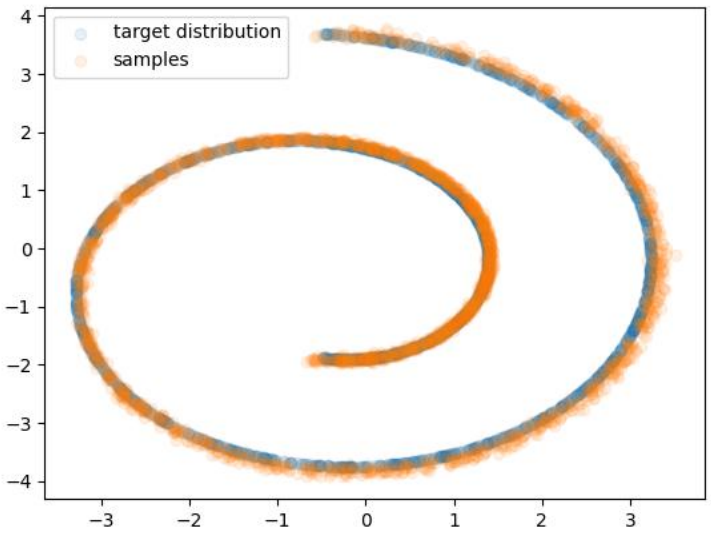
Task 1 results:

DDPM sampling (Assignment 1)

```
# You will get full credits if your chamfer distance is lower than 20.
from chamferdist import chamfer_distance

num_eval_particles = 2048
pc_ref = target_ds[:num_eval_particles]
pc_gen = ddpm.p_sample_loop(shape=(num_eval_particles, 2))

pc_gen = pc_gen.reshape(1, num_eval_particles, 2)
pc_ref = pc_ref.reshape(1, num_eval_particles, 2)
with torch.no_grad():
    cd = chamfer_distance(
            pc_gen.reshape(-1, 2).cpu().numpy(),
            pc_ref.reshape(-1, 2).cpu().numpy(),
        )
    print(f"DDPM Chamfer Distance: {cd.item():.4f}")

# Visualize samples with the target distribution.
pc_gen = pc_gen.reshape(num_eval_particles, 2).cpu().numpy()
pc_ref = pc_ref.reshape(num_eval_particles, 2).cpu().numpy()

fig, ax = plt.subplots(1,1)
ax.scatter(pc_ref[:,0], pc_ref[:,1], alpha=0.1, label="target distribution")
ax.scatter(pc_gen[:,0], pc_gen[:,1], alpha=0.1, label="samples")
ax.legend()
plt.show()
```

[6]

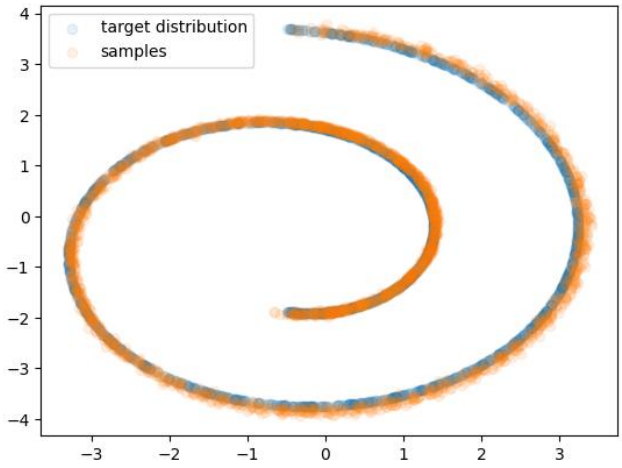
```
DDPM Chamfer Distance: 11.5294
```



DDIM Sampling (Assignment 2)

```python
# You will get full credits if your chamfer distance is lower than 40.
from chamferdist import chamfer_distance

num_eval_particles = 2048
pc_ref = target_ds[:num_eval_particles]
pc_gen = ddpm.ddim_p_sample_loop(shape=(num_eval_particles, 2), eta=1.0) # Asked in forum if we can change eta

pc_gen = pc_gen.reshape(1, num_eval_particles, 2)
pc_ref = pc_ref.reshape(1, num_eval_particles, 2)
with torch.no_grad():
    cd = chamfer_distance(
            pc_gen.reshape(-1, 2).cpu().numpy(),
            pc_ref.reshape(-1, 2).cpu().numpy(),
        )
    print(f"DDIM Chamfer Distance: {cd.item():.4f}")

# Visualize samples with the target distribution.
pc_gen = pc_gen.reshape(num_eval_particles, 2).cpu().numpy()
pc_ref = pc_ref.reshape(num_eval_particles, 2).cpu().numpy()

fig, ax = plt.subplots(1,1)
ax.scatter(pc_ref[:,0], pc_ref[:,1], alpha=0.1, label="target distribution")
ax.scatter(pc_gen[:,0], pc_gen[:,1], alpha=0.1, label="samples")
ax.legend()
plt.show()
```

```
DDIM Chamfer Distance: 10.3217
```



Task 2 :

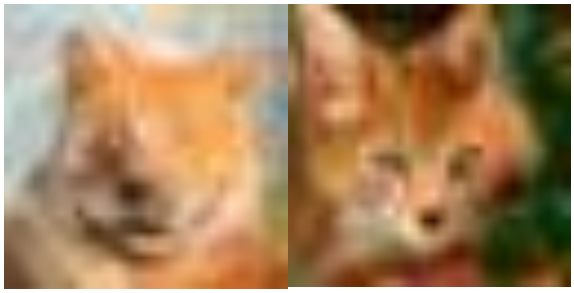
```
scale 0.0 fid score
Calculating FID given paths data/afhq/afhq/eval and samples_cfg_0.0...
/home/student/.local/lib/python3.10/site-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is de
  warnings.warn(
/home/student/.local/lib/python3.10/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight en
  warnings.warn(msg)
/home/student/.local/lib/python3.10/site-packages/torchvision/models/inception.py:43: FutureWarning: The default weight initializ
  warnings.warn(
100%|████████████████████████████████████████| 24/24 [00:06<00:00,  3.76it/s]
100%|████████████████████████████████████████| 8/8 [00:02<00:00,  3.82it/s]
FID: 4.75516731450273
scale 7.5 fid score
Calculating FID given paths data/afhq/afhq/eval and samples_cfg_7.5...
/home/student/.local/lib/python3.10/site-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is de
  warnings.warn(
/home/student/.local/lib/python3.10/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight en
  warnings.warn(msg)
/home/student/.local/lib/python3.10/site-packages/torchvision/models/inception.py:43: FutureWarning: The default weight initializ
  warnings.warn(
100%|████████████████████████████████████████| 24/24 [00:06<00:00,  3.90it/s]
100%|████████████████████████████████████████| 8/8 [00:02<00:00,  3.83it/s]
FID: 0.34146331304458394
```

Bash command didn’t work so used the following code -

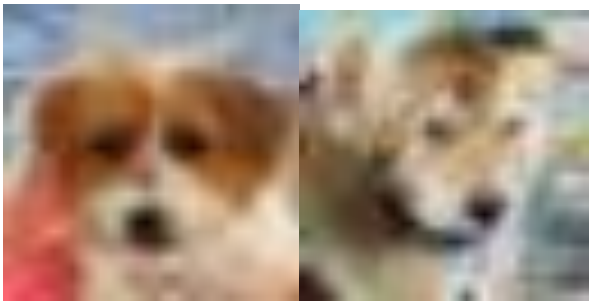
```
print("scale 0.0 fid score")
!python3 fid/measure_fid.py data/afhq/afhq/eval samples_cfg_0.0
print("scale 7.5 fid score")
!python3 fid/measure_fid.py data/afhq/afhq/eval samples_cfg_7.5
```

Scale 0.0 images:

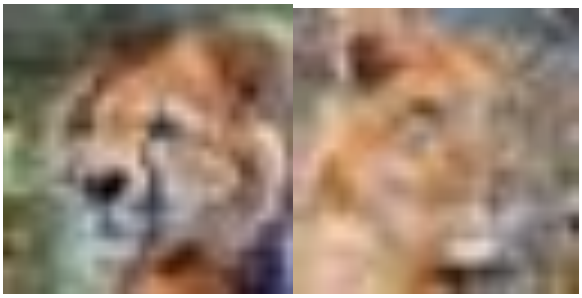
Cat class:



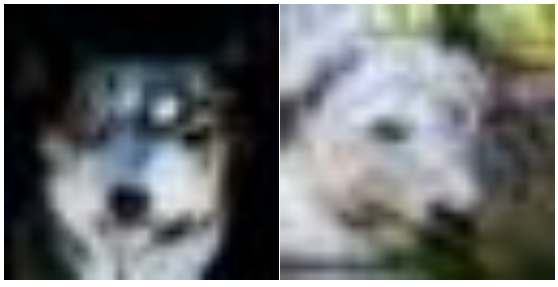
Dog class:



Wild class:

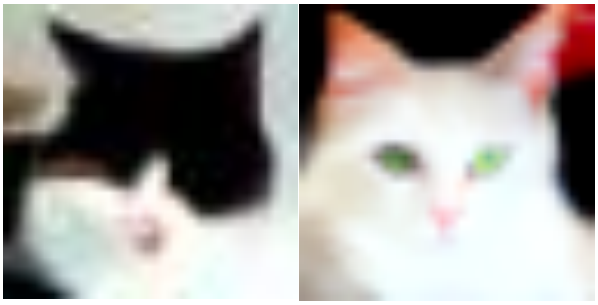


0 class:

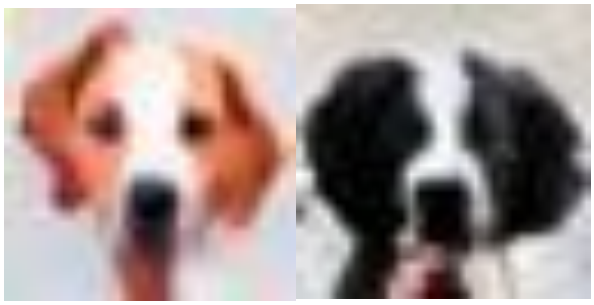


Scale 7.5 images:

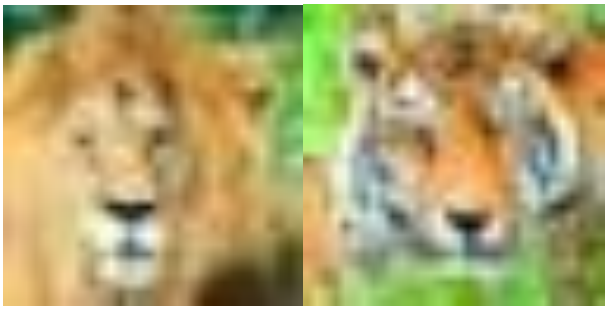
Cat class:



Dog class:



Wild class:



0 class: