43/200] Batch [0/3] Loss: 0.4674873948097229 MSE Loss:  
0.07802280783653259 Perceptual Loss: 3.8946456909179688  
Epoch [44/200] Batch [0/3] Loss: 0.46998029947280884 MSE Loss:  
0.07932622730731964 Perceptual Loss: 3.906540870666504  
Epoch [45/200] Batch [0/3] Loss: 0.6232905983924866 MSE Loss:  
0.07817058265209198 Perceptual Loss: 5.451200008392334  
Epoch [46/200] Batch [0/3] Loss: 0.5646225214004517 MSE Loss: 0.091303251683712  
Perceptual Loss: 4.733192443847656  
Epoch [47/200] Batch [0/3] Loss: 0.49099335074424744 MSE Loss:  
0.08383873105049133 Perceptual Loss: 4.0715460777282715  
Epoch [48/200] Batch [0/3] Loss: 0.4661226272583008 MSE Loss:  
0.07389552891254425 Perceptual Loss: 3.9222710132598877  
Epoch [49/200] Batch [0/3] Loss: 0.44918298721313477 MSE Loss:  
0.07251598685979843 Perceptual Loss: 3.766669750213623  
Epoch [50/200] Batch [0/3] Loss: 0.46632981300354004 MSE Loss:  
0.07876864075660706 Perceptual Loss: 3.8756115436553955  
Epoch [51/200] Batch [0/3] Loss: 0.4738656282424927 MSE Loss:  
0.07979787886142731 Perceptual Loss: 3.9406776428222656  
Epoch [52/200] Batch [0/3] Loss: 0.45721635222435 MSE Loss: 0.07705866545438766  
Perceptual Loss: 3.801576852798462  
Epoch [53/200] Batch [0/3] Loss: 0.4450324475765228 MSE Loss:  
0.07418381422758102 Perceptual Loss: 3.7084860801696777  
Epoch [54/200] Batch [0/3] Loss: 0.477968692779541 MSE Loss: 0.08449094742536545  
Perceptual Loss: 3.93477725982666  
Epoch [55/200] Batch [0/3] Loss: 0.45523369312286377 MSE Loss:  
0.07609514892101288 Perceptual Loss: 3.7913856506347656  
Epoch [56/200] Batch [0/3] Loss: 0.4678055942058563 MSE Loss:  
0.08137926459312439 Perceptual Loss: 3.8642632961273193  
Epoch [57/200] Batch [0/3] Loss: 0.45205768942832947 MSE Loss:

0.07628613710403442 Perceptual Loss: 3.7577154636383057  
Epoch [58/200] Batch [0/3] Loss: 0.46608179807662964 MSE Loss:  
0.07940645515918732 Perceptual Loss: 3.866753339767456  
Epoch [59/200] Batch [0/3] Loss: 0.457225501537323 MSE Loss: 0.07609255611896515  
Perceptual Loss: 3.8113293647766113  
Epoch [60/200] Batch [0/3] Loss: 0.442788302898407 MSE Loss: 0.07617698609828949  
Perceptual Loss: 3.6661133766174316  
Epoch [61/200] Batch [0/3] Loss: 0.43247130513191223 MSE Loss:  
0.07246013730764389 Perceptual Loss: 3.600111484527588  
Epoch [62/200] Batch [0/3] Loss: 0.4614314138889313 MSE Loss:  
0.07895541191101074 Perceptual Loss: 3.8247599601745605  
Epoch [63/200] Batch [0/3] Loss: 0.4663166403770447 MSE Loss:  
0.08050225675106049 Perceptual Loss: 3.8581438064575195  
Epoch [64/200] Batch [0/3] Loss: 0.43104690313339233 MSE Loss:  
0.07277999818325043 Perceptual Loss: 3.5826687812805176  
Epoch [65/200] Batch [0/3] Loss: 0.4285880923271179 MSE Loss:  
0.07119674235582352 Perceptual Loss: 3.57391357421875  
Epoch [66/200] Batch [0/3] Loss: 0.4271964430809021 MSE Loss: 0.073509082198143  
Perceptual Loss: 3.5368735790252686  
Epoch [67/200] Batch [0/3] Loss: 0.4011649489402771 MSE Loss:  
0.06421269476413727 Perceptual Loss: 3.3695225715637207  
Epoch [68/200] Batch [0/3] Loss: 0.44639328122138977 MSE Loss:  
0.07985842972993851 Perceptual Loss: 3.665348529815674  
Epoch [69/200] Batch [0/3] Loss: 0.43680521845817566 MSE Loss:  
0.07622655481100082 Perceptual Loss: 3.6057865619659424  
Epoch [70/200] Batch [0/3] Loss: 0.4259728193283081 MSE Loss:  
0.07158877700567245 Perceptual Loss: 3.543840169906616  
Epoch [71/200] Batch [0/3] Loss: 0.4410169720649719 MSE Loss:  
0.07297583669424057 Perceptual Loss: 3.6804113388061523  
Epoch [72/200] Batch [0/3] Loss: 0.43862032890319824 MSE Loss:  
0.07606729865074158 Perceptual Loss: 3.625530242919922  
Epoch [73/200] Batch [0/3] Loss: 0.43125221133232117 MSE Loss:  
0.07339202612638474 Perceptual Loss: 3.578601837158203  
Epoch [74/200] Batch [0/3] Loss: 0.44341742992401123 MSE Loss:  
0.07727210223674774 Perceptual Loss: 3.6614530086517334  
Epoch [75/200] Batch [0/3] Loss: 0.4149339199066162 MSE Loss:  
0.06816890090703964 Perceptual Loss: 3.4676501750946045  
Epoch [76/200] Batch [0/3] Loss: 0.43472373485565186 MSE Loss:  
0.07304085791110992 Perceptual Loss: 3.6168289184570312  
Epoch [77/200] Batch [0/3] Loss: 0.4022957980632782 MSE Loss:  
0.06996185332536697 Perceptual Loss: 3.3233394622802734  
Epoch [78/200] Batch [0/3] Loss: 0.42764416337013245 MSE Loss:  
0.07240897417068481 Perceptual Loss: 3.552351951599121  
Epoch [79/200] Batch [0/3] Loss: 0.4395805299282074 MSE Loss:  
0.07679092139005661 Perceptual Loss: 3.6278958320617676  
Epoch [80/200] Batch [0/3] Loss: 0.4130682945251465 MSE Loss:  
0.07147641479969025 Perceptual Loss: 3.4159188270568848  
Epoch [81/200] Batch [0/3] Loss: 0.39013952016830444 MSE Loss:

0.06486961245536804 Perceptual Loss: 3.2526988983154297  
Epoch [82/200] Batch [0/3] Loss: 0.4013456106185913 MSE Loss:  
0.06734834611415863 Perceptual Loss: 3.339972734451294  
Epoch [83/200] Batch [0/3] Loss: 0.4052610695362091 MSE Loss:  
0.06799598783254623 Perceptual Loss: 3.372650623321533  
Epoch [84/200] Batch [0/3] Loss: 0.38855135440826416 MSE Loss:  
0.06562434136867523 Perceptual Loss: 3.2292702198028564  
Epoch [85/200] Batch [0/3] Loss: 0.4132601022720337 MSE Loss:  
0.06968910247087479 Perceptual Loss: 3.4357099533081055  
Epoch [86/200] Batch [0/3] Loss: 0.424957275390625 MSE Loss: 0.0758139118552208  
Perceptual Loss: 3.491433620452881  
Epoch [87/200] Batch [0/3] Loss: 0.40719276666641235 MSE Loss:  
0.06915248930454254 Perceptual Loss: 3.3804025650024414  
Epoch [88/200] Batch [0/3] Loss: 0.4383088946342468 MSE Loss:  
0.07641109079122543 Perceptual Loss: 3.6189777851104736  
Epoch [89/200] Batch [0/3] Loss: 0.3856915235519409 MSE Loss:  
0.06535877287387848 Perceptual Loss: 3.203327178955078  
Epoch [90/200] Batch [0/3] Loss: 0.40706172585487366 MSE Loss:  
0.06971654295921326 Perceptual Loss: 3.3734517097473145  
Epoch [91/200] Batch [0/3] Loss: 0.39881497621536255 MSE Loss:  
0.06777502596378326 Perceptual Loss: 3.3103995323181152  
Epoch [92/200] Batch [0/3] Loss: 0.38551050424575806 MSE Loss:  
0.06613464653491974 Perceptual Loss: 3.193758726119995  
Epoch [93/200] Batch [0/3] Loss: 0.3790735602378845 MSE Loss:  
0.06434763967990875 Perceptual Loss: 3.14725923538208  
Epoch [94/200] Batch [0/3] Loss: 0.3919718563556671 MSE Loss:  
0.06731674075126648 Perceptual Loss: 3.246551036834717  
Epoch [95/200] Batch [0/3] Loss: 0.41094714403152466 MSE Loss:  
0.0741112157702446 Perceptual Loss: 3.368359088897705  
Epoch [96/200] Batch [0/3] Loss: 0.4105765223503113 MSE Loss:  
0.07230755686759949 Perceptual Loss: 3.3826894760131836  
Epoch [97/200] Batch [0/3] Loss: 0.41890114545822144 MSE Loss:  
0.07577382028102875 Perceptual Loss: 3.4312729835510254  
Epoch [98/200] Batch [0/3] Loss: 0.3909171521663666 MSE Loss:  
0.06594062596559525 Perceptual Loss: 3.249765157699585  
Epoch [99/200] Batch [0/3] Loss: 0.38604626059532166 MSE Loss:  
0.0670785903930664 Perceptual Loss: 3.1896767616271973  
Epoch [100/200] Batch [0/3] Loss: 0.38627785444259644 MSE Loss:  
0.06618814170360565 Perceptual Loss: 3.200896978378296  
Epoch [101/200] Batch [0/3] Loss: 0.38420185446739197 MSE Loss:  
0.06722443550825119 Perceptual Loss: 3.169774055480957  
Epoch [102/200] Batch [0/3] Loss: 0.4266863465309143 MSE Loss:  
0.07639136910438538 Perceptual Loss: 3.5029497146606445  
Epoch [103/200] Batch [0/3] Loss: 0.40945157408714294 MSE Loss:  
0.07024957984685898 Perceptual Loss: 3.392019748687744  
Epoch [104/200] Batch [0/3] Loss: 0.4092675447463989 MSE Loss:  
0.07098892331123352 Perceptual Loss: 3.382786273956299  
Epoch [105/200] Batch [0/3] Loss: 0.39200204610824585 MSE Loss:

0.06631504744291306 Perceptual Loss: 3.2568697929382324  
Epoch [106/200] Batch [0/3] Loss: 0.3889457881450653 MSE Loss:  
0.06760882586240768 Perceptual Loss: 3.213369369506836  
Epoch [107/200] Batch [0/3] Loss: 0.38818806409835815 MSE Loss:  
0.06875310838222504 Perceptual Loss: 3.194349527359009  
Epoch [108/200] Batch [0/3] Loss: 0.3823050260543823 MSE Loss:  
0.06476734578609467 Perceptual Loss: 3.1753768920898438  
Epoch [109/200] Batch [0/3] Loss: 0.37932658195495605 MSE Loss:  
0.06797976046800613 Perceptual Loss: 3.1134681701660156  
Epoch [110/200] Batch [0/3] Loss: 0.38473886251449585 MSE Loss:  
0.06719328463077545 Perceptual Loss: 3.1754555702209473  
Epoch [111/200] Batch [0/3] Loss: 0.3768519461154938 MSE Loss:  
0.06616652011871338 Perceptual Loss: 3.106854200363159  
Epoch [112/200] Batch [0/3] Loss: 0.40579909086227417 MSE Loss:  
0.0725574940443039 Perceptual Loss: 3.332415819168091  
Epoch [113/200] Batch [0/3] Loss: 0.376336932182312 MSE Loss:  
0.06450347602367401 Perceptual Loss: 3.1183347702026367  
Epoch [114/200] Batch [0/3] Loss: 0.400277316570282 MSE Loss:  
0.07184629142284393 Perceptual Loss: 3.2843101024627686  
Epoch [115/200] Batch [0/3] Loss: 0.3981856107711792 MSE Loss:  
0.07135821878910065 Perceptual Loss: 3.2682735919952393  
Epoch [116/200] Batch [0/3] Loss: 0.3985360860824585 MSE Loss:  
0.06926240772008896 Perceptual Loss: 3.292736768722534  
Epoch [117/200] Batch [0/3] Loss: 0.3854157328605652 MSE Loss:  
0.06668636202812195 Perceptual Loss: 3.187293767929077  
Epoch [118/200] Batch [0/3] Loss: 0.3845432996749878 MSE Loss:  
0.06922256946563721 Perceptual Loss: 3.153207302093506  
Epoch [119/200] Batch [0/3] Loss: 0.39914682507514954 MSE Loss:  
0.07017189264297485 Perceptual Loss: 3.2897491455078125  
Epoch [120/200] Batch [0/3] Loss: 0.4139936566352844 MSE Loss:  
0.07570911198854446 Perceptual Loss: 3.382845401763916  
Epoch [121/200] Batch [0/3] Loss: 0.35179898142814636 MSE Loss:  
0.059865694493055344 Perceptual Loss: 2.919332981109619  
Epoch [122/200] Batch [0/3] Loss: 0.3784219026565552 MSE Loss: 0.066206194460392  
Perceptual Loss: 3.122157096862793  
Epoch [123/200] Batch [0/3] Loss: 0.3536931872367859 MSE Loss:  
0.06038103997707367 Perceptual Loss: 2.933121681213379  
Epoch [124/200] Batch [0/3] Loss: 0.3918105363845825 MSE Loss:  
0.07181005924940109 Perceptual Loss: 3.2000045776367188  
Epoch [125/200] Batch [0/3] Loss: 0.3874603509902954 MSE Loss:  
0.06913141906261444 Perceptual Loss: 3.1832895278930664  
Epoch [126/200] Batch [0/3] Loss: 0.38254183530807495 MSE Loss:  
0.0670495331287384 Perceptual Loss: 3.1549229621887207  
Epoch [127/200] Batch [0/3] Loss: 0.3979966640472412 MSE Loss:  
0.07110443711280823 Perceptual Loss: 3.2689223289489746  
Epoch [128/200] Batch [0/3] Loss: 0.3759599030017853 MSE Loss:  
0.06649059057235718 Perceptual Loss: 3.0946929454803467  
Epoch [129/200] Batch [0/3] Loss: 0.35128211975097656 MSE Loss:

0.06151827424764633 Perceptual Loss: 2.8976383209228516  
Epoch [130/200] Batch [0/3] Loss: 0.39996764063835144 MSE Loss:  
0.07390090823173523 Perceptual Loss: 3.260667324066162  
Epoch [131/200] Batch [0/3] Loss: 0.39835429191589355 MSE Loss:  
0.07040812075138092 Perceptual Loss: 3.27946138381958  
Epoch [132/200] Batch [0/3] Loss: 0.3820864260196686 MSE Loss:  
0.06764194369316101 Perceptual Loss: 3.144444704055786  
Epoch [133/200] Batch [0/3] Loss: 0.3555755913257599 MSE Loss:  
0.06406302005052567 Perceptual Loss: 2.915125846862793  
Epoch [134/200] Batch [0/3] Loss: 0.36307549476623535 MSE Loss:  
0.0647532194852829 Perceptual Loss: 2.9832229614257812  
Epoch [135/200] Batch [0/3] Loss: 0.36994531750679016 MSE Loss:  
0.06462055444717407 Perceptual Loss: 3.0532474517822266  
Epoch [136/200] Batch [0/3] Loss: 0.3844618797302246 MSE Loss:  
0.06967978924512863 Perceptual Loss: 3.1478207111358643  
Epoch [137/200] Batch [0/3] Loss: 0.4022229313850403 MSE Loss:  
0.07202950865030289 Perceptual Loss: 3.301934242248535  
Epoch [138/200] Batch [0/3] Loss: 0.36009830236434937 MSE Loss:  
0.06431576609611511 Perceptual Loss: 2.957825183868408  
Epoch [139/200] Batch [0/3] Loss: 0.37183958292007446 MSE Loss:  
0.06350693106651306 Perceptual Loss: 3.0833263397216797  
Epoch [140/200] Batch [0/3] Loss: 0.36738675832748413 MSE Loss:  
0.064359650015831 Perceptual Loss: 3.030271053314209  
Epoch [141/200] Batch [0/3] Loss: 0.35970258712768555 MSE Loss:  
0.06359778344631195 Perceptual Loss: 2.961047887802124  
Epoch [142/200] Batch [0/3] Loss: 0.38648536801338196 MSE Loss:  
0.07130127400159836 Perceptual Loss: 3.151840925216675  
Epoch [143/200] Batch [0/3] Loss: 0.3746766448020935 MSE Loss:  
0.06574967503547668 Perceptual Loss: 3.0892696380615234  
Epoch [144/200] Batch [0/3] Loss: 0.36602598428726196 MSE Loss:  
0.06612228602170944 Perceptual Loss: 2.9990367889404297  
Epoch [145/200] Batch [0/3] Loss: 0.38775449991226196 MSE Loss:  
0.07179924845695496 Perceptual Loss: 3.159552574157715  
Epoch [146/200] Batch [0/3] Loss: 0.3706916570663452 MSE Loss:  
0.06740359961986542 Perceptual Loss: 3.0328807830810547  
Epoch [147/200] Batch [0/3] Loss: 0.3980022072792053 MSE Loss:  
0.07070040702819824 Perceptual Loss: 3.2730178833007812  
Epoch [148/200] Batch [0/3] Loss: 0.35730329155921936 MSE Loss:  
0.061793237924575806 Perceptual Loss: 2.9551005363464355  
Epoch [149/200] Batch [0/3] Loss: 0.37603989243507385 MSE Loss:  
0.06736946105957031 Perceptual Loss: 3.0867042541503906  
Epoch [150/200] Batch [0/3] Loss: 0.3722425103187561 MSE Loss:  
0.06828087568283081 Perceptual Loss: 3.039616346359253  
Epoch [151/200] Batch [0/3] Loss: 0.3953818678855896 MSE Loss:  
0.0687408596277237 Perceptual Loss: 3.2664098739624023  
Epoch [152/200] Batch [0/3] Loss: 0.373620867729187 MSE Loss:  
0.06842231005430222 Perceptual Loss: 3.051985502243042  
Epoch [153/200] Batch [0/3] Loss: 0.3778247833251953 MSE Loss:

0.06888093054294586 Perceptual Loss: 3.0894384384155273  
Epoch [154/200] Batch [0/3] Loss: 0.3733295202255249 MSE Loss:  
0.06801595538854599 Perceptual Loss: 3.053135395050049  
Epoch [155/200] Batch [0/3] Loss: 0.3278217315673828 MSE Loss:  
0.05662380903959274 Perceptual Loss: 2.7119791507720947  
Epoch [156/200] Batch [0/3] Loss: 0.3512627184391022 MSE Loss:  
0.060997992753982544 Perceptual Loss: 2.9026472568511963  
Epoch [157/200] Batch [0/3] Loss: 0.3409191966056824 MSE Loss:  
0.05795461684465408 Perceptual Loss: 2.829645872116089  
Epoch [158/200] Batch [0/3] Loss: 0.35519763827323914 MSE Loss:  
0.06510353088378906 Perceptual Loss: 2.9009411334991455  
Epoch [159/200] Batch [0/3] Loss: 0.36033737659454346 MSE Loss:  
0.06522282212972641 Perceptual Loss: 2.9511454105377197  
Epoch [160/200] Batch [0/3] Loss: 0.37260204553604126 MSE Loss:  
0.06754235923290253 Perceptual Loss: 3.0505969524383545  
Epoch [161/200] Batch [0/3] Loss: 0.3628228008747101 MSE Loss:  
0.06580349802970886 Perceptual Loss: 2.9701929092407227  
Epoch [162/200] Batch [0/3] Loss: 0.3807256519794464 MSE Loss:  
0.0689358115196228 Perceptual Loss: 3.117898464202881  
Epoch [163/200] Batch [0/3] Loss: 0.3719448447227478 MSE Loss:  
0.06778185069561005 Perceptual Loss: 3.0416300296783447  
Epoch [164/200] Batch [0/3] Loss: 0.36224791407585144 MSE Loss:  
0.0659375786781311 Perceptual Loss: 2.9631032943725586  
Epoch [165/200] Batch [0/3] Loss: 0.37918391823768616 MSE Loss:  
0.07032626867294312 Perceptual Loss: 3.088576316833496  
Epoch [166/200] Batch [0/3] Loss: 0.34934142231941223 MSE Loss:  
0.06381233781576157 Perceptual Loss: 2.855290651321411  
Epoch [167/200] Batch [0/3] Loss: 0.3380972743034363 MSE Loss:  
0.05905483290553093 Perceptual Loss: 2.790424346923828  
Epoch [168/200] Batch [0/3] Loss: 0.3672915995121002 MSE Loss:  
0.06580114364624023 Perceptual Loss: 3.014904499053955  
Epoch [169/200] Batch [0/3] Loss: 0.35479894280433655 MSE Loss:  
0.06570333987474442 Perceptual Loss: 2.890955924987793  
Epoch [170/200] Batch [0/3] Loss: 0.34714195132255554 MSE Loss:  
0.06322457641363144 Perceptual Loss: 2.8391735553741455  
Epoch [171/200] Batch [0/3] Loss: 0.3552449941635132 MSE Loss:  
0.06520266830921173 Perceptual Loss: 2.900423049926758  
Epoch [172/200] Batch [0/3] Loss: 0.37367314100265503 MSE Loss:  
0.06880243122577667 Perceptual Loss: 3.0487072467803955  
Epoch [173/200] Batch [0/3] Loss: 0.41327157616615295 MSE Loss:  
0.07624783366918564 Perceptual Loss: 3.370237350463867  
Epoch [174/200] Batch [0/3] Loss: 0.3880876898765564 MSE Loss:  
0.07238228619098663 Perceptual Loss: 3.1570539474487305  
Epoch [175/200] Batch [0/3] Loss: 0.3716335892677307 MSE Loss:  
0.06995747983455658 Perceptual Loss: 3.016761302947998  
Epoch [176/200] Batch [0/3] Loss: 0.3781694173812866 MSE Loss:  
0.0722997635602951 Perceptual Loss: 3.0586965084075928  
Epoch [177/200] Batch [0/3] Loss: 0.3584194779396057 MSE Loss:

0.06522045284509659 Perceptual Loss: 2.931990146636963  
Epoch [178/200] Batch [0/3] Loss: 0.35416579246520996 MSE Loss:  
0.06276798248291016 Perceptual Loss: 2.913978099822998  
Epoch [179/200] Batch [0/3] Loss: 0.37532350420951843 MSE Loss:  
0.06828805059194565 Perceptual Loss: 3.070354461669922  
Epoch [180/200] Batch [0/3] Loss: 0.3608534336090088 MSE Loss:  
0.06522371619939804 Perceptual Loss: 2.9562971591949463  
Epoch [181/200] Batch [0/3] Loss: 0.3497145473957062 MSE Loss:  
0.06259766221046448 Perceptual Loss: 2.871168851852417  
Epoch [182/200] Batch [0/3] Loss: 0.36522793769836426 MSE Loss:  
0.06526440382003784 Perceptual Loss: 2.9996352195739746  
Epoch [183/200] Batch [0/3] Loss: 0.3691824972629547 MSE Loss:  
0.0677754208445549 Perceptual Loss: 3.014070510864258  
Epoch [184/200] Batch [0/3] Loss: 0.3555159866809845 MSE Loss:  
0.06390523910522461 Perceptual Loss: 2.916107416152954  
Epoch [185/200] Batch [0/3] Loss: 0.3725053369998932 MSE Loss:  
0.06936359405517578 Perceptual Loss: 3.0314173698425293  
Epoch [186/200] Batch [0/3] Loss: 0.3475646674633026 MSE Loss:  
0.06429693847894669 Perceptual Loss: 2.8326773643493652  
Epoch [187/200] Batch [0/3] Loss: 0.3317621648311615 MSE Loss:  
0.05925660580396652 Perceptual Loss: 2.725055456161499  
Epoch [188/200] Batch [0/3] Loss: 0.33302292227745056 MSE Loss:  
0.058886345475912094 Perceptual Loss: 2.741365671157837  
Epoch [189/200] Batch [0/3] Loss: 0.34138497710227966 MSE Loss:  
0.06270676106214523 Perceptual Loss: 2.7867820262908936  
Epoch [190/200] Batch [0/3] Loss: 0.32701775431632996 MSE Loss:  
0.05882521718740463 Perceptual Loss: 2.6819252967834473  
Epoch [191/200] Batch [0/3] Loss: 0.36648017168045044 MSE Loss:  
0.06632418930530548 Perceptual Loss: 3.0015597343444824  
Epoch [192/200] Batch [0/3] Loss: 0.3577832579612732 MSE Loss:  
0.06524050235748291 Perceptual Loss: 2.9254274368286133  
Epoch [193/200] Batch [0/3] Loss: 0.3500967025756836 MSE Loss:  
0.0650021880865097 Perceptual Loss: 2.850944995880127  
Epoch [194/200] Batch [0/3] Loss: 0.3437422513961792 MSE Loss:  
0.06452083587646484 Perceptual Loss: 2.7922141551971436  
Epoch [195/200] Batch [0/3] Loss: 0.3560502827167511 MSE Loss:  
0.06436532735824585 Perceptual Loss: 2.9168496131896973  
Epoch [196/200] Batch [0/3] Loss: 0.3585730791091919 MSE Loss:  
0.06522464007139206 Perceptual Loss: 2.9334843158721924  
Epoch [197/200] Batch [0/3] Loss: 0.36994877457618713 MSE Loss:  
0.07070904970169067 Perceptual Loss: 2.9923973083496094  
Epoch [198/200] Batch [0/3] Loss: 0.33717313408851624 MSE Loss:  
0.060788244009017944 Perceptual Loss: 2.7638487815856934  
Epoch [199/200] Batch [0/3] Loss: 0.3483392596244812 MSE Loss:  
0.06584464758634567 Perceptual Loss: 2.8249459266662598  
Epoch [200/200] Batch [0/3] Loss: 0.3388610780239105 MSE Loss:  
0.061199676245450974 Perceptual Loss: 2.776614189147949  
Model's time taken - 978.944883108139

FID score: 1215.9480549633552  
Inception score: 1.9762130975723267 ± 0.03892264515161514  
Training with hyperparameters: {'lr': 0.001, 'beta1': 0.7}  
{'lr': 0.001, 'beta1': 0.7}  
Epoch [1/200] Batch [0/3] Loss: 1.1512597799301147 MSE Loss: 0.3403172194957733  
Perceptual Loss: 8.10942554473877  
Epoch [2/200] Batch [0/3] Loss: 1.147242784500122 MSE Loss: 0.33694130182266235  
Perceptual Loss: 8.10301399230957  
Epoch [3/200] Batch [0/3] Loss: 1.0511503219604492 MSE Loss: 0.3178141117095947  
Perceptual Loss: 7.333362579345703  
Epoch [4/200] Batch [0/3] Loss: 0.9853325486183167 MSE Loss: 0.2998999357223511  
Perceptual Loss: 6.854326248168945  
Epoch [5/200] Batch [0/3] Loss: 0.9622716903686523 MSE Loss: 0.28866061568260193  
Perceptual Loss: 6.736110687255859  
Epoch [6/200] Batch [0/3] Loss: 0.9150558710098267 MSE Loss: 0.2636389136314392  
Perceptual Loss: 6.514169692993164  
Epoch [7/200] Batch [0/3] Loss: 0.9085195064544678 MSE Loss: 0.2499077022075653  
Perceptual Loss: 6.586118221282959  
Epoch [8/200] Batch [0/3] Loss: 0.888789176940918 MSE Loss: 0.2309618443250656  
Perceptual Loss: 6.578273296356201  
Epoch [9/200] Batch [0/3] Loss: 0.8185440897941589 MSE Loss: 0.1969563364982605  
Perceptual Loss: 6.215877532958984  
Epoch [10/200] Batch [0/3] Loss: 0.7875810861587524 MSE Loss:  
0.19253775477409363 Perceptual Loss: 5.950432777404785  
Epoch [11/200] Batch [0/3] Loss: 0.7349830865859985 MSE Loss:  
0.17361316084861755 Perceptual Loss: 5.613698959350586  
Epoch [12/200] Batch [0/3] Loss: 0.717456042766571 MSE Loss: 0.16348884999752045  
Perceptual Loss: 5.539671421051025  
Epoch [13/200] Batch [0/3] Loss: 0.7061479091644287 MSE Loss:  
0.15209513902664185 Perceptual Loss: 5.540527820587158  
Epoch [14/200] Batch [0/3] Loss: 0.7026527523994446 MSE Loss:  
0.14906130731105804 Perceptual Loss: 5.535913944244385  
Epoch [15/200] Batch [0/3] Loss: 0.678031325340271 MSE Loss: 0.1333216279745102  
Perceptual Loss: 5.447096824645996  
Epoch [16/200] Batch [0/3] Loss: 0.6782018542289734 MSE Loss: 0.1311776489019394  
Perceptual Loss: 5.470241546630859  
Epoch [17/200] Batch [0/3] Loss: 0.6365774869918823 MSE Loss:  
0.12249639630317688 Perceptual Loss: 5.140810966491699  
Epoch [18/200] Batch [0/3] Loss: 0.6248858571052551 MSE Loss:  
0.11984988301992416 Perceptual Loss: 5.050359725952148  
Epoch [19/200] Batch [0/3] Loss: 0.5966796875 MSE Loss: 0.10731098055839539  
Perceptual Loss: 4.893686771392822  
Epoch [20/200] Batch [0/3] Loss: 0.5769612789154053 MSE Loss: 0.102476567029953  
Perceptual Loss: 4.744847297668457  
Epoch [21/200] Batch [0/3] Loss: 0.5634917616844177 MSE Loss:  
0.10055383294820786 Perceptual Loss: 4.6293792724609375  
Epoch [22/200] Batch [0/3] Loss: 0.5528101325035095 MSE Loss:  
0.09933333098888397 Perceptual Loss: 4.534768104553223

Epoch [23/200] Batch [0/3] Loss: 0.563176155090332 MSE Loss: 0.10262152552604675  
Perceptual Loss: 4.605545997619629

Epoch [24/200] Batch [0/3] Loss: 0.5503594875335693 MSE Loss:  
0.09522849321365356 Perceptual Loss: 4.551309585571289

Epoch [25/200] Batch [0/3] Loss: 0.5350703001022339 MSE Loss:  
0.08932474255561829 Perceptual Loss: 4.457455635070801

Epoch [26/200] Batch [0/3] Loss: 0.5479528903961182 MSE Loss:  
0.09616345167160034 Perceptual Loss: 4.517894744873047

Epoch [27/200] Batch [0/3] Loss: 0.5458180904388428 MSE Loss:  
0.09468001127243042 Perceptual Loss: 4.511381149291992

Epoch [28/200] Batch [0/3] Loss: 0.5397576093673706 MSE Loss:  
0.09109248965978622 Perceptual Loss: 4.486651420593262

Epoch [29/200] Batch [0/3] Loss: 0.5080280303955078 MSE Loss:  
0.08750653266906738 Perceptual Loss: 4.205214500427246

Epoch [30/200] Batch [0/3] Loss: 0.4975094199180603 MSE Loss: 0.0854758769273758  
Perceptual Loss: 4.120335578918457

Epoch [31/200] Batch [0/3] Loss: 0.5078073740005493 MSE Loss:  
0.08489714562892914 Perceptual Loss: 4.22910213470459

Epoch [32/200] Batch [0/3] Loss: 0.49564385414123535 MSE Loss:  
0.08166004717350006 Perceptual Loss: 4.139838218688965

Epoch [33/200] Batch [0/3] Loss: 0.49683964252471924 MSE Loss:  
0.08396486937999725 Perceptual Loss: 4.128747940063477

Epoch [34/200] Batch [0/3] Loss: 0.49765777587890625 MSE Loss:  
0.08532121032476425 Perceptual Loss: 4.12336540222168

Epoch [35/200] Batch [0/3] Loss: 0.48867669701576233 MSE Loss: 0.0804443359375  
Perceptual Loss: 4.0823235511779785

Epoch [36/200] Batch [0/3] Loss: 0.4809340238571167 MSE Loss:  
0.07840125262737274 Perceptual Loss: 4.025327682495117

Epoch [37/200] Batch [0/3] Loss: 0.47465240955352783 MSE Loss:  
0.0782385915517807 Perceptual Loss: 3.9641380310058594

Epoch [38/200] Batch [0/3] Loss: 0.4623478353023529 MSE Loss:  
0.07517004013061523 Perceptual Loss: 3.8717780113220215

Epoch [39/200] Batch [0/3] Loss: 0.5107167363166809 MSE Loss:  
0.08528247475624084 Perceptual Loss: 4.254342555999756

Epoch [40/200] Batch [0/3] Loss: 0.5375643372535706 MSE Loss:  
0.08778315782546997 Perceptual Loss: 4.497811794281006

Epoch [41/200] Batch [0/3] Loss: 0.519398033618927 MSE Loss: 0.07946290075778961  
Perceptual Loss: 4.399351119995117

Epoch [42/200] Batch [0/3] Loss: 0.5445759296417236 MSE Loss:  
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Epoch [43/200] Batch [0/3] Loss: 0.48840051889419556 MSE Loss:  
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Epoch [44/200] Batch [0/3] Loss: 0.4825785160064697 MSE Loss:  
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Epoch [45/200] Batch [0/3] Loss: 0.44860586524009705 MSE Loss:  
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Epoch [46/200] Batch [0/3] Loss: 0.46152156591415405 MSE Loss:  
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Epoch [49/200] Batch [0/3] Loss: 0.4701627194881439 MSE Loss:  
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Perceptual Loss: 3.7316396236419678  
Epoch [54/200] Batch [0/3] Loss: 0.47006720304489136 MSE Loss:  
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Epoch [102/200] Batch [0/3] Loss: 0.4140366017818451 MSE Loss:  
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Epoch [115/200] Batch [0/3] Loss: 0.40312474966049194 MSE Loss:  
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Epoch [119/200] Batch [0/3] Loss: 0.3787815570831299 MSE Loss:  
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Epoch [133/200] Batch [0/3] Loss: 0.38384926319122314 MSE Loss:  
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Epoch [134/200] Batch [0/3] Loss: 0.37289977073669434 MSE Loss:  
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Epoch [135/200] Batch [0/3] Loss: 0.3972547650337219 MSE Loss:  
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Epoch [136/200] Batch [0/3] Loss: 0.3795695900917053 MSE Loss:  
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Epoch [137/200] Batch [0/3] Loss: 0.37714889645576477 MSE Loss:  
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Epoch [138/200] Batch [0/3] Loss: 0.3670269846916199 MSE Loss:  
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Epoch [139/200] Batch [0/3] Loss: 0.37198561429977417 MSE Loss:  
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Epoch [140/200] Batch [0/3] Loss: 0.39887678623199463 MSE Loss:  
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Epoch [142/200] Batch [0/3] Loss: 0.3740122616291046 MSE Loss:  
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Epoch [143/200] Batch [0/3] Loss: 0.3972233533859253 MSE Loss:  
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Epoch [144/200] Batch [0/3] Loss: 0.3638220727443695 MSE Loss:  
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Epoch [145/200] Batch [0/3] Loss: 0.3896748423576355 MSE Loss:  
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Epoch [155/200] Batch [0/3] Loss: 0.3692472279071808 MSE Loss:  
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Epoch [156/200] Batch [0/3] Loss: 0.3976565897464752 MSE Loss:  
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Epoch [158/200] Batch [0/3] Loss: 0.3939654231071472 MSE Loss:  
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Epoch [159/200] Batch [0/3] Loss: 0.36671578884124756 MSE Loss:  
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Epoch [160/200] Batch [0/3] Loss: 0.41587620973587036 MSE Loss:  
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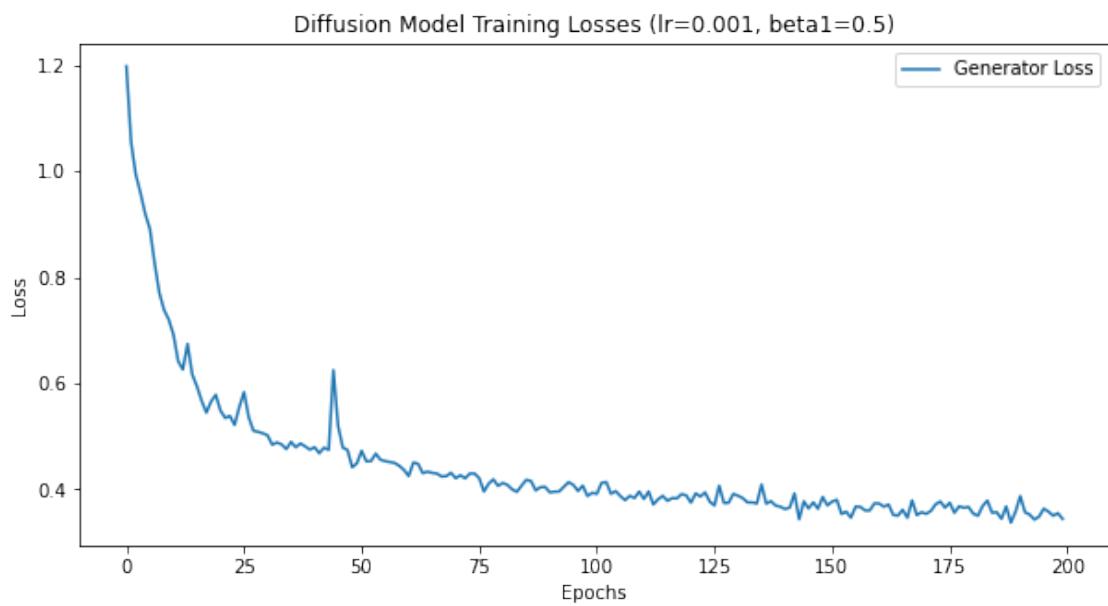
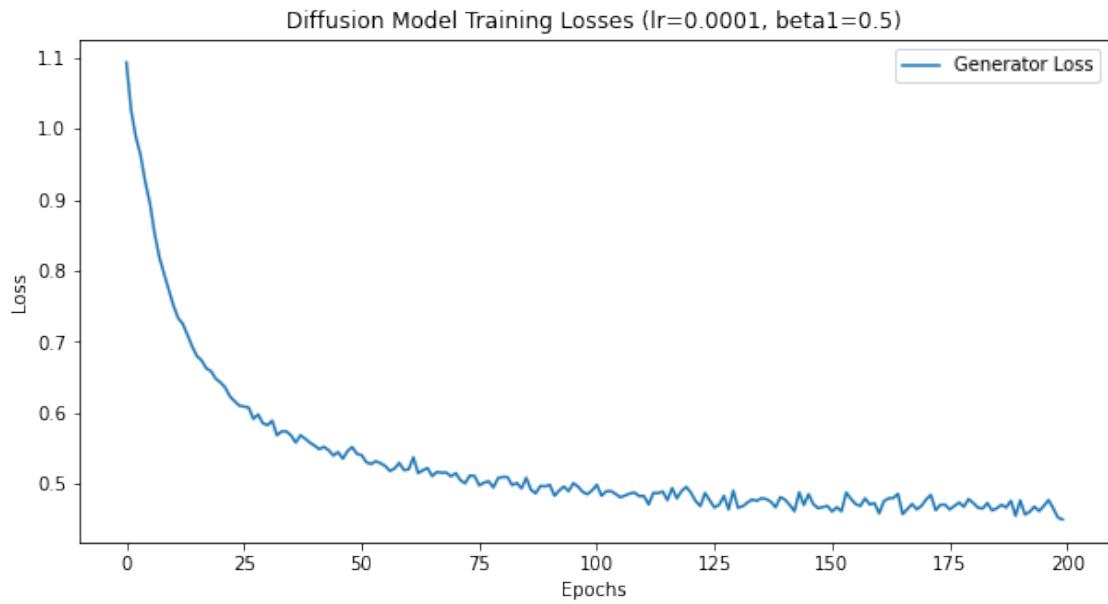
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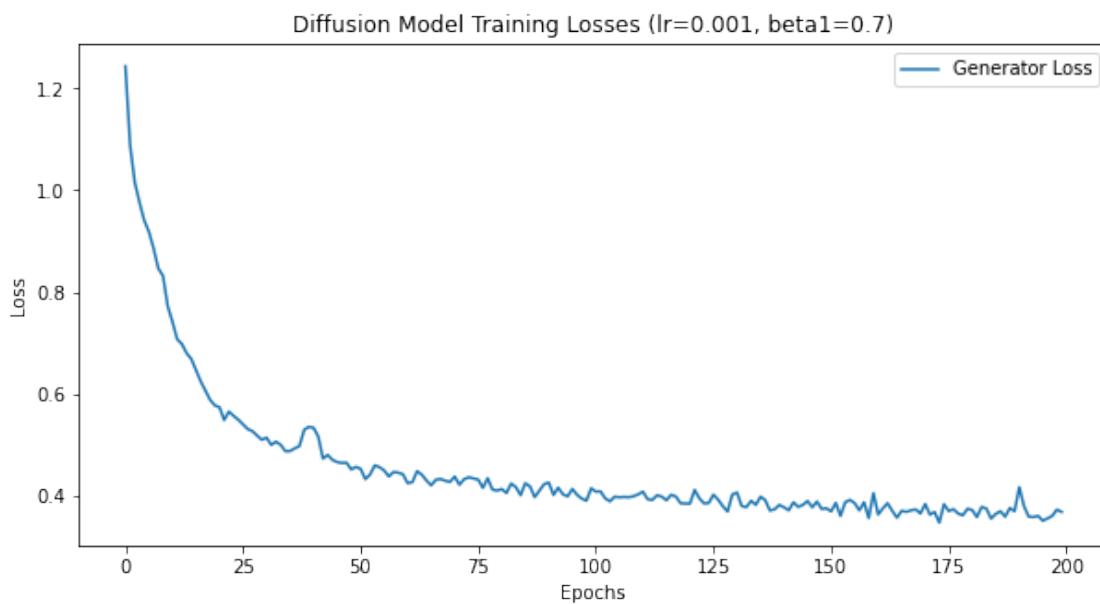
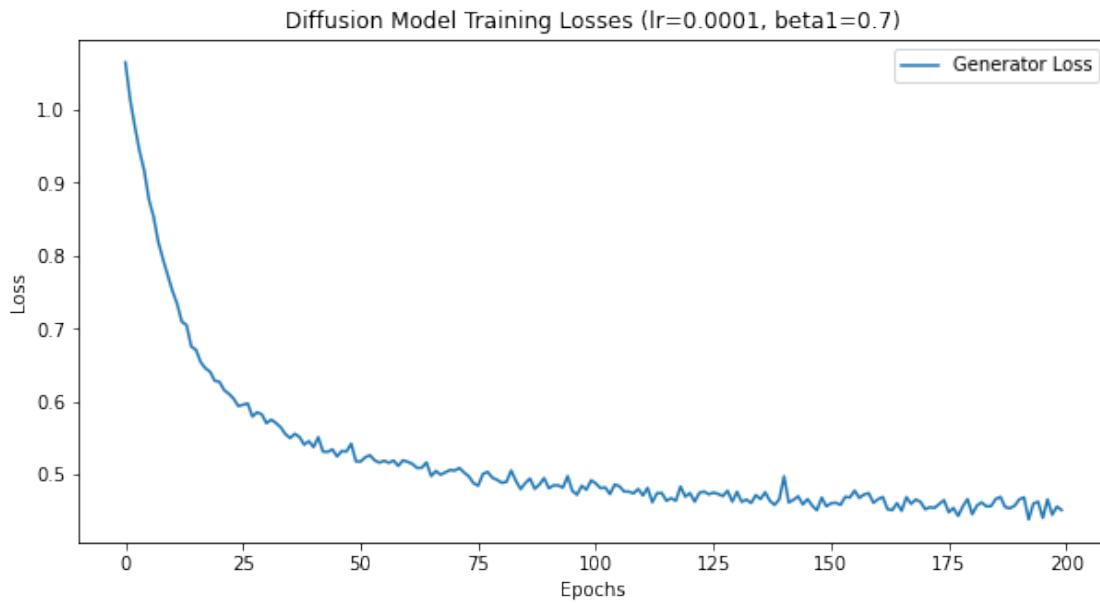
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Epoch [198/200] Batch [0/3] Loss: 0.3640965223312378 MSE Loss:
0.06540201604366302 Perceptual Loss: 2.9869449138641357
Epoch [199/200] Batch [0/3] Loss: 0.3437817096710205 MSE Loss:
0.06157434731721878 Perceptual Loss: 2.8220736980438232
Epoch [200/200] Batch [0/3] Loss: 0.3434070348739624 MSE Loss:
0.06391949951648712 Perceptual Loss: 2.794875383377075
Model's time taken - 955.839679479599
FID score: 1152.6366943320004
Inception score: 1.9546012878417969 ± 0.05276035889983177
Best hyperparameters: {'lr': 0.001, 'beta1': 0.7}
Best Inception Score: 1.9762130975723267

```

[49]: diffusion\_losses, diffusion\_filenames = load\_losses('diffusion\_losses')  
plot\_losses(diffusion\_losses, diffusion\_filenames, 'Diffusion Model')





## 17 Training the Diffusion model with best hyperparameters

```
[34]: num_epochs = 250
best_model = UNet().apply(weights_init).to(device)
best_diffusion_model = DiffusionModel(best_model)
```

```

G_losses_diff, img_list, training_time_best_model =_
    ↪train_diffusion_model_with_time(dataloader, best_model,_
    ↪best_diffusion_model, num_epochs, best_model_params['lr'],_
    ↪best_model_params['beta1'])

```

Epoch [1/250] Batch [0/3] Loss: 1.082291841506958 MSE Loss: 0.3043631911277771  
 Perceptual Loss: 7.779286861419678  
 Epoch [2/250] Batch [0/3] Loss: 1.0617376565933228 MSE Loss: 0.31119710206985474  
 Perceptual Loss: 7.505405426025391  
 Epoch [3/250] Batch [0/3] Loss: 0.9789612293243408 MSE Loss: 0.2818361520767212  
 Perceptual Loss: 6.971250534057617  
 Epoch [4/250] Batch [0/3] Loss: 0.8905470967292786 MSE Loss: 0.24505960941314697  
 Perceptual Loss: 6.4548749923706055  
 Epoch [5/250] Batch [0/3] Loss: 0.8523281216621399 MSE Loss: 0.21934670209884644  
 Perceptual Loss: 6.3298139572143555  
 Epoch [6/250] Batch [0/3] Loss: 0.8022506237030029 MSE Loss: 0.1891370713710785  
 Perceptual Loss: 6.131135940551758  
 Epoch [7/250] Batch [0/3] Loss: 0.7546161413192749 MSE Loss: 0.1747020184993744  
 Perceptual Loss: 5.799140930175781  
 Epoch [8/250] Batch [0/3] Loss: 0.742256760597229 MSE Loss: 0.16148358583450317  
 Perceptual Loss: 5.807731628417969  
 Epoch [9/250] Batch [0/3] Loss: 0.6869184970855713 MSE Loss: 0.14257600903511047  
 Perceptual Loss: 5.443425178527832  
 Epoch [10/250] Batch [0/3] Loss: 0.677018940448761 MSE Loss: 0.1358892321586609  
 Perceptual Loss: 5.411296844482422  
 Epoch [11/250] Batch [0/3] Loss: 0.6715892553329468 MSE Loss:  
 0.12846648693084717 Perceptual Loss: 5.431227684020996  
 Epoch [12/250] Batch [0/3] Loss: 0.7142761945724487 MSE Loss: 0.1277693212032318  
 Perceptual Loss: 5.865068435668945  
 Epoch [13/250] Batch [0/3] Loss: 0.6584915518760681 MSE Loss:  
 0.12393774837255478 Perceptual Loss: 5.345538139343262  
 Epoch [14/250] Batch [0/3] Loss: 0.598379373550415 MSE Loss: 0.10782261937856674  
 Perceptual Loss: 4.905567646026611  
 Epoch [15/250] Batch [0/3] Loss: 0.6120843291282654 MSE Loss:  
 0.11071109026670456 Perceptual Loss: 5.013732433319092  
 Epoch [16/250] Batch [0/3] Loss: 0.5651507377624512 MSE Loss:  
 0.09812285006046295 Perceptual Loss: 4.670278549194336  
 Epoch [17/250] Batch [0/3] Loss: 0.5881677865982056 MSE Loss:  
 0.10746531188488007 Perceptual Loss: 4.807024955749512  
 Epoch [18/250] Batch [0/3] Loss: 0.5527172088623047 MSE Loss:  
 0.09427597373723984 Perceptual Loss: 4.584412097930908  
 Epoch [19/250] Batch [0/3] Loss: 0.5288311243057251 MSE Loss:  
 0.09128351509571075 Perceptual Loss: 4.375475883483887  
 Epoch [20/250] Batch [0/3] Loss: 0.5323508977890015 MSE Loss:  
 0.08745237439870834 Perceptual Loss: 4.4489850997924805  
 Epoch [21/250] Batch [0/3] Loss: 0.5377377867698669 MSE Loss:  
 0.09265681356191635 Perceptual Loss: 4.450809955596924

Epoch [22/250] Batch [0/3] Loss: 0.5384572744369507 MSE Loss:  
0.09282232820987701 Perceptual Loss: 4.4563493728637695  
Epoch [23/250] Batch [0/3] Loss: 0.5283135771751404 MSE Loss:  
0.09002529829740524 Perceptual Loss: 4.382883071899414  
Epoch [24/250] Batch [0/3] Loss: 0.5056491494178772 MSE Loss:  
0.08506304025650024 Perceptual Loss: 4.2058610916137695  
Epoch [25/250] Batch [0/3] Loss: 0.5228172540664673 MSE Loss:  
0.08808428049087524 Perceptual Loss: 4.347330093383789  
Epoch [26/250] Batch [0/3] Loss: 0.5255186557769775 MSE Loss:  
0.08914043754339218 Perceptual Loss: 4.363781929016113  
Epoch [27/250] Batch [0/3] Loss: 0.4950808882713318 MSE Loss: 0.0812336653470993  
Perceptual Loss: 4.138472080230713  
Epoch [28/250] Batch [0/3] Loss: 0.49940225481987 MSE Loss: 0.08296701312065125  
Perceptual Loss: 4.1643524169921875  
Epoch [29/250] Batch [0/3] Loss: 0.5057705044746399 MSE Loss:  
0.08238252252340317 Perceptual Loss: 4.233879566192627  
Epoch [30/250] Batch [0/3] Loss: 0.5109323263168335 MSE Loss:  
0.08556441962718964 Perceptual Loss: 4.253678798675537  
Epoch [31/250] Batch [0/3] Loss: 0.5000313520431519 MSE Loss: 0.0840706154704094  
Perceptual Loss: 4.159607410430908  
Epoch [32/250] Batch [0/3] Loss: 0.4756317138671875 MSE Loss:  
0.07705621421337128 Perceptual Loss: 3.9857547283172607  
Epoch [33/250] Batch [0/3] Loss: 0.4848586618900299 MSE Loss:  
0.08307719230651855 Perceptual Loss: 4.017814636230469  
Epoch [34/250] Batch [0/3] Loss: 0.49589312076568604 MSE Loss:  
0.0835757702589035 Perceptual Loss: 4.123173713684082  
Epoch [35/250] Batch [0/3] Loss: 0.48842954635620117 MSE Loss:  
0.0837186798453331 Perceptual Loss: 4.0471086502075195  
Epoch [36/250] Batch [0/3] Loss: 0.4652208983898163 MSE Loss:  
0.07848495244979858 Perceptual Loss: 3.8673593997955322  
Epoch [37/250] Batch [0/3] Loss: 0.47724711894989014 MSE Loss:  
0.07936421781778336 Perceptual Loss: 3.9788291454315186  
Epoch [38/250] Batch [0/3] Loss: 0.46985864639282227 MSE Loss:  
0.07921053469181061 Perceptual Loss: 3.9064807891845703  
Epoch [39/250] Batch [0/3] Loss: 0.46189698576927185 MSE Loss:  
0.07597261667251587 Perceptual Loss: 3.859243631362915  
Epoch [40/250] Batch [0/3] Loss: 0.46323734521865845 MSE Loss:  
0.07695169746875763 Perceptual Loss: 3.862856149673462  
Epoch [41/250] Batch [0/3] Loss: 0.49090781807899475 MSE Loss:  
0.08770068734884262 Perceptual Loss: 4.032071113586426  
Epoch [42/250] Batch [0/3] Loss: 0.48466891050338745 MSE Loss:  
0.08471392095088959 Perceptual Loss: 3.9995498657226562  
Epoch [43/250] Batch [0/3] Loss: 0.45537418127059937 MSE Loss:  
0.07426759600639343 Perceptual Loss: 3.811065673828125  
Epoch [44/250] Batch [0/3] Loss: 0.4891623258590698 MSE Loss:  
0.08234155923128128 Perceptual Loss: 4.068207740783691  
Epoch [45/250] Batch [0/3] Loss: 0.47140756249427795 MSE Loss:  
0.07966256141662598 Perceptual Loss: 3.917449951171875

Epoch [46/250] Batch [0/3] Loss: 0.4782750606536865 MSE Loss:  
0.07669393718242645 Perceptual Loss: 4.015811443328857

Epoch [47/250] Batch [0/3] Loss: 0.4878247380256653 MSE Loss:  
0.07879906892776489 Perceptual Loss: 4.090256690979004

Epoch [48/250] Batch [0/3] Loss: 0.46326977014541626 MSE Loss:  
0.07646139711141586 Perceptual Loss: 3.8680837154388428

Epoch [49/250] Batch [0/3] Loss: 0.4652012884616852 MSE Loss:  
0.07861578464508057 Perceptual Loss: 3.8658549785614014

Epoch [50/250] Batch [0/3] Loss: 0.46302902698516846 MSE Loss:  
0.08185732364654541 Perceptual Loss: 3.8117170333862305

Epoch [51/250] Batch [0/3] Loss: 0.4449039697647095 MSE Loss:  
0.07670388370752335 Perceptual Loss: 3.6820008754730225

Epoch [52/250] Batch [0/3] Loss: 0.438951313495636 MSE Loss: 0.07748125493526459  
Perceptual Loss: 3.6147007942199707

Epoch [53/250] Batch [0/3] Loss: 0.4584292769432068 MSE Loss:  
0.07713490724563599 Perceptual Loss: 3.812943696975708

Epoch [54/250] Batch [0/3] Loss: 0.4424038827419281 MSE Loss:  
0.07293661683797836 Perceptual Loss: 3.6946725845336914

Epoch [55/250] Batch [0/3] Loss: 0.43451544642448425 MSE Loss:  
0.07161784172058105 Perceptual Loss: 3.6289761066436768

Epoch [56/250] Batch [0/3] Loss: 0.4198744297027588 MSE Loss:  
0.06740240752696991 Perceptual Loss: 3.5247201919555664

Epoch [57/250] Batch [0/3] Loss: 0.42332810163497925 MSE Loss:  
0.07088520377874374 Perceptual Loss: 3.5244288444519043

Epoch [58/250] Batch [0/3] Loss: 0.4222126007080078 MSE Loss:  
0.06836701929569244 Perceptual Loss: 3.5384557247161865

Epoch [59/250] Batch [0/3] Loss: 0.4392054080963135 MSE Loss:  
0.07727214694023132 Perceptual Loss: 3.6193325519561768

Epoch [60/250] Batch [0/3] Loss: 0.46036988496780396 MSE Loss:  
0.0824492871761322 Perceptual Loss: 3.7792060375213623

Epoch [61/250] Batch [0/3] Loss: 0.4268687963485718 MSE Loss:  
0.07203345000743866 Perceptual Loss: 3.5483531951904297

Epoch [62/250] Batch [0/3] Loss: 0.41000503301620483 MSE Loss:  
0.06814928352832794 Perceptual Loss: 3.418557643890381

Epoch [63/250] Batch [0/3] Loss: 0.4298311471939087 MSE Loss:  
0.07229666411876678 Perceptual Loss: 3.5753445625305176

Epoch [64/250] Batch [0/3] Loss: 0.3853764533996582 MSE Loss:  
0.06186790391802788 Perceptual Loss: 3.2350854873657227

Epoch [65/250] Batch [0/3] Loss: 0.4248781204223633 MSE Loss: 0.0720364972949028  
Perceptual Loss: 3.528416156768799

Epoch [66/250] Batch [0/3] Loss: 0.42444542050361633 MSE Loss:  
0.07322163134813309 Perceptual Loss: 3.512238025665283

Epoch [67/250] Batch [0/3] Loss: 0.44687435030937195 MSE Loss:  
0.07938182353973389 Perceptual Loss: 3.6749250888824463

Epoch [68/250] Batch [0/3] Loss: 0.40975093841552734 MSE Loss:  
0.06888021528720856 Perceptual Loss: 3.4087069034576416

Epoch [69/250] Batch [0/3] Loss: 0.42156872153282166 MSE Loss:  
0.06931211799383163 Perceptual Loss: 3.5225658416748047

Epoch [70/250] Batch [0/3] Loss: 0.4126809537410736 MSE Loss:  
0.06984784454107285 Perceptual Loss: 3.428330898284912  
Epoch [71/250] Batch [0/3] Loss: 0.3901352286338806 MSE Loss:  
0.06262955814599991 Perceptual Loss: 3.275056838989258  
Epoch [72/250] Batch [0/3] Loss: 0.4070628881454468 MSE Loss: 0.0689881294965744  
Perceptual Loss: 3.3807477951049805  
Epoch [73/250] Batch [0/3] Loss: 0.42469972372055054 MSE Loss:  
0.07239209115505219 Perceptual Loss: 3.5230765342712402  
Epoch [74/250] Batch [0/3] Loss: 0.43936625123023987 MSE Loss:  
0.07468703389167786 Perceptual Loss: 3.64679217338562  
Epoch [75/250] Batch [0/3] Loss: 0.40263456106185913 MSE Loss:  
0.0680931955575943 Perceptual Loss: 3.3454136848449707  
Epoch [76/250] Batch [0/3] Loss: 0.4156837463378906 MSE Loss: 0.071565642952919  
Perceptual Loss: 3.44118070602417  
Epoch [77/250] Batch [0/3] Loss: 0.41594311594963074 MSE Loss:  
0.07173909991979599 Perceptual Loss: 3.442039966583252  
Epoch [78/250] Batch [0/3] Loss: 0.41671785712242126 MSE Loss:  
0.07274215668439865 Perceptual Loss: 3.4397568702697754  
Epoch [79/250] Batch [0/3] Loss: 0.39037495851516724 MSE Loss:  
0.06399036943912506 Perceptual Loss: 3.263845920562744  
Epoch [80/250] Batch [0/3] Loss: 0.4258264899253845 MSE Loss:  
0.07213984429836273 Perceptual Loss: 3.5368661880493164  
Epoch [81/250] Batch [0/3] Loss: 0.4073878228664398 MSE Loss:  
0.06915667653083801 Perceptual Loss: 3.3823113441467285  
Epoch [82/250] Batch [0/3] Loss: 0.41252124309539795 MSE Loss:  
0.07255855202674866 Perceptual Loss: 3.3996269702911377  
Epoch [83/250] Batch [0/3] Loss: 0.3899795711040497 MSE Loss:  
0.06640025973320007 Perceptual Loss: 3.235793113708496  
Epoch [84/250] Batch [0/3] Loss: 0.43368250131607056 MSE Loss:  
0.07643042504787445 Perceptual Loss: 3.5725207328796387  
Epoch [85/250] Batch [0/3] Loss: 0.4221971035003662 MSE Loss:  
0.07652796804904938 Perceptual Loss: 3.456691265106201  
Epoch [86/250] Batch [0/3] Loss: 0.39851468801498413 MSE Loss:  
0.06930560618638992 Perceptual Loss: 3.292090892791748  
Epoch [87/250] Batch [0/3] Loss: 0.4112884998321533 MSE Loss: 0.0705675333738327  
Perceptual Loss: 3.407209873199463  
Epoch [88/250] Batch [0/3] Loss: 0.38709431886672974 MSE Loss:  
0.06641196459531784 Perceptual Loss: 3.2068233489990234  
Epoch [89/250] Batch [0/3] Loss: 0.40998369455337524 MSE Loss:  
0.07187129557132721 Perceptual Loss: 3.3811237812042236  
Epoch [90/250] Batch [0/3] Loss: 0.4194335341453552 MSE Loss:  
0.07537573575973511 Perceptual Loss: 3.440577983856201  
Epoch [91/250] Batch [0/3] Loss: 0.4151442050933838 MSE Loss:  
0.07382408529520035 Perceptual Loss: 3.413201332092285  
Epoch [92/250] Batch [0/3] Loss: 0.364239364862442 MSE Loss:  
0.059728264808654785 Perceptual Loss: 3.0451109409332275  
Epoch [93/250] Batch [0/3] Loss: 0.39896538853645325 MSE Loss:  
0.07004084438085556 Perceptual Loss: 3.289245367050171

Epoch [94/250] Batch [0/3] Loss: 0.3878284692764282 MSE Loss:  
0.06722080707550049 Perceptual Loss: 3.2060766220092773  
Epoch [95/250] Batch [0/3] Loss: 0.40222984552383423 MSE Loss:  
0.06769886612892151 Perceptual Loss: 3.3453097343444824  
Epoch [96/250] Batch [0/3] Loss: 0.40382981300354004 MSE Loss:  
0.06930805742740631 Perceptual Loss: 3.345217227935791  
Epoch [97/250] Batch [0/3] Loss: 0.3947703242301941 MSE Loss:  
0.06700611114501953 Perceptual Loss: 3.277642011642456  
Epoch [98/250] Batch [0/3] Loss: 0.41828957200050354 MSE Loss:  
0.07555946707725525 Perceptual Loss: 3.4273009300231934  
Epoch [99/250] Batch [0/3] Loss: 0.37925440073013306 MSE Loss:  
0.06635366380214691 Perceptual Loss: 3.129007339477539  
Epoch [100/250] Batch [0/3] Loss: 0.40914422273635864 MSE Loss:  
0.0755992978811264 Perceptual Loss: 3.335449457168579  
Epoch [101/250] Batch [0/3] Loss: 0.39492595195770264 MSE Loss:  
0.0675135999917984 Perceptual Loss: 3.2741236686706543  
Epoch [102/250] Batch [0/3] Loss: 0.39196068048477173 MSE Loss:  
0.06797510385513306 Perceptual Loss: 3.2398557662963867  
Epoch [103/250] Batch [0/3] Loss: 0.3556271493434906 MSE Loss:  
0.06034855172038078 Perceptual Loss: 2.9527859687805176  
Epoch [104/250] Batch [0/3] Loss: 0.40429648756980896 MSE Loss:  
0.07167021185159683 Perceptual Loss: 3.3262627124786377  
Epoch [105/250] Batch [0/3] Loss: 0.3809204399585724 MSE Loss:  
0.06608555465936661 Perceptual Loss: 3.148348808288574  
Epoch [106/250] Batch [0/3] Loss: 0.4060835540294647 MSE Loss:  
0.0714770257472992 Perceptual Loss: 3.3460652828216553  
Epoch [107/250] Batch [0/3] Loss: 0.3976573646068573 MSE Loss:  
0.06991487741470337 Perceptual Loss: 3.2774248123168945  
Epoch [108/250] Batch [0/3] Loss: 0.38638144731521606 MSE Loss:  
0.06946708261966705 Perceptual Loss: 3.1691436767578125  
Epoch [109/250] Batch [0/3] Loss: 0.40448036789894104 MSE Loss:  
0.07257527112960815 Perceptual Loss: 3.3190510272979736  
Epoch [110/250] Batch [0/3] Loss: 0.39036622643470764 MSE Loss:  
0.0703834816813469 Perceptual Loss: 3.1998274326324463  
Epoch [111/250] Batch [0/3] Loss: 0.4020911455154419 MSE Loss:  
0.07052792608737946 Perceptual Loss: 3.3156323432922363  
Epoch [112/250] Batch [0/3] Loss: 0.3856027126312256 MSE Loss:  
0.06795111298561096 Perceptual Loss: 3.176515817642212  
Epoch [113/250] Batch [0/3] Loss: 0.386695921421051 MSE Loss:  
0.06903965771198273 Perceptual Loss: 3.1765623092651367  
Epoch [114/250] Batch [0/3] Loss: 0.38524049520492554 MSE Loss:  
0.06744873523712158 Perceptual Loss: 3.17791748046875  
Epoch [115/250] Batch [0/3] Loss: 0.3743165135383606 MSE Loss:  
0.06438861787319183 Perceptual Loss: 3.0992791652679443  
Epoch [116/250] Batch [0/3] Loss: 0.382154256105423 MSE Loss:  
0.06702237576246262 Perceptual Loss: 3.1513187885284424  
Epoch [117/250] Batch [0/3] Loss: 0.39818477630615234 MSE Loss:  
0.07563270628452301 Perceptual Loss: 3.225520610809326

Epoch [118/250] Batch [0/3] Loss: 0.37387293577194214 MSE Loss:  
0.06693015992641449 Perceptual Loss: 3.069427490234375  
Epoch [119/250] Batch [0/3] Loss: 0.3999904990196228 MSE Loss:  
0.07196304947137833 Perceptual Loss: 3.2802743911743164  
Epoch [120/250] Batch [0/3] Loss: 0.4039248824119568 MSE Loss:  
0.0728069469332695 Perceptual Loss: 3.3111791610717773  
Epoch [121/250] Batch [0/3] Loss: 0.3850395679473877 MSE Loss:  
0.06830964237451553 Perceptual Loss: 3.167299270629883  
Epoch [122/250] Batch [0/3] Loss: 0.3746478259563446 MSE Loss:  
0.06607010960578918 Perceptual Loss: 3.0857770442962646  
Epoch [123/250] Batch [0/3] Loss: 0.39499539136886597 MSE Loss:  
0.0724765732884407 Perceptual Loss: 3.2251882553100586  
Epoch [124/250] Batch [0/3] Loss: 0.37066584825515747 MSE Loss:  
0.06443439424037933 Perceptual Loss: 3.062314510345459  
Epoch [125/250] Batch [0/3] Loss: 0.3834451138973236 MSE Loss:  
0.06951483339071274 Perceptual Loss: 3.1393027305603027  
Epoch [126/250] Batch [0/3] Loss: 0.37300339341163635 MSE Loss:  
0.06605511903762817 Perceptual Loss: 3.0694828033447266  
Epoch [127/250] Batch [0/3] Loss: 0.37693920731544495 MSE Loss:  
0.06697863340377808 Perceptual Loss: 3.0996055603027344  
Epoch [128/250] Batch [0/3] Loss: 0.3581056594848633 MSE Loss:  
0.06582265347242355 Perceptual Loss: 2.9228298664093018  
Epoch [129/250] Batch [0/3] Loss: 0.36667245626449585 MSE Loss:  
0.06581491231918335 Perceptual Loss: 3.008575439453125  
Epoch [130/250] Batch [0/3] Loss: 0.4002547860145569 MSE Loss:  
0.07255369424819946 Perceptual Loss: 3.277010917663574  
Epoch [131/250] Batch [0/3] Loss: 0.3737282156944275 MSE Loss:  
0.0677446648478508 Perceptual Loss: 3.059835433959961  
Epoch [132/250] Batch [0/3] Loss: 0.37724998593330383 MSE Loss:  
0.06620904803276062 Perceptual Loss: 3.1104092597961426  
Epoch [133/250] Batch [0/3] Loss: 0.3751451373100281 MSE Loss:  
0.06656365096569061 Perceptual Loss: 3.085814952850342  
Epoch [134/250] Batch [0/3] Loss: 0.35154590010643005 MSE Loss:  
0.06227349489927292 Perceptual Loss: 2.89272403717041  
Epoch [135/250] Batch [0/3] Loss: 0.3769022524356842 MSE Loss:  
0.06857704371213913 Perceptual Loss: 3.083251953125  
Epoch [136/250] Batch [0/3] Loss: 0.3905056416988373 MSE Loss:  
0.07066735625267029 Perceptual Loss: 3.19838285446167  
Epoch [137/250] Batch [0/3] Loss: 0.3781510591506958 MSE Loss:  
0.06798632442951202 Perceptual Loss: 3.101647138595581  
Epoch [138/250] Batch [0/3] Loss: 0.3487527370452881 MSE Loss:  
0.05949483439326286 Perceptual Loss: 2.8925790786743164  
Epoch [139/250] Batch [0/3] Loss: 0.35828834772109985 MSE Loss:  
0.06400759518146515 Perceptual Loss: 2.942807674407959  
Epoch [140/250] Batch [0/3] Loss: 0.3475436568260193 MSE Loss:  
0.06300538778305054 Perceptual Loss: 2.8453826904296875  
Epoch [141/250] Batch [0/3] Loss: 0.3782004117965698 MSE Loss:  
0.06539618968963623 Perceptual Loss: 3.128042221069336

Epoch [142/250] Batch [0/3] Loss: 0.3818608522415161 MSE Loss:  
0.06751157343387604 Perceptual Loss: 3.1434926986694336  
Epoch [143/250] Batch [0/3] Loss: 0.3947485685348511 MSE Loss:  
0.06850108504295349 Perceptual Loss: 3.262474775314331  
Epoch [144/250] Batch [0/3] Loss: 0.36300128698349 MSE Loss: 0.06479894369840622  
Perceptual Loss: 2.982023239135742  
Epoch [145/250] Batch [0/3] Loss: 0.38235747814178467 MSE Loss:  
0.0677131861448288 Perceptual Loss: 3.1464426517486572  
Epoch [146/250] Batch [0/3] Loss: 0.36215847730636597 MSE Loss:  
0.06304758042097092 Perceptual Loss: 2.9911088943481445  
Epoch [147/250] Batch [0/3] Loss: 0.3749639689922333 MSE Loss:  
0.0680794045329094 Perceptual Loss: 3.068845510482788  
Epoch [148/250] Batch [0/3] Loss: 0.36989524960517883 MSE Loss:  
0.06445219367742538 Perceptual Loss: 3.0544304847717285  
Epoch [149/250] Batch [0/3] Loss: 0.36485838890075684 MSE Loss:  
0.06737683713436127 Perceptual Loss: 2.9748153686523438  
Epoch [150/250] Batch [0/3] Loss: 0.3614236116409302 MSE Loss:  
0.06484295427799225 Perceptual Loss: 2.965806484222412  
Epoch [151/250] Batch [0/3] Loss: 0.35771727561950684 MSE Loss:  
0.06423339247703552 Perceptual Loss: 2.9348387718200684  
Epoch [152/250] Batch [0/3] Loss: 0.32250717282295227 MSE Loss:  
0.056813232600688934 Perceptual Loss: 2.6569392681121826  
Epoch [153/250] Batch [0/3] Loss: 0.3524206876754761 MSE Loss:  
0.06318580359220505 Perceptual Loss: 2.8923487663269043  
Epoch [154/250] Batch [0/3] Loss: 0.36448293924331665 MSE Loss:  
0.06681177020072937 Perceptual Loss: 2.9767115116119385  
Epoch [155/250] Batch [0/3] Loss: 0.3496856689453125 MSE Loss:  
0.06151358410716057 Perceptual Loss: 2.881721019744873  
Epoch [156/250] Batch [0/3] Loss: 0.34747374057769775 MSE Loss:  
0.058567725121974945 Perceptual Loss: 2.8890600204467773  
Epoch [157/250] Batch [0/3] Loss: 0.37946444749832153 MSE Loss:  
0.06938301026821136 Perceptual Loss: 3.1008145809173584  
Epoch [158/250] Batch [0/3] Loss: 0.4038582444190979 MSE Loss:  
0.0741569772362709 Perceptual Loss: 3.2970128059387207  
Epoch [159/250] Batch [0/3] Loss: 0.37640446424484253 MSE Loss:  
0.07115867733955383 Perceptual Loss: 3.052457809448242  
Epoch [160/250] Batch [0/3] Loss: 0.3729172646999359 MSE Loss:  
0.06538975238800049 Perceptual Loss: 3.075275182723999  
Epoch [161/250] Batch [0/3] Loss: 0.3449136018753052 MSE Loss:  
0.06392983347177505 Perceptual Loss: 2.809837818145752  
Epoch [162/250] Batch [0/3] Loss: 0.3537622094154358 MSE Loss:  
0.06234131008386612 Perceptual Loss: 2.9142091274261475  
Epoch [163/250] Batch [0/3] Loss: 0.34861987829208374 MSE Loss:  
0.06269592046737671 Perceptual Loss: 2.8592395782470703  
Epoch [164/250] Batch [0/3] Loss: 0.37148958444595337 MSE Loss:  
0.06765703111886978 Perceptual Loss: 3.038325548171997  
Epoch [165/250] Batch [0/3] Loss: 0.3771098256111145 MSE Loss:  
0.06744196265935898 Perceptual Loss: 3.0966784954071045

Epoch [166/250] Batch [0/3] Loss: 0.3454424738883972 MSE Loss:  
0.05959785729646683 Perceptual Loss: 2.8584461212158203  
Epoch [167/250] Batch [0/3] Loss: 0.3658933937549591 MSE Loss:  
0.06660586595535278 Perceptual Loss: 2.992875099182129  
Epoch [168/250] Batch [0/3] Loss: 0.3519147038459778 MSE Loss:  
0.06460733711719513 Perceptual Loss: 2.8730738162994385  
Epoch [169/250] Batch [0/3] Loss: 0.38104769587516785 MSE Loss:  
0.07072964310646057 Perceptual Loss: 3.103180408477783  
Epoch [170/250] Batch [0/3] Loss: 0.3563321828842163 MSE Loss: 0.064487524330616  
Perceptual Loss: 2.9184465408325195  
Epoch [171/250] Batch [0/3] Loss: 0.3506074845790863 MSE Loss:  
0.06333338469266891 Perceptual Loss: 2.8727409839630127  
Epoch [172/250] Batch [0/3] Loss: 0.3405029773712158 MSE Loss:  
0.05887233465909958 Perceptual Loss: 2.8163063526153564  
Epoch [173/250] Batch [0/3] Loss: 0.34544339776039124 MSE Loss:  
0.06239765137434006 Perceptual Loss: 2.8304574489593506  
Epoch [174/250] Batch [0/3] Loss: 0.3818932771682739 MSE Loss:  
0.07078485190868378 Perceptual Loss: 3.111083984375  
Epoch [175/250] Batch [0/3] Loss: 0.3661249577999115 MSE Loss:  
0.06845974922180176 Perceptual Loss: 2.976652145385742  
Epoch [176/250] Batch [0/3] Loss: 0.3698910176753998 MSE Loss:  
0.06892770528793335 Perceptual Loss: 3.0096330642700195  
Epoch [177/250] Batch [0/3] Loss: 0.33218371868133545 MSE Loss:  
0.059337642043828964 Perceptual Loss: 2.7284605503082275  
Epoch [178/250] Batch [0/3] Loss: 0.34534400701522827 MSE Loss:  
0.061471641063690186 Perceptual Loss: 2.838723659515381  
Epoch [179/250] Batch [0/3] Loss: 0.37431371212005615 MSE Loss:  
0.06945206969976425 Perceptual Loss: 3.048616409301758  
Epoch [180/250] Batch [0/3] Loss: 0.3671780228614807 MSE Loss:  
0.06737310439348221 Perceptual Loss: 2.998049259185791  
Epoch [181/250] Batch [0/3] Loss: 0.34981805086135864 MSE Loss:  
0.06449927389621735 Perceptual Loss: 2.8531877994537354  
Epoch [182/250] Batch [0/3] Loss: 0.34587380290031433 MSE Loss:  
0.061493515968322754 Perceptual Loss: 2.8438029289245605  
Epoch [183/250] Batch [0/3] Loss: 0.36043208837509155 MSE Loss:  
0.06742551177740097 Perceptual Loss: 2.930065631866455  
Epoch [184/250] Batch [0/3] Loss: 0.37007543444633484 MSE Loss:  
0.06928685307502747 Perceptual Loss: 3.007885694503784  
Epoch [185/250] Batch [0/3] Loss: 0.3372778594493866 MSE Loss:  
0.05938255041837692 Perceptual Loss: 2.7789530754089355  
Epoch [186/250] Batch [0/3] Loss: 0.3389299213886261 MSE Loss:  
0.05930086225271225 Perceptual Loss: 2.796290397644043  
Epoch [187/250] Batch [0/3] Loss: 0.3738238215446472 MSE Loss:  
0.06818941980600357 Perceptual Loss: 3.0563440322875977  
Epoch [188/250] Batch [0/3] Loss: 0.3531150817871094 MSE Loss:  
0.06547428667545319 Perceptual Loss: 2.8764076232910156  
Epoch [189/250] Batch [0/3] Loss: 0.3601534962654114 MSE Loss:  
0.06479363143444061 Perceptual Loss: 2.9535984992980957

Epoch [190/250] Batch [0/3] Loss: 0.36493581533432007 MSE Loss:  
0.06699629873037338 Perceptual Loss: 2.9793949127197266  
Epoch [191/250] Batch [0/3] Loss: 0.3649282157421112 MSE Loss:  
0.06725141406059265 Perceptual Loss: 2.9767680168151855  
Epoch [192/250] Batch [0/3] Loss: 0.3727557361125946 MSE Loss:  
0.06816369295120239 Perceptual Loss: 3.0459203720092773  
Epoch [193/250] Batch [0/3] Loss: 0.3573065400123596 MSE Loss:  
0.0640602856874466 Perceptual Loss: 2.932462215423584  
Epoch [194/250] Batch [0/3] Loss: 0.3471507728099823 MSE Loss:  
0.06346803903579712 Perceptual Loss: 2.836827278137207  
Epoch [195/250] Batch [0/3] Loss: 0.3592551350593567 MSE Loss:  
0.06426914036273956 Perceptual Loss: 2.949859857559204  
Epoch [196/250] Batch [0/3] Loss: 0.374912828207016 MSE Loss:  
0.06751906871795654 Perceptual Loss: 3.07393741607666  
Epoch [197/250] Batch [0/3] Loss: 0.3533579707145691 MSE Loss:  
0.06388919055461884 Perceptual Loss: 2.8946878910064697  
Epoch [198/250] Batch [0/3] Loss: 0.35858213901519775 MSE Loss:  
0.06540435552597046 Perceptual Loss: 2.9317777156829834  
Epoch [199/250] Batch [0/3] Loss: 0.304347425699234 MSE Loss:  
0.05341477319598198 Perceptual Loss: 2.509326696395874  
Epoch [200/250] Batch [0/3] Loss: 0.3548956513404846 MSE Loss:  
0.06640980392694473 Perceptual Loss: 2.8848586082458496  
Epoch [201/250] Batch [0/3] Loss: 0.3542018234729767 MSE Loss:  
0.06332144886255264 Perceptual Loss: 2.908803701400757  
Epoch [202/250] Batch [0/3] Loss: 0.3473913073539734 MSE Loss:  
0.06412799656391144 Perceptual Loss: 2.8326332569122314  
Epoch [203/250] Batch [0/3] Loss: 0.35387179255485535 MSE Loss:  
0.0648353099822998 Perceptual Loss: 2.890364646911621  
Epoch [204/250] Batch [0/3] Loss: 0.37405654788017273 MSE Loss:  
0.06925326585769653 Perceptual Loss: 3.048032760620117  
Epoch [205/250] Batch [0/3] Loss: 0.33061665296554565 MSE Loss:  
0.05775698274374008 Perceptual Loss: 2.7285966873168945  
Epoch [206/250] Batch [0/3] Loss: 0.34460169076919556 MSE Loss:  
0.06039373204112053 Perceptual Loss: 2.8420796394348145  
Epoch [207/250] Batch [0/3] Loss: 0.3298610746860504 MSE Loss:  
0.05897315591573715 Perceptual Loss: 2.708878993988037  
Epoch [208/250] Batch [0/3] Loss: 0.35402095317840576 MSE Loss:  
0.06271408498287201 Perceptual Loss: 2.9130687713623047  
Epoch [209/250] Batch [0/3] Loss: 0.344990998506546 MSE Loss:  
0.061330266296863556 Perceptual Loss: 2.8366072177886963  
Epoch [210/250] Batch [0/3] Loss: 0.33802664279937744 MSE Loss:  
0.0593237578868866 Perceptual Loss: 2.7870287895202637  
Epoch [211/250] Batch [0/3] Loss: 0.3595607578754425 MSE Loss:  
0.06732183694839478 Perceptual Loss: 2.922389030456543  
Epoch [212/250] Batch [0/3] Loss: 0.3532721698284149 MSE Loss:  
0.06547217816114426 Perceptual Loss: 2.877999782562256  
Epoch [213/250] Batch [0/3] Loss: 0.36900559067726135 MSE Loss:  
0.06835515052080154 Perceptual Loss: 3.0065042972564697

Epoch [214/250] Batch [0/3] Loss: 0.3535005450248718 MSE Loss:  
0.06765910983085632 Perceptual Loss: 2.8584141731262207  
Epoch [215/250] Batch [0/3] Loss: 0.32979780435562134 MSE Loss:  
0.060379743576049805 Perceptual Loss: 2.694180488586426  
Epoch [216/250] Batch [0/3] Loss: 0.304670125246048 MSE Loss:  
0.053725503385066986 Perceptual Loss: 2.509446144104004  
Epoch [217/250] Batch [0/3] Loss: 0.36102718114852905 MSE Loss:  
0.0667230412364006 Perceptual Loss: 2.9430413246154785  
Epoch [218/250] Batch [0/3] Loss: 0.3946005702018738 MSE Loss:  
0.07604245841503143 Perceptual Loss: 3.1855812072753906  
Epoch [219/250] Batch [0/3] Loss: 0.35751593112945557 MSE Loss:  
0.06387613713741302 Perceptual Loss: 2.9363977909088135  
Epoch [220/250] Batch [0/3] Loss: 0.35552316904067993 MSE Loss:  
0.06333565711975098 Perceptual Loss: 2.921875  
Epoch [221/250] Batch [0/3] Loss: 0.3675827383995056 MSE Loss:  
0.06849002838134766 Perceptual Loss: 2.99092698097229  
Epoch [222/250] Batch [0/3] Loss: 0.3843381404876709 MSE Loss:  
0.07400509715080261 Perceptual Loss: 3.103330373764038  
Epoch [223/250] Batch [0/3] Loss: 0.3791569471359253 MSE Loss:  
0.0705871433019638 Perceptual Loss: 3.085698127746582  
Epoch [224/250] Batch [0/3] Loss: 0.3439323306083679 MSE Loss:  
0.06439481675624847 Perceptual Loss: 2.795375108718872  
Epoch [225/250] Batch [0/3] Loss: 0.35976362228393555 MSE Loss:  
0.06782558560371399 Perceptual Loss: 2.9193801879882812  
Epoch [226/250] Batch [0/3] Loss: 0.34496772289276123 MSE Loss:  
0.06299423426389694 Perceptual Loss: 2.819734811782837  
Epoch [227/250] Batch [0/3] Loss: 0.35024285316467285 MSE Loss:  
0.06434990465641022 Perceptual Loss: 2.858929395675659  
Epoch [228/250] Batch [0/3] Loss: 0.35385340452194214 MSE Loss:  
0.0643799901008606 Perceptual Loss: 2.8947341442108154  
Epoch [229/250] Batch [0/3] Loss: 0.33189311623573303 MSE Loss:  
0.06200225278735161 Perceptual Loss: 2.698908567428589  
Epoch [230/250] Batch [0/3] Loss: 0.3464438319206238 MSE Loss:  
0.06405214965343475 Perceptual Loss: 2.8239166736602783  
Epoch [231/250] Batch [0/3] Loss: 0.333987832069397 MSE Loss:  
0.059459805488586426 Perceptual Loss: 2.7452802658081055  
Epoch [232/250] Batch [0/3] Loss: 0.363634318113327 MSE Loss:  
0.06553756445646286 Perceptual Loss: 2.9809672832489014  
Epoch [233/250] Batch [0/3] Loss: 0.36071762442588806 MSE Loss:  
0.0652376040816307 Perceptual Loss: 2.9548001289367676  
Epoch [234/250] Batch [0/3] Loss: 0.36209970712661743 MSE Loss:  
0.06623730063438416 Perceptual Loss: 2.9586241245269775  
Epoch [235/250] Batch [0/3] Loss: 0.35737788677215576 MSE Loss:  
0.06489832699298859 Perceptual Loss: 2.924795627593994  
Epoch [236/250] Batch [0/3] Loss: 0.3491007089614868 MSE Loss:  
0.06501282751560211 Perceptual Loss: 2.840878963470459  
Epoch [237/250] Batch [0/3] Loss: 0.3960982859134674 MSE Loss:  
0.07520896196365356 Perceptual Loss: 3.208893299102783

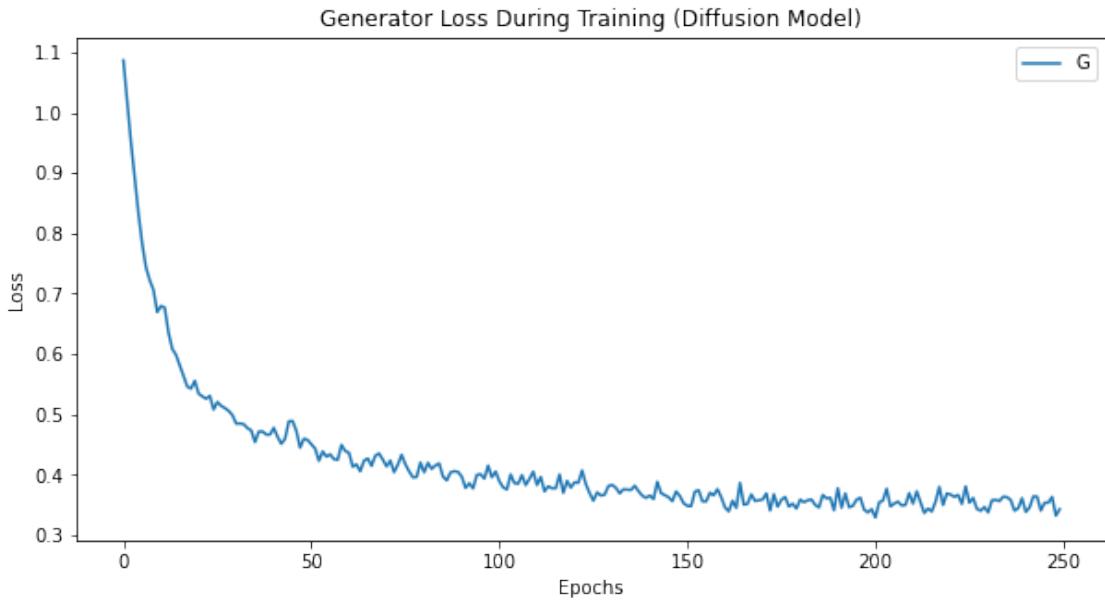
```

Epoch [238/250] Batch [0/3] Loss: 0.33593475818634033 MSE Loss:
0.0606955885887146 Perceptual Loss: 2.7523915767669678
Epoch [239/250] Batch [0/3] Loss: 0.33057066798210144 MSE Loss:
0.058366693556308746 Perceptual Loss: 2.7220396995544434
Epoch [240/250] Batch [0/3] Loss: 0.37964993715286255 MSE Loss:
0.07201702892780304 Perceptual Loss: 3.076328754425049
Epoch [241/250] Batch [0/3] Loss: 0.3533341586589813 MSE Loss:
0.06613865494728088 Perceptual Loss: 2.871954917907715
Epoch [242/250] Batch [0/3] Loss: 0.3081505596637726 MSE Loss:
0.056425534188747406 Perceptual Loss: 2.5172500610351562
Epoch [243/250] Batch [0/3] Loss: 0.33584824204444885 MSE Loss:
0.061399947851896286 Perceptual Loss: 2.74448299407959
Epoch [244/250] Batch [0/3] Loss: 0.36275583505630493 MSE Loss:
0.06681448966264725 Perceptual Loss: 2.959413528442383
Epoch [245/250] Batch [0/3] Loss: 0.3079732358455658 MSE Loss:
0.055951058864593506 Perceptual Loss: 2.520221710205078
Epoch [246/250] Batch [0/3] Loss: 0.3488582372665405 MSE Loss:
0.06181836128234863 Perceptual Loss: 2.870398759841919
Epoch [247/250] Batch [0/3] Loss: 0.38488802313804626 MSE Loss:
0.07340702414512634 Perceptual Loss: 3.114809989929199
Epoch [248/250] Batch [0/3] Loss: 0.34481081366539 MSE Loss: 0.06541549414396286
Perceptual Loss: 2.7939529418945312
Epoch [249/250] Batch [0/3] Loss: 0.33587679266929626 MSE Loss:
0.05996289104223251 Perceptual Loss: 2.759138822555542
Epoch [250/250] Batch [0/3] Loss: 0.36073586344718933 MSE Loss:
0.0678682029247284 Perceptual Loss: 2.9286766052246094

```

## 18 Plot generator losses for Diffusion Model

```
[35]: plt.figure(figsize=(10, 5))
plt.title("Generator Loss During Training (Diffusion Model)")
plt.plot(G_losses_diff, label="G")
plt.xlabel("Epochs")
plt.ylabel("Loss")
plt.legend()
plt.show()
```



## 19 Defining Generator for DC-GANS

```
[16]: class Generator(nn.Module):
    def __init__(self, ngpu):
        super(Generator, self).__init__()
        self.ngpu = ngpu
        self.main = nn.Sequential(
            nn.ConvTranspose2d( nz, ngf * 8, 4, 1, 0, bias=False),
            nn.BatchNorm2d(ngf * 8),
            nn.ReLU(True),
            nn.ConvTranspose2d(ngf * 8, ngf * 4, 4, 2, 1, bias=False),
            nn.BatchNorm2d(ngf * 4),
            nn.ReLU(True),
            nn.ConvTranspose2d( ngf * 4, ngf * 2, 4, 2, 1, bias=False),
            nn.BatchNorm2d(ngf * 2),
            nn.ReLU(True),
            nn.ConvTranspose2d( ngf * 2, ngf, 4, 2, 1, bias=False),
            nn.BatchNorm2d(ngf),
            nn.ReLU(True),
            nn.ConvTranspose2d( ngf, nc, 4, 2, 1, bias=False),
            nn.Tanh()
        )

    def forward(self, input):
        return self.main(input)
```

```
[17]: netG = Generator(ngpu).to(device)
if (device.type == 'cuda') and (ngpu > 1):
    netG = nn.DataParallel(netG, list(range(ngpu)))
netG.apply(weights_init)
```

```
[17]: Generator(
  (main): Sequential(
    (0): ConvTranspose2d(100, 512, kernel_size=(4, 4), stride=(1, 1),
bias=False)
    (1): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
    (2): ReLU(inplace=True)
    (3): ConvTranspose2d(512, 256, kernel_size=(4, 4), stride=(2, 2),
padding=(1, 1), bias=False)
    (4): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
    (5): ReLU(inplace=True)
    (6): ConvTranspose2d(256, 128, kernel_size=(4, 4), stride=(2, 2),
padding=(1, 1), bias=False)
    (7): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
    (8): ReLU(inplace=True)
    (9): ConvTranspose2d(128, 64, kernel_size=(4, 4), stride=(2, 2), padding=(1,
1), bias=False)
    (10): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
    (11): ReLU(inplace=True)
    (12): ConvTranspose2d(64, 3, kernel_size=(4, 4), stride=(2, 2), padding=(1,
1), bias=False)
    (13): Tanh()
  )
)
```

## 20 Defining Discriminator for DC-GANS

```
[18]: class Discriminator(nn.Module):
    def __init__(self, ngpu):
        super(Discriminator, self).__init__()
        self.ngpu = ngpu
        self.main = nn.Sequential(
            nn.Conv2d(nc, ndf, 4, 2, 1, bias=False),
            nn.LeakyReLU(0.2, inplace=True),
            nn.Conv2d(ndf, ndf * 2, 4, 2, 1, bias=False),
            nn.BatchNorm2d(ndf * 2),
            nn.LeakyReLU(0.2, inplace=True),
            nn.Conv2d(ndf * 2, ndf * 4, 4, 2, 1, bias=False),
```

```

        nn.BatchNorm2d(ndf * 4),
        nn.LeakyReLU(0.2, inplace=True),
        nn.Conv2d(ndf * 4, ndf * 8, 4, 2, 1, bias=False),
        nn.BatchNorm2d(ndf * 8),
        nn.LeakyReLU(0.2, inplace=True),
        nn.Conv2d(ndf * 8, 1, 4, 1, 0, bias=False),
        nn.Sigmoid()
    )

    def forward(self, input):
        return self.main(input)

```

[19]:

```

netD = Discriminator(ngpu).to(device)
if (device.type == 'cuda') and (ngpu > 1):
    netD = nn.DataParallel(netD, list(range(ngpu)))
netD.apply(weights_init)
print(netD)

```

```

Discriminator(
    (main): Sequential(
        (0): Conv2d(3, 64, kernel_size=(4, 4), stride=(2, 2), padding=(1, 1),
bias=False)
        (1): LeakyReLU(negative_slope=0.2, inplace=True)
        (2): Conv2d(64, 128, kernel_size=(4, 4), stride=(2, 2), padding=(1, 1),
bias=False)
        (3): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
        (4): LeakyReLU(negative_slope=0.2, inplace=True)
        (5): Conv2d(128, 256, kernel_size=(4, 4), stride=(2, 2), padding=(1, 1),
bias=False)
        (6): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
        (7): LeakyReLU(negative_slope=0.2, inplace=True)
        (8): Conv2d(256, 512, kernel_size=(4, 4), stride=(2, 2), padding=(1, 1),
bias=False)
        (9): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
        (10): LeakyReLU(negative_slope=0.2, inplace=True)
        (11): Conv2d(512, 1, kernel_size=(4, 4), stride=(1, 1), bias=False)
        (12): Sigmoid()
    )
)

```

## 21 Image Generator for DC-GANS

```
[20]: def generate_images_dcgan(generator, num_images, nz):
    noise = torch.randn(num_images, nz, 1, 1, device=device)
    with torch.no_grad():
        generated_images = generator(noise).detach().cpu()
    return generated_images
```

## 22 DC-GANS Training Function

```
[21]: def train_dcgan_with_fid(dataloader, netG, netD, num_epochs, lr, beta1):
    criterion = nn.BCELoss()
    fixed_noise = torch.randn(64, nz, 1, 1, device=device)
    real_label = 1.
    fake_label = 0.
    optimizerD = optim.Adam(netD.parameters(), lr=lr, betas=(beta1, 0.999))
    optimizerG = optim.Adam(netG.parameters(), lr=lr, betas=(beta1, 0.999))

    # Track time
    start_time = time.time()

    # Lists to keep track of progress
    img_list = []
    G_losses_epoch = []
    D_losses_epoch = []

    print("Starting Training Loop...")
    for epoch in range(num_epochs):
        epoch_G_loss = 0
        epoch_D_loss = 0
        for i, data in enumerate(dataloader, 0):
            netD.zero_grad()
            real_cpu = data[0].to(device)
            b_size = real_cpu.size(0)
            label = torch.full((b_size,), real_label, dtype=torch.float, □
device=device)
            output = netD(real_cpu).view(-1)
            errD_real = criterion(output, label)
            errD_real.backward()
            D_x = output.mean().item()

            noise = torch.randn(b_size, nz, 1, 1, device=device)
            fake = netG(noise)
            label.fill_(fake_label)
            output = netD(fake.detach()).view(-1)
            errD_fake = criterion(output, label)
```

```

        errD_fake.backward()
        D_G_z1 = output.mean().item()
        errD = errD_real + errD_fake
        optimizerD.step()

        netG.zero_grad()
        label.fill_(real_label)
        output = netD(fake).view(-1)
        errG = criterion(output, label)
        errG.backward()
        D_G_z2 = output.mean().item()
        optimizerG.step()

        epoch_G_loss += errG.item()
        epoch_D_loss += errD.item()

        if i % 50 == 0:
            print('[%d/%d] [%d/%d] \tLoss_D: %.4f \tLoss_G: %.4f \tD(x): %.4f \tD(G(z)): %.4f / %.4f'
                  % (epoch, num_epochs, i, len(dataloader),
                     errD.item(), errG.item(), D_x, D_G_z1, D_G_z2))

    # Store epoch losses
    G_losses_epoch.append(epoch_G_loss / len(dataloader))
    D_losses_epoch.append(epoch_D_loss / len(dataloader))

    if (epoch == num_epochs-1):
        with torch.no_grad():
            fake = netG(fixed_noise).detach().cpu()
        img_list.append(vutils.make_grid(fake, padding=2, normalize=True))

end_time = time.time()
training_time = end_time - start_time

# Generate images and calculate FID and Inception scores
real_images = next(iter(dataloader))[0].to(device)
real_images_pil = [transforms.ToPILImage()(img.cpu()) for img in real_images]
fake_images = generate_images_dcgan(netG, len(dataloader.dataset), nz)
fake_images_pil = [transforms.ToPILImage()(img.cpu()) for img in fake_images]
fid_score = calculate_fid(real_images_pil, fake_images_pil, inception_model)
inception_score, inception_std = calculate_inception_score(fake_images_pil, inception_model)

return G_losses_epoch, D_losses_epoch, img_list, training_time, fid_score, inception_score, inception_std

```

## 23 Hyperparameter tuning for DCGAN

```
[22]: best_inception_score_dcgan = 0
best_fid_dcgan = float('inf')
best_dcgan_params = None
hyperparams_list_dcgan = [
    {'lr': 0.0001, 'beta1': 0.5},
    {'lr': 0.0001, 'beta1': 0.7},
    {'lr': 0.001, 'beta1': 0.5},
    {'lr': 0.001, 'beta1': 0.7},
]
```

## 24 Hyperparameter tuning on DC-GANS and getting best parameters

```
[29]: num_epochs = 200
for idx, params in enumerate(hyperparams_list_dcgan):
    print(f"Training DCGAN with hyperparameters: {params}")

    netG = Generator(ngpu).apply(weights_init).to(device)
    netD = Discriminator(ngpu).apply(weights_init).to(device)

    G_losses_dcgan, D_losses_dcgan, img_list_dcgan, training_time_dcgan, ↴
    ↵ fid_score_dcgan, inception_score_dcgan, inception_std_dcgan = ↴
    ↵ train_dcgan_with_fid(
        dataloader, netG, netD, num_epochs, params['lr'], params['beta1']
    )

    print(f"fid score: {fid_score_dcgan}")
    print(f"inception score: {inception_score_dcgan} ± {inception_std_dcgan}")

    # Save losses and model state
    with open(f'dc_gans_losses/losses_{params["lr"]}_{params["beta1"]}.pkl', ↴
    ↵ 'wb') as f:
        pickle.dump({'G_losses': G_losses_dcgan, 'D_losses': D_losses_dcgan, ↴
        ↵ 'FID': fid_score_dcgan, 'Inception Score': inception_score_dcgan, 'Inception' ↵
        ↵ 'Std': inception_std_dcgan}, f)
    torch.save(netG.state_dict(), f'dc_gans_models/' ↵
    ↵ netG_{params["lr"]}_{params["beta1"]}.pth')
    torch.save(netD.state_dict(), f'dc_gans_models/' ↵
    ↵ netD_{params["lr"]}_{params["beta1"]}.pth')

    if fid_score_dcgan < best_fid_dcgan:
        best_fid_dcgan = fid_score_dcgan
        best_dcgan_params = params
        torch.save(netG.state_dict(), "best_models/best_dcgan_generator.pth")
```

```

        torch.save(netD.state_dict(), "best_models/best_dcgan_discriminator.
→pth")

    if inception_score_dcgan > best_inception_score_dcgan:
        best_inception_score_dcgan = inception_score_dcgan

print(f"Best hyperparameters for DCGAN: {best_dcgan_params}")
print(f"Best Inception Score for DCGAN: {best_inception_score_dcgan}")
print(f"Best hyperparameters for DCGAN: {best_dcgan_params}")

```

Training DCGAN with hyperparameters: {'lr': 0.0001, 'beta1': 0.5}

Starting Training Loop...

Iteration	Loss_D	Loss_G	D(x)	D(G(z))
[0/200] [0/3]	1.1415	2.4389	0.5808	0.3709
/ 0.1284				
[1/200] [0/3]	0.3013	4.3605	0.9847	0.2190
/ 0.0209				
[2/200] [0/3]	0.2047	4.3972	0.9701	0.1328
/ 0.0225				
[3/200] [0/3]	0.1271	4.9078	0.9791	0.0926
/ 0.0122				
[4/200] [0/3]	0.1254	5.1032	0.9692	0.0810
/ 0.0102				
[5/200] [0/3]	0.0681	5.4973	0.9869	0.0513
/ 0.0064				
[6/200] [0/3]	0.0769	5.7016	0.9845	0.0564
/ 0.0052				
[7/200] [0/3]	0.0669	5.8448	0.9845	0.0478
/ 0.0041				
[8/200] [0/3]	0.0522	6.1655	0.9864	0.0363
/ 0.0033				
[9/200] [0/3]	0.0458	6.2281	0.9881	0.0320
/ 0.0028				
[10/200] [0/3]	0.0330	6.8563	0.9884	0.0201
/ 0.0017				
[11/200] [0/3]	0.0448	7.3614	0.9853	0.0280
/ 0.0011				
[12/200] [0/3]	0.0322	7.4242	0.9906	0.0216
/ 0.0011				
[13/200] [0/3]	0.0297	7.4518	0.9908	0.0194
/ 0.0010				
[14/200] [0/3]	0.0423	7.6303	0.9909	0.0317
/ 0.0007				
[15/200] [0/3]	0.0262	7.3155	0.9915	0.0168
/ 0.0011				
[16/200] [0/3]	0.0306	7.8258	0.9908	0.0206
/ 0.0006				
[17/200] [0/3]	0.0295	8.0735	0.9935	0.0222

/ 0.0005				
[18/200] [0/3]	Loss_D: 0.0343	Loss_G: 7.7926	D(x): 0.9898	D(G(z)): 0.0233
/ 0.0006				
[19/200] [0/3]	Loss_D: 0.0240	Loss_G: 7.5744	D(x): 0.9919	D(G(z)): 0.0154
/ 0.0007				
[20/200] [0/3]	Loss_D: 0.0199	Loss_G: 7.6350	D(x): 0.9945	D(G(z)): 0.0142
/ 0.0007				
[21/200] [0/3]	Loss_D: 0.0236	Loss_G: 7.7129	D(x): 0.9936	D(G(z)): 0.0168
/ 0.0006				
[22/200] [0/3]	Loss_D: 0.0262	Loss_G: 7.9079	D(x): 0.9916	D(G(z)): 0.0173
/ 0.0005				
[23/200] [0/3]	Loss_D: 0.0224	Loss_G: 8.1595	D(x): 0.9897	D(G(z)): 0.0116
/ 0.0005				
[24/200] [0/3]	Loss_D: 0.0202	Loss_G: 8.1970	D(x): 0.9917	D(G(z)): 0.0115
/ 0.0004				
[25/200] [0/3]	Loss_D: 0.0212	Loss_G: 8.2698	D(x): 0.9935	D(G(z)): 0.0143
/ 0.0004				
[26/200] [0/3]	Loss_D: 0.0173	Loss_G: 8.1427	D(x): 0.9917	D(G(z)): 0.0087
/ 0.0004				
[27/200] [0/3]	Loss_D: 0.0161	Loss_G: 8.1113	D(x): 0.9943	D(G(z)): 0.0101
/ 0.0005				
[28/200] [0/3]	Loss_D: 0.0195	Loss_G: 8.3322	D(x): 0.9915	D(G(z)): 0.0105
/ 0.0004				
[29/200] [0/3]	Loss_D: 0.0150	Loss_G: 8.4299	D(x): 0.9946	D(G(z)): 0.0094
/ 0.0003				
[30/200] [0/3]	Loss_D: 0.0189	Loss_G: 8.5954	D(x): 0.9929	D(G(z)): 0.0115
/ 0.0003				
[31/200] [0/3]	Loss_D: 0.0164	Loss_G: 8.5521	D(x): 0.9939	D(G(z)): 0.0100
/ 0.0003				
[32/200] [0/3]	Loss_D: 0.0172	Loss_G: 8.4544	D(x): 0.9923	D(G(z)): 0.0092
/ 0.0003				
[33/200] [0/3]	Loss_D: 0.0128	Loss_G: 8.5994	D(x): 0.9953	D(G(z)): 0.0079
/ 0.0003				
[34/200] [0/3]	Loss_D: 0.0179	Loss_G: 9.1566	D(x): 0.9935	D(G(z)): 0.0112
/ 0.0002				
[35/200] [0/3]	Loss_D: 0.0141	Loss_G: 8.5550	D(x): 0.9939	D(G(z)): 0.0078
/ 0.0003				
[36/200] [0/3]	Loss_D: 0.0155	Loss_G: 8.5361	D(x): 0.9940	D(G(z)): 0.0093
/ 0.0003				
[37/200] [0/3]	Loss_D: 0.0166	Loss_G: 8.5516	D(x): 0.9950	D(G(z)): 0.0113
/ 0.0003				
[38/200] [0/3]	Loss_D: 0.0124	Loss_G: 8.3702	D(x): 0.9956	D(G(z)): 0.0078
/ 0.0004				
[39/200] [0/3]	Loss_D: 0.0171	Loss_G: 9.0077	D(x): 0.9953	D(G(z)): 0.0122
/ 0.0002				
[40/200] [0/3]	Loss_D: 0.0154	Loss_G: 8.9350	D(x): 0.9962	D(G(z)): 0.0115
/ 0.0002				
[41/200] [0/3]	Loss_D: 0.0159	Loss_G: 8.7440	D(x): 0.9940	D(G(z)): 0.0096

```

/ 0.0003
[42/200] [0/3] Loss_D: 0.0150 Loss_G: 8.6344 D(x): 0.9942 D(G(z)): 0.0090
/ 0.0003
[43/200] [0/3] Loss_D: 0.0147 Loss_G: 8.2732 D(x): 0.9921 D(G(z)): 0.0066
/ 0.0005
[44/200] [0/3] Loss_D: 0.0119 Loss_G: 8.0299 D(x): 0.9906 D(G(z)): 0.0022
/ 0.0005
[45/200] [0/3] Loss_D: 0.0090 Loss_G: 10.2909 D(x): 0.9915 D(G(z)): 0.0002
/ 0.0001
[46/200] [0/3] Loss_D: 0.1952 Loss_G: 9.0441 D(x): 0.8669 D(G(z)): 0.0000
/ 0.0002
[47/200] [0/3] Loss_D: 0.0172 Loss_G: 9.8251 D(x): 0.9925 D(G(z)): 0.0084
/ 0.0001
[48/200] [0/3] Loss_D: 0.0027 Loss_G: 10.5419 D(x): 0.9975 D(G(z)): 0.0000
/ 0.0001
[49/200] [0/3] Loss_D: 0.0041 Loss_G: 7.5215 D(x): 0.9965 D(G(z)): 0.0001
/ 0.0012
[50/200] [0/3] Loss_D: 2.7465 Loss_G: 28.0027 D(x): 0.2441 D(G(z)): 0.0000
/ 0.0000
[51/200] [0/3] Loss_D: 1.0842 Loss_G: 19.9317 D(x): 0.9991 D(G(z)): 0.5327
/ 0.0000
[52/200] [0/3] Loss_D: 0.1099 Loss_G: 10.0546 D(x): 0.9456 D(G(z)): 0.0004
/ 0.0002
[53/200] [0/3] Loss_D: 0.0193 Loss_G: 9.2330 D(x): 0.9855 D(G(z)): 0.0004
/ 0.0002
[54/200] [0/3] Loss_D: 0.3676 Loss_G: 18.7919 D(x): 0.8023 D(G(z)): 0.0000
/ 0.0000
[55/200] [0/3] Loss_D: 0.0994 Loss_G: 15.7911 D(x): 0.9283 D(G(z)): 0.0002
/ 0.0000
[56/200] [0/3] Loss_D: 0.2263 Loss_G: 13.2198 D(x): 0.9689 D(G(z)): 0.1522
/ 0.0000
[57/200] [0/3] Loss_D: 0.1263 Loss_G: 10.7812 D(x): 0.9075 D(G(z)): 0.0019
/ 0.0000
[58/200] [0/3] Loss_D: 5.4985 Loss_G: 15.1058 D(x): 0.0553 D(G(z)): 0.0000
/ 0.0000
[59/200] [0/3] Loss_D: 0.1535 Loss_G: 24.6940 D(x): 0.9203 D(G(z)): 0.0000
/ 0.0000
[60/200] [0/3] Loss_D: 0.1058 Loss_G: 5.3414 D(x): 0.9883 D(G(z)): 0.0825
/ 0.0088
[61/200] [0/3] Loss_D: 0.0402 Loss_G: 14.9107 D(x): 0.9640 D(G(z)): 0.0000
/ 0.0000
[62/200] [0/3] Loss_D: 0.2102 Loss_G: 9.9765 D(x): 0.9912 D(G(z)): 0.1656
/ 0.0001
[63/200] [0/3] Loss_D: 0.4182 Loss_G: 7.5891 D(x): 0.8222 D(G(z)): 0.1132
/ 0.0012
[64/200] [0/3] Loss_D: 0.7991 Loss_G: 17.4842 D(x): 0.9642 D(G(z)): 0.4740
/ 0.0000
[65/200] [0/3] Loss_D: 1.0415 Loss_G: 16.6659 D(x): 0.9947 D(G(z)): 0.5808

```

```

/ 0.0000
[66/200] [0/3] Loss_D: 0.0567 Loss_G: 6.5956 D(x): 0.9550 D(G(z)): 0.0021
/ 0.0027
[67/200] [0/3] Loss_D: 0.0862 Loss_G: 6.0476 D(x): 0.9342 D(G(z)): 0.0064
/ 0.0046
[68/200] [0/3] Loss_D: 0.1477 Loss_G: 6.5763 D(x): 0.8862 D(G(z)): 0.0027
/ 0.0024
[69/200] [0/3] Loss_D: 0.3526 Loss_G: 4.8156 D(x): 0.7991 D(G(z)): 0.0534
/ 0.0144
[70/200] [0/3] Loss_D: 0.2573 Loss_G: 5.1759 D(x): 0.9866 D(G(z)): 0.1975
/ 0.0095
[71/200] [0/3] Loss_D: 0.1081 Loss_G: 4.8073 D(x): 0.9323 D(G(z)): 0.0234
/ 0.0147
[72/200] [0/3] Loss_D: 0.1441 Loss_G: 4.1092 D(x): 0.9175 D(G(z)): 0.0390
/ 0.0261
[73/200] [0/3] Loss_D: 0.1303 Loss_G: 5.9993 D(x): 0.9043 D(G(z)): 0.0027
/ 0.0051
[74/200] [0/3] Loss_D: 0.3179 Loss_G: 6.2057 D(x): 0.7938 D(G(z)): 0.0133
/ 0.0037
[75/200] [0/3] Loss_D: 1.5886 Loss_G: 3.7743 D(x): 0.3355 D(G(z)): 0.0011
/ 0.0340
[76/200] [0/3] Loss_D: 0.0888 Loss_G: 5.8191 D(x): 0.9470 D(G(z)): 0.0229
/ 0.0052
[77/200] [0/3] Loss_D: 0.3061 Loss_G: 4.5444 D(x): 0.8256 D(G(z)): 0.0481
/ 0.0166
[78/200] [0/3] Loss_D: 0.3810 Loss_G: 6.6251 D(x): 0.9308 D(G(z)): 0.2349
/ 0.0023
[79/200] [0/3] Loss_D: 0.3904 Loss_G: 7.5764 D(x): 0.9134 D(G(z)): 0.2270
/ 0.0009
[80/200] [0/3] Loss_D: 0.9739 Loss_G: 6.2790 D(x): 0.4858 D(G(z)): 0.0004
/ 0.0027
[81/200] [0/3] Loss_D: 0.6281 Loss_G: 8.0111 D(x): 0.6264 D(G(z)): 0.0008
/ 0.0006
[82/200] [0/3] Loss_D: 0.2549 Loss_G: 5.2471 D(x): 0.8255 D(G(z)): 0.0207
/ 0.0076
[83/200] [0/3] Loss_D: 0.7945 Loss_G: 1.2502 D(x): 0.5631 D(G(z)): 0.0144
/ 0.3323
[84/200] [0/3] Loss_D: 0.0818 Loss_G: 4.3301 D(x): 0.9357 D(G(z)): 0.0053
/ 0.0264
[85/200] [0/3] Loss_D: 0.2438 Loss_G: 4.2045 D(x): 0.8593 D(G(z)): 0.0389
/ 0.0242
[86/200] [0/3] Loss_D: 0.3123 Loss_G: 5.9177 D(x): 0.9345 D(G(z)): 0.1977
/ 0.0042
[87/200] [0/3] Loss_D: 0.1816 Loss_G: 5.1592 D(x): 0.9093 D(G(z)): 0.0673
/ 0.0097
[88/200] [0/3] Loss_D: 0.2285 Loss_G: 5.1223 D(x): 0.8932 D(G(z)): 0.0882
/ 0.0106
[89/200] [0/3] Loss_D: 0.3699 Loss_G: 3.9619 D(x): 0.7621 D(G(z)): 0.0363

```

```

/ 0.0314
[90/200] [0/3] Loss_D: 0.2176 Loss_G: 3.6468 D(x): 0.8800 D(G(z)): 0.0595
/ 0.0417
[91/200] [0/3] Loss_D: 0.7137 Loss_G: 9.6333 D(x): 0.9575 D(G(z)): 0.4182
/ 0.0002
[92/200] [0/3] Loss_D: 1.3315 Loss_G: 5.0861 D(x): 0.4101 D(G(z)): 0.0004
/ 0.0095
[93/200] [0/3] Loss_D: 0.1353 Loss_G: 4.9123 D(x): 0.9033 D(G(z)): 0.0217
/ 0.0097
[94/200] [0/3] Loss_D: 0.2257 Loss_G: 5.2962 D(x): 0.9311 D(G(z)): 0.1215
/ 0.0073
[95/200] [0/3] Loss_D: 0.3222 Loss_G: 3.6754 D(x): 0.8106 D(G(z)): 0.0412
/ 0.0363
[96/200] [0/3] Loss_D: 0.2200 Loss_G: 5.3514 D(x): 0.9698 D(G(z)): 0.1605
/ 0.0074
[97/200] [0/3] Loss_D: 0.2763 Loss_G: 4.2335 D(x): 0.8607 D(G(z)): 0.0935
/ 0.0200
[98/200] [0/3] Loss_D: 1.8433 Loss_G: 13.7404 D(x): 0.9924 D(G(z)): 0.7775
/ 0.0000
[99/200] [0/3] Loss_D: 0.2641 Loss_G: 5.3584 D(x): 0.9886 D(G(z)): 0.1626
/ 0.0154
[100/200] [0/3] Loss_D: 0.2426 Loss_G: 4.7916 D(x): 0.9146 D(G(z)): 0.1191
/ 0.0138
[101/200] [0/3] Loss_D: 0.2738 Loss_G: 4.9293 D(x): 0.8672 D(G(z)): 0.0914
/ 0.0119
[102/200] [0/3] Loss_D: 0.3192 Loss_G: 5.4308 D(x): 0.8780 D(G(z)): 0.1399
/ 0.0068
[103/200] [0/3] Loss_D: 0.3946 Loss_G: 3.0633 D(x): 0.7662 D(G(z)): 0.0462
/ 0.0667
[104/200] [0/3] Loss_D: 0.3729 Loss_G: 5.2090 D(x): 0.9643 D(G(z)): 0.2478
/ 0.0106
[105/200] [0/3] Loss_D: 0.2182 Loss_G: 4.3665 D(x): 0.9011 D(G(z)): 0.0855
/ 0.0211
[106/200] [0/3] Loss_D: 0.3019 Loss_G: 4.6610 D(x): 0.8869 D(G(z)): 0.1382
/ 0.0160
[107/200] [0/3] Loss_D: 0.2892 Loss_G: 5.7903 D(x): 0.9345 D(G(z)): 0.1832
/ 0.0050
[108/200] [0/3] Loss_D: 0.2027 Loss_G: 4.8173 D(x): 0.9149 D(G(z)): 0.0945
/ 0.0128
[109/200] [0/3] Loss_D: 0.2331 Loss_G: 3.7226 D(x): 0.8564 D(G(z)): 0.0517
/ 0.0381
[110/200] [0/3] Loss_D: 0.4099 Loss_G: 7.2723 D(x): 0.9644 D(G(z)): 0.2876
/ 0.0012
[111/200] [0/3] Loss_D: 0.1458 Loss_G: 5.3533 D(x): 0.9149 D(G(z)): 0.0451
/ 0.0075
[112/200] [0/3] Loss_D: 0.2555 Loss_G: 4.6047 D(x): 0.8863 D(G(z)): 0.1092
/ 0.0146
[113/200] [0/3] Loss_D: 0.8931 Loss_G: 0.9808 D(x): 0.5214 D(G(z)): 0.0089

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/ 0.4360
[114/200] [0/3] Loss_D: 0.0383 Loss_G: 4.1934 D(x): 0.9843 D(G(z)): 0.0189
/ 0.0422
[115/200] [0/3] Loss_D: 0.1447 Loss_G: 4.7130 D(x): 0.9059 D(G(z)): 0.0343
/ 0.0141
[116/200] [0/3] Loss_D: 0.2848 Loss_G: 4.2600 D(x): 0.8809 D(G(z)): 0.1260
/ 0.0222
[117/200] [0/3] Loss_D: 0.2194 Loss_G: 4.0805 D(x): 0.8989 D(G(z)): 0.0928
/ 0.0268
[118/200] [0/3] Loss_D: 0.4316 Loss_G: 6.3811 D(x): 0.9374 D(G(z)): 0.2818
/ 0.0032
[119/200] [0/3] Loss_D: 0.3672 Loss_G: 5.8074 D(x): 0.9317 D(G(z)): 0.2223
/ 0.0066
[120/200] [0/3] Loss_D: 0.3671 Loss_G: 4.1006 D(x): 0.7541 D(G(z)): 0.0276
/ 0.0269
[121/200] [0/3] Loss_D: 0.2143 Loss_G: 4.4531 D(x): 0.8925 D(G(z)): 0.0801
/ 0.0207
[122/200] [0/3] Loss_D: 0.2455 Loss_G: 5.3371 D(x): 0.9399 D(G(z)): 0.1513
/ 0.0085
[123/200] [0/3] Loss_D: 0.1424 Loss_G: 4.7967 D(x): 0.9511 D(G(z)): 0.0821
/ 0.0130
[124/200] [0/3] Loss_D: 0.2298 Loss_G: 5.1544 D(x): 0.9316 D(G(z)): 0.1285
/ 0.0098
[125/200] [0/3] Loss_D: 0.2474 Loss_G: 5.5100 D(x): 0.9455 D(G(z)): 0.1568
/ 0.0071
[126/200] [0/3] Loss_D: 0.1676 Loss_G: 4.9230 D(x): 0.8867 D(G(z)): 0.0265
/ 0.0128
[127/200] [0/3] Loss_D: 0.2336 Loss_G: 4.6511 D(x): 0.8479 D(G(z)): 0.0331
/ 0.0180
[128/200] [0/3] Loss_D: 0.2838 Loss_G: 4.2671 D(x): 0.8063 D(G(z)): 0.0254
/ 0.0249
[129/200] [0/3] Loss_D: 0.3144 Loss_G: 3.6756 D(x): 0.7878 D(G(z)): 0.0313
/ 0.0401
[130/200] [0/3] Loss_D: 0.2222 Loss_G: 3.6955 D(x): 0.8760 D(G(z)): 0.0655
/ 0.0346
[131/200] [0/3] Loss_D: 0.2656 Loss_G: 4.5005 D(x): 0.9243 D(G(z)): 0.1539
/ 0.0182
[132/200] [0/3] Loss_D: 0.2288 Loss_G: 4.3225 D(x): 0.8954 D(G(z)): 0.0959
/ 0.0197
[133/200] [0/3] Loss_D: 0.3528 Loss_G: 2.2727 D(x): 0.7541 D(G(z)): 0.0195
/ 0.1410
[134/200] [0/3] Loss_D: 0.1443 Loss_G: 3.4703 D(x): 0.9756 D(G(z)): 0.1045
/ 0.0491
[135/200] [0/3] Loss_D: 0.1825 Loss_G: 3.4449 D(x): 0.8841 D(G(z)): 0.0375
/ 0.0459
[136/200] [0/3] Loss_D: 0.2329 Loss_G: 2.9600 D(x): 0.8588 D(G(z)): 0.0581
/ 0.0742
[137/200] [0/3] Loss_D: 0.2884 Loss_G: 5.5427 D(x): 0.9687 D(G(z)): 0.2089

```

```

/ 0.0071
[138/200] [0/3] Loss_D: 0.1534 Loss_G: 4.6985 D(x): 0.9577 D(G(z)): 0.0981
/ 0.0136
[139/200] [0/3] Loss_D: 0.2725 Loss_G: 5.7824 D(x): 0.9558 D(G(z)): 0.1894
/ 0.0052
[140/200] [0/3] Loss_D: 0.4945 Loss_G: 4.3032 D(x): 0.6749 D(G(z)): 0.0050
/ 0.0278
[141/200] [0/3] Loss_D: 0.5858 Loss_G: 2.0847 D(x): 0.6315 D(G(z)): 0.0105
/ 0.1584
[142/200] [0/3] Loss_D: 0.1094 Loss_G: 3.2577 D(x): 0.9445 D(G(z)): 0.0461
/ 0.0587
[143/200] [0/3] Loss_D: 0.1649 Loss_G: 3.6067 D(x): 0.8864 D(G(z)): 0.0309
/ 0.0397
[144/200] [0/3] Loss_D: 0.3379 Loss_G: 6.0617 D(x): 0.9720 D(G(z)): 0.2479
/ 0.0041
[145/200] [0/3] Loss_D: 0.2585 Loss_G: 5.3577 D(x): 0.9660 D(G(z)): 0.1833
/ 0.0097
[146/200] [0/3] Loss_D: 0.2485 Loss_G: 5.5895 D(x): 0.9741 D(G(z)): 0.1856
/ 0.0074
[147/200] [0/3] Loss_D: 0.1493 Loss_G: 4.6749 D(x): 0.9486 D(G(z)): 0.0841
/ 0.0155
[148/200] [0/3] Loss_D: 0.1693 Loss_G: 3.7601 D(x): 0.9164 D(G(z)): 0.0721
/ 0.0342
[149/200] [0/3] Loss_D: 0.2215 Loss_G: 4.2836 D(x): 0.9337 D(G(z)): 0.1299
/ 0.0238
[150/200] [0/3] Loss_D: 0.1775 Loss_G: 4.2063 D(x): 0.8960 D(G(z)): 0.0522
/ 0.0284
[151/200] [0/3] Loss_D: 0.1366 Loss_G: 4.3975 D(x): 0.9175 D(G(z)): 0.0429
/ 0.0188
[152/200] [0/3] Loss_D: 0.3022 Loss_G: 3.0071 D(x): 0.7864 D(G(z)): 0.0246
/ 0.0734
[153/200] [0/3] Loss_D: 0.1224 Loss_G: 3.6819 D(x): 0.9336 D(G(z)): 0.0458
/ 0.0396
[154/200] [0/3] Loss_D: 0.1910 Loss_G: 4.1307 D(x): 0.9406 D(G(z)): 0.1118
/ 0.0235
[155/200] [0/3] Loss_D: 0.3095 Loss_G: 5.7307 D(x): 0.9446 D(G(z)): 0.1960
/ 0.0056
[156/200] [0/3] Loss_D: 0.2761 Loss_G: 6.1094 D(x): 0.9388 D(G(z)): 0.1738
/ 0.0043
[157/200] [0/3] Loss_D: 0.6922 Loss_G: 4.3929 D(x): 0.5943 D(G(z)): 0.0019
/ 0.0224
[158/200] [0/3] Loss_D: 0.1184 Loss_G: 6.7318 D(x): 0.9151 D(G(z)): 0.0088
/ 0.0028
[159/200] [0/3] Loss_D: 0.1461 Loss_G: 4.2750 D(x): 0.9551 D(G(z)): 0.0878
/ 0.0216
[160/200] [0/3] Loss_D: 0.3511 Loss_G: 2.2349 D(x): 0.8098 D(G(z)): 0.0876
/ 0.1420
[161/200] [0/3] Loss_D: 0.7698 Loss_G: 9.2271 D(x): 0.9810 D(G(z)): 0.4818

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/ 0.0005
[162/200] [0/3] Loss_D: 0.1853 Loss_G: 6.1554 D(x): 0.9675 D(G(z)): 0.1207
/ 0.0052
[163/200] [0/3] Loss_D: 0.2017 Loss_G: 4.5199 D(x): 0.9301 D(G(z)): 0.1091
/ 0.0196
[164/200] [0/3] Loss_D: 0.2107 Loss_G: 3.2842 D(x): 0.8605 D(G(z)): 0.0316
/ 0.0582
[165/200] [0/3] Loss_D: 0.2305 Loss_G: 5.0558 D(x): 0.9703 D(G(z)): 0.1650
/ 0.0140
[166/200] [0/3] Loss_D: 0.2406 Loss_G: 5.5056 D(x): 0.9670 D(G(z)): 0.1762
/ 0.0076
[167/200] [0/3] Loss_D: 0.2112 Loss_G: 4.5382 D(x): 0.9397 D(G(z)): 0.1215
/ 0.0212
[168/200] [0/3] Loss_D: 0.1679 Loss_G: 3.8530 D(x): 0.9094 D(G(z)): 0.0594
/ 0.0293
[169/200] [0/3] Loss_D: 0.1668 Loss_G: 4.0652 D(x): 0.9288 D(G(z)): 0.0809
/ 0.0251
[170/200] [0/3] Loss_D: 0.1207 Loss_G: 4.5469 D(x): 0.9452 D(G(z)): 0.0572
/ 0.0185
[171/200] [0/3] Loss_D: 0.1669 Loss_G: 4.2406 D(x): 0.8901 D(G(z)): 0.0353
/ 0.0220
[172/200] [0/3] Loss_D: 0.1903 Loss_G: 4.5652 D(x): 0.9292 D(G(z)): 0.0977
/ 0.0203
[173/200] [0/3] Loss_D: 0.4083 Loss_G: 1.6284 D(x): 0.7305 D(G(z)): 0.0288
/ 0.2652
[174/200] [0/3] Loss_D: 0.2263 Loss_G: 4.2209 D(x): 0.9942 D(G(z)): 0.1710
/ 0.0298
[175/200] [0/3] Loss_D: 1.8352 Loss_G: 11.3571 D(x): 0.9985 D(G(z)): 0.7393
/ 0.0006
[176/200] [0/3] Loss_D: 0.1604 Loss_G: 4.1670 D(x): 0.9852 D(G(z)): 0.1140
/ 0.0554
[177/200] [0/3] Loss_D: 0.2261 Loss_G: 3.9679 D(x): 0.8580 D(G(z)): 0.0328
/ 0.0445
[178/200] [0/3] Loss_D: 0.3082 Loss_G: 3.5447 D(x): 0.8629 D(G(z)): 0.1250
/ 0.0482
[179/200] [0/3] Loss_D: 0.2467 Loss_G: 4.3169 D(x): 0.9355 D(G(z)): 0.1530
/ 0.0218
[180/200] [0/3] Loss_D: 0.1972 Loss_G: 4.0402 D(x): 0.9371 D(G(z)): 0.1134
/ 0.0305
[181/200] [0/3] Loss_D: 0.2496 Loss_G: 4.7543 D(x): 0.9497 D(G(z)): 0.1589
/ 0.0196
[182/200] [0/3] Loss_D: 0.2641 Loss_G: 3.6092 D(x): 0.8523 D(G(z)): 0.0724
/ 0.0461
[183/200] [0/3] Loss_D: 0.3093 Loss_G: 4.3999 D(x): 0.8922 D(G(z)): 0.1523
/ 0.0235
[184/200] [0/3] Loss_D: 0.2431 Loss_G: 3.6631 D(x): 0.8654 D(G(z)): 0.0671
/ 0.0430
[185/200] [0/3] Loss_D: 0.2295 Loss_G: 5.8313 D(x): 0.9643 D(G(z)): 0.1602

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```

/ 0.0056
[186/200] [0/3] Loss_D: 0.1422 Loss_G: 4.5544 D(x): 0.9262 D(G(z)): 0.0531
/ 0.0148
[187/200] [0/3] Loss_D: 0.2262 Loss_G: 4.4077 D(x): 0.9191 D(G(z)): 0.1182
/ 0.0216
[188/200] [0/3] Loss_D: 0.2925 Loss_G: 5.5648 D(x): 0.9332 D(G(z)): 0.1810
/ 0.0075
[189/200] [0/3] Loss_D: 0.5169 Loss_G: 3.7513 D(x): 0.6630 D(G(z)): 0.0048
/ 0.0497
[190/200] [0/3] Loss_D: 0.1414 Loss_G: 4.5868 D(x): 0.9240 D(G(z)): 0.0524
/ 0.0174
[191/200] [0/3] Loss_D: 0.2929 Loss_G: 5.6984 D(x): 0.9224 D(G(z)): 0.1737
/ 0.0075
[192/200] [0/3] Loss_D: 5.5584 Loss_G: 6.2726 D(x): 0.0307 D(G(z)): 0.0000
/ 0.0136
[193/200] [0/3] Loss_D: 0.4693 Loss_G: 0.9904 D(x): 0.7334 D(G(z)): 0.0264
/ 0.4380
[194/200] [0/3] Loss_D: 0.3147 Loss_G: 3.0751 D(x): 0.9875 D(G(z)): 0.2170
/ 0.0946
[195/200] [0/3] Loss_D: 0.3406 Loss_G: 2.6406 D(x): 0.7806 D(G(z)): 0.0328
/ 0.1264
[196/200] [0/3] Loss_D: 0.3026 Loss_G: 2.5730 D(x): 0.8196 D(G(z)): 0.0639
/ 0.1122
[197/200] [0/3] Loss_D: 0.5781 Loss_G: 5.7843 D(x): 0.9646 D(G(z)): 0.3695
/ 0.0117
[198/200] [0/3] Loss_D: 0.2032 Loss_G: 4.3511 D(x): 0.9162 D(G(z)): 0.0982
/ 0.0234
[199/200] [0/3] Loss_D: 0.2653 Loss_G: 3.4457 D(x): 0.8463 D(G(z)): 0.0733
/ 0.0532
FID score: 1120.9282781125562
Inception score: 1.7195374965667725 ± 0.13076834380626678
Training DCGAN with hyperparameters: {'lr': 0.0001, 'beta1': 0.7}
Starting Training Loop...
[0/200] [0/3] Loss_D: 2.0973 Loss_G: 2.2097 D(x): 0.6557 D(G(z)): 0.7366
/ 0.1557
[1/200] [0/3] Loss_D: 0.2351 Loss_G: 4.6208 D(x): 0.9822 D(G(z)): 0.1804
/ 0.0159
[2/200] [0/3] Loss_D: 0.1770 Loss_G: 4.5099 D(x): 0.9680 D(G(z)): 0.1236
/ 0.0177
[3/200] [0/3] Loss_D: 0.1334 Loss_G: 5.0296 D(x): 0.9782 D(G(z)): 0.0969
/ 0.0100
[4/200] [0/3] Loss_D: 0.1076 Loss_G: 5.3811 D(x): 0.9811 D(G(z)): 0.0803
/ 0.0062
[5/200] [0/3] Loss_D: 0.1076 Loss_G: 5.6565 D(x): 0.9763 D(G(z)): 0.0735
/ 0.0056
[6/200] [0/3] Loss_D: 0.0609 Loss_G: 6.1012 D(x): 0.9883 D(G(z)): 0.0462
/ 0.0035
[7/200] [0/3] Loss_D: 0.0613 Loss_G: 6.2036 D(x): 0.9840 D(G(z)): 0.0423

```

/ 0.0033				
[8/200] [0/3]	Loss_D: 0.0500	Loss_G: 6.6171	D(x): 0.9835	D(G(z)): 0.0306
/ 0.0021				
[9/200] [0/3]	Loss_D: 0.0556	Loss_G: 6.7095	D(x): 0.9861	D(G(z)): 0.0382
/ 0.0021				
[10/200] [0/3]	Loss_D: 0.0546	Loss_G: 6.8697	D(x): 0.9865	D(G(z)): 0.0389
/ 0.0015				
[11/200] [0/3]	Loss_D: 0.0336	Loss_G: 7.4432	D(x): 0.9893	D(G(z)): 0.0219
/ 0.0009				
[12/200] [0/3]	Loss_D: 0.0439	Loss_G: 7.4423	D(x): 0.9928	D(G(z)): 0.0351
/ 0.0008				
[13/200] [0/3]	Loss_D: 0.0330	Loss_G: 7.3218	D(x): 0.9861	D(G(z)): 0.0178
/ 0.0010				
[14/200] [0/3]	Loss_D: 0.0343	Loss_G: 7.4722	D(x): 0.9888	D(G(z)): 0.0219
/ 0.0008				
[15/200] [0/3]	Loss_D: 0.0329	Loss_G: 7.7023	D(x): 0.9913	D(G(z)): 0.0232
/ 0.0007				
[16/200] [0/3]	Loss_D: 0.0274	Loss_G: 7.6186	D(x): 0.9915	D(G(z)): 0.0182
/ 0.0007				
[17/200] [0/3]	Loss_D: 0.0289	Loss_G: 7.9284	D(x): 0.9890	D(G(z)): 0.0170
/ 0.0005				
[18/200] [0/3]	Loss_D: 0.0264	Loss_G: 7.5421	D(x): 0.9926	D(G(z)): 0.0184
/ 0.0008				
[19/200] [0/3]	Loss_D: 0.0192	Loss_G: 7.8847	D(x): 0.9930	D(G(z)): 0.0119
/ 0.0006				
[20/200] [0/3]	Loss_D: 0.0243	Loss_G: 7.8832	D(x): 0.9943	D(G(z)): 0.0181
/ 0.0006				
[21/200] [0/3]	Loss_D: 0.0242	Loss_G: 7.7128	D(x): 0.9915	D(G(z)): 0.0150
/ 0.0006				
[22/200] [0/3]	Loss_D: 0.0220	Loss_G: 7.9945	D(x): 0.9946	D(G(z)): 0.0162
/ 0.0005				
[23/200] [0/3]	Loss_D: 0.0166	Loss_G: 8.0790	D(x): 0.9950	D(G(z)): 0.0114
/ 0.0005				
[24/200] [0/3]	Loss_D: 0.0176	Loss_G: 7.9600	D(x): 0.9959	D(G(z)): 0.0133
/ 0.0005				
[25/200] [0/3]	Loss_D: 0.0145	Loss_G: 8.1348	D(x): 0.9964	D(G(z)): 0.0107
/ 0.0004				
[26/200] [0/3]	Loss_D: 0.0175	Loss_G: 7.9017	D(x): 0.9953	D(G(z)): 0.0126
/ 0.0005				
[27/200] [0/3]	Loss_D: 0.0138	Loss_G: 7.9840	D(x): 0.9963	D(G(z)): 0.0100
/ 0.0005				
[28/200] [0/3]	Loss_D: 0.0126	Loss_G: 8.1993	D(x): 0.9968	D(G(z)): 0.0092
/ 0.0004				
[29/200] [0/3]	Loss_D: 0.0175	Loss_G: 8.1265	D(x): 0.9941	D(G(z)): 0.0113
/ 0.0004				
[30/200] [0/3]	Loss_D: 0.0146	Loss_G: 8.2040	D(x): 0.9958	D(G(z)): 0.0103
/ 0.0004				
[31/200] [0/3]	Loss_D: 0.0143	Loss_G: 8.1518	D(x): 0.9948	D(G(z)): 0.0089

/ 0.0004				
[32/200] [0/3]	Loss_D: 0.0131	Loss_G: 8.2996	D(x): 0.9955	D(G(z)): 0.0085
/ 0.0003				
[33/200] [0/3]	Loss_D: 0.0158	Loss_G: 8.1801	D(x): 0.9934	D(G(z)): 0.0090
/ 0.0004				
[34/200] [0/3]	Loss_D: 0.0138	Loss_G: 8.0983	D(x): 0.9951	D(G(z)): 0.0087
/ 0.0004				
[35/200] [0/3]	Loss_D: 0.0126	Loss_G: 7.9545	D(x): 0.9947	D(G(z)): 0.0072
/ 0.0005				
[36/200] [0/3]	Loss_D: 0.0106	Loss_G: 8.2868	D(x): 0.9959	D(G(z)): 0.0065
/ 0.0003				
[37/200] [0/3]	Loss_D: 0.0112	Loss_G: 8.2987	D(x): 0.9960	D(G(z)): 0.0071
/ 0.0003				
[38/200] [0/3]	Loss_D: 0.0128	Loss_G: 8.0781	D(x): 0.9953	D(G(z)): 0.0080
/ 0.0004				
[39/200] [0/3]	Loss_D: 0.0145	Loss_G: 8.4209	D(x): 0.9938	D(G(z)): 0.0081
/ 0.0003				
[40/200] [0/3]	Loss_D: 0.0106	Loss_G: 8.1089	D(x): 0.9955	D(G(z)): 0.0059
/ 0.0004				
[41/200] [0/3]	Loss_D: 0.0127	Loss_G: 8.3011	D(x): 0.9947	D(G(z)): 0.0073
/ 0.0003				
[42/200] [0/3]	Loss_D: 0.0104	Loss_G: 8.1337	D(x): 0.9962	D(G(z)): 0.0065
/ 0.0004				
[43/200] [0/3]	Loss_D: 0.0100	Loss_G: 8.3006	D(x): 0.9959	D(G(z)): 0.0058
/ 0.0003				
[44/200] [0/3]	Loss_D: 0.0100	Loss_G: 8.0174	D(x): 0.9976	D(G(z)): 0.0075
/ 0.0004				
[45/200] [0/3]	Loss_D: 0.0115	Loss_G: 8.3176	D(x): 0.9952	D(G(z)): 0.0066
/ 0.0003				
[46/200] [0/3]	Loss_D: 0.0100	Loss_G: 8.3008	D(x): 0.9961	D(G(z)): 0.0059
/ 0.0003				
[47/200] [0/3]	Loss_D: 0.0083	Loss_G: 8.6205	D(x): 0.9965	D(G(z)): 0.0047
/ 0.0002				
[48/200] [0/3]	Loss_D: 0.0103	Loss_G: 8.4307	D(x): 0.9960	D(G(z)): 0.0062
/ 0.0003				
[49/200] [0/3]	Loss_D: 0.0077	Loss_G: 7.9867	D(x): 0.9978	D(G(z)): 0.0054
/ 0.0004				
[50/200] [0/3]	Loss_D: 0.0078	Loss_G: 8.0495	D(x): 0.9971	D(G(z)): 0.0049
/ 0.0004				
[51/200] [0/3]	Loss_D: 0.0087	Loss_G: 8.0599	D(x): 0.9978	D(G(z)): 0.0064
/ 0.0004				
[52/200] [0/3]	Loss_D: 0.0081	Loss_G: 8.4451	D(x): 0.9970	D(G(z)): 0.0051
/ 0.0003				
[53/200] [0/3]	Loss_D: 0.0112	Loss_G: 8.3515	D(x): 0.9970	D(G(z)): 0.0080
/ 0.0003				
[54/200] [0/3]	Loss_D: 0.0085	Loss_G: 8.4025	D(x): 0.9964	D(G(z)): 0.0049
/ 0.0004				
[55/200] [0/3]	Loss_D: 0.0104	Loss_G: 8.6369	D(x): 0.9968	D(G(z)): 0.0071

/ 0.0003				
[56/200] [0/3]	Loss_D: 0.0101	Loss_G: 8.6153	D(x): 0.9971	D(G(z)): 0.0071
/ 0.0003				
[57/200] [0/3]	Loss_D: 0.0100	Loss_G: 8.6145	D(x): 0.9962	D(G(z)): 0.0061
/ 0.0003				
[58/200] [0/3]	Loss_D: 0.0127	Loss_G: 8.7358	D(x): 0.9954	D(G(z)): 0.0079
/ 0.0003				
[59/200] [0/3]	Loss_D: 0.0099	Loss_G: 8.8471	D(x): 0.9948	D(G(z)): 0.0046
/ 0.0003				
[60/200] [0/3]	Loss_D: 0.0158	Loss_G: 9.2884	D(x): 0.9890	D(G(z)): 0.0045
/ 0.0002				
[61/200] [0/3]	Loss_D: 0.0179	Loss_G: 9.4260	D(x): 0.9935	D(G(z)): 0.0111
/ 0.0001				
[62/200] [0/3]	Loss_D: 0.0228	Loss_G: 9.5917	D(x): 0.9915	D(G(z)): 0.0139
/ 0.0001				
[63/200] [0/3]	Loss_D: 0.0436	Loss_G: 14.1246	D(x): 0.9940	D(G(z)): 0.0362
/ 0.0000				
[64/200] [0/3]	Loss_D: 0.1600	Loss_G: 23.8714	D(x): 0.9967	D(G(z)): 0.1398
/ 0.0000				
[65/200] [0/3]	Loss_D: 0.0351	Loss_G: 11.9256	D(x): 0.9855	D(G(z)): 0.0000
/ 0.0000				
[66/200] [0/3]	Loss_D: 7.6107	Loss_G: 27.1122	D(x): 0.0064	D(G(z)): 0.0000
/ 0.0000				
[67/200] [0/3]	Loss_D: 0.0019	Loss_G: 13.4750	D(x): 0.9982	D(G(z)): 0.0000
/ 0.0000				
[68/200] [0/3]	Loss_D: 0.5304	Loss_G: 26.3078	D(x): 0.8019	D(G(z)): 0.0000
/ 0.0000				
[69/200] [0/3]	Loss_D: 0.0088	Loss_G: 14.4091	D(x): 0.9926	D(G(z)): 0.0000
/ 0.0000				
[70/200] [0/3]	Loss_D: 0.0604	Loss_G: 21.7329	D(x): 0.9689	D(G(z)): 0.0000
/ 0.0000				
[71/200] [0/3]	Loss_D: 0.0112	Loss_G: 11.0313	D(x): 0.9893	D(G(z)): 0.0002
/ 0.0001				
[72/200] [0/3]	Loss_D: 0.1344	Loss_G: 19.8342	D(x): 0.9100	D(G(z)): 0.0000
/ 0.0000				
[73/200] [0/3]	Loss_D: 0.0076	Loss_G: 8.3090	D(x): 0.9941	D(G(z)): 0.0013
/ 0.0007				
[74/200] [0/3]	Loss_D: 0.0206	Loss_G: 14.8792	D(x): 0.9831	D(G(z)): 0.0002
/ 0.0000				
[75/200] [0/3]	Loss_D: 0.5404	Loss_G: 18.0492	D(x): 0.9712	D(G(z)): 0.3257
/ 0.0000				
[76/200] [0/3]	Loss_D: 0.0342	Loss_G: 6.6293	D(x): 0.9944	D(G(z)): 0.0251
/ 0.0038				
[77/200] [0/3]	Loss_D: 1.5346	Loss_G: 26.6776	D(x): 0.4183	D(G(z)): 0.0000
/ 0.0000				
[78/200] [0/3]	Loss_D: 0.0020	Loss_G: 6.8165	D(x): 0.9993	D(G(z)): 0.0013
/ 0.0016				
[79/200] [0/3]	Loss_D: 1.1645	Loss_G: 21.6127	D(x): 0.5108	D(G(z)): 0.0000

/ 0.0000				
[80/200] [0/3]	Loss_D: 0.0372	Loss_G: 5.0966	D(x): 0.9969	D(G(z)): 0.0325
/ 0.0114				
[81/200] [0/3]	Loss_D: 1.3804	Loss_G: 19.8181	D(x): 0.5202	D(G(z)): 0.0000
/ 0.0000				
[82/200] [0/3]	Loss_D: 2.6957	Loss_G: 17.4314	D(x): 0.9995	D(G(z)): 0.8824
/ 0.0000				
[83/200] [0/3]	Loss_D: 0.0715	Loss_G: 12.8276	D(x): 0.9482	D(G(z)): 0.0000
/ 0.0000				
[84/200] [0/3]	Loss_D: 0.0679	Loss_G: 16.3608	D(x): 0.9482	D(G(z)): 0.0009
/ 0.0000				
[85/200] [0/3]	Loss_D: 0.1399	Loss_G: 4.6617	D(x): 0.9598	D(G(z)): 0.0755
/ 0.0232				
[86/200] [0/3]	Loss_D: 0.6612	Loss_G: 14.9816	D(x): 0.6860	D(G(z)): 0.0000
/ 0.0000				
[87/200] [0/3]	Loss_D: 1.2446	Loss_G: 13.3205	D(x): 0.9958	D(G(z)): 0.6328
/ 0.0000				
[88/200] [0/3]	Loss_D: 0.1399	Loss_G: 8.8368	D(x): 0.9043	D(G(z)): 0.0003
/ 0.0003				
[89/200] [0/3]	Loss_D: 0.1185	Loss_G: 17.1207	D(x): 0.9221	D(G(z)): 0.0003
/ 0.0000				
[90/200] [0/3]	Loss_D: 0.0329	Loss_G: 5.8231	D(x): 0.9744	D(G(z)): 0.0038
/ 0.0050				
[91/200] [0/3]	Loss_D: 0.0999	Loss_G: 8.6072	D(x): 0.9393	D(G(z)): 0.0168
/ 0.0005				
[92/200] [0/3]	Loss_D: 0.5205	Loss_G: 6.8727	D(x): 0.7206	D(G(z)): 0.0592
/ 0.0027				
[93/200] [0/3]	Loss_D: 0.2634	Loss_G: 8.4451	D(x): 0.9322	D(G(z)): 0.1592
/ 0.0004				
[94/200] [0/3]	Loss_D: 0.2951	Loss_G: 9.2219	D(x): 0.9514	D(G(z)): 0.1992
/ 0.0002				
[95/200] [0/3]	Loss_D: 0.2954	Loss_G: 9.3603	D(x): 0.9749	D(G(z)): 0.2265
/ 0.0002				
[96/200] [0/3]	Loss_D: 0.4791	Loss_G: 10.4886	D(x): 0.9676	D(G(z)): 0.3258
/ 0.0001				
[97/200] [0/3]	Loss_D: 0.3946	Loss_G: 9.3475	D(x): 0.9720	D(G(z)): 0.2783
/ 0.0002				
[98/200] [0/3]	Loss_D: 0.2471	Loss_G: 5.9621	D(x): 0.9135	D(G(z)): 0.1263
/ 0.0043				
[99/200] [0/3]	Loss_D: 0.1606	Loss_G: 5.6576	D(x): 0.9480	D(G(z)): 0.0897
/ 0.0046				
[100/200] [0/3]	Loss_D: 0.1306	Loss_G: 6.0007	D(x): 0.9193	D(G(z)): 0.0209
/ 0.0042				
[101/200] [0/3]	Loss_D: 0.2638	Loss_G: 5.8493	D(x): 0.8501	D(G(z)): 0.0374
/ 0.0050				
[102/200] [0/3]	Loss_D: 0.2791	Loss_G: 7.5162	D(x): 0.9321	D(G(z)): 0.1664
/ 0.0008				
[103/200] [0/3]	Loss_D: 0.5788	Loss_G: 11.8824	D(x): 0.9594	D(G(z)): 0.3774

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/ 0.0000
[104/200] [0/3] Loss_D: 0.3532 Loss_G: 7.5640 D(x): 0.9887 D(G(z)): 0.2577
/ 0.0010
[105/200] [0/3] Loss_D: 0.3181 Loss_G: 5.3282 D(x): 0.8640 D(G(z)): 0.1135
/ 0.0087
[106/200] [0/3] Loss_D: 0.7795 Loss_G: 10.6939 D(x): 0.9609 D(G(z)): 0.4449
/ 0.0001
[107/200] [0/3] Loss_D: 0.1117 Loss_G: 4.6927 D(x): 0.9891 D(G(z)): 0.0874
/ 0.0211
[108/200] [0/3] Loss_D: 0.0872 Loss_G: 7.1866 D(x): 0.9344 D(G(z)): 0.0128
/ 0.0018
[109/200] [0/3] Loss_D: 0.2331 Loss_G: 6.2451 D(x): 0.9517 D(G(z)): 0.1560
/ 0.0029
[110/200] [0/3] Loss_D: 0.2296 Loss_G: 5.3641 D(x): 0.8820 D(G(z)): 0.0767
/ 0.0074
[111/200] [0/3] Loss_D: 0.2692 Loss_G: 5.2320 D(x): 0.8822 D(G(z)): 0.1118
/ 0.0082
[112/200] [0/3] Loss_D: 1.3255 Loss_G: 13.9790 D(x): 0.9863 D(G(z)): 0.6815
/ 0.0000
[113/200] [0/3] Loss_D: 0.6036 Loss_G: 5.7634 D(x): 0.9891 D(G(z)): 0.3754
/ 0.0065
[114/200] [0/3] Loss_D: 0.1731 Loss_G: 5.1023 D(x): 0.8778 D(G(z)): 0.0185
/ 0.0113
[115/200] [0/3] Loss_D: 0.4134 Loss_G: 5.9328 D(x): 0.7391 D(G(z)): 0.0267
/ 0.0064
[116/200] [0/3] Loss_D: 0.2440 Loss_G: 7.3570 D(x): 0.8357 D(G(z)): 0.0147
/ 0.0012
[117/200] [0/3] Loss_D: 0.3896 Loss_G: 6.8723 D(x): 0.9629 D(G(z)): 0.2664
/ 0.0021
[118/200] [0/3] Loss_D: 0.4960 Loss_G: 7.2475 D(x): 0.9684 D(G(z)): 0.3345
/ 0.0013
[119/200] [0/3] Loss_D: 0.5230 Loss_G: 7.2982 D(x): 0.9811 D(G(z)): 0.3624
/ 0.0012
[120/200] [0/3] Loss_D: 0.1345 Loss_G: 4.4214 D(x): 0.9186 D(G(z)): 0.0383
/ 0.0170
[121/200] [0/3] Loss_D: 0.1931 Loss_G: 5.0784 D(x): 0.8656 D(G(z)): 0.0244
/ 0.0106
[122/200] [0/3] Loss_D: 0.1630 Loss_G: 6.2432 D(x): 0.9102 D(G(z)): 0.0508
/ 0.0031
[123/200] [0/3] Loss_D: 0.3334 Loss_G: 6.8116 D(x): 0.9382 D(G(z)): 0.2120
/ 0.0022
[124/200] [0/3] Loss_D: 0.2780 Loss_G: 6.0271 D(x): 0.9525 D(G(z)): 0.1807
/ 0.0045
[125/200] [0/3] Loss_D: 0.1655 Loss_G: 5.4207 D(x): 0.9230 D(G(z)): 0.0681
/ 0.0072
[126/200] [0/3] Loss_D: 0.2128 Loss_G: 5.8418 D(x): 0.9184 D(G(z)): 0.0968
/ 0.0051
[127/200] [0/3] Loss_D: 0.2085 Loss_G: 6.2803 D(x): 0.8808 D(G(z)): 0.0409

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/ 0.0029
[128/200] [0/3] Loss_D: 0.3791 Loss_G: 5.5810 D(x): 0.7794 D(G(z)): 0.0225
/ 0.0060
[129/200] [0/3] Loss_D: 0.2769 Loss_G: 5.2030 D(x): 0.8185 D(G(z)): 0.0141
/ 0.0085
[130/200] [0/3] Loss_D: 0.3346 Loss_G: 5.3223 D(x): 0.7906 D(G(z)): 0.0087
/ 0.0080
[131/200] [0/3] Loss_D: 0.1320 Loss_G: 6.5785 D(x): 0.9014 D(G(z)): 0.0097
/ 0.0019
[132/200] [0/3] Loss_D: 0.1620 Loss_G: 7.2172 D(x): 0.9029 D(G(z)): 0.0258
/ 0.0009
[133/200] [0/3] Loss_D: 0.2080 Loss_G: 7.5024 D(x): 0.9689 D(G(z)): 0.1516
/ 0.0007
[134/200] [0/3] Loss_D: 0.2127 Loss_G: 6.0983 D(x): 0.9775 D(G(z)): 0.1668
/ 0.0029
[135/200] [0/3] Loss_D: 0.1347 Loss_G: 4.6331 D(x): 0.9558 D(G(z)): 0.0797
/ 0.0120
[136/200] [0/3] Loss_D: 0.1551 Loss_G: 4.8953 D(x): 0.9093 D(G(z)): 0.0440
/ 0.0100
[137/200] [0/3] Loss_D: 0.1921 Loss_G: 6.0872 D(x): 0.9577 D(G(z)): 0.1284
/ 0.0041
[138/200] [0/3] Loss_D: 0.1996 Loss_G: 6.1934 D(x): 0.9592 D(G(z)): 0.1352
/ 0.0044
[139/200] [0/3] Loss_D: 0.2064 Loss_G: 5.4750 D(x): 0.9334 D(G(z)): 0.1150
/ 0.0079
[140/200] [0/3] Loss_D: 0.2048 Loss_G: 5.1182 D(x): 0.8876 D(G(z)): 0.0514
/ 0.0093
[141/200] [0/3] Loss_D: 0.1560 Loss_G: 5.5803 D(x): 0.9272 D(G(z)): 0.0669
/ 0.0052
[142/200] [0/3] Loss_D: 0.1321 Loss_G: 5.3225 D(x): 0.9318 D(G(z)): 0.0497
/ 0.0075
[143/200] [0/3] Loss_D: 0.1512 Loss_G: 5.8436 D(x): 0.9584 D(G(z)): 0.0969
/ 0.0041
[144/200] [0/3] Loss_D: 0.1569 Loss_G: 5.2789 D(x): 0.9407 D(G(z)): 0.0841
/ 0.0078
[145/200] [0/3] Loss_D: 0.1761 Loss_G: 4.7767 D(x): 0.9125 D(G(z)): 0.0622
/ 0.0120
[146/200] [0/3] Loss_D: 0.3926 Loss_G: 8.4305 D(x): 0.9617 D(G(z)): 0.2665
/ 0.0011
[147/200] [0/3] Loss_D: 0.1966 Loss_G: 5.8028 D(x): 0.9826 D(G(z)): 0.1508
/ 0.0063
[148/200] [0/3] Loss_D: 0.1537 Loss_G: 5.0963 D(x): 0.9375 D(G(z)): 0.0770
/ 0.0100
[149/200] [0/3] Loss_D: 0.2694 Loss_G: 5.3254 D(x): 0.9006 D(G(z)): 0.1363
/ 0.0079
[150/200] [0/3] Loss_D: 0.2239 Loss_G: 5.3641 D(x): 0.8988 D(G(z)): 0.1007
/ 0.0071
[151/200] [0/3] Loss_D: 0.1892 Loss_G: 5.6924 D(x): 0.9281 D(G(z)): 0.0985

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/ 0.0048
[152/200] [0/3] Loss_D: 0.3954 Loss_G: 10.5204 D(x): 0.9778 D(G(z)): 0.2872
/ 0.0002
[153/200] [0/3] Loss_D: 0.3755 Loss_G: 9.6752 D(x): 0.9944 D(G(z)): 0.2762
/ 0.0001
[154/200] [0/3] Loss_D: 0.0243 Loss_G: 4.0154 D(x): 0.9873 D(G(z)): 0.0105
/ 0.0340
[155/200] [0/3] Loss_D: 0.0363 Loss_G: 8.0264 D(x): 0.9768 D(G(z)): 0.0102
/ 0.0008
[156/200] [0/3] Loss_D: 0.1745 Loss_G: 4.9092 D(x): 0.9666 D(G(z)): 0.1194
/ 0.0141
[157/200] [0/3] Loss_D: 0.2840 Loss_G: 4.1614 D(x): 0.8780 D(G(z)): 0.1116
/ 0.0258
[158/200] [0/3] Loss_D: 0.3553 Loss_G: 6.6420 D(x): 0.9289 D(G(z)): 0.2185
/ 0.0028
[159/200] [0/3] Loss_D: 0.1168 Loss_G: 6.0668 D(x): 0.9505 D(G(z)): 0.0587
/ 0.0041
[160/200] [0/3] Loss_D: 0.1803 Loss_G: 4.9320 D(x): 0.9215 D(G(z)): 0.0813
/ 0.0133
[161/200] [0/3] Loss_D: 0.2653 Loss_G: 4.8314 D(x): 0.8936 D(G(z)): 0.1134
/ 0.0137
[162/200] [0/3] Loss_D: 0.1655 Loss_G: 6.1863 D(x): 0.9662 D(G(z)): 0.1090
/ 0.0039
[163/200] [0/3] Loss_D: 0.1274 Loss_G: 5.6514 D(x): 0.9690 D(G(z)): 0.0862
/ 0.0052
[164/200] [0/3] Loss_D: 0.1573 Loss_G: 6.0270 D(x): 0.9705 D(G(z)): 0.1134
/ 0.0038
[165/200] [0/3] Loss_D: 0.1143 Loss_G: 5.9302 D(x): 0.9595 D(G(z)): 0.0637
/ 0.0048
[166/200] [0/3] Loss_D: 0.1216 Loss_G: 6.2077 D(x): 0.9723 D(G(z)): 0.0845
/ 0.0037
[167/200] [0/3] Loss_D: 0.1162 Loss_G: 5.5876 D(x): 0.9723 D(G(z)): 0.0788
/ 0.0067
[168/200] [0/3] Loss_D: 0.3691 Loss_G: 9.8221 D(x): 0.9819 D(G(z)): 0.2710
/ 0.0002
[169/200] [0/3] Loss_D: 0.1075 Loss_G: 7.7577 D(x): 0.9906 D(G(z)): 0.0863
/ 0.0015
[170/200] [0/3] Loss_D: 0.2156 Loss_G: 5.2255 D(x): 0.9311 D(G(z)): 0.1091
/ 0.0146
[171/200] [0/3] Loss_D: 0.3654 Loss_G: 5.8967 D(x): 0.8755 D(G(z)): 0.1635
/ 0.0090
[172/200] [0/3] Loss_D: 0.1916 Loss_G: 6.3844 D(x): 0.9120 D(G(z)): 0.0773
/ 0.0039
[173/200] [0/3] Loss_D: 0.1953 Loss_G: 6.3187 D(x): 0.9129 D(G(z)): 0.0753
/ 0.0054
[174/200] [0/3] Loss_D: 0.5654 Loss_G: 10.6387 D(x): 0.9755 D(G(z)): 0.3564
/ 0.0001
[175/200] [0/3] Loss_D: 0.0267 Loss_G: 5.6612 D(x): 0.9837 D(G(z)): 0.0076

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/ 0.0120
[176/200] [0/3] Loss_D: 0.0481 Loss_G: 8.3352 D(x): 0.9751 D(G(z)): 0.0156
/ 0.0005
[177/200] [0/3] Loss_D: 0.1958 Loss_G: 4.8278 D(x): 0.9404 D(G(z)): 0.0896
/ 0.0151
[178/200] [0/3] Loss_D: 0.2615 Loss_G: 5.1271 D(x): 0.9102 D(G(z)): 0.1271
/ 0.0088
[179/200] [0/3] Loss_D: 0.2482 Loss_G: 5.4415 D(x): 0.9372 D(G(z)): 0.1363
/ 0.0068
[180/200] [0/3] Loss_D: 0.1584 Loss_G: 4.6315 D(x): 0.9370 D(G(z)): 0.0773
/ 0.0144
[181/200] [0/3] Loss_D: 0.3190 Loss_G: 7.0168 D(x): 0.9564 D(G(z)): 0.2227
/ 0.0024
[182/200] [0/3] Loss_D: 0.1178 Loss_G: 6.3370 D(x): 0.9517 D(G(z)): 0.0573
/ 0.0037
[183/200] [0/3] Loss_D: 0.1321 Loss_G: 4.7351 D(x): 0.9707 D(G(z)): 0.0914
/ 0.0134
[184/200] [0/3] Loss_D: 0.2465 Loss_G: 5.8617 D(x): 0.9764 D(G(z)): 0.1848
/ 0.0053
[185/200] [0/3] Loss_D: 0.1590 Loss_G: 4.8035 D(x): 0.9824 D(G(z)): 0.1263
/ 0.0129
[186/200] [0/3] Loss_D: 0.1314 Loss_G: 4.3394 D(x): 0.9496 D(G(z)): 0.0672
/ 0.0209
[187/200] [0/3] Loss_D: 0.2539 Loss_G: 6.5202 D(x): 0.9754 D(G(z)): 0.1911
/ 0.0026
[188/200] [0/3] Loss_D: 0.3492 Loss_G: 8.4686 D(x): 0.9903 D(G(z)): 0.2665
/ 0.0005
[189/200] [0/3] Loss_D: 0.1129 Loss_G: 4.2652 D(x): 0.9905 D(G(z)): 0.0928
/ 0.0231
[190/200] [0/3] Loss_D: 0.0746 Loss_G: 6.6338 D(x): 0.9460 D(G(z)): 0.0074
/ 0.0022
[191/200] [0/3] Loss_D: 0.1840 Loss_G: 6.3535 D(x): 0.9739 D(G(z)): 0.1359
/ 0.0034
[192/200] [0/3] Loss_D: 0.2443 Loss_G: 6.3754 D(x): 0.9733 D(G(z)): 0.1812
/ 0.0036
[193/200] [0/3] Loss_D: 0.5252 Loss_G: 9.6854 D(x): 0.9896 D(G(z)): 0.3635
/ 0.0002
[194/200] [0/3] Loss_D: 0.0664 Loss_G: 4.2566 D(x): 0.9876 D(G(z)): 0.0501
/ 0.0343
[195/200] [0/3] Loss_D: 0.3582 Loss_G: 4.2596 D(x): 0.7645 D(G(z)): 0.0124
/ 0.0275
[196/200] [0/3] Loss_D: 0.1713 Loss_G: 5.8342 D(x): 0.8911 D(G(z)): 0.0326
/ 0.0113
[197/200] [0/3] Loss_D: 0.1055 Loss_G: 5.7997 D(x): 0.9550 D(G(z)): 0.0512
/ 0.0069
[198/200] [0/3] Loss_D: 0.1586 Loss_G: 5.7685 D(x): 0.9463 D(G(z)): 0.0851
/ 0.0077
[199/200] [0/3] Loss_D: 0.1986 Loss_G: 6.4905 D(x): 0.9676 D(G(z)): 0.1384

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/ 0.0035
FID score: 1138.144622544761
Inception score: 1.755354642868042 ± 0.057488299906253815
Training DCGAN with hyperparameters: {'lr': 0.001, 'beta1': 0.5}
Starting Training Loop...
[0/200] [0/3]    Loss_D: 1.7933  Loss_G: 19.6504 D(x): 0.5155      D(G(z)): 0.5877
/ 0.0000
[1/200] [0/3]    Loss_D: 5.0003  Loss_G: 40.4602 D(x): 0.9186      D(G(z)): 0.9656
/ 0.0000
[2/200] [0/3]    Loss_D: 0.1016  Loss_G: 42.6979 D(x): 0.9711      D(G(z)): 0.0000
/ 0.0000
[3/200] [0/3]    Loss_D: 0.0021  Loss_G: 42.4727 D(x): 0.9981      D(G(z)): 0.0000
/ 0.0000
[4/200] [0/3]    Loss_D: 0.0023  Loss_G: 42.2209 D(x): 0.9978      D(G(z)): 0.0000
/ 0.0000
[5/200] [0/3]    Loss_D: 0.0014  Loss_G: 42.2558 D(x): 0.9986      D(G(z)): 0.0000
/ 0.0000
[6/200] [0/3]    Loss_D: 0.0001  Loss_G: 42.1008 D(x): 0.9999      D(G(z)): 0.0000
/ 0.0000
[7/200] [0/3]    Loss_D: 0.0003  Loss_G: 42.0711 D(x): 0.9997      D(G(z)): 0.0000
/ 0.0000
[8/200] [0/3]    Loss_D: 0.0011  Loss_G: 42.0400 D(x): 0.9989      D(G(z)): 0.0000
/ 0.0000
[9/200] [0/3]    Loss_D: 0.0000  Loss_G: 41.7809 D(x): 1.0000      D(G(z)): 0.0000
/ 0.0000
[10/200] [0/3]   Loss_D: 0.0006  Loss_G: 41.3650 D(x): 0.9994      D(G(z)): 0.0000
/ 0.0000
[11/200] [0/3]   Loss_D: 0.0005  Loss_G: 39.9121 D(x): 0.9995      D(G(z)): 0.0000
/ 0.0000
[12/200] [0/3]   Loss_D: 29.5237 Loss_G: 37.0752 D(x): 0.9996      D(G(z)): 0.8122
/ 0.0000
[13/200] [0/3]   Loss_D: 12.8720 Loss_G: 18.0470 D(x): 0.9759      D(G(z)): 0.7820
/ 0.0000
[14/200] [0/3]   Loss_D: 0.6106  Loss_G: 7.5676  D(x): 0.9274      D(G(z)): 0.1256
/ 0.0249
[15/200] [0/3]   Loss_D: 0.2889  Loss_G: 8.0559  D(x): 0.9621      D(G(z)): 0.0648
/ 0.0117
[16/200] [0/3]   Loss_D: 13.1346 Loss_G: 7.7655  D(x): 0.0127      D(G(z)): 0.0015
/ 0.0269
[17/200] [0/3]   Loss_D: 1.1216  Loss_G: 4.6510  D(x): 0.9862      D(G(z)): 0.4537
/ 0.1068
[18/200] [0/3]   Loss_D: 3.0742  Loss_G: 3.4161  D(x): 0.4182      D(G(z)): 0.2723
/ 0.0738
[19/200] [0/3]   Loss_D: 1.0365  Loss_G: 5.9982  D(x): 0.9034      D(G(z)): 0.3591
/ 0.0232
[20/200] [0/3]   Loss_D: 1.2843  Loss_G: 7.3441  D(x): 0.9086      D(G(z)): 0.4853
/ 0.0062
[21/200] [0/3]   Loss_D: 0.5059  Loss_G: 3.8370  D(x): 0.7354      D(G(z)): 0.0437

```

/ 0.0293				
[22/200] [0/3]	Loss_D: 1.2118	Loss_G: 3.5730	D(x): 0.6633	D(G(z)): 0.2507
/ 0.0926				
[23/200] [0/3]	Loss_D: 3.9127	Loss_G: 1.1425	D(x): 0.1173	D(G(z)): 0.0510
/ 0.5154				
[24/200] [0/3]	Loss_D: 2.7808	Loss_G: 8.2676	D(x): 0.5898	D(G(z)): 0.7319
/ 0.0023				
[25/200] [0/3]	Loss_D: 1.3702	Loss_G: 5.1648	D(x): 0.7132	D(G(z)): 0.4678
/ 0.0240				
[26/200] [0/3]	Loss_D: 2.6514	Loss_G: 1.8760	D(x): 0.2002	D(G(z)): 0.0381
/ 0.2161				
[27/200] [0/3]	Loss_D: 1.6095	Loss_G: 2.2965	D(x): 0.6448	D(G(z)): 0.4629
/ 0.1827				
[28/200] [0/3]	Loss_D: 1.8798	Loss_G: 4.6539	D(x): 0.8749	D(G(z)): 0.6399
/ 0.0385				
[29/200] [0/3]	Loss_D: 1.0201	Loss_G: 2.8065	D(x): 0.6842	D(G(z)): 0.3588
/ 0.1180				
[30/200] [0/3]	Loss_D: 1.7545	Loss_G: 0.8053	D(x): 0.3557	D(G(z)): 0.2040
/ 0.5279				
[31/200] [0/3]	Loss_D: 2.5930	Loss_G: 8.2570	D(x): 0.8143	D(G(z)): 0.8411
/ 0.0019				
[32/200] [0/3]	Loss_D: 2.9357	Loss_G: 6.3268	D(x): 0.8250	D(G(z)): 0.8527
/ 0.0048				
[33/200] [0/3]	Loss_D: 2.8665	Loss_G: 2.1444	D(x): 0.5138	D(G(z)): 0.7294
/ 0.1899				
[34/200] [0/3]	Loss_D: 1.5303	Loss_G: 1.5413	D(x): 0.6951	D(G(z)): 0.5507
/ 0.3020				
[35/200] [0/3]	Loss_D: 1.1584	Loss_G: 2.3783	D(x): 0.6748	D(G(z)): 0.4442
/ 0.1299				
[36/200] [0/3]	Loss_D: 1.2218	Loss_G: 1.7619	D(x): 0.6784	D(G(z)): 0.4726
/ 0.2354				
[37/200] [0/3]	Loss_D: 1.2522	Loss_G: 1.5642	D(x): 0.5147	D(G(z)): 0.3442
/ 0.2582				
[38/200] [0/3]	Loss_D: 1.6615	Loss_G: 3.3354	D(x): 0.7542	D(G(z)): 0.6517
/ 0.0686				
[39/200] [0/3]	Loss_D: 1.8507	Loss_G: 0.8654	D(x): 0.2901	D(G(z)): 0.1521
/ 0.4568				
[40/200] [0/3]	Loss_D: 1.4349	Loss_G: 2.5745	D(x): 0.6108	D(G(z)): 0.5457
/ 0.1072				
[41/200] [0/3]	Loss_D: 1.1551	Loss_G: 2.2984	D(x): 0.6465	D(G(z)): 0.3907
/ 0.1600				
[42/200] [0/3]	Loss_D: 1.3042	Loss_G: 1.6772	D(x): 0.5245	D(G(z)): 0.3554
/ 0.2168				
[43/200] [0/3]	Loss_D: 1.4762	Loss_G: 3.7811	D(x): 0.7634	D(G(z)): 0.6473
/ 0.0542				
[44/200] [0/3]	Loss_D: 1.5081	Loss_G: 1.5208	D(x): 0.3670	D(G(z)): 0.2203
/ 0.2772				
[45/200] [0/3]	Loss_D: 1.1216	Loss_G: 1.7721	D(x): 0.6020	D(G(z)): 0.3848

/ 0.2206				
[46/200] [0/3]	Loss_D: 1.1882	Loss_G: 0.7782	D(x): 0.5013	D(G(z)): 0.2707
/ 0.4966				
[47/200] [0/3]	Loss_D: 1.2490	Loss_G: 2.2799	D(x): 0.7494	D(G(z)): 0.5667
/ 0.1403				
[48/200] [0/3]	Loss_D: 1.5973	Loss_G: 0.7901	D(x): 0.3551	D(G(z)): 0.2647
/ 0.4999				
[49/200] [0/3]	Loss_D: 1.6400	Loss_G: 3.0160	D(x): 0.7541	D(G(z)): 0.6736
/ 0.0974				
[50/200] [0/3]	Loss_D: 0.8908	Loss_G: 2.4280	D(x): 0.6881	D(G(z)): 0.3289
/ 0.1346				
[51/200] [0/3]	Loss_D: 1.1629	Loss_G: 1.5767	D(x): 0.5604	D(G(z)): 0.3032
/ 0.2644				
[52/200] [0/3]	Loss_D: 1.1082	Loss_G: 1.1831	D(x): 0.5263	D(G(z)): 0.2949
/ 0.3410				
[53/200] [0/3]	Loss_D: 2.5388	Loss_G: 4.8200	D(x): 0.8511	D(G(z)): 0.8662
/ 0.0187				
[54/200] [0/3]	Loss_D: 0.9859	Loss_G: 1.7866	D(x): 0.5813	D(G(z)): 0.2808
/ 0.2152				
[55/200] [0/3]	Loss_D: 1.1356	Loss_G: 1.8771	D(x): 0.7042	D(G(z)): 0.4603
/ 0.2215				
[56/200] [0/3]	Loss_D: 1.0447	Loss_G: 1.4592	D(x): 0.5352	D(G(z)): 0.2467
/ 0.2971				
[57/200] [0/3]	Loss_D: 0.8868	Loss_G: 1.5527	D(x): 0.6509	D(G(z)): 0.3125
/ 0.2606				
[58/200] [0/3]	Loss_D: 0.9562	Loss_G: 2.3248	D(x): 0.6973	D(G(z)): 0.3948
/ 0.1288				
[59/200] [0/3]	Loss_D: 1.7198	Loss_G: 0.6568	D(x): 0.3186	D(G(z)): 0.0847
/ 0.5792				
[60/200] [0/3]	Loss_D: 1.4067	Loss_G: 1.8655	D(x): 0.7311	D(G(z)): 0.5092
/ 0.2255				
[61/200] [0/3]	Loss_D: 1.2026	Loss_G: 2.2354	D(x): 0.6985	D(G(z)): 0.4835
/ 0.1691				
[62/200] [0/3]	Loss_D: 1.4830	Loss_G: 1.0868	D(x): 0.3500	D(G(z)): 0.2328
/ 0.4134				
[63/200] [0/3]	Loss_D: 0.7784	Loss_G: 1.9879	D(x): 0.7207	D(G(z)): 0.3069
/ 0.1752				
[64/200] [0/3]	Loss_D: 1.2260	Loss_G: 3.3706	D(x): 0.7857	D(G(z)): 0.5507
/ 0.0702				
[65/200] [0/3]	Loss_D: 1.0903	Loss_G: 1.8111	D(x): 0.5357	D(G(z)): 0.2690
/ 0.2036				
[66/200] [0/3]	Loss_D: 1.2178	Loss_G: 2.3073	D(x): 0.6004	D(G(z)): 0.4358
/ 0.1312				
[67/200] [0/3]	Loss_D: 1.5646	Loss_G: 3.4266	D(x): 0.6184	D(G(z)): 0.5978
/ 0.0599				
[68/200] [0/3]	Loss_D: 1.1355	Loss_G: 1.4642	D(x): 0.5180	D(G(z)): 0.2111
/ 0.2694				
[69/200] [0/3]	Loss_D: 1.1206	Loss_G: 2.6051	D(x): 0.7807	D(G(z)): 0.5262

/ 0.1127				
[70/200] [0/3]	Loss_D: 1.5995	Loss_G: 0.9158	D(x): 0.3463	D(G(z)): 0.1853
/ 0.4524				
[71/200] [0/3]	Loss_D: 1.2883	Loss_G: 3.1027	D(x): 0.7517	D(G(z)): 0.5794
/ 0.0684				
[72/200] [0/3]	Loss_D: 1.4357	Loss_G: 1.8234	D(x): 0.4239	D(G(z)): 0.2222
/ 0.2256				
[73/200] [0/3]	Loss_D: 1.9082	Loss_G: 5.3519	D(x): 0.8519	D(G(z)): 0.7770
/ 0.0125				
[74/200] [0/3]	Loss_D: 1.7286	Loss_G: 2.1402	D(x): 0.3747	D(G(z)): 0.2908
/ 0.1796				
[75/200] [0/3]	Loss_D: 1.0389	Loss_G: 3.0319	D(x): 0.7988	D(G(z)): 0.5046
/ 0.0729				
[76/200] [0/3]	Loss_D: 1.2659	Loss_G: 1.3517	D(x): 0.4788	D(G(z)): 0.2127
/ 0.3233				
[77/200] [0/3]	Loss_D: 1.2052	Loss_G: 2.3946	D(x): 0.7256	D(G(z)): 0.4684
/ 0.1345				
[78/200] [0/3]	Loss_D: 0.7663	Loss_G: 2.0499	D(x): 0.6717	D(G(z)): 0.2438
/ 0.1695				
[79/200] [0/3]	Loss_D: 0.7438	Loss_G: 3.2468	D(x): 0.8388	D(G(z)): 0.3951
/ 0.0704				
[80/200] [0/3]	Loss_D: 0.6229	Loss_G: 2.3808	D(x): 0.6902	D(G(z)): 0.1354
/ 0.1151				
[81/200] [0/3]	Loss_D: 1.3417	Loss_G: 5.5152	D(x): 0.7958	D(G(z)): 0.6035
/ 0.0071				
[82/200] [0/3]	Loss_D: 1.5710	Loss_G: 1.7380	D(x): 0.3114	D(G(z)): 0.0458
/ 0.2406				
[83/200] [0/3]	Loss_D: 0.7588	Loss_G: 1.7507	D(x): 0.6409	D(G(z)): 0.1862
/ 0.2110				
[84/200] [0/3]	Loss_D: 1.0249	Loss_G: 2.8102	D(x): 0.7534	D(G(z)): 0.4193
/ 0.0920				
[85/200] [0/3]	Loss_D: 1.1162	Loss_G: 1.4412	D(x): 0.4957	D(G(z)): 0.2075
/ 0.3155				
[86/200] [0/3]	Loss_D: 1.3793	Loss_G: 0.6197	D(x): 0.5006	D(G(z)): 0.3220
/ 0.6380				
[87/200] [0/3]	Loss_D: 0.6653	Loss_G: 1.5074	D(x): 0.6397	D(G(z)): 0.1246
/ 0.2858				
[88/200] [0/3]	Loss_D: 0.5560	Loss_G: 2.4398	D(x): 0.7899	D(G(z)): 0.2342
/ 0.1275				
[89/200] [0/3]	Loss_D: 1.3372	Loss_G: 1.4636	D(x): 0.4832	D(G(z)): 0.3702
/ 0.2686				
[90/200] [0/3]	Loss_D: 1.1629	Loss_G: 4.1439	D(x): 0.8208	D(G(z)): 0.5223
/ 0.0287				
[91/200] [0/3]	Loss_D: 1.6644	Loss_G: 1.5734	D(x): 0.3252	D(G(z)): 0.0744
/ 0.2707				
[92/200] [0/3]	Loss_D: 0.6489	Loss_G: 2.7067	D(x): 0.8045	D(G(z)): 0.3033
/ 0.0866				
[93/200] [0/3]	Loss_D: 0.9205	Loss_G: 3.8558	D(x): 0.7718	D(G(z)): 0.4188

/ 0.0399  
 [94/200] [0/3] Loss\_D: 2.9648 Loss\_G: 1.9381 D(x): 0.1337 D(G(z)): 0.0945  
 / 0.2568  
 [95/200] [0/3] Loss\_D: 0.9523 Loss\_G: 2.3590 D(x): 0.6802 D(G(z)): 0.3248  
 / 0.1248  
 [96/200] [0/3] Loss\_D: 1.4603 Loss\_G: 1.1749 D(x): 0.4259 D(G(z)): 0.2291  
 / 0.3741  
 [97/200] [0/3] Loss\_D: 1.3915 Loss\_G: 3.4759 D(x): 0.7425 D(G(z)): 0.5882  
 / 0.0552  
 [98/200] [0/3] Loss\_D: 2.8582 Loss\_G: 0.8233 D(x): 0.1104 D(G(z)): 0.0847  
 / 0.4850  
 [99/200] [0/3] Loss\_D: 0.9498 Loss\_G: 2.6045 D(x): 0.7464 D(G(z)): 0.4229  
 / 0.1033  
 [100/200] [0/3] Loss\_D: 0.9540 Loss\_G: 1.8488 D(x): 0.5655 D(G(z)): 0.2045  
 / 0.2125  
 [101/200] [0/3] Loss\_D: 1.2899 Loss\_G: 1.0200 D(x): 0.4637 D(G(z)): 0.2919  
 / 0.4312  
 [102/200] [0/3] Loss\_D: 1.4507 Loss\_G: 2.6978 D(x): 0.8279 D(G(z)): 0.6355  
 / 0.1104  
 [103/200] [0/3] Loss\_D: 1.1618 Loss\_G: 3.8167 D(x): 0.7924 D(G(z)): 0.5475  
 / 0.0427  
 [104/200] [0/3] Loss\_D: 1.4693 Loss\_G: 1.3704 D(x): 0.3672 D(G(z)): 0.1707  
 / 0.3097  
 [105/200] [0/3] Loss\_D: 1.2350 Loss\_G: 2.8365 D(x): 0.6602 D(G(z)): 0.4932  
 / 0.0858  
 [106/200] [0/3] Loss\_D: 0.9909 Loss\_G: 1.8560 D(x): 0.5733 D(G(z)): 0.2654  
 / 0.1933  
 [107/200] [0/3] Loss\_D: 1.6453 Loss\_G: 5.2195 D(x): 0.8736 D(G(z)): 0.7198  
 / 0.0126  
 [108/200] [0/3] Loss\_D: 1.1914 Loss\_G: 2.8600 D(x): 0.7538 D(G(z)): 0.5448  
 / 0.0904  
 [109/200] [0/3] Loss\_D: 0.9186 Loss\_G: 2.1587 D(x): 0.6610 D(G(z)): 0.3324  
 / 0.1732  
 [110/200] [0/3] Loss\_D: 1.3093 Loss\_G: 1.5631 D(x): 0.5100 D(G(z)): 0.3499  
 / 0.2700  
 [111/200] [0/3] Loss\_D: 0.9391 Loss\_G: 3.3396 D(x): 0.8021 D(G(z)): 0.4583  
 / 0.0691  
 [112/200] [0/3] Loss\_D: 1.3071 Loss\_G: 0.7325 D(x): 0.3737 D(G(z)): 0.1329  
 / 0.5302  
 [113/200] [0/3] Loss\_D: 1.5978 Loss\_G: 3.9327 D(x): 0.8229 D(G(z)): 0.7120  
 / 0.0332  
 [114/200] [0/3] Loss\_D: 1.6642 Loss\_G: 0.9183 D(x): 0.3102 D(G(z)): 0.1375  
 / 0.4426  
 [115/200] [0/3] Loss\_D: 0.8727 Loss\_G: 1.4755 D(x): 0.6507 D(G(z)): 0.2933  
 / 0.2755  
 [116/200] [0/3] Loss\_D: 1.4278 Loss\_G: 2.7384 D(x): 0.8323 D(G(z)): 0.6486  
 / 0.0932  
 [117/200] [0/3] Loss\_D: 0.8113 Loss\_G: 2.3053 D(x): 0.6803 D(G(z)): 0.2860

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/ 0.1418
[118/200] [0/3] Loss_D: 1.7214 Loss_G: 3.1678 D(x): 0.9020 D(G(z)): 0.7614
/ 0.0623
[119/200] [0/3] Loss_D: 1.3105 Loss_G: 1.6719 D(x): 0.4288 D(G(z)): 0.2313
/ 0.2240
[120/200] [0/3] Loss_D: 1.3869 Loss_G: 4.4845 D(x): 0.8828 D(G(z)): 0.6542
/ 0.0284
[121/200] [0/3] Loss_D: 1.4157 Loss_G: 1.5207 D(x): 0.3978 D(G(z)): 0.2081
/ 0.2666
[122/200] [0/3] Loss_D: 1.0394 Loss_G: 2.1818 D(x): 0.6457 D(G(z)): 0.3876
/ 0.1402
[123/200] [0/3] Loss_D: 1.1805 Loss_G: 4.0303 D(x): 0.7298 D(G(z)): 0.5168
/ 0.0431
[124/200] [0/3] Loss_D: 1.5671 Loss_G: 1.3566 D(x): 0.2966 D(G(z)): 0.1006
/ 0.3284
[125/200] [0/3] Loss_D: 1.0080 Loss_G: 2.7618 D(x): 0.8030 D(G(z)): 0.4696
/ 0.1031
[126/200] [0/3] Loss_D: 0.7872 Loss_G: 2.6215 D(x): 0.7342 D(G(z)): 0.3228
/ 0.1265
[127/200] [0/3] Loss_D: 1.4219 Loss_G: 1.0940 D(x): 0.4146 D(G(z)): 0.1701
/ 0.3830
[128/200] [0/3] Loss_D: 1.4162 Loss_G: 3.0449 D(x): 0.8615 D(G(z)): 0.6729
/ 0.0865
[129/200] [0/3] Loss_D: 1.4098 Loss_G: 1.2697 D(x): 0.4319 D(G(z)): 0.2555
/ 0.3301
[130/200] [0/3] Loss_D: 1.1579 Loss_G: 3.3676 D(x): 0.8666 D(G(z)): 0.5587
/ 0.0545
[131/200] [0/3] Loss_D: 1.0483 Loss_G: 1.4981 D(x): 0.4685 D(G(z)): 0.1525
/ 0.3038
[132/200] [0/3] Loss_D: 1.0755 Loss_G: 1.9326 D(x): 0.8060 D(G(z)): 0.5102
/ 0.1768
[133/200] [0/3] Loss_D: 1.0114 Loss_G: 2.5333 D(x): 0.7513 D(G(z)): 0.4602
/ 0.1079
[134/200] [0/3] Loss_D: 1.7462 Loss_G: 0.9722 D(x): 0.2537 D(G(z)): 0.0918
/ 0.4387
[135/200] [0/3] Loss_D: 1.1501 Loss_G: 3.1871 D(x): 0.8753 D(G(z)): 0.5822
/ 0.0673
[136/200] [0/3] Loss_D: 1.2187 Loss_G: 1.5650 D(x): 0.4309 D(G(z)): 0.1680
/ 0.2629
[137/200] [0/3] Loss_D: 1.2930 Loss_G: 3.7291 D(x): 0.7916 D(G(z)): 0.6133
/ 0.0305
[138/200] [0/3] Loss_D: 1.1368 Loss_G: 1.4951 D(x): 0.4458 D(G(z)): 0.1790
/ 0.2692
[139/200] [0/3] Loss_D: 1.2404 Loss_G: 2.9210 D(x): 0.8571 D(G(z)): 0.6148
/ 0.0821
[140/200] [0/3] Loss_D: 1.0682 Loss_G: 2.0257 D(x): 0.5981 D(G(z)): 0.3559
/ 0.1611
[141/200] [0/3] Loss_D: 0.8613 Loss_G: 1.9168 D(x): 0.6072 D(G(z)): 0.2371

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/ 0.1883
[142/200] [0/3] Loss_D: 1.2520 Loss_G: 4.2551 D(x): 0.8345 D(G(z)): 0.5926
/ 0.0460
[143/200] [0/3] Loss_D: 2.2896 Loss_G: 0.7884 D(x): 0.1630 D(G(z)): 0.0989
/ 0.5180
[144/200] [0/3] Loss_D: 1.1152 Loss_G: 1.9701 D(x): 0.8089 D(G(z)): 0.5173
/ 0.1843
[145/200] [0/3] Loss_D: 1.2863 Loss_G: 3.2545 D(x): 0.7421 D(G(z)): 0.5594
/ 0.0706
[146/200] [0/3] Loss_D: 0.8718 Loss_G: 2.0861 D(x): 0.5590 D(G(z)): 0.1610
/ 0.1817
[147/200] [0/3] Loss_D: 1.0783 Loss_G: 3.3207 D(x): 0.7864 D(G(z)): 0.5225
/ 0.0504
[148/200] [0/3] Loss_D: 1.5105 Loss_G: 1.1945 D(x): 0.3478 D(G(z)): 0.1473
/ 0.3677
[149/200] [0/3] Loss_D: 1.0939 Loss_G: 1.5734 D(x): 0.5355 D(G(z)): 0.3072
/ 0.2558
[150/200] [0/3] Loss_D: 1.7669 Loss_G: 4.2267 D(x): 0.8854 D(G(z)): 0.7663
/ 0.0242
[151/200] [0/3] Loss_D: 1.0513 Loss_G: 2.4422 D(x): 0.6508 D(G(z)): 0.4066
/ 0.1219
[152/200] [0/3] Loss_D: 1.1010 Loss_G: 2.6446 D(x): 0.6409 D(G(z)): 0.4177
/ 0.1164
[153/200] [0/3] Loss_D: 1.2455 Loss_G: 1.6538 D(x): 0.4688 D(G(z)): 0.2314
/ 0.2372
[154/200] [0/3] Loss_D: 1.0671 Loss_G: 2.5292 D(x): 0.6584 D(G(z)): 0.4231
/ 0.1264
[155/200] [0/3] Loss_D: 1.5575 Loss_G: 5.2723 D(x): 0.8036 D(G(z)): 0.6896
/ 0.0168
[156/200] [0/3] Loss_D: 1.5568 Loss_G: 1.2572 D(x): 0.3136 D(G(z)): 0.1237
/ 0.3269
[157/200] [0/3] Loss_D: 1.1738 Loss_G: 2.7685 D(x): 0.7438 D(G(z)): 0.5361
/ 0.1072
[158/200] [0/3] Loss_D: 1.7804 Loss_G: 1.0153 D(x): 0.2344 D(G(z)): 0.1144
/ 0.4361
[159/200] [0/3] Loss_D: 1.0381 Loss_G: 2.6577 D(x): 0.7254 D(G(z)): 0.4725
/ 0.1073
[160/200] [0/3] Loss_D: 1.0557 Loss_G: 1.9059 D(x): 0.5441 D(G(z)): 0.3083
/ 0.1976
[161/200] [0/3] Loss_D: 1.4186 Loss_G: 4.5844 D(x): 0.7698 D(G(z)): 0.6330
/ 0.0233
[162/200] [0/3] Loss_D: 1.3220 Loss_G: 1.6675 D(x): 0.3642 D(G(z)): 0.1223
/ 0.2457
[163/200] [0/3] Loss_D: 1.0905 Loss_G: 2.5116 D(x): 0.7010 D(G(z)): 0.4721
/ 0.1239
[164/200] [0/3] Loss_D: 1.3345 Loss_G: 2.5158 D(x): 0.6538 D(G(z)): 0.5499
/ 0.0966
[165/200] [0/3] Loss_D: 1.1069 Loss_G: 2.0773 D(x): 0.5424 D(G(z)): 0.3240

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/ 0.1625
[166/200] [0/3] Loss_D: 1.0525 Loss_G: 1.7507 D(x): 0.5380 D(G(z)): 0.2855
/ 0.2253
[167/200] [0/3] Loss_D: 1.5130 Loss_G: 3.1726 D(x): 0.8765 D(G(z)): 0.7044
/ 0.0667
[168/200] [0/3] Loss_D: 1.1501 Loss_G: 1.4763 D(x): 0.4707 D(G(z)): 0.2329
/ 0.2617
[169/200] [0/3] Loss_D: 1.4358 Loss_G: 3.6880 D(x): 0.8579 D(G(z)): 0.6691
/ 0.0402
[170/200] [0/3] Loss_D: 1.3487 Loss_G: 1.3809 D(x): 0.3751 D(G(z)): 0.1465
/ 0.3095
[171/200] [0/3] Loss_D: 1.1540 Loss_G: 2.6475 D(x): 0.8241 D(G(z)): 0.5595
/ 0.1003
[172/200] [0/3] Loss_D: 1.2169 Loss_G: 3.3331 D(x): 0.7331 D(G(z)): 0.5259
/ 0.0622
[173/200] [0/3] Loss_D: 0.9020 Loss_G: 2.2568 D(x): 0.5948 D(G(z)): 0.2363
/ 0.1513
[174/200] [0/3] Loss_D: 1.0178 Loss_G: 1.8757 D(x): 0.5933 D(G(z)): 0.3013
/ 0.1870
[175/200] [0/3] Loss_D: 1.8318 Loss_G: 5.7880 D(x): 0.8764 D(G(z)): 0.7507
/ 0.0095
[176/200] [0/3] Loss_D: 1.2435 Loss_G: 3.0304 D(x): 0.6222 D(G(z)): 0.4676
/ 0.0673
[177/200] [0/3] Loss_D: 1.6515 Loss_G: 1.7363 D(x): 0.2991 D(G(z)): 0.1272
/ 0.2265
[178/200] [0/3] Loss_D: 0.9217 Loss_G: 1.9603 D(x): 0.5982 D(G(z)): 0.2780
/ 0.1846
[179/200] [0/3] Loss_D: 1.1004 Loss_G: 1.8264 D(x): 0.5523 D(G(z)): 0.3276
/ 0.2115
[180/200] [0/3] Loss_D: 1.2749 Loss_G: 3.3728 D(x): 0.7171 D(G(z)): 0.5602
/ 0.0583
[181/200] [0/3] Loss_D: 1.3865 Loss_G: 1.4451 D(x): 0.3509 D(G(z)): 0.1551
/ 0.2857
[182/200] [0/3] Loss_D: 1.1697 Loss_G: 3.7341 D(x): 0.7641 D(G(z)): 0.5449
/ 0.0469
[183/200] [0/3] Loss_D: 1.2985 Loss_G: 1.5375 D(x): 0.3845 D(G(z)): 0.1564
/ 0.2706
[184/200] [0/3] Loss_D: 1.0676 Loss_G: 2.9766 D(x): 0.7067 D(G(z)): 0.4476
/ 0.1010
[185/200] [0/3] Loss_D: 1.3457 Loss_G: 1.1650 D(x): 0.3461 D(G(z)): 0.1206
/ 0.3850
[186/200] [0/3] Loss_D: 1.1000 Loss_G: 2.6675 D(x): 0.7183 D(G(z)): 0.4542
/ 0.1091
[187/200] [0/3] Loss_D: 1.5617 Loss_G: 1.0753 D(x): 0.2929 D(G(z)): 0.1222
/ 0.4184
[188/200] [0/3] Loss_D: 1.0946 Loss_G: 2.9776 D(x): 0.8182 D(G(z)): 0.5540
/ 0.0755
[189/200] [0/3] Loss_D: 1.0600 Loss_G: 1.7397 D(x): 0.4996 D(G(z)): 0.2225

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/ 0.2071
[190/200] [0/3] Loss_D: 1.0818 Loss_G: 1.8383 D(x): 0.5540 D(G(z)): 0.3146
/ 0.2039
[191/200] [0/3] Loss_D: 1.1612 Loss_G: 3.5116 D(x): 0.8588 D(G(z)): 0.6055
/ 0.0424
[192/200] [0/3] Loss_D: 1.0326 Loss_G: 1.7225 D(x): 0.5211 D(G(z)): 0.2366
/ 0.2221
[193/200] [0/3] Loss_D: 1.3912 Loss_G: 3.5710 D(x): 0.8586 D(G(z)): 0.6416
/ 0.0427
[194/200] [0/3] Loss_D: 1.1385 Loss_G: 1.2246 D(x): 0.4570 D(G(z)): 0.1708
/ 0.3478
[195/200] [0/3] Loss_D: 1.2105 Loss_G: 2.5315 D(x): 0.8185 D(G(z)): 0.5701
/ 0.1272
[196/200] [0/3] Loss_D: 0.9774 Loss_G: 2.8521 D(x): 0.7858 D(G(z)): 0.4873
/ 0.0742
[197/200] [0/3] Loss_D: 1.2141 Loss_G: 1.3239 D(x): 0.4502 D(G(z)): 0.2222
/ 0.3122
[198/200] [0/3] Loss_D: 1.4319 Loss_G: 3.6650 D(x): 0.8650 D(G(z)): 0.6832
/ 0.0746
[199/200] [0/3] Loss_D: 1.0485 Loss_G: 2.1093 D(x): 0.5931 D(G(z)): 0.3084
/ 0.1757
FID score: 1199.5717037454358
Inception score: 1.993157982826233 ± 0.14169281721115112
Training DCGAN with hyperparameters: {'lr': 0.001, 'beta1': 0.7}
Starting Training Loop...
[0/200] [0/3] Loss_D: 1.5773 Loss_G: 17.5799 D(x): 0.5305 D(G(z)): 0.4889
/ 0.0000
[1/200] [0/3] Loss_D: 2.1549 Loss_G: 29.0773 D(x): 0.7265 D(G(z)): 0.3468
/ 0.0000
[2/200] [0/3] Loss_D: 0.2689 Loss_G: 38.5855 D(x): 0.9539 D(G(z)): 0.0000
/ 0.0000
[3/200] [0/3] Loss_D: 0.0491 Loss_G: 21.4763 D(x): 0.9736 D(G(z)): 0.0001
/ 0.0001
[4/200] [0/3] Loss_D: 0.3721 Loss_G: 14.9420 D(x): 0.9411 D(G(z)): 0.0832
/ 0.0000
[5/200] [0/3] Loss_D: 0.2085 Loss_G: 12.6179 D(x): 0.9398 D(G(z)): 0.0011
/ 0.0003
[6/200] [0/3] Loss_D: 0.0840 Loss_G: 18.6258 D(x): 0.9669 D(G(z)): 0.0000
/ 0.0000
[7/200] [0/3] Loss_D: 0.0851 Loss_G: 13.8220 D(x): 0.9581 D(G(z)): 0.0004
/ 0.0006
[8/200] [0/3] Loss_D: 0.2674 Loss_G: 8.9365 D(x): 0.9941 D(G(z)): 0.1150
/ 0.0123
[9/200] [0/3] Loss_D: 0.2370 Loss_G: 8.1945 D(x): 0.9043 D(G(z)): 0.0398
/ 0.0029
[10/200] [0/3] Loss_D: 9.8946 Loss_G: 2.2193 D(x): 0.0048 D(G(z)): 0.0010
/ 0.4324
[11/200] [0/3] Loss_D: 17.1443 Loss_G: 4.2153 D(x): 0.9749 D(G(z)): 0.5679

```

/ 0.2584  
 [12/200] [0/3] Loss\_D: 0.5333 Loss\_G: 3.3317 D(x): 0.8866 D(G(z)): 0.1510  
 / 0.2079  
 [13/200] [0/3] Loss\_D: 3.7868 Loss\_G: 7.2323 D(x): 0.2041 D(G(z)): 0.0053  
 / 0.0040  
 [14/200] [0/3] Loss\_D: 3.6573 Loss\_G: 4.6626 D(x): 0.2798 D(G(z)): 0.1657  
 / 0.0437  
 [15/200] [0/3] Loss\_D: 0.9133 Loss\_G: 7.3982 D(x): 0.7977 D(G(z)): 0.2249  
 / 0.0136  
 [16/200] [0/3] Loss\_D: 2.0872 Loss\_G: 5.5070 D(x): 0.6060 D(G(z)): 0.4325  
 / 0.0153  
 [17/200] [0/3] Loss\_D: 2.1351 Loss\_G: 2.6775 D(x): 0.3623 D(G(z)): 0.1524  
 / 0.1967  
 [18/200] [0/3] Loss\_D: 1.1375 Loss\_G: 2.6472 D(x): 0.7088 D(G(z)): 0.3138  
 / 0.1448  
 [19/200] [0/3] Loss\_D: 1.6905 Loss\_G: 6.6658 D(x): 0.8562 D(G(z)): 0.6066  
 / 0.0125  
 [20/200] [0/3] Loss\_D: 1.1611 Loss\_G: 6.1018 D(x): 0.6063 D(G(z)): 0.1804  
 / 0.0091  
 [21/200] [0/3] Loss\_D: 1.5079 Loss\_G: 8.7815 D(x): 0.8237 D(G(z)): 0.5805  
 / 0.0007  
 [22/200] [0/3] Loss\_D: 2.8258 Loss\_G: 4.0587 D(x): 0.3096 D(G(z)): 0.2564  
 / 0.0721  
 [23/200] [0/3] Loss\_D: 1.8951 Loss\_G: 6.0714 D(x): 0.6715 D(G(z)): 0.6082  
 / 0.0043  
 [24/200] [0/3] Loss\_D: 2.1135 Loss\_G: 3.6119 D(x): 0.4107 D(G(z)): 0.1201  
 / 0.0541  
 [25/200] [0/3] Loss\_D: 1.2650 Loss\_G: 4.6278 D(x): 0.6359 D(G(z)): 0.2056  
 / 0.0744  
 [26/200] [0/3] Loss\_D: 1.0630 Loss\_G: 5.4562 D(x): 0.6658 D(G(z)): 0.2265  
 / 0.0267  
 [27/200] [0/3] Loss\_D: 1.4243 Loss\_G: 5.7507 D(x): 0.6672 D(G(z)): 0.3521  
 / 0.0121  
 [28/200] [0/3] Loss\_D: 1.4027 Loss\_G: 6.8029 D(x): 0.6671 D(G(z)): 0.3706  
 / 0.0042  
 [29/200] [0/3] Loss\_D: 3.5107 Loss\_G: 3.3153 D(x): 0.1874 D(G(z)): 0.0037  
 / 0.0930  
 [30/200] [0/3] Loss\_D: 2.4474 Loss\_G: 3.6110 D(x): 0.4011 D(G(z)): 0.2632  
 / 0.0720  
 [31/200] [0/3] Loss\_D: 0.8539 Loss\_G: 3.2641 D(x): 0.7059 D(G(z)): 0.2955  
 / 0.0667  
 [49/200] [0/3] Loss\_D: 0.7951 Loss\_G: 2.6540 D(x): 0.6527 D(G(z)): 0.1768  
 / 0.1585  
 [50/200] [0/3] Loss\_D: 1.0474 Loss\_G: 3.4743 D(x): 0.7432 D(G(z)): 0.3831  
 / 0.0755  
 [51/200] [0/3] Loss\_D: 1.2654 Loss\_G: 1.8738 D(x): 0.4217 D(G(z)): 0.0972  
 / 0.2166  
 [52/200] [0/3] Loss\_D: 0.3145 Loss\_G: 3.3995 D(x): 0.8323 D(G(z)): 0.0772

/ 0.0504				
[53/200] [0/3]	Loss_D: 0.5225	Loss_G: 3.2122	D(x): 0.7287	D(G(z)): 0.0877
/ 0.0662				
[54/200] [0/3]	Loss_D: 0.6428	Loss_G: 3.7815	D(x): 0.8315	D(G(z)): 0.3208
/ 0.0348				
[55/200] [0/3]	Loss_D: 0.7607	Loss_G: 1.7875	D(x): 0.6385	D(G(z)): 0.1882
/ 0.2479				
[56/200] [0/3]	Loss_D: 0.6211	Loss_G: 0.5956	D(x): 0.7649	D(G(z)): 0.2370
/ 0.6110				
[57/200] [0/3]	Loss_D: 0.4603	Loss_G: 2.1812	D(x): 0.7611	D(G(z)): 0.0710
/ 0.1905				
[58/200] [0/3]	Loss_D: 0.6525	Loss_G: 4.0472	D(x): 0.6950	D(G(z)): 0.1008
/ 0.0512				
[59/200] [0/3]	Loss_D: 0.6009	Loss_G: 4.1177	D(x): 0.7817	D(G(z)): 0.2201
/ 0.0260				
[60/200] [0/3]	Loss_D: 0.5585	Loss_G: 3.6744	D(x): 0.7528	D(G(z)): 0.1439
/ 0.0391				
[61/200] [0/3]	Loss_D: 0.4939	Loss_G: 3.2742	D(x): 0.7835	D(G(z)): 0.1610
/ 0.0649				
[62/200] [0/3]	Loss_D: 1.5249	Loss_G: 9.0300	D(x): 0.9341	D(G(z)): 0.6677
/ 0.0008				
[63/200] [0/3]	Loss_D: 1.7801	Loss_G: 3.5616	D(x): 0.9749	D(G(z)): 0.7160
/ 0.0575				
[64/200] [0/3]	Loss_D: 0.6165	Loss_G: 2.6747	D(x): 0.7949	D(G(z)): 0.2084
/ 0.1327				
[65/200] [0/3]	Loss_D: 0.9629	Loss_G: 2.0946	D(x): 0.5640	D(G(z)): 0.1155
/ 0.1818				
[66/200] [0/3]	Loss_D: 0.4379	Loss_G: 3.2898	D(x): 0.8043	D(G(z)): 0.1373
/ 0.0535				
[67/200] [0/3]	Loss_D: 0.5578	Loss_G: 3.7111	D(x): 0.8005	D(G(z)): 0.2249
/ 0.0442				
[68/200] [0/3]	Loss_D: 0.4099	Loss_G: 3.6418	D(x): 0.8151	D(G(z)): 0.1167
/ 0.0415				
[69/200] [0/3]	Loss_D: 0.4949	Loss_G: 5.4157	D(x): 0.8912	D(G(z)): 0.2668
/ 0.0141				
[70/200] [0/3]	Loss_D: 0.9820	Loss_G: 2.5397	D(x): 0.5336	D(G(z)): 0.0144
/ 0.1494				
[71/200] [0/3]	Loss_D: 0.6957	Loss_G: 2.8828	D(x): 0.8844	D(G(z)): 0.3129
/ 0.1120				
[72/200] [0/3]	Loss_D: 0.3896	Loss_G: 2.8510	D(x): 0.7823	D(G(z)): 0.0599
/ 0.1234				
[73/200] [0/3]	Loss_D: 0.5200	Loss_G: 3.7158	D(x): 0.7938	D(G(z)): 0.1711
/ 0.0448				
[74/200] [0/3]	Loss_D: 0.9379	Loss_G: 2.8913	D(x): 0.6110	D(G(z)): 0.2102
/ 0.0870				
[75/200] [0/3]	Loss_D: 0.3377	Loss_G: 3.6156	D(x): 0.9433	D(G(z)): 0.2027
/ 0.0656				
[76/200] [0/3]	Loss_D: 0.5731	Loss_G: 3.8654	D(x): 0.9478	D(G(z)): 0.3476

/ 0.0456				
[77/200] [0/3]	Loss_D: 0.4735	Loss_G: 2.7666	D(x): 0.7714	D(G(z)): 0.0954
/ 0.1040				
[78/200] [0/3]	Loss_D: 0.4740	Loss_G: 3.6771	D(x): 0.7907	D(G(z)): 0.1227
/ 0.0642				
[79/200] [0/3]	Loss_D: 0.6680	Loss_G: 2.0124	D(x): 0.7157	D(G(z)): 0.1226
/ 0.1979				
[80/200] [0/3]	Loss_D: 0.3959	Loss_G: 4.0253	D(x): 0.8003	D(G(z)): 0.0167
/ 0.0557				
[81/200] [0/3]	Loss_D: 1.8091	Loss_G: 3.5947	D(x): 0.4094	D(G(z)): 0.0289
/ 0.0991				
[82/200] [0/3]	Loss_D: 0.5584	Loss_G: 4.6295	D(x): 0.7646	D(G(z)): 0.1024
/ 0.0483				
[83/200] [0/3]	Loss_D: 0.5381	Loss_G: 4.6328	D(x): 0.7966	D(G(z)): 0.1385
/ 0.0318				
[84/200] [0/3]	Loss_D: 0.6214	Loss_G: 7.3332	D(x): 0.9323	D(G(z)): 0.3155
/ 0.0055				
[85/200] [0/3]	Loss_D: 0.3659	Loss_G: 8.5177	D(x): 0.7868	D(G(z)): 0.0088
/ 0.0009				
[86/200] [0/3]	Loss_D: 1.5451	Loss_G: 10.4391	D(x): 0.4097	D(G(z)): 0.0019
/ 0.0008				
[87/200] [0/3]	Loss_D: 0.6882	Loss_G: 7.8610	D(x): 0.9960	D(G(z)): 0.3877
/ 0.0040				
[88/200] [0/3]	Loss_D: 2.1174	Loss_G: 10.6629	D(x): 0.9975	D(G(z)): 0.7168
/ 0.0012				
[89/200] [0/3]	Loss_D: 1.7311	Loss_G: 10.4186	D(x): 0.9775	D(G(z)): 0.6090
/ 0.0010				
[90/200] [0/3]	Loss_D: 0.6745	Loss_G: 3.6367	D(x): 0.9230	D(G(z)): 0.3245
/ 0.0591				
[91/200] [0/3]	Loss_D: 0.3397	Loss_G: 4.4932	D(x): 0.8550	D(G(z)): 0.1091
/ 0.0397				
[92/200] [0/3]	Loss_D: 1.2848	Loss_G: 8.5551	D(x): 0.8300	D(G(z)): 0.5595
/ 0.0012				
[93/200] [0/3]	Loss_D: 0.5592	Loss_G: 5.0937	D(x): 0.9677	D(G(z)): 0.3351
/ 0.0138				
[94/200] [0/3]	Loss_D: 0.2891	Loss_G: 3.3154	D(x): 0.9104	D(G(z)): 0.1366
/ 0.0722				
[95/200] [0/3]	Loss_D: 0.5823	Loss_G: 5.5078	D(x): 0.8733	D(G(z)): 0.2838
/ 0.0079				
[96/200] [0/3]	Loss_D: 4.8158	Loss_G: 4.9190	D(x): 0.0475	D(G(z)): 0.0004
/ 0.0209				
[97/200] [0/3]	Loss_D: 0.4073	Loss_G: 6.6479	D(x): 0.7977	D(G(z)): 0.1001
/ 0.0062				
[98/200] [0/3]	Loss_D: 1.4259	Loss_G: 4.8814	D(x): 0.9091	D(G(z)): 0.5897
/ 0.0337				
[99/200] [0/3]	Loss_D: 1.0819	Loss_G: 3.5981	D(x): 0.8661	D(G(z)): 0.4541
/ 0.0908				
[100/200] [0/3]	Loss_D: 0.6389	Loss_G: 4.7806	D(x): 0.9114	D(G(z)): 0.3390

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/ 0.0434
[101/200] [0/3] Loss_D: 0.4464 Loss_G: 4.0655 D(x): 0.9025 D(G(z)): 0.2359
/ 0.0528
[102/200] [0/3] Loss_D: 0.5400 Loss_G: 3.8871 D(x): 0.8403 D(G(z)): 0.2392
/ 0.0443
[103/200] [0/3] Loss_D: 0.1632 Loss_G: 5.0324 D(x): 0.9516 D(G(z)): 0.0943
/ 0.0157
[104/200] [0/3] Loss_D: 0.2635 Loss_G: 6.2938 D(x): 0.9698 D(G(z)): 0.1872
/ 0.0047
[105/200] [0/3] Loss_D: 0.6117 Loss_G: 4.6856 D(x): 0.6538 D(G(z)): 0.0286
/ 0.0387
[106/200] [0/3] Loss_D: 0.2397 Loss_G: 5.3536 D(x): 0.8579 D(G(z)): 0.0409
/ 0.0110
[107/200] [0/3] Loss_D: 3.4471 Loss_G: 8.2100 D(x): 0.9881 D(G(z)): 0.8933
/ 0.0019
[108/200] [0/3] Loss_D: 0.6380 Loss_G: 2.5962 D(x): 0.9735 D(G(z)): 0.3663
/ 0.1480
[109/200] [0/3] Loss_D: 0.3607 Loss_G: 4.7717 D(x): 0.7827 D(G(z)): 0.0357
/ 0.0244
[110/200] [0/3] Loss_D: 0.4464 Loss_G: 5.8565 D(x): 0.8433 D(G(z)): 0.1792
/ 0.0139
[111/200] [0/3] Loss_D: 1.0410 Loss_G: 10.0915 D(x): 0.5898 D(G(z)): 0.0029
/ 0.0007
[112/200] [0/3] Loss_D: 0.5617 Loss_G: 5.6685 D(x): 0.9935 D(G(z)): 0.3161
/ 0.0189
[113/200] [0/3] Loss_D: 0.3093 Loss_G: 5.0834 D(x): 0.9276 D(G(z)): 0.1661
/ 0.0237
[114/200] [0/3] Loss_D: 3.6244 Loss_G: 10.9758 D(x): 0.9825 D(G(z)): 0.8940
/ 0.0003
[115/200] [0/3] Loss_D: 0.3346 Loss_G: 3.4462 D(x): 0.9282 D(G(z)): 0.1413
/ 0.1630
[116/200] [0/3] Loss_D: 0.6522 Loss_G: 4.4852 D(x): 0.7567 D(G(z)): 0.1145
/ 0.0472
[117/200] [0/3] Loss_D: 1.0446 Loss_G: 3.8491 D(x): 0.5941 D(G(z)): 0.1656
/ 0.0625
[118/200] [0/3] Loss_D: 2.1825 Loss_G: 0.7921 D(x): 0.2681 D(G(z)): 0.0814
/ 0.5769
[119/200] [0/3] Loss_D: 0.4354 Loss_G: 6.7169 D(x): 0.7592 D(G(z)): 0.0126
/ 0.0318
[120/200] [0/3] Loss_D: 0.2630 Loss_G: 6.2785 D(x): 0.9814 D(G(z)): 0.1656
/ 0.0165
[121/200] [0/3] Loss_D: 0.6813 Loss_G: 5.8228 D(x): 0.9438 D(G(z)): 0.3727
/ 0.0135
[122/200] [0/3] Loss_D: 0.7967 Loss_G: 2.9841 D(x): 0.6264 D(G(z)): 0.1092
/ 0.0881
[123/200] [0/3] Loss_D: 1.9768 Loss_G: 5.9374 D(x): 0.9076 D(G(z)): 0.7531
/ 0.0123
[124/200] [0/3] Loss_D: 0.5810 Loss_G: 3.6243 D(x): 0.9535 D(G(z)): 0.3336

```

```

/ 0.0716
[125/200] [0/3] Loss_D: 0.3287 Loss_G: 4.1852 D(x): 0.8507 D(G(z)): 0.0974
/ 0.0462
[126/200] [0/3] Loss_D: 0.5294 Loss_G: 4.4966 D(x): 0.7404 D(G(z)): 0.0695
/ 0.0355
[127/200] [0/3] Loss_D: 0.9477 Loss_G: 5.8939 D(x): 0.8036 D(G(z)): 0.3873
/ 0.0123
[128/200] [0/3] Loss_D: 0.6188 Loss_G: 5.6434 D(x): 0.7962 D(G(z)): 0.1752
/ 0.0217
[129/200] [0/3] Loss_D: 0.5331 Loss_G: 5.4012 D(x): 0.7555 D(G(z)): 0.0884
/ 0.0169
[130/200] [0/3] Loss_D: 0.6181 Loss_G: 5.6515 D(x): 0.8234 D(G(z)): 0.2575
/ 0.0101
[131/200] [0/3] Loss_D: 2.1525 Loss_G: 6.0554 D(x): 0.3116 D(G(z)): 0.0029
/ 0.0203
[132/200] [0/3] Loss_D: 0.5029 Loss_G: 5.5509 D(x): 0.9704 D(G(z)): 0.2844
/ 0.0249
[133/200] [0/3] Loss_D: 0.5459 Loss_G: 3.8065 D(x): 0.8849 D(G(z)): 0.2357
/ 0.0735
[134/200] [0/3] Loss_D: 0.3783 Loss_G: 3.0212 D(x): 0.7899 D(G(z)): 0.0798
/ 0.0912
[135/200] [0/3] Loss_D: 0.2148 Loss_G: 4.1053 D(x): 0.8579 D(G(z)): 0.0272
/ 0.0550
[136/200] [0/3] Loss_D: 0.3153 Loss_G: 5.5226 D(x): 0.8747 D(G(z)): 0.0747
/ 0.0199
[137/200] [0/3] Loss_D: 0.3209 Loss_G: 5.6192 D(x): 0.8335 D(G(z)): 0.0712
/ 0.0154
[138/200] [0/3] Loss_D: 0.2796 Loss_G: 5.0418 D(x): 0.8715 D(G(z)): 0.1009
/ 0.0174
[139/200] [0/3] Loss_D: 0.6368 Loss_G: 6.9007 D(x): 0.9305 D(G(z)): 0.3762
/ 0.0066
[140/200] [0/3] Loss_D: 0.7851 Loss_G: 8.1176 D(x): 0.9733 D(G(z)): 0.4620
/ 0.0015
[141/200] [0/3] Loss_D: 0.6004 Loss_G: 7.2934 D(x): 0.9143 D(G(z)): 0.3152
/ 0.0059
[142/200] [0/3] Loss_D: 0.8897 Loss_G: 5.8634 D(x): 0.5661 D(G(z)): 0.0203
/ 0.0083
[143/200] [0/3] Loss_D: 0.4529 Loss_G: 6.9233 D(x): 0.9122 D(G(z)): 0.2356
/ 0.0112
[144/200] [0/3] Loss_D: 1.1242 Loss_G: 2.6060 D(x): 0.5270 D(G(z)): 0.1312
/ 0.1528
[145/200] [0/3] Loss_D: 0.4170 Loss_G: 2.5789 D(x): 0.8260 D(G(z)): 0.0851
/ 0.1321
[146/200] [0/3] Loss_D: 0.3634 Loss_G: 5.7377 D(x): 0.8054 D(G(z)): 0.0280
/ 0.0129
[147/200] [0/3] Loss_D: 0.5561 Loss_G: 4.1001 D(x): 0.7780 D(G(z)): 0.1727
/ 0.0361
[148/200] [0/3] Loss_D: 0.7043 Loss_G: 2.9301 D(x): 0.6477 D(G(z)): 0.0931

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/ 0.1038
[149/200] [0/3] Loss_D: 0.4345 Loss_G: 4.1413 D(x): 0.9479 D(G(z)): 0.2646
/ 0.0451
[150/200] [0/3] Loss_D: 0.3810 Loss_G: 4.3563 D(x): 0.8720 D(G(z)): 0.1616
/ 0.0298
[151/200] [0/3] Loss_D: 0.4347 Loss_G: 5.7782 D(x): 0.9461 D(G(z)): 0.2695
/ 0.0092
[152/200] [0/3] Loss_D: 0.2454 Loss_G: 5.6824 D(x): 0.9613 D(G(z)): 0.1647
/ 0.0086
[153/200] [0/3] Loss_D: 0.2693 Loss_G: 6.4132 D(x): 0.9315 D(G(z)): 0.1400
/ 0.0055
[154/200] [0/3] Loss_D: 6.2217 Loss_G: 6.5333 D(x): 0.0147 D(G(z)): 0.0026
/ 0.0181
[155/200] [0/3] Loss_D: 0.2933 Loss_G: 8.4156 D(x): 0.9637 D(G(z)): 0.1539
/ 0.0052
[156/200] [0/3] Loss_D: 0.7211 Loss_G: 4.5470 D(x): 0.9599 D(G(z)): 0.3708
/ 0.0521
[157/200] [0/3] Loss_D: 0.5796 Loss_G: 4.5906 D(x): 0.8733 D(G(z)): 0.2888
/ 0.0197
[158/200] [0/3] Loss_D: 0.7009 Loss_G: 4.3164 D(x): 0.7409 D(G(z)): 0.2251
/ 0.0356
[159/200] [0/3] Loss_D: 0.5527 Loss_G: 6.7242 D(x): 0.8852 D(G(z)): 0.2616
/ 0.0081
[160/200] [0/3] Loss_D: 0.3119 Loss_G: 4.2925 D(x): 0.8561 D(G(z)): 0.1100
/ 0.0330
[161/200] [0/3] Loss_D: 0.1959 Loss_G: 5.0017 D(x): 0.9154 D(G(z)): 0.0840
/ 0.0154
[162/200] [0/3] Loss_D: 0.3438 Loss_G: 7.2704 D(x): 0.9241 D(G(z)): 0.1957
/ 0.0029
[163/200] [0/3] Loss_D: 5.7003 Loss_G: 5.5225 D(x): 0.0520 D(G(z)): 0.0023
/ 0.0673
[164/200] [0/3] Loss_D: 0.6224 Loss_G: 5.0570 D(x): 0.6641 D(G(z)): 0.0498
/ 0.0172
[165/200] [0/3] Loss_D: 0.1994 Loss_G: 4.8280 D(x): 0.9314 D(G(z)): 0.1054
/ 0.0233
[166/200] [0/3] Loss_D: 0.6974 Loss_G: 5.9114 D(x): 0.9024 D(G(z)): 0.3627
/ 0.0138
[167/200] [0/3] Loss_D: 1.9125 Loss_G: 4.6018 D(x): 0.2552 D(G(z)): 0.0146
/ 0.1016
[168/200] [0/3] Loss_D: 0.5678 Loss_G: 4.7737 D(x): 0.7481 D(G(z)): 0.0990
/ 0.0321
[169/200] [0/3] Loss_D: 0.8339 Loss_G: 2.4276 D(x): 0.6262 D(G(z)): 0.1694
/ 0.1595
[170/200] [0/3] Loss_D: 1.2454 Loss_G: 5.7006 D(x): 0.9681 D(G(z)): 0.6049
/ 0.0270
[171/200] [0/3] Loss_D: 0.6640 Loss_G: 4.1351 D(x): 0.8599 D(G(z)): 0.2954
/ 0.0627
[172/200] [0/3] Loss_D: 0.8678 Loss_G: 5.9084 D(x): 0.8552 D(G(z)): 0.3866

```

```

/ 0.0107
[173/200] [0/3] Loss_D: 0.3752 Loss_G: 4.9467 D(x): 0.8436 D(G(z)): 0.1362
/ 0.0229
[174/200] [0/3] Loss_D: 0.5632 Loss_G: 5.8057 D(x): 0.8541 D(G(z)): 0.2714
/ 0.0118
[175/200] [0/3] Loss_D: 1.2504 Loss_G: 4.7526 D(x): 0.4110 D(G(z)): 0.0222
/ 0.0663
[176/200] [0/3] Loss_D: 1.2719 Loss_G: 4.4769 D(x): 0.4857 D(G(z)): 0.0121
/ 0.0516
[177/200] [0/3] Loss_D: 0.6567 Loss_G: 5.7626 D(x): 0.9671 D(G(z)): 0.3663
/ 0.0198
[178/200] [0/3] Loss_D: 0.6743 Loss_G: 7.9717 D(x): 0.8925 D(G(z)): 0.3522
/ 0.0018
[179/200] [0/3] Loss_D: 0.3333 Loss_G: 7.6590 D(x): 0.8320 D(G(z)): 0.0598
/ 0.0061
[180/200] [0/3] Loss_D: 3.0586 Loss_G: 4.2895 D(x): 0.1455 D(G(z)): 0.0017
/ 0.0370
[181/200] [0/3] Loss_D: 0.7728 Loss_G: 5.8935 D(x): 0.6122 D(G(z)): 0.0263
/ 0.0144
[182/200] [0/3] Loss_D: 0.4260 Loss_G: 5.6556 D(x): 0.8520 D(G(z)): 0.1704
/ 0.0099
[183/200] [0/3] Loss_D: 0.7409 Loss_G: 4.3478 D(x): 0.7747 D(G(z)): 0.2364
/ 0.0548
[184/200] [0/3] Loss_D: 0.6196 Loss_G: 3.8879 D(x): 0.6895 D(G(z)): 0.0672
/ 0.0591
[185/200] [0/3] Loss_D: 0.9648 Loss_G: 1.6547 D(x): 0.5199 D(G(z)): 0.0394
/ 0.2841
[186/200] [0/3] Loss_D: 0.5360 Loss_G: 3.1882 D(x): 0.7623 D(G(z)): 0.1335
/ 0.1310
[187/200] [0/3] Loss_D: 0.2708 Loss_G: 4.4823 D(x): 0.8568 D(G(z)): 0.0740
/ 0.0263
[188/200] [0/3] Loss_D: 0.7606 Loss_G: 7.4751 D(x): 0.9115 D(G(z)): 0.4095
/ 0.0056
[189/200] [0/3] Loss_D: 1.6318 Loss_G: 6.0808 D(x): 0.3480 D(G(z)): 0.0064
/ 0.0175
[190/200] [0/3] Loss_D: 0.5616 Loss_G: 5.2358 D(x): 0.9710 D(G(z)): 0.3593
/ 0.0136
[191/200] [0/3] Loss_D: 0.6629 Loss_G: 3.7161 D(x): 0.8972 D(G(z)): 0.3368
/ 0.0565
[192/200] [0/3] Loss_D: 0.5785 Loss_G: 4.7414 D(x): 0.8672 D(G(z)): 0.2889
/ 0.0231
[193/200] [0/3] Loss_D: 0.5788 Loss_G: 5.5595 D(x): 0.6755 D(G(z)): 0.0574
/ 0.0187
[194/200] [0/3] Loss_D: 0.3492 Loss_G: 5.3459 D(x): 0.8168 D(G(z)): 0.0833
/ 0.0139
[195/200] [0/3] Loss_D: 0.4600 Loss_G: 7.2112 D(x): 0.8875 D(G(z)): 0.2281
/ 0.0022
[196/200] [0/3] Loss_D: 6.1762 Loss_G: 10.2078 D(x): 0.0178 D(G(z)): 0.0010

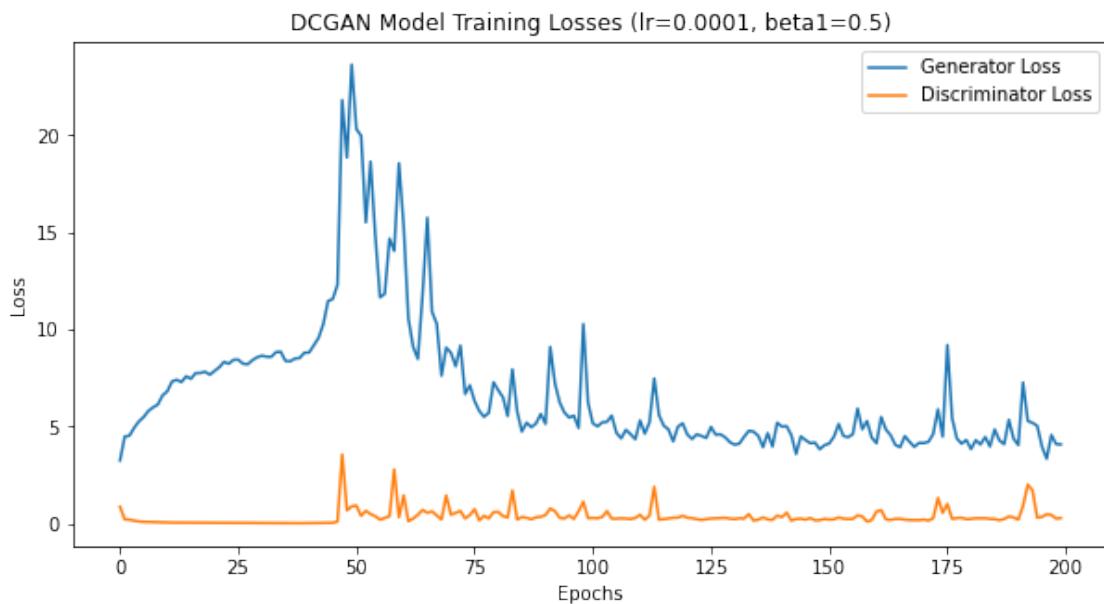
```

```

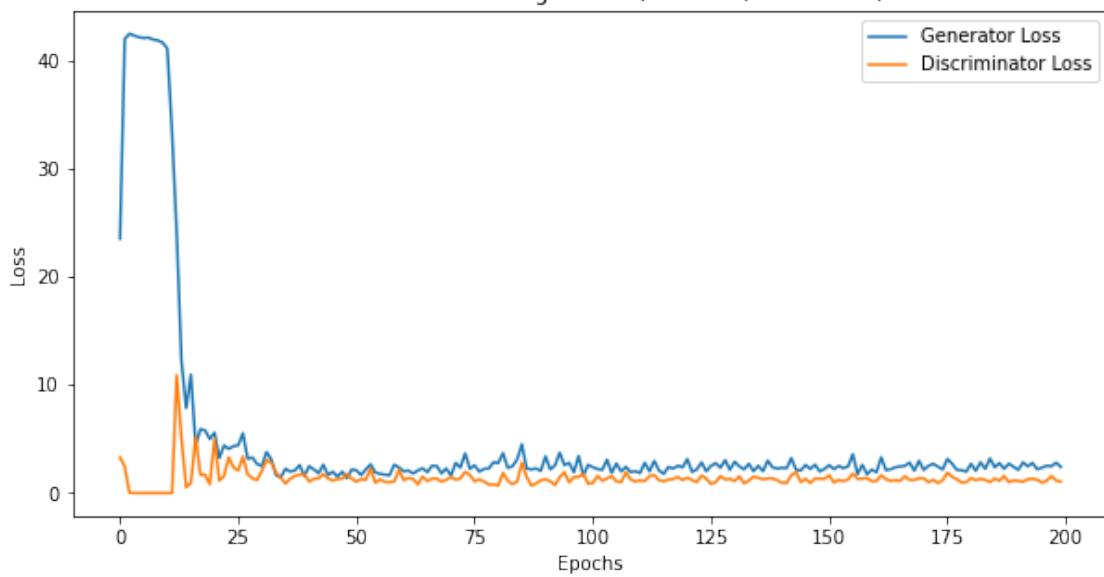
/ 0.0104
[197/200] [0/3]  Loss_D: 0.6213  Loss_G: 7.5739  D(x): 0.9552      D(G(z)): 0.3112
/ 0.0072
[198/200] [0/3]  Loss_D: 1.2541  Loss_G: 6.7124  D(x): 0.9070      D(G(z)): 0.4924
/ 0.0120
[199/200] [0/3]  Loss_D: 0.8792  Loss_G: 4.0471  D(x): 0.6774      D(G(z)): 0.2192
/ 0.0918
FID score: 1088.6557931159014
Inception score: 1.802716612815857 ± 0.07303211092948914
Best hyperparameters for DCGAN: {'lr': 0.001, 'beta1': 0.7}
Best Inception Score for DCGAN: 1.993157982826233
Best hyperparameters for DCGAN: {'lr': 0.001, 'beta1': 0.7}

```

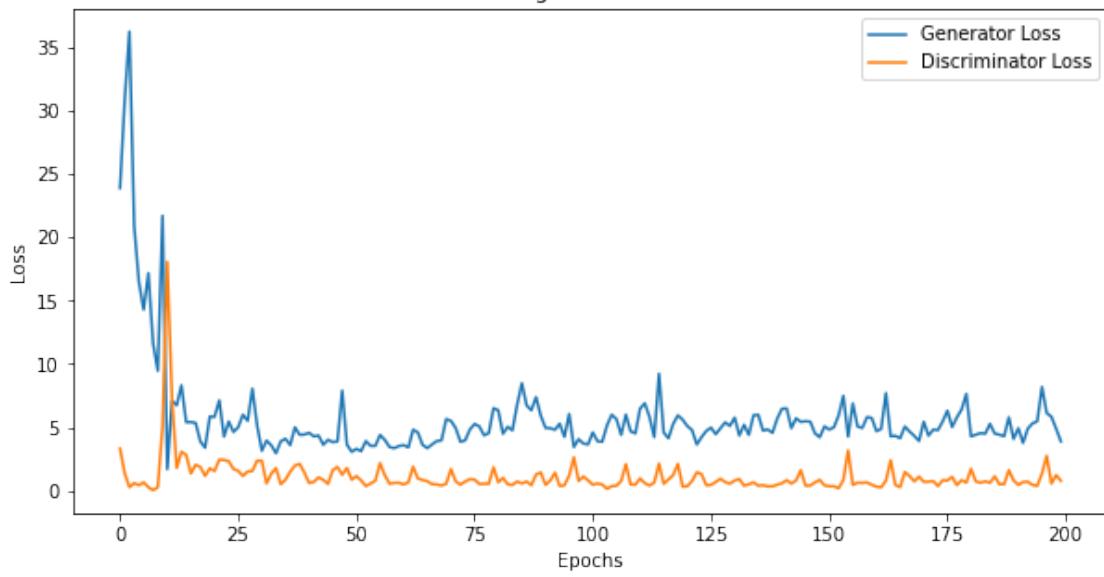
[50]: `dcgan_losses, dcgan_filenames = load_losses('dc_gans_losses')  
plot_losses(dcgan_losses, dcgan_filenames, 'DCGAN Model')`

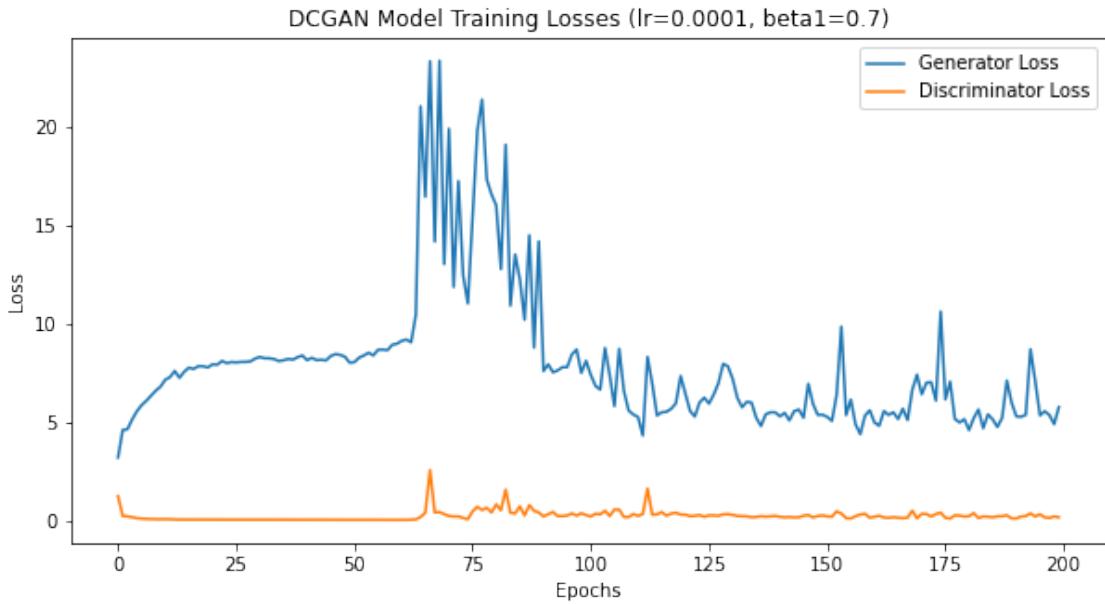


DCGAN Model Training Losses ( $\text{lr}=0.001$ ,  $\text{beta1}=0.5$ )



DCGAN Model Training Losses ( $\text{lr}=0.001$ ,  $\text{beta1}=0.7$ )





## 25 Training the DCGAN model with best hyperparameters

```
[37]: num_epochs = 250
best_netG = Generator(ngpu).apply(weights_init).to(device)
best_netD = Discriminator(ngpu).apply(weights_init).to(device)

G_losses_best_dcgan, D_losses_best_dcgan, img_list_best_dcgan, □
    ↵ training_time_best_dcgan, fid_score_best_dcgan, inception_score_best_dcgan, □
    ↵ inception_std_best_dcgan = train_dcgan_with_fid(
        dataloader, best_netG, best_netD, num_epochs, best_dcgan_params['lr'], □
        ↵ best_dcgan_params['beta1']
    )
```

Starting Training Loop...

[0/250] [0/3]	Loss_D: 1.2108	Loss_G: 13.6903	D(x): 0.5619	D(G(z)): 0.3614
/ 0.0000				
[1/250] [0/3]	Loss_D: 7.5893	Loss_G: 32.0001	D(x): 0.9500	D(G(z)): 0.9985
/ 0.0000				
[2/250] [0/3]	Loss_D: 0.0754	Loss_G: 36.8962	D(x): 0.9736	D(G(z)): 0.0000
/ 0.0000				
[3/250] [0/3]	Loss_D: 0.0259	Loss_G: 31.4327	D(x): 0.9839	D(G(z)): 0.0000
/ 0.0000				
[4/250] [0/3]	Loss_D: 0.1395	Loss_G: 26.7733	D(x): 0.9838	D(G(z)): 0.0366
/ 0.0000				
[5/250] [0/3]	Loss_D: 1.7058	Loss_G: 15.4905	D(x): 0.5779	D(G(z)): 0.0247
/ 0.0000				

[6/250] [0/3]	Loss_D: 0.5928	Loss_G: 22.8357	D(x): 0.8924	D(G(z)): 0.0000
/ 0.0000				
[7/250] [0/3]	Loss_D: 2.6043	Loss_G: 13.2456	D(x): 0.9245	D(G(z)): 0.5624
/ 0.0002				
[8/250] [0/3]	Loss_D: 0.5582	Loss_G: 7.2087	D(x): 0.9100	D(G(z)): 0.1420
/ 0.0401				
[9/250] [0/3]	Loss_D: 0.7209	Loss_G: 6.8489	D(x): 0.8109	D(G(z)): 0.1501
/ 0.0108				
[10/250] [0/3]	Loss_D: 0.6569	Loss_G: 3.9335	D(x): 0.8039	D(G(z)): 0.0827
/ 0.1202				
[11/250] [0/3]	Loss_D: 0.6138	Loss_G: 6.2070	D(x): 0.9243	D(G(z)): 0.2590
/ 0.0200				
[12/250] [0/3]	Loss_D: 1.5159	Loss_G: 4.7978	D(x): 0.7253	D(G(z)): 0.2017
/ 0.0534				
[13/250] [0/3]	Loss_D: 0.5862	Loss_G: 4.3369	D(x): 0.8272	D(G(z)): 0.1465
/ 0.0310				
[14/250] [0/3]	Loss_D: 0.4576	Loss_G: 8.4790	D(x): 0.8195	D(G(z)): 0.0109
/ 0.0056				
[15/250] [0/3]	Loss_D: 0.2895	Loss_G: 7.3312	D(x): 0.8593	D(G(z)): 0.0349
/ 0.0027				
[16/250] [0/3]	Loss_D: 2.5897	Loss_G: 21.2667	D(x): 0.6541	D(G(z)): 0.6402
/ 0.0000				
[17/250] [0/3]	Loss_D: 4.5676	Loss_G: 12.1717	D(x): 0.9288	D(G(z)): 0.9463
/ 0.0043				
[18/250] [0/3]	Loss_D: 2.8262	Loss_G: 3.4534	D(x): 0.9466	D(G(z)): 0.8304
/ 0.1072				
[19/250] [0/3]	Loss_D: 2.7716	Loss_G: 1.8322	D(x): 0.4978	D(G(z)): 0.6136
/ 0.2566				
[20/250] [0/3]	Loss_D: 0.9280	Loss_G: 3.0916	D(x): 0.7084	D(G(z)): 0.2127
/ 0.1107				
[21/250] [0/3]	Loss_D: 1.5250	Loss_G: 2.8346	D(x): 0.5036	D(G(z)): 0.3074
/ 0.1412				
[22/250] [0/3]	Loss_D: 0.7451	Loss_G: 4.4002	D(x): 0.7508	D(G(z)): 0.1906
/ 0.0348				
[23/250] [0/3]	Loss_D: 0.8179	Loss_G: 4.6807	D(x): 0.7577	D(G(z)): 0.2537
/ 0.0366				
[24/250] [0/3]	Loss_D: 2.2781	Loss_G: 2.6883	D(x): 0.2693	D(G(z)): 0.0190
/ 0.1835				
[25/250] [0/3]	Loss_D: 1.1076	Loss_G: 4.2819	D(x): 0.6329	D(G(z)): 0.1901
/ 0.1208				
[26/250] [0/3]	Loss_D: 2.1213	Loss_G: 3.9253	D(x): 0.6253	D(G(z)): 0.6038
/ 0.0569				
[27/250] [0/3]	Loss_D: 0.4613	Loss_G: 4.8288	D(x): 0.9328	D(G(z)): 0.2349
/ 0.0188				
[28/250] [0/3]	Loss_D: 0.9775	Loss_G: 3.4901	D(x): 0.7098	D(G(z)): 0.2876
/ 0.0580				
[29/250] [0/3]	Loss_D: 1.0645	Loss_G: 4.7289	D(x): 0.8652	D(G(z)): 0.5026
/ 0.0247				

[30/250] [0/3]	Loss_D: 0.2743	Loss_G: 4.0066	D(x): 0.9382	D(G(z)): 0.1348
/ 0.0424				
[31/250] [0/3]	Loss_D: 0.3481	Loss_G: 4.4253	D(x): 0.8554	D(G(z)): 0.0872
/ 0.0220				
[32/250] [0/3]	Loss_D: 0.8477	Loss_G: 5.0718	D(x): 0.7619	D(G(z)): 0.2635
/ 0.0174				
[33/250] [0/3]	Loss_D: 1.7397	Loss_G: 2.2411	D(x): 0.3871	D(G(z)): 0.0379
/ 0.2359				
[34/250] [0/3]	Loss_D: 1.5713	Loss_G: 3.2866	D(x): 0.6701	D(G(z)): 0.4892
/ 0.0857				
[35/250] [0/3]	Loss_D: 1.3052	Loss_G: 5.8285	D(x): 0.9026	D(G(z)): 0.5471
/ 0.0160				
[36/250] [0/3]	Loss_D: 1.2227	Loss_G: 6.0174	D(x): 0.8041	D(G(z)): 0.4675
/ 0.0119				
[37/250] [0/3]	Loss_D: 1.0362	Loss_G: 7.2133	D(x): 0.9229	D(G(z)): 0.4882
/ 0.0064				
[38/250] [0/3]	Loss_D: 1.8789	Loss_G: 7.7679	D(x): 0.8127	D(G(z)): 0.6377
/ 0.0043				
[39/250] [0/3]	Loss_D: 1.1008	Loss_G: 6.1996	D(x): 0.7744	D(G(z)): 0.3071
/ 0.0119				
[40/250] [0/3]	Loss_D: 1.0914	Loss_G: 6.9526	D(x): 0.7730	D(G(z)): 0.3358
/ 0.0063				
[41/250] [0/3]	Loss_D: 0.5650	Loss_G: 5.1747	D(x): 0.8975	D(G(z)): 0.2573
/ 0.0141				
[42/250] [0/3]	Loss_D: 0.4245	Loss_G: 5.5231	D(x): 0.8655	D(G(z)): 0.1607
/ 0.0175				
[43/250] [0/3]	Loss_D: 0.9332	Loss_G: 5.5754	D(x): 0.7718	D(G(z)): 0.3646
/ 0.0081				
[44/250] [0/3]	Loss_D: 0.5232	Loss_G: 6.4641	D(x): 0.9134	D(G(z)): 0.3091
/ 0.0063				
[45/250] [0/3]	Loss_D: 1.0121	Loss_G: 6.2049	D(x): 0.9535	D(G(z)): 0.4757
/ 0.0131				
[46/250] [0/3]	Loss_D: 0.2937	Loss_G: 8.6965	D(x): 0.8257	D(G(z)): 0.0282
/ 0.0014				
[47/250] [0/3]	Loss_D: 1.0040	Loss_G: 14.9313	D(x): 0.9176	D(G(z)): 0.4467
/ 0.0000				
[48/250] [0/3]	Loss_D: 0.2655	Loss_G: 7.8534	D(x): 0.9468	D(G(z)): 0.1302
/ 0.0012				
[49/250] [0/3]	Loss_D: 2.4495	Loss_G: 4.5738	D(x): 0.2675	D(G(z)): 0.0057
/ 0.0415				
[50/250] [0/3]	Loss_D: 0.2442	Loss_G: 7.5552	D(x): 0.8655	D(G(z)): 0.0439
/ 0.0050				
[51/250] [0/3]	Loss_D: 1.4759	Loss_G: 7.1127	D(x): 0.9736	D(G(z)): 0.6492
/ 0.0030				
[52/250] [0/3]	Loss_D: 2.0050	Loss_G: 6.1468	D(x): 0.8882	D(G(z)): 0.6802
/ 0.0090				
[53/250] [0/3]	Loss_D: 2.9379	Loss_G: 9.7927	D(x): 0.7604	D(G(z)): 0.8474
/ 0.0006				

[54/250] [0/3]	Loss_D: 2.6351	Loss_G: 11.8355	D(x): 0.9542	D(G(z)): 0.7052
/ 0.0001				
[55/250] [0/3]	Loss_D: 2.3649	Loss_G: 6.8276	D(x): 0.9204	D(G(z)): 0.7679
/ 0.0247				
[56/250] [0/3]	Loss_D: 1.3507	Loss_G: 5.8682	D(x): 0.9186	D(G(z)): 0.6176
/ 0.0085				
[57/250] [0/3]	Loss_D: 0.4826	Loss_G: 5.6111	D(x): 0.9422	D(G(z)): 0.2692
/ 0.0095				
[58/250] [0/3]	Loss_D: 2.0786	Loss_G: 8.1899	D(x): 0.9494	D(G(z)): 0.7205
/ 0.0015				
[59/250] [0/3]	Loss_D: 0.7351	Loss_G: 4.6532	D(x): 0.9575	D(G(z)): 0.4218
/ 0.0163				
[60/250] [0/3]	Loss_D: 0.5337	Loss_G: 4.6562	D(x): 0.9012	D(G(z)): 0.2937
/ 0.0276				
[61/250] [0/3]	Loss_D: 2.1564	Loss_G: 9.8814	D(x): 0.9447	D(G(z)): 0.7558
/ 0.0012				
[62/250] [0/3]	Loss_D: 1.4804	Loss_G: 4.8750	D(x): 0.9747	D(G(z)): 0.6482
/ 0.0279				
[63/250] [0/3]	Loss_D: 0.2481	Loss_G: 4.6305	D(x): 0.8730	D(G(z)): 0.0513
/ 0.0456				
[64/250] [0/3]	Loss_D: 0.3969	Loss_G: 3.6893	D(x): 0.8316	D(G(z)): 0.1247
/ 0.0576				
[65/250] [0/3]	Loss_D: 0.7423	Loss_G: 2.9597	D(x): 0.8442	D(G(z)): 0.3275
/ 0.0954				
[66/250] [0/3]	Loss_D: 0.4551	Loss_G: 3.1868	D(x): 0.8443	D(G(z)): 0.1794
/ 0.0847				
[67/250] [0/3]	Loss_D: 0.3827	Loss_G: 4.3201	D(x): 0.8741	D(G(z)): 0.1550
/ 0.0304				
[68/250] [0/3]	Loss_D: 0.3483	Loss_G: 4.8735	D(x): 0.8764	D(G(z)): 0.1449
/ 0.0249				
[69/250] [0/3]	Loss_D: 0.7811	Loss_G: 7.8650	D(x): 0.7739	D(G(z)): 0.2982
/ 0.0018				
[70/250] [0/3]	Loss_D: 0.1170	Loss_G: 7.3671	D(x): 0.9348	D(G(z)): 0.0263
/ 0.0029				
[71/250] [0/3]	Loss_D: 0.2845	Loss_G: 7.2590	D(x): 0.9222	D(G(z)): 0.1209
/ 0.0026				
[72/250] [0/3]	Loss_D: 0.4765	Loss_G: 7.0110	D(x): 0.8350	D(G(z)): 0.1405
/ 0.0035				
[73/250] [0/3]	Loss_D: 0.7566	Loss_G: 2.3760	D(x): 0.9151	D(G(z)): 0.3524
/ 0.2294				
[74/250] [0/3]	Loss_D: 0.6777	Loss_G: 5.1327	D(x): 0.6827	D(G(z)): 0.0416
/ 0.0380				
[75/250] [0/3]	Loss_D: 0.2692	Loss_G: 7.4182	D(x): 0.8159	D(G(z)): 0.0181
/ 0.0036				
[76/250] [0/3]	Loss_D: 0.3933	Loss_G: 7.2131	D(x): 0.9539	D(G(z)): 0.2474
/ 0.0025				
[77/250] [0/3]	Loss_D: 0.3472	Loss_G: 7.3580	D(x): 0.9564	D(G(z)): 0.2285
/ 0.0081				

[78/250] [0/3]	Loss_D: 0.1498	Loss_G: 6.0671	D(x): 0.9357	D(G(z)): 0.0642
/ 0.0070				
[79/250] [0/3]	Loss_D: 0.2588	Loss_G: 5.7709	D(x): 0.8923	D(G(z)): 0.1014
/ 0.0107				
[80/250] [0/3]	Loss_D: 1.0841	Loss_G: 11.5629	D(x): 0.9478	D(G(z)): 0.5289
/ 0.0002				
[81/250] [0/3]	Loss_D: 1.7073	Loss_G: 5.8629	D(x): 0.9958	D(G(z)): 0.6917
/ 0.0178				
[82/250] [0/3]	Loss_D: 0.4263	Loss_G: 2.7345	D(x): 0.8295	D(G(z)): 0.1363
/ 0.1336				
[83/250] [0/3]	Loss_D: 0.5512	Loss_G: 2.4674	D(x): 0.7357	D(G(z)): 0.0798
/ 0.1264				
[84/250] [0/3]	Loss_D: 0.3154	Loss_G: 4.4272	D(x): 0.8110	D(G(z)): 0.0444
/ 0.0254				
[85/250] [0/3]	Loss_D: 0.4147	Loss_G: 4.9596	D(x): 0.8120	D(G(z)): 0.1045
/ 0.0228				
[86/250] [0/3]	Loss_D: 0.7031	Loss_G: 3.8483	D(x): 0.6423	D(G(z)): 0.0913
/ 0.0505				
[87/250] [0/3]	Loss_D: 0.2803	Loss_G: 5.0093	D(x): 0.8835	D(G(z)): 0.1068
/ 0.0184				
[88/250] [0/3]	Loss_D: 0.9818	Loss_G: 10.9148	D(x): 0.9386	D(G(z)): 0.5014
/ 0.0012				
[89/250] [0/3]	Loss_D: 1.0475	Loss_G: 9.0507	D(x): 0.9885	D(G(z)): 0.5040
/ 0.0010				
[90/250] [0/3]	Loss_D: 0.4073	Loss_G: 4.0597	D(x): 0.9457	D(G(z)): 0.2304
/ 0.0480				
[91/250] [0/3]	Loss_D: 0.5009	Loss_G: 3.1146	D(x): 0.8772	D(G(z)): 0.2174
/ 0.1189				
[92/250] [0/3]	Loss_D: 0.5604	Loss_G: 3.0755	D(x): 0.8214	D(G(z)): 0.1890
/ 0.1262				
[93/250] [0/3]	Loss_D: 0.4291	Loss_G: 3.4143	D(x): 0.7479	D(G(z)): 0.0256
/ 0.0548				
[94/250] [0/3]	Loss_D: 0.4881	Loss_G: 5.3972	D(x): 0.7337	D(G(z)): 0.0279
/ 0.0106				
[95/250] [0/3]	Loss_D: 0.6098	Loss_G: 5.3489	D(x): 0.7409	D(G(z)): 0.0582
/ 0.0174				
[96/250] [0/3]	Loss_D: 0.7354	Loss_G: 4.8344	D(x): 0.6660	D(G(z)): 0.0837
/ 0.0286				
[97/250] [0/3]	Loss_D: 0.4381	Loss_G: 5.8484	D(x): 0.8860	D(G(z)): 0.1800
/ 0.0167				
[98/250] [0/3]	Loss_D: 0.4150	Loss_G: 5.4710	D(x): 0.8756	D(G(z)): 0.1774
/ 0.0158				
[99/250] [0/3]	Loss_D: 1.7770	Loss_G: 2.7225	D(x): 0.3186	D(G(z)): 0.0112
/ 0.1088				
[100/250] [0/3]	Loss_D: 0.2230	Loss_G: 5.8946	D(x): 0.8541	D(G(z)): 0.0272
/ 0.0164				
[101/250] [0/3]	Loss_D: 0.4068	Loss_G: 5.4299	D(x): 0.8718	D(G(z)): 0.1515
/ 0.0147				

[102/250] [0/3]	Loss_D: 1.2124	Loss_G: 3.3231	D(x): 0.4866	D(G(z)): 0.0450
/ 0.0936				
[103/250] [0/3]	Loss_D: 0.4368	Loss_G: 3.6302	D(x): 0.8212	D(G(z)): 0.1356
/ 0.0510				
[104/250] [0/3]	Loss_D: 0.4218	Loss_G: 3.4412	D(x): 0.7887	D(G(z)): 0.0868
/ 0.0555				
[105/250] [0/3]	Loss_D: 0.7713	Loss_G: 6.8803	D(x): 0.9813	D(G(z)): 0.4308
/ 0.0028				
[106/250] [0/3]	Loss_D: 0.1360	Loss_G: 4.4621	D(x): 0.9550	D(G(z)): 0.0718
/ 0.0273				
[107/250] [0/3]	Loss_D: 0.5086	Loss_G: 4.0548	D(x): 0.7426	D(G(z)): 0.0630
/ 0.0447				
[108/250] [0/3]	Loss_D: 0.5573	Loss_G: 4.4235	D(x): 0.8782	D(G(z)): 0.2485
/ 0.0568				
[109/250] [0/3]	Loss_D: 0.5350	Loss_G: 5.7838	D(x): 0.8706	D(G(z)): 0.2284
/ 0.0249				
[110/250] [0/3]	Loss_D: 1.0344	Loss_G: 10.0639	D(x): 0.9160	D(G(z)): 0.4593
/ 0.0029				
[111/250] [0/3]	Loss_D: 0.7255	Loss_G: 5.8867	D(x): 0.9713	D(G(z)): 0.4087
/ 0.0214				
[112/250] [0/3]	Loss_D: 0.3033	Loss_G: 4.4570	D(x): 0.9526	D(G(z)): 0.1835
/ 0.0354				
[113/250] [0/3]	Loss_D: 0.3186	Loss_G: 3.7959	D(x): 0.8894	D(G(z)): 0.1266
/ 0.0662				
[114/250] [0/3]	Loss_D: 0.3376	Loss_G: 4.7761	D(x): 0.9104	D(G(z)): 0.1817
/ 0.0185				
[115/250] [0/3]	Loss_D: 0.3145	Loss_G: 4.5980	D(x): 0.8704	D(G(z)): 0.1310
/ 0.0249				
[116/250] [0/3]	Loss_D: 0.4081	Loss_G: 6.8103	D(x): 0.9342	D(G(z)): 0.2398
/ 0.0061				
[117/250] [0/3]	Loss_D: 0.3527	Loss_G: 6.2772	D(x): 0.8928	D(G(z)): 0.1691
/ 0.0109				
[118/250] [0/3]	Loss_D: 0.3827	Loss_G: 4.7164	D(x): 0.7758	D(G(z)): 0.0304
/ 0.0233				
[119/250] [0/3]	Loss_D: 0.2817	Loss_G: 7.1545	D(x): 0.9494	D(G(z)): 0.1674
/ 0.0036				
[120/250] [0/3]	Loss_D: 0.7471	Loss_G: 1.1693	D(x): 0.6514	D(G(z)): 0.1070
/ 0.4006				
[121/250] [0/3]	Loss_D: 0.6642	Loss_G: 2.4227	D(x): 0.6213	D(G(z)): 0.0074
/ 0.1989				
[122/250] [0/3]	Loss_D: 0.7567	Loss_G: 5.4782	D(x): 0.6382	D(G(z)): 0.0390
/ 0.0305				
[123/250] [0/3]	Loss_D: 1.0091	Loss_G: 3.6760	D(x): 0.5315	D(G(z)): 0.1057
/ 0.0942				
[124/250] [0/3]	Loss_D: 0.5430	Loss_G: 3.5862	D(x): 0.7048	D(G(z)): 0.0724
/ 0.0654				
[125/250] [0/3]	Loss_D: 0.4691	Loss_G: 4.2857	D(x): 0.8571	D(G(z)): 0.1811
/ 0.0582				

[126/250] [0/3]	Loss_D: 0.7769	Loss_G: 5.9659	D(x): 0.8344	D(G(z)): 0.3248
/ 0.0248				
[127/250] [0/3]	Loss_D: 0.4613	Loss_G: 4.3768	D(x): 0.7739	D(G(z)): 0.0940
/ 0.0415				
[128/250] [0/3]	Loss_D: 0.9295	Loss_G: 9.8537	D(x): 0.9499	D(G(z)): 0.4805
/ 0.0029				
[129/250] [0/3]	Loss_D: 0.3158	Loss_G: 5.9109	D(x): 0.9375	D(G(z)): 0.1642
/ 0.0185				
[130/250] [0/3]	Loss_D: 0.7808	Loss_G: 5.5321	D(x): 0.9552	D(G(z)): 0.3922
/ 0.0167				
[131/250] [0/3]	Loss_D: 0.4477	Loss_G: 3.6698	D(x): 0.9340	D(G(z)): 0.2640
/ 0.0512				
[132/250] [0/3]	Loss_D: 0.2919	Loss_G: 3.5425	D(x): 0.9014	D(G(z)): 0.1240
/ 0.0566				
[133/250] [0/3]	Loss_D: 0.3444	Loss_G: 4.3210	D(x): 0.8701	D(G(z)): 0.1105
/ 0.0384				
[134/250] [0/3]	Loss_D: 0.2515	Loss_G: 4.7949	D(x): 0.8930	D(G(z)): 0.0991
/ 0.0260				
[135/250] [0/3]	Loss_D: 0.3727	Loss_G: 5.4150	D(x): 0.8827	D(G(z)): 0.1694
/ 0.0143				
[136/250] [0/3]	Loss_D: 1.0293	Loss_G: 2.8918	D(x): 0.5119	D(G(z)): 0.0411
/ 0.1372				
[137/250] [0/3]	Loss_D: 0.4617	Loss_G: 9.7105	D(x): 0.6997	D(G(z)): 0.0012
/ 0.0019				
[138/250] [0/3]	Loss_D: 0.2054	Loss_G: 7.3650	D(x): 0.9423	D(G(z)): 0.1143
/ 0.0039				
[139/250] [0/3]	Loss_D: 1.2324	Loss_G: 9.1017	D(x): 0.9649	D(G(z)): 0.5762
/ 0.0043				
[140/250] [0/3]	Loss_D: 0.9008	Loss_G: 5.4085	D(x): 0.8045	D(G(z)): 0.3196
/ 0.0457				
[141/250] [0/3]	Loss_D: 0.6001	Loss_G: 5.5613	D(x): 0.8508	D(G(z)): 0.2399
/ 0.0176				
[142/250] [0/3]	Loss_D: 1.5008	Loss_G: 1.7821	D(x): 0.3738	D(G(z)): 0.0222
/ 0.2753				
[143/250] [0/3]	Loss_D: 0.4378	Loss_G: 3.7245	D(x): 0.8323	D(G(z)): 0.1328
/ 0.1011				
[144/250] [0/3]	Loss_D: 1.0402	Loss_G: 6.6818	D(x): 0.9186	D(G(z)): 0.4265
/ 0.0173				
[145/250] [0/3]	Loss_D: 0.5316	Loss_G: 5.7911	D(x): 0.8405	D(G(z)): 0.2099
/ 0.0126				
[146/250] [0/3]	Loss_D: 0.6671	Loss_G: 5.2771	D(x): 0.6559	D(G(z)): 0.0219
/ 0.0278				
[147/250] [0/3]	Loss_D: 0.2001	Loss_G: 5.8316	D(x): 0.9336	D(G(z)): 0.0890
/ 0.0136				
[148/250] [0/3]	Loss_D: 0.9203	Loss_G: 0.3925	D(x): 0.5347	D(G(z)): 0.0223
/ 0.7525				
[149/250] [0/3]	Loss_D: 0.6435	Loss_G: 3.8992	D(x): 0.6621	D(G(z)): 0.0216
/ 0.0970				

[150/250] [0/3]	Loss_D: 0.6336	Loss_G: 4.4359	D(x): 0.6793	D(G(z)): 0.0645
/ 0.0301				
[151/250] [0/3]	Loss_D: 0.5213	Loss_G: 3.5219	D(x): 0.8116	D(G(z)): 0.1635
/ 0.0837				
[152/250] [0/3]	Loss_D: 0.3884	Loss_G: 4.1249	D(x): 0.8696	D(G(z)): 0.1723
/ 0.0342				
[153/250] [0/3]	Loss_D: 0.5135	Loss_G: 4.2336	D(x): 0.8214	D(G(z)): 0.1956
/ 0.0429				
[154/250] [0/3]	Loss_D: 1.0720	Loss_G: 9.1488	D(x): 0.9360	D(G(z)): 0.5186
/ 0.0008				
[155/250] [0/3]	Loss_D: 0.2452	Loss_G: 7.7967	D(x): 0.9651	D(G(z)): 0.1404
/ 0.0034				
[156/250] [0/3]	Loss_D: 0.4694	Loss_G: 4.8104	D(x): 0.9688	D(G(z)): 0.3024
/ 0.0268				
[157/250] [0/3]	Loss_D: 0.6080	Loss_G: 4.3873	D(x): 0.8531	D(G(z)): 0.2681
/ 0.0371				
[158/250] [0/3]	Loss_D: 0.6819	Loss_G: 4.1846	D(x): 0.7317	D(G(z)): 0.1934
/ 0.0449				
[159/250] [0/3]	Loss_D: 0.3766	Loss_G: 4.3479	D(x): 0.8561	D(G(z)): 0.1466
/ 0.0312				
[160/250] [0/3]	Loss_D: 0.2492	Loss_G: 5.4167	D(x): 0.9229	D(G(z)): 0.1274
/ 0.0141				
[161/250] [0/3]	Loss_D: 0.3172	Loss_G: 5.5650	D(x): 0.8801	D(G(z)): 0.1487
/ 0.0107				
[162/250] [0/3]	Loss_D: 1.1488	Loss_G: 2.1522	D(x): 0.4462	D(G(z)): 0.0292
/ 0.1886				
[163/250] [0/3]	Loss_D: 0.1420	Loss_G: 5.6706	D(x): 0.9404	D(G(z)): 0.0435
/ 0.0727				
[164/250] [0/3]	Loss_D: 0.3246	Loss_G: 5.9843	D(x): 0.8200	D(G(z)): 0.0525
/ 0.0089				
[165/250] [0/3]	Loss_D: 0.4362	Loss_G: 5.7279	D(x): 0.8022	D(G(z)): 0.1017
/ 0.0215				
[166/250] [0/3]	Loss_D: 0.5214	Loss_G: 6.0574	D(x): 0.9262	D(G(z)): 0.3105
/ 0.0150				
[167/250] [0/3]	Loss_D: 0.5739	Loss_G: 6.4151	D(x): 0.8918	D(G(z)): 0.3021
/ 0.0046				
[168/250] [0/3]	Loss_D: 1.3439	Loss_G: 4.4579	D(x): 0.4768	D(G(z)): 0.0324
/ 0.0684				
[169/250] [0/3]	Loss_D: 0.6682	Loss_G: 5.1529	D(x): 0.6451	D(G(z)): 0.0254
/ 0.0303				
[170/250] [0/3]	Loss_D: 0.6643	Loss_G: 4.2442	D(x): 0.6881	D(G(z)): 0.1110
/ 0.0399				
[171/250] [0/3]	Loss_D: 0.5246	Loss_G: 3.6840	D(x): 0.7003	D(G(z)): 0.0774
/ 0.0540				
[172/250] [0/3]	Loss_D: 0.4887	Loss_G: 5.6657	D(x): 0.9633	D(G(z)): 0.3192
/ 0.0116				
[173/250] [0/3]	Loss_D: 0.3809	Loss_G: 3.9935	D(x): 0.8272	D(G(z)): 0.0974
/ 0.0512				

[174/250] [0/3]	Loss_D: 0.5523	Loss_G: 5.8283	D(x): 0.9438	D(G(z)): 0.3089
/ 0.0118				
[175/250] [0/3]	Loss_D: 0.4358	Loss_G: 4.8038	D(x): 0.8416	D(G(z)): 0.1716
/ 0.0320				
[176/250] [0/3]	Loss_D: 0.9609	Loss_G: 8.8921	D(x): 0.9619	D(G(z)): 0.4932
/ 0.0020				
[177/250] [0/3]	Loss_D: 0.6407	Loss_G: 7.3697	D(x): 0.9849	D(G(z)): 0.3949
/ 0.0023				
[178/250] [0/3]	Loss_D: 0.2818	Loss_G: 7.0434	D(x): 0.9476	D(G(z)): 0.1510
/ 0.0052				
[179/250] [0/3]	Loss_D: 0.3801	Loss_G: 5.6788	D(x): 0.8495	D(G(z)): 0.1366
/ 0.0070				
[180/250] [0/3]	Loss_D: 0.2152	Loss_G: 6.3986	D(x): 0.8846	D(G(z)): 0.0579
/ 0.0156				
[181/250] [0/3]	Loss_D: 0.3377	Loss_G: 5.6993	D(x): 0.8311	D(G(z)): 0.0931
/ 0.0070				
[182/250] [0/3]	Loss_D: 2.7763	Loss_G: 3.0235	D(x): 0.2001	D(G(z)): 0.0146
/ 0.2183				
[183/250] [0/3]	Loss_D: 0.1817	Loss_G: 9.6626	D(x): 0.8711	D(G(z)): 0.0086
/ 0.0010				
[184/250] [0/3]	Loss_D: 1.2744	Loss_G: 6.9559	D(x): 0.9807	D(G(z)): 0.5851
/ 0.0117				
[185/250] [0/3]	Loss_D: 1.2228	Loss_G: 6.5236	D(x): 0.8863	D(G(z)): 0.4862
/ 0.0354				
[186/250] [0/3]	Loss_D: 0.6162	Loss_G: 5.4048	D(x): 0.7844	D(G(z)): 0.1898
/ 0.0138				
[187/250] [0/3]	Loss_D: 0.6152	Loss_G: 6.2847	D(x): 0.8761	D(G(z)): 0.3045
/ 0.0075				
[188/250] [0/3]	Loss_D: 0.2271	Loss_G: 6.7987	D(x): 0.9362	D(G(z)): 0.1243
/ 0.0086				
[189/250] [0/3]	Loss_D: 0.3188	Loss_G: 6.8439	D(x): 0.9105	D(G(z)): 0.1615
/ 0.0043				
[190/250] [0/3]	Loss_D: 3.2972	Loss_G: 6.9539	D(x): 0.1356	D(G(z)): 0.0020
/ 0.0132				
[191/250] [0/3]	Loss_D: 0.4225	Loss_G: 3.9494	D(x): 0.9629	D(G(z)): 0.2629
/ 0.0502				
[192/250] [0/3]	Loss_D: 0.4420	Loss_G: 2.2460	D(x): 0.8422	D(G(z)): 0.1852
/ 0.1672				
[193/250] [0/3]	Loss_D: 0.5618	Loss_G: 2.6812	D(x): 0.8370	D(G(z)): 0.2298
/ 0.1382				
[194/250] [0/3]	Loss_D: 1.0651	Loss_G: 4.8376	D(x): 0.9457	D(G(z)): 0.5285
/ 0.0294				
[195/250] [0/3]	Loss_D: 0.4505	Loss_G: 3.7593	D(x): 0.9132	D(G(z)): 0.2500
/ 0.0514				
[196/250] [0/3]	Loss_D: 0.4289	Loss_G: 3.2155	D(x): 0.8708	D(G(z)): 0.1942
/ 0.0799				
[197/250] [0/3]	Loss_D: 0.5511	Loss_G: 5.1845	D(x): 0.9552	D(G(z)): 0.3425
/ 0.0227				

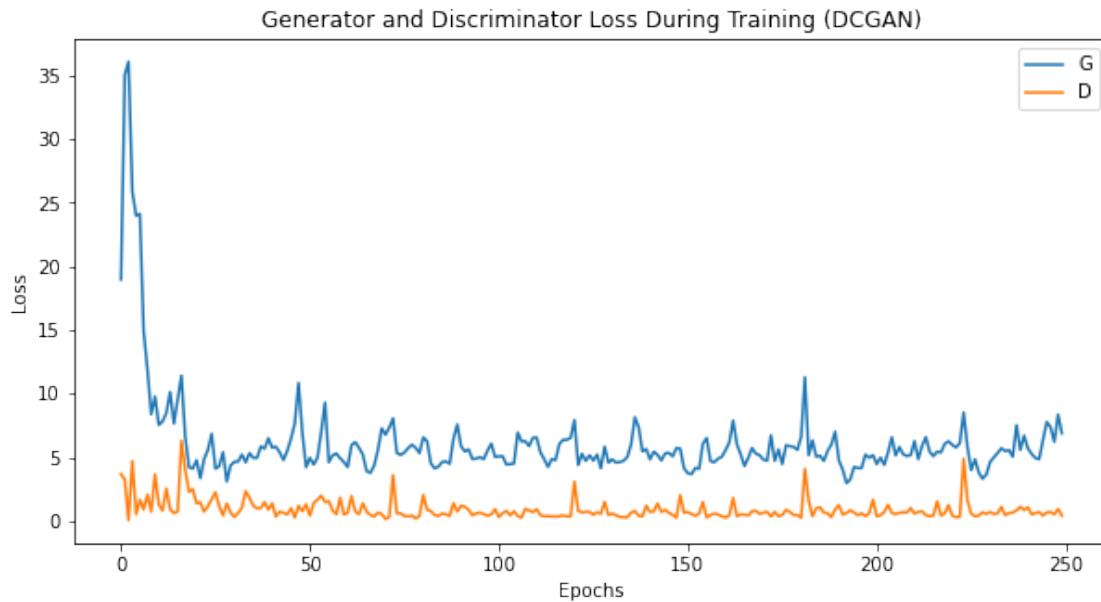
[198/250] [0/3]	Loss_D: 0.4659	Loss_G: 5.0735	D(x): 0.8885	D(G(z)): 0.2427
/ 0.0214				
[199/250] [0/3]	Loss_D: 1.3457	Loss_G: 1.0689	D(x): 0.4204	D(G(z)): 0.0583
/ 0.4976				
[200/250] [0/3]	Loss_D: 0.2249	Loss_G: 2.9407	D(x): 0.8890	D(G(z)): 0.0662
/ 0.1330				
[201/250] [0/3]	Loss_D: 0.2757	Loss_G: 5.8165	D(x): 0.8732	D(G(z)): 0.0709
/ 0.0169				
[202/250] [0/3]	Loss_D: 0.8292	Loss_G: 3.5660	D(x): 0.6412	D(G(z)): 0.1739
/ 0.0804				
[203/250] [0/3]	Loss_D: 0.6354	Loss_G: 2.8284	D(x): 0.6803	D(G(z)): 0.1097
/ 0.1181				
[204/250] [0/3]	Loss_D: 0.3268	Loss_G: 3.1272	D(x): 0.9267	D(G(z)): 0.1801
/ 0.1049				
[205/250] [0/3]	Loss_D: 0.6384	Loss_G: 5.7742	D(x): 0.6806	D(G(z)): 0.0443
/ 0.0406				
[206/250] [0/3]	Loss_D: 0.4392	Loss_G: 6.8163	D(x): 0.8364	D(G(z)): 0.1546
/ 0.0044				
[207/250] [0/3]	Loss_D: 0.6370	Loss_G: 5.3221	D(x): 0.7223	D(G(z)): 0.1529
/ 0.0227				
[208/250] [0/3]	Loss_D: 0.7208	Loss_G: 3.6873	D(x): 0.6388	D(G(z)): 0.0847
/ 0.0657				
[209/250] [0/3]	Loss_D: 0.6029	Loss_G: 3.8371	D(x): 0.6847	D(G(z)): 0.0908
/ 0.0764				
[210/250] [0/3]	Loss_D: 0.9836	Loss_G: 6.8680	D(x): 0.9761	D(G(z)): 0.5032
/ 0.0093				
[211/250] [0/3]	Loss_D: 0.4112	Loss_G: 4.5773	D(x): 0.9085	D(G(z)): 0.2044
/ 0.0310				
[212/250] [0/3]	Loss_D: 1.0027	Loss_G: 8.0350	D(x): 0.9403	D(G(z)): 0.5131
/ 0.0070				
[213/250] [0/3]	Loss_D: 0.6473	Loss_G: 7.4707	D(x): 0.9633	D(G(z)): 0.3765
/ 0.0033				
[214/250] [0/3]	Loss_D: 0.4986	Loss_G: 5.5127	D(x): 0.9562	D(G(z)): 0.2930
/ 0.0155				
[215/250] [0/3]	Loss_D: 0.3638	Loss_G: 5.4027	D(x): 0.9405	D(G(z)): 0.2136
/ 0.0172				
[216/250] [0/3]	Loss_D: 1.0094	Loss_G: 8.9599	D(x): 0.9100	D(G(z)): 0.5123
/ 0.0006				
[217/250] [0/3]	Loss_D: 0.4424	Loss_G: 5.7718	D(x): 0.8898	D(G(z)): 0.2038
/ 0.0183				
[218/250] [0/3]	Loss_D: 0.4357	Loss_G: 5.6612	D(x): 0.9356	D(G(z)): 0.2207
/ 0.0152				
[219/250] [0/3]	Loss_D: 1.2007	Loss_G: 2.3255	D(x): 0.4945	D(G(z)): 0.1245
/ 0.2255				
[220/250] [0/3]	Loss_D: 0.2048	Loss_G: 5.7348	D(x): 0.8808	D(G(z)): 0.0377
/ 0.0535				
[221/250] [0/3]	Loss_D: 0.3479	Loss_G: 7.4913	D(x): 0.8130	D(G(z)): 0.0317
/ 0.0017				

[222/250] [0/3]	Loss_D: 0.4076	Loss_G: 6.4598	D(x): 0.9482	D(G(z)): 0.2540
/ 0.0077				
[223/250] [0/3]	Loss_D: 1.6634	Loss_G: 15.3365	D(x): 0.9336	D(G(z)): 0.6730
/ 0.0001				
[224/250] [0/3]	Loss_D: 2.6829	Loss_G: 2.2109	D(x): 0.9820	D(G(z)): 0.7841
/ 0.2807				
[225/250] [0/3]	Loss_D: 0.7882	Loss_G: 5.6871	D(x): 0.6254	D(G(z)): 0.0097
/ 0.0439				
[226/250] [0/3]	Loss_D: 0.3770	Loss_G: 4.9199	D(x): 0.9670	D(G(z)): 0.2415
/ 0.0195				
[227/250] [0/3]	Loss_D: 0.3550	Loss_G: 2.8251	D(x): 0.8611	D(G(z)): 0.1395
/ 0.1028				
[228/250] [0/3]	Loss_D: 0.6517	Loss_G: 2.9155	D(x): 0.6844	D(G(z)): 0.1105
/ 0.0875				
[229/250] [0/3]	Loss_D: 0.6222	Loss_G: 3.5503	D(x): 0.7407	D(G(z)): 0.1857
/ 0.0626				
[230/250] [0/3]	Loss_D: 0.4953	Loss_G: 4.7988	D(x): 0.8803	D(G(z)): 0.2553
/ 0.0213				
[231/250] [0/3]	Loss_D: 0.8204	Loss_G: 3.9202	D(x): 0.5450	D(G(z)): 0.0336
/ 0.0462				
[232/250] [0/3]	Loss_D: 0.4347	Loss_G: 4.9614	D(x): 0.7601	D(G(z)): 0.0685
/ 0.0263				
[233/250] [0/3]	Loss_D: 1.1025	Loss_G: 2.2157	D(x): 0.4435	D(G(z)): 0.0278
/ 0.1902				
[234/250] [0/3]	Loss_D: 0.3273	Loss_G: 4.2867	D(x): 0.8402	D(G(z)): 0.0714
/ 0.0753				
[235/250] [0/3]	Loss_D: 0.5496	Loss_G: 5.4820	D(x): 0.7066	D(G(z)): 0.0591
/ 0.0287				
[236/250] [0/3]	Loss_D: 0.6875	Loss_G: 4.5180	D(x): 0.6222	D(G(z)): 0.0543
/ 0.0253				
[237/250] [0/3]	Loss_D: 0.5439	Loss_G: 7.7744	D(x): 0.8910	D(G(z)): 0.2739
/ 0.0045				
[238/250] [0/3]	Loss_D: 2.2231	Loss_G: 4.9462	D(x): 0.2363	D(G(z)): 0.0097
/ 0.0287				
[239/250] [0/3]	Loss_D: 0.5194	Loss_G: 6.7990	D(x): 0.8981	D(G(z)): 0.2533
/ 0.0050				
[240/250] [0/3]	Loss_D: 1.8050	Loss_G: 4.0285	D(x): 0.3217	D(G(z)): 0.0202
/ 0.0752				
[241/250] [0/3]	Loss_D: 0.4019	Loss_G: 5.4087	D(x): 0.8121	D(G(z)): 0.1024
/ 0.0178				
[242/250] [0/3]	Loss_D: 0.5752	Loss_G: 5.0325	D(x): 0.7692	D(G(z)): 0.1830
/ 0.0173				
[243/250] [0/3]	Loss_D: 0.5602	Loss_G: 4.8290	D(x): 0.8031	D(G(z)): 0.2063
/ 0.0192				
[244/250] [0/3]	Loss_D: 0.4787	Loss_G: 6.6419	D(x): 0.8838	D(G(z)): 0.2461
/ 0.0059				
[245/250] [0/3]	Loss_D: 0.6295	Loss_G: 7.5971	D(x): 0.8290	D(G(z)): 0.2913
/ 0.0029				

```
[246/250] [0/3]  Loss_D: 1.1236  Loss_G: 6.2432  D(x): 0.4602    D(G(z)): 0.0120
/ 0.0073
[247/250] [0/3]  Loss_D: 0.3207  Loss_G: 6.3007  D(x): 0.8920    D(G(z)): 0.1471
/ 0.0118
[248/250] [0/3]  Loss_D: 1.0424  Loss_G: 11.4888 D(x): 0.9426    D(G(z)): 0.5168
/ 0.0018
[249/250] [0/3]  Loss_D: 0.5857  Loss_G: 7.6134  D(x): 0.9708    D(G(z)): 0.3098
/ 0.0020
```

## 26 Plot generator and discriminator losses for DCGAN

```
[38]: plt.figure(figsize=(10, 5))
plt.title("Generator and Discriminator Loss During Training (DCGAN)")
plt.plot(G_losses_best_dcgan, label="G")
plt.plot(D_losses_best_dcgan, label="D")
plt.xlabel("Epochs")
plt.ylabel("Loss")
plt.legend()
plt.show()
```



## 27 Image Generation from Noise

```
[33]: # Load the diffusion model and DCGAN model weights
def load_model_weights(model, model_path):
    model.load_state_dict(torch.load(model_path, map_location=device))
```

```

    return model

# Generate images using the models
def generate_diffusion_images(model, diffusion_model, num_images):
    noise = torch.randn(num_images, nc, image_size, image_size, device=device)
    with torch.no_grad():
        generated_images = diffusion_model.sample(noise)
    return generated_images

def generate_dcgan_images(generator, num_images, nz):
    noise = torch.randn(num_images, nz, 1, 1, device=device)
    with torch.no_grad():
        generated_images = generator(noise).detach().cpu()
    return generated_images

# Display generated images
def display_images(images, title):
    plt.figure(figsize=(8, 8))
    plt.axis("off")
    plt.title(title)
    plt.imshow(np.transpose(vutils.make_grid(images, padding=2, normalize=True).
    ↵cpu(), (1, 2, 0)))
    plt.show()

diffusion_model_paths = [os.path.join('diffusion_models', f) for f in os.
    ↵listdir('diffusion_models') if f.endswith('.pth')]
dcgan_generator_paths = [os.path.join('dc_gans_models', f) for f in os.
    ↵listdir('dc_gans_models') if 'netG' in f]

num_images = 64 # Number of images to generate
nz = 100 # Latent vector size for DCGAN

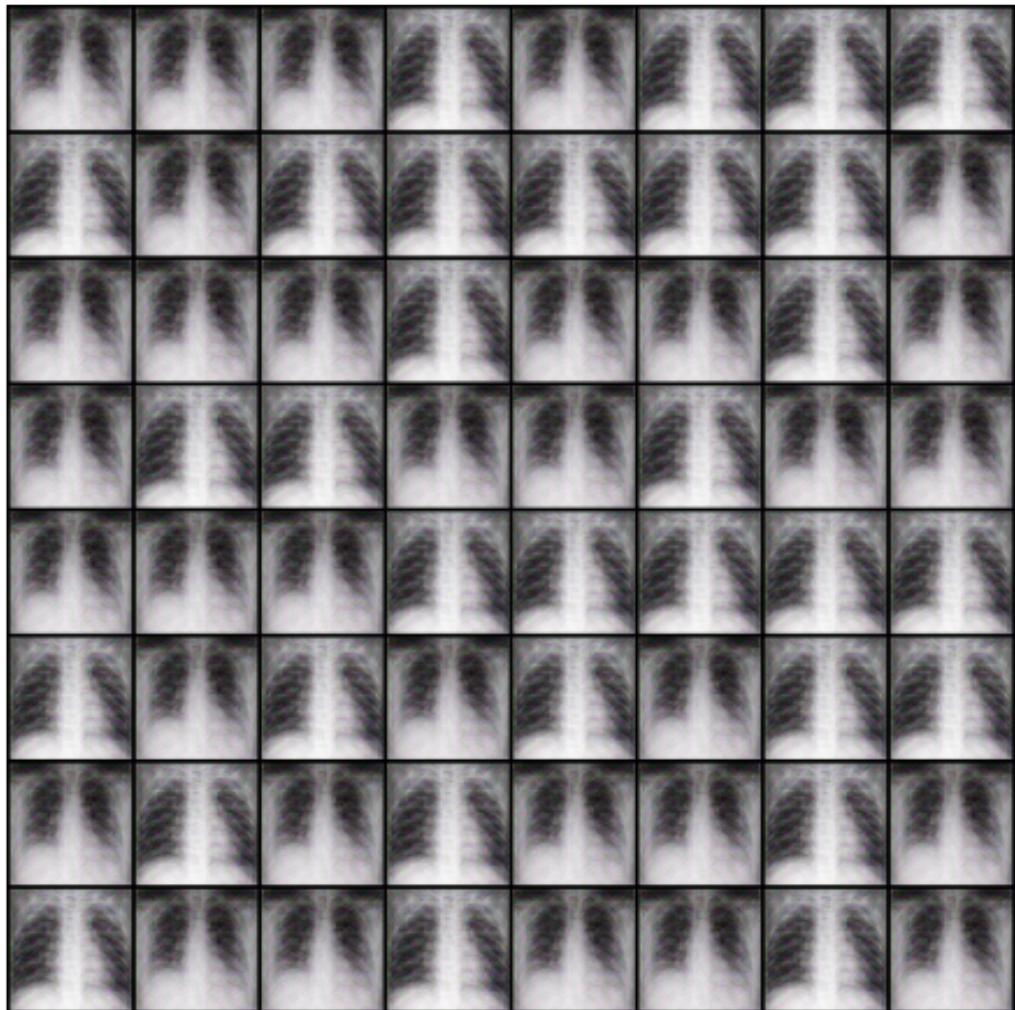
# Generate images using Diffusion Model
for model_path in diffusion_model_paths:
    model = UNet().to(device)
    diffusion_model = DiffusionModel(model)
    model = load_model_weights(model, model_path)
    generated_images = generate_diffusion_images(model, diffusion_model,
    ↵num_images)
    display_images(generated_images, f'Generated Images - Diffusion Model_{model_path}')

# Generate images using DCGAN
for model_path in dcgan_generator_paths:
    generator = Generator(ngpu).to(device)
    generator = load_model_weights(generator, model_path)
    generated_images = generate_dcgan_images(generator, num_images, nz)

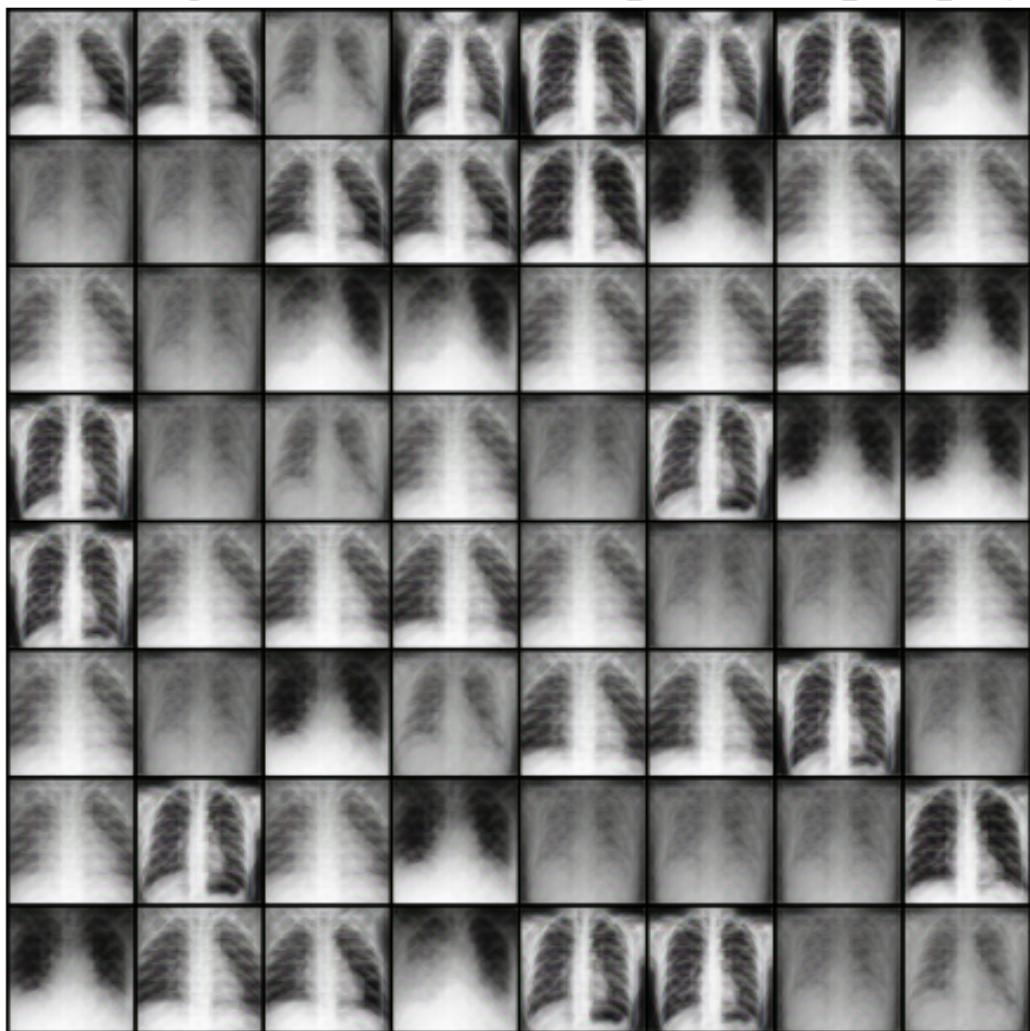
```

```
display_images(generated_images, f'Generated Images - DCGAN Generator  
→({model_path})')
```

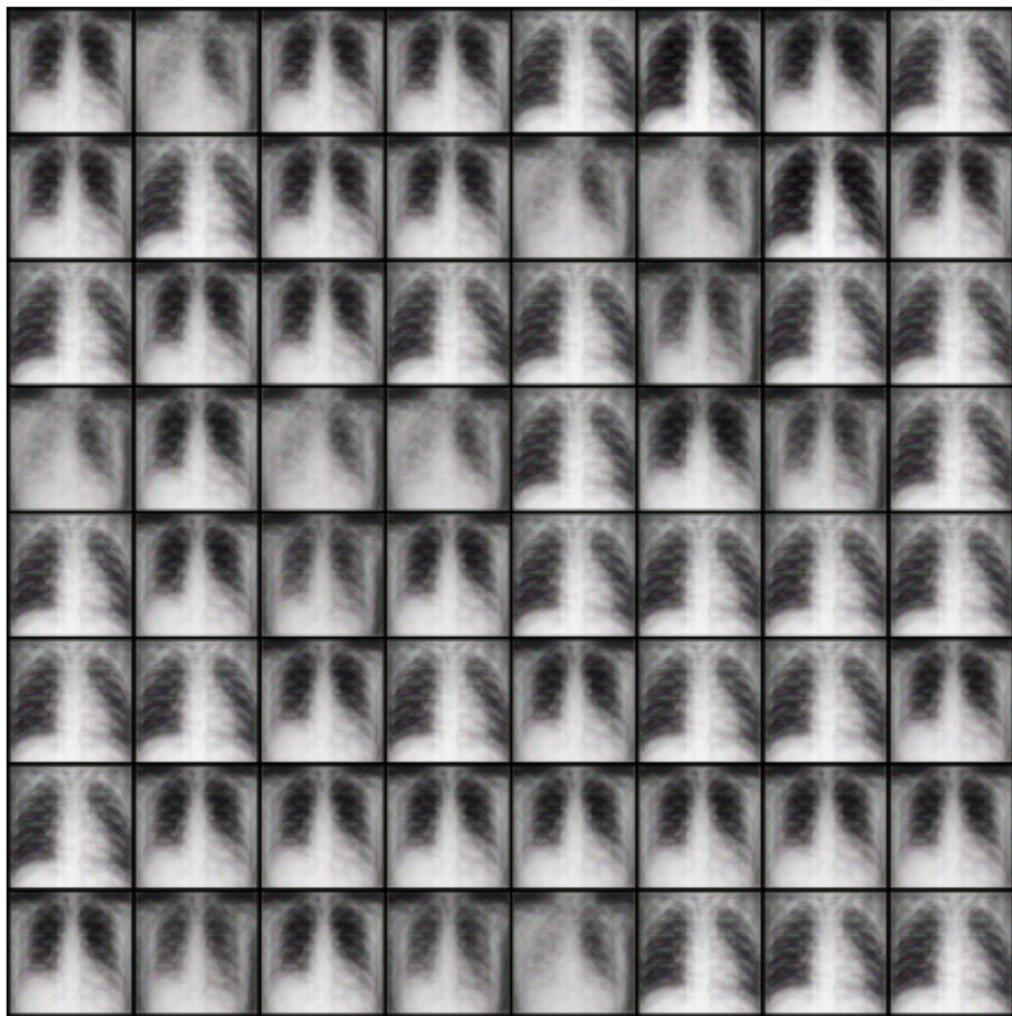
Generated Images - Diffusion Model (diffusion\_models/model\_0.0001\_0.5.pth)



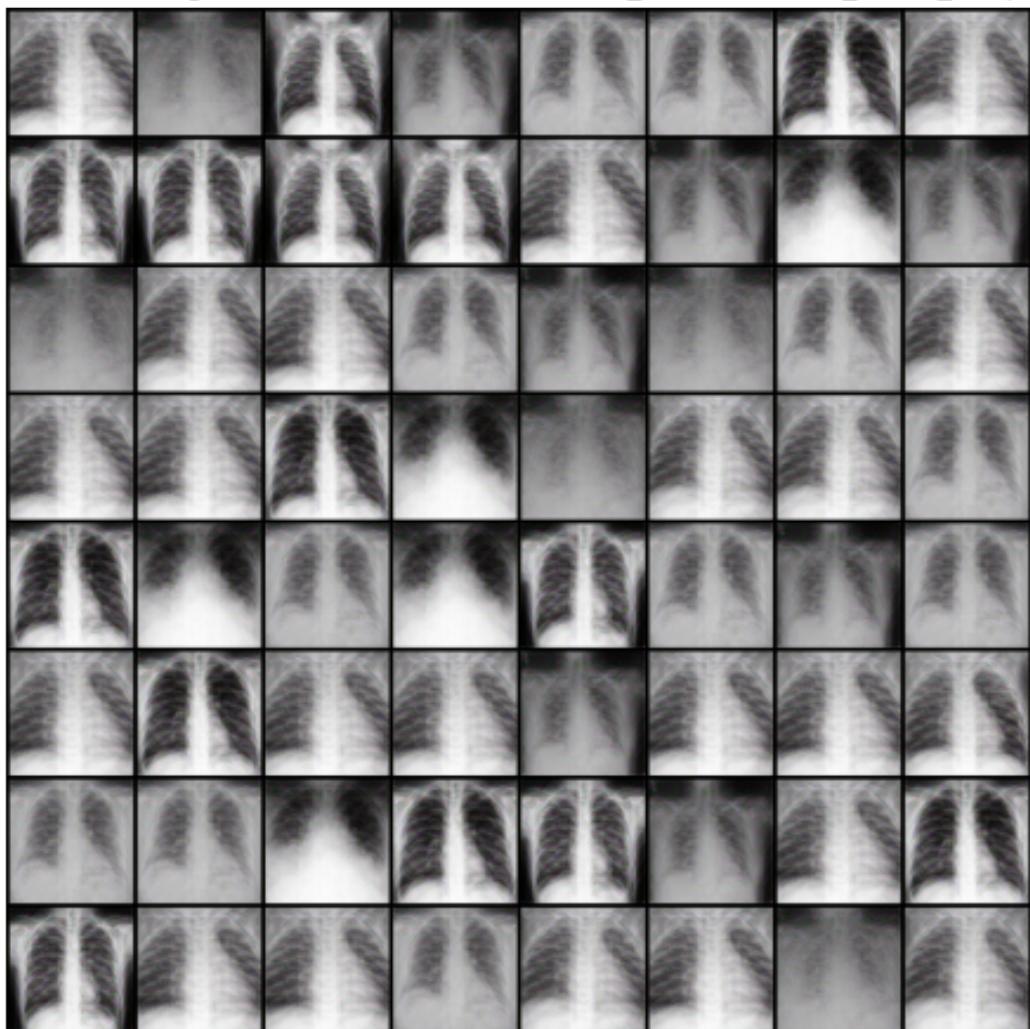
Generated Images - Diffusion Model (diffusion\_models/model\_0.001\_0.7.pth)



Generated Images - Diffusion Model (diffusion\_models/model\_0.0001\_0.7.pth)



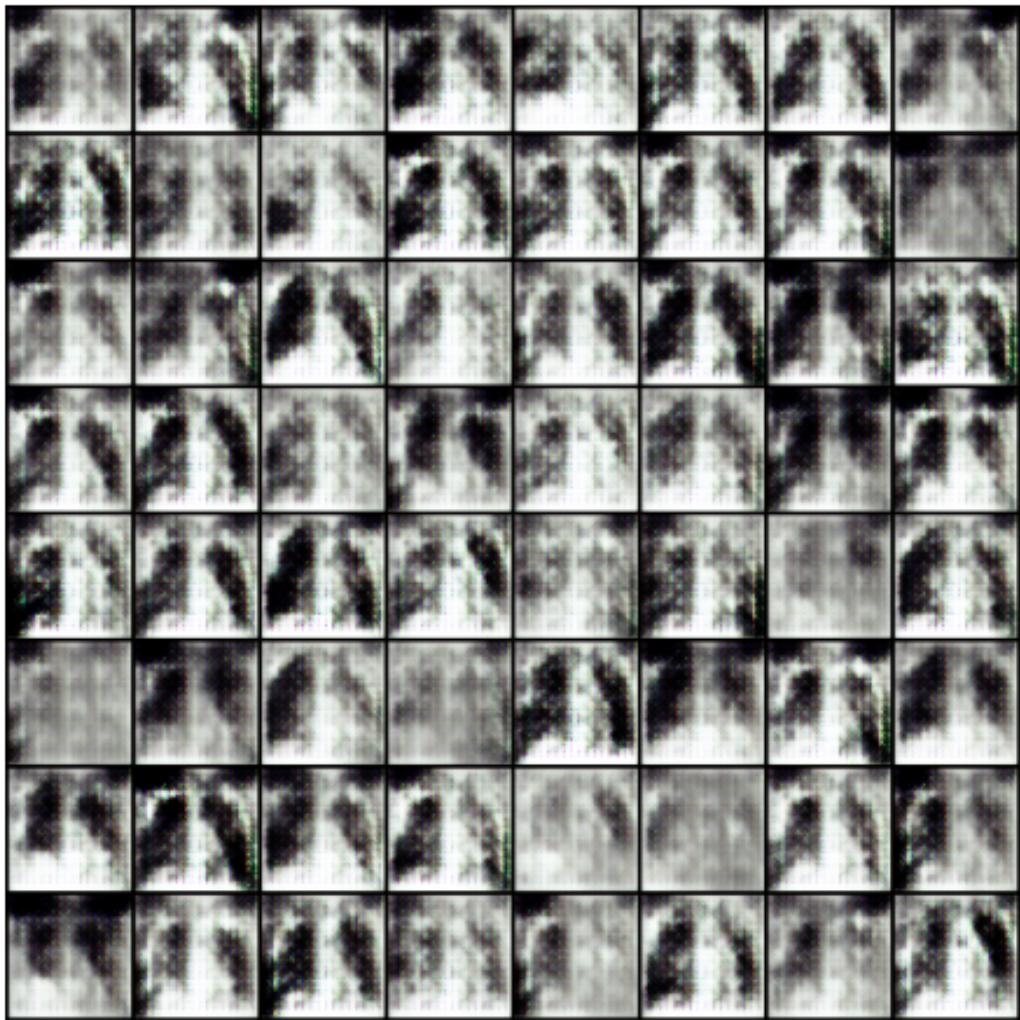
Generated Images - Diffusion Model (diffusion\_models/model\_0.001\_0.5.pth)



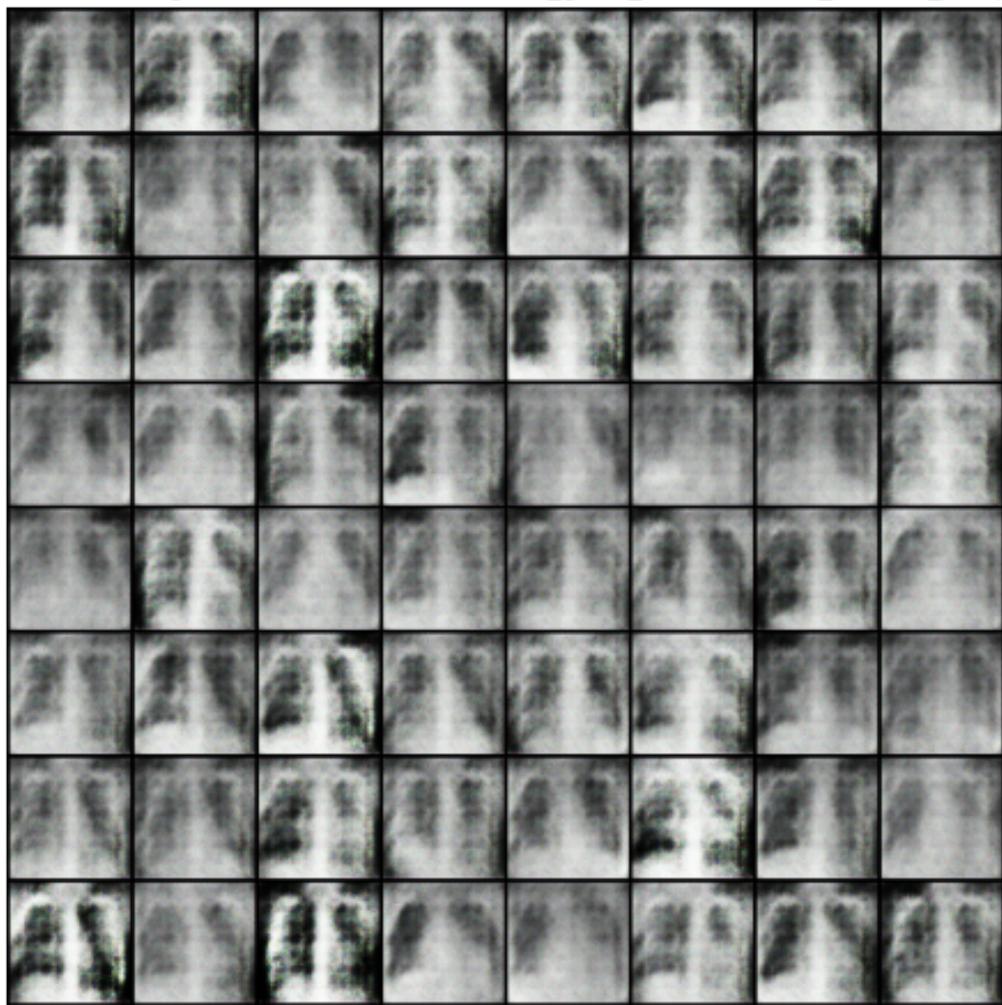
Generated Images - DCGAN Generator (dc\_gans\_models/netG\_0.0001\_0.7.pth)



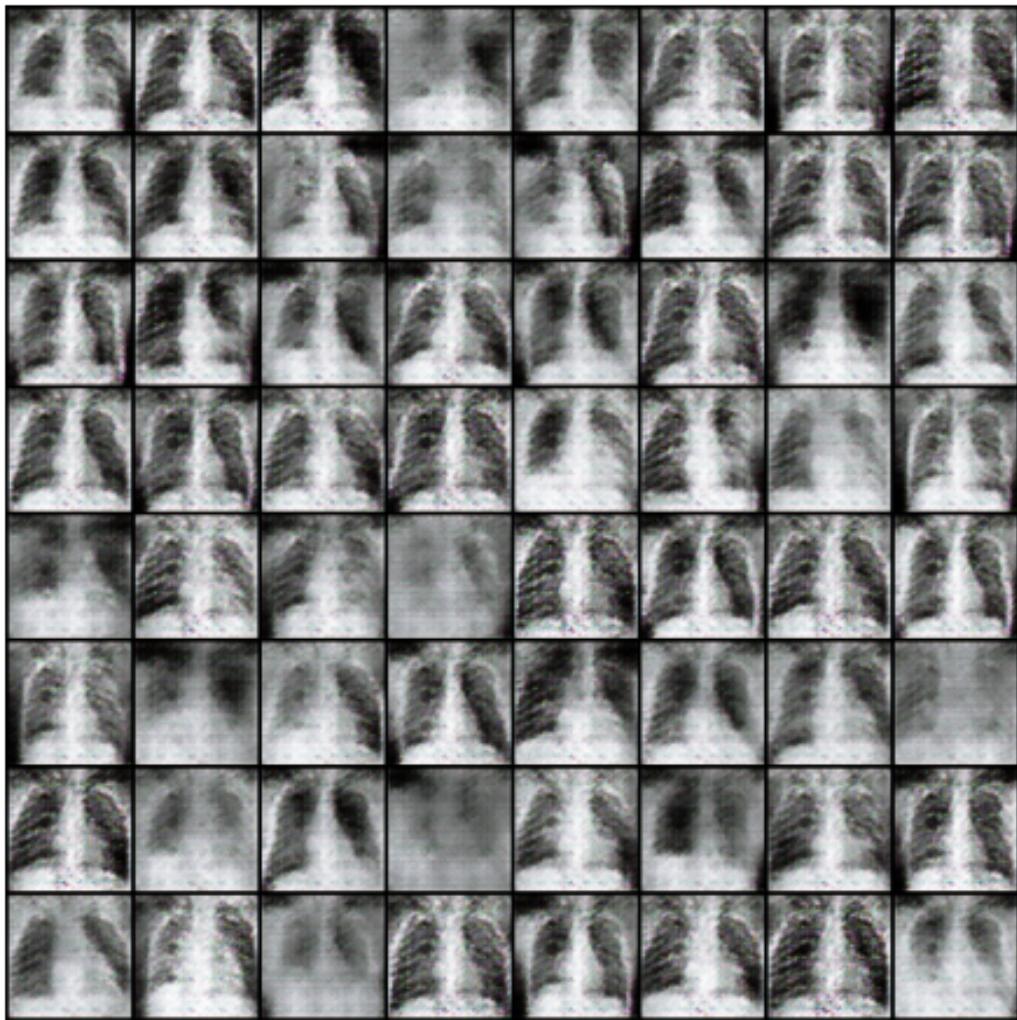
Generated Images - DCGAN Generator (dc\_gans\_models/netG\_0.001\_0.7.pth)



Generated Images - DCGAN Generator (dc\_gans\_models/netG\_0.0001\_0.5.pth)



Generated Images - DCGAN Generator (dc\_gans\_models/netG\_0.001\_0.5.pth)



## 28 Generate images from both models

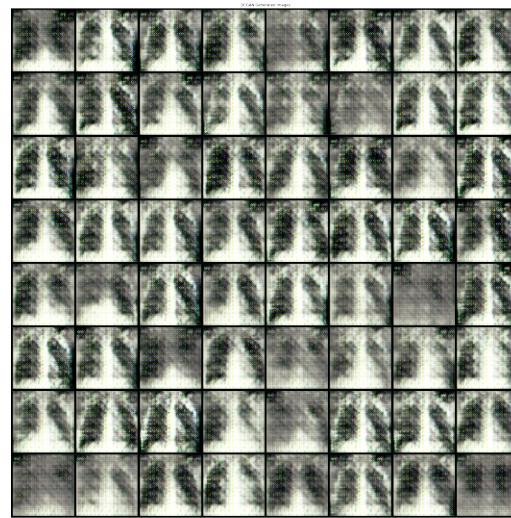
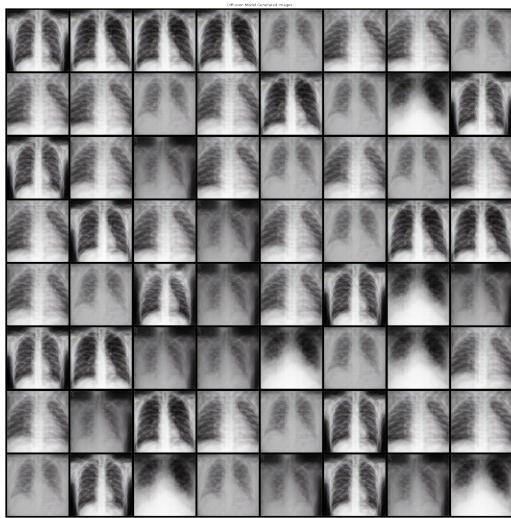
```
[42]: new_images_diff = generate_images(model, diffusion_model, 64)
fixed_noise = torch.randn(64, nz, 1, 1, device=device)
with torch.no_grad():
    new_images_best_dcgan = best_netG(fixed_noise).detach().cpu()

plt.figure(figsize=(64,64))
plt.subplot(1, 2, 1)
plt.axis("off")
plt.title("Diffusion Model Generated Images")
plt.imshow(np.transpose(vutils.make_grid(new_images_diff, padding=2, normalize=True).cpu(), (1, 2, 0)))
```

```

plt.subplot(1, 2, 2)
plt.axis("off")
plt.title("DCGAN Generated Images")
plt.imshow(np.transpose(vutils.make_grid(new_images_best_dcgan, padding=2,
                                         normalize=True).cpu(), (1, 2, 0)))
plt.show()

```



## 29 Compare training times

```
[40]: print(f"Training Time for Diffusion Model: {training_time_diff} seconds")
print(f"Training Time for DCGAN: {training_time_best_dcgan} seconds")
```

Training Time for Diffusion Model: 955.839679479599 seconds  
 Training Time for DCGAN: 1280.6716103553772 seconds

## 30 Calculate and compare FID scores

```
[41]: fid_score_diff = calculate_fid(real_images_pil, [transforms.ToPILImage()(img.
                                         .cpu()) for img in new_images_diff], inception_model)
fid_score_best_dcgan = calculate_fid(real_images_pil, [transforms.
                                         ToPILImage()(img.cpu()) for img in new_images_best_dcgan], inception_model)

print(f"FID Score for Diffusion Model: {fid_score_diff}")
print(f"FID Score for Best DCGAN: {fid_score_best_dcgan}")
```

FID Score for Diffusion Model: 1199.3796504533175  
 FID Score for Best DCGAN: 1125.7944171347297

### 31 Calculate and compare Inception scores

```
[43]: inception_score_diff, inception_std_diff =  
    calculate_inception_score([transforms.ToPILImage()(img.cpu()) for img in  
    new_images_diff], inception_model)  
inception_score_best_dcgan, inception_std_best_dcgan =  
    calculate_inception_score([transforms.ToPILImage()(img.cpu()) for img in  
    new_images_best_dcgan], inception_model)  
  
print(f"Inception Score for Diffusion Model: {inception_score_diff} ±  
    {inception_std_diff}")  
print(f"Inception Score for Best DCGAN: {inception_score_best_dcgan} ±  
    {inception_std_best_dcgan}")
```

Inception Score for Diffusion Model: 1.6471960544586182 ± 0.05443725734949112  
Inception Score for Best DCGAN: 1.831146240234375 ± 0.22770574688911438

32 ===== END OF FILE  
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