**📝 Notes on What They Are**

* **GAN = Generative Adversarial Network**
* Invented by **Ian Goodfellow (2014)**
* Purpose → generate **new, realistic data** (images, text, audio, etc.)
* **Two neural networks in competition**:
  + **Generator (G):** creates fake samples
  + **Discriminator (D):** distinguishes real vs fake

**📝 Notes on How They Work**

* **Generator (G):**
  + Input: random noise
  + Output: fake data (e.g., fake image)
* **Discriminator (D):**
  + Input: data sample (real or fake)
  + Output: probability → real or fake
* **Adversarial Training Process:**
  + G improves to fool D
  + D improves to catch G
  + Both keep improving until G generates data **indistinguishable from real**
* **Analogy:**
  + G = artist making fakes
  + D = art critic spotting fakes
  + Over time → artist gets so good critic can’t tell the difference