

## Marked exercises, submission 2

This is the set of marked exercises for Submission 2. In this assignment, you will get familiar with Generative Adversarial Networks (GANs). Submission 2 consists of completing the implementation of a GAN model and its training function, training WGAN, and answering written questions. In total you can get 60 points for Submission 2.

Standard referencing practices apply for both your code and written questions. Not referencing a used source (either for code, or for a written answer) will be penalised. Use IEEE referencing style.

### Completing the implementation of a GAN model and its training function, training WGAN [40 points]

- 2.10.1 [3 points] Implement DiscriminatorBlock in model.py.
- 2.10.2 [5 points] Implement GeneratorBlock in model.py.
- 2.10.3 [5 points] Complete Generator in model.py: specify kernel\_sizes, stride\_sizes, padding\_sizes in Generator def \_\_init\_\_.
- 2.10.4 [3 points] Implement weight clamping in trainer.py: def clamp\_weights(self)
- 2.10.5 [9 points] Implement Discriminator update step in trainer.py: def disc\_step(self, z, real\_images).
- 2.10.6 [9 points] Implement Generator update step in trainer.py: def gen\_step(self).
- 2.10.7 [6 points] Complete the call of disc\_step() and gen\_step in train\_epoch(). Train the GAN for at least 5000 iterations and 5 epochs, and report the generated images.

Further instructions and explanations are provided in the accompanying README.md and files.

### Questions [20 points] – Make sure to reference any sources used

#### 2.10.8 [10 points] Challenges with training GANs (200 words max)

Discuss *mode collapse* as a challenge with training GANs and choose a second challenge yourself. Outline methods that address these challenges. Additionally, state the cause for these challenges. Support your claims with formulas, plots, and graphs. One plot = 50 words.

#### 2.10.9 [10 points] Evaluation metrics for GANs (200 words max)

Discuss two metrics for evaluating the performance of GANs. Describe the advantages and disadvantages of each metric. Support your claims with formulas, plots, and graphs. One plot = 50 words.