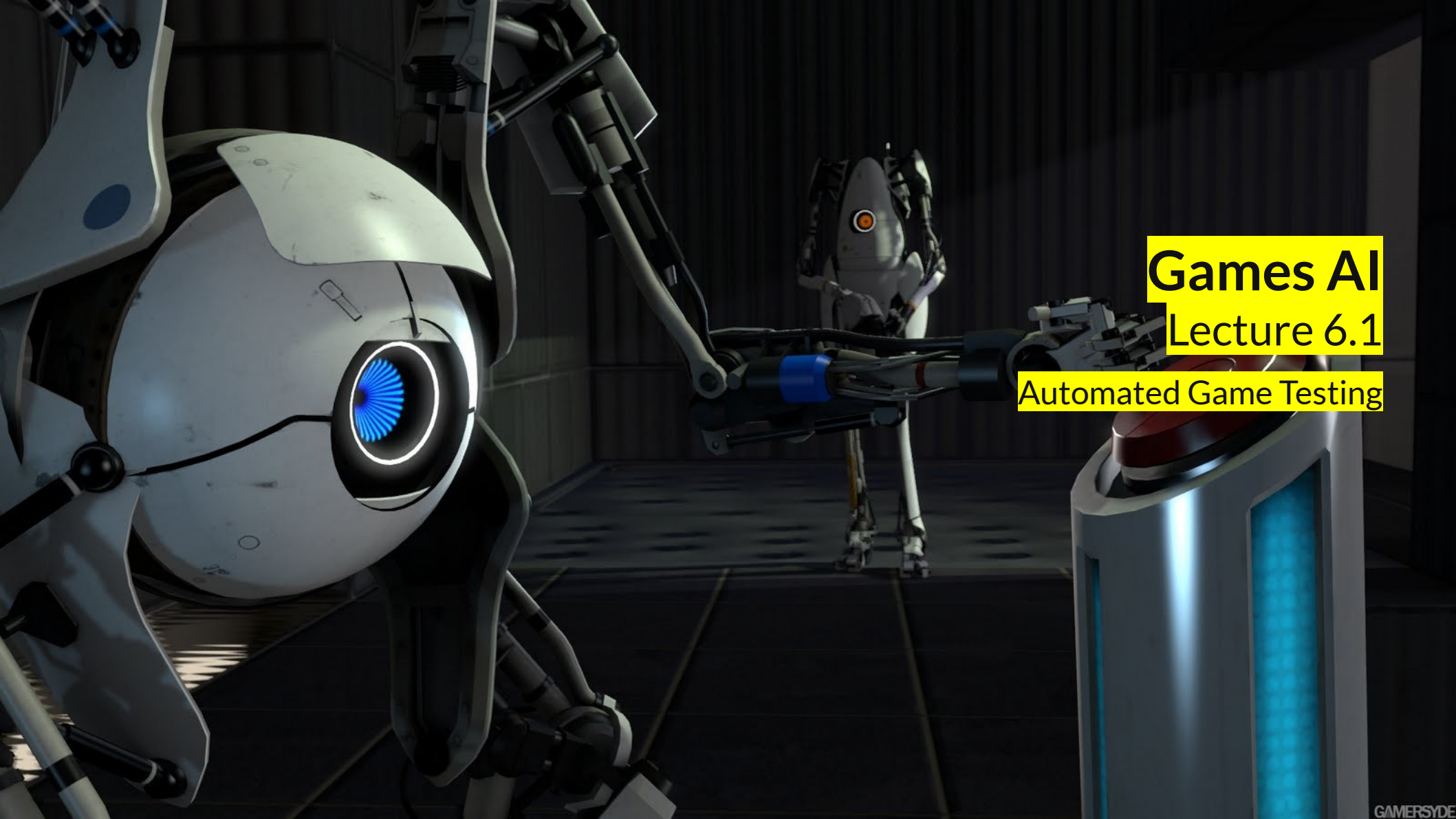
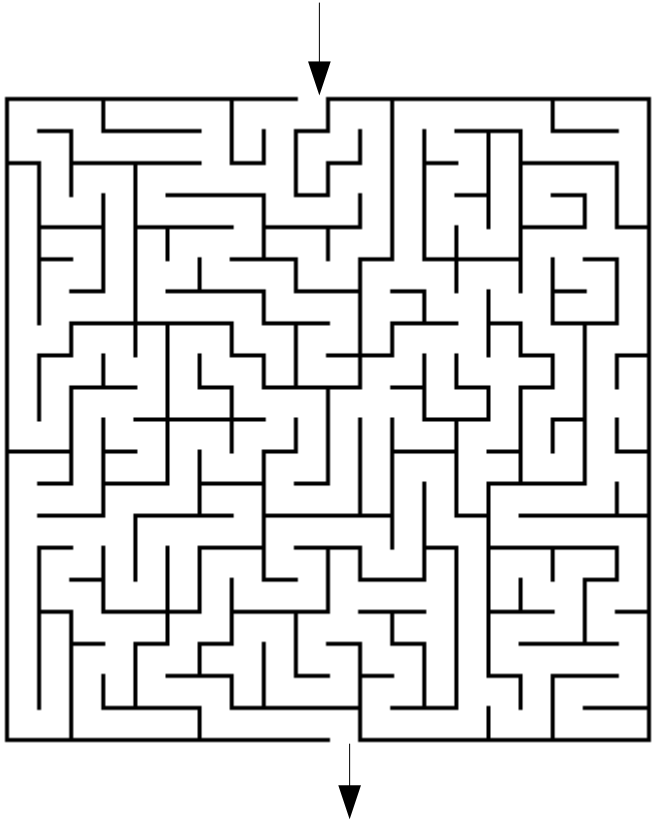

Games AI
Lecture 6.1
Automated Game Testing
GAMERSYDE

- Last lecture we talked about **Procedural Content Generation**
  - A PCG algorithm has a **generative space** of content that it can create
  - We want our content to be **functional** and **aesthetic.**
  - Among the other features we wanted from our generater were:
    - Reliability
    - Controllability
    - Diversity
    - Creativity

- **Iteration** is important in developing good PCG
  - But how do we iterate?
    1) Generate some content
    2) **Look at it**
    3) Tweak the generator
    4) Repeat

- **Look at it**
  - But what if that takes too long?

- Look at it – **with AI**
  - Is this maze passable?
  - How could we check automatically?



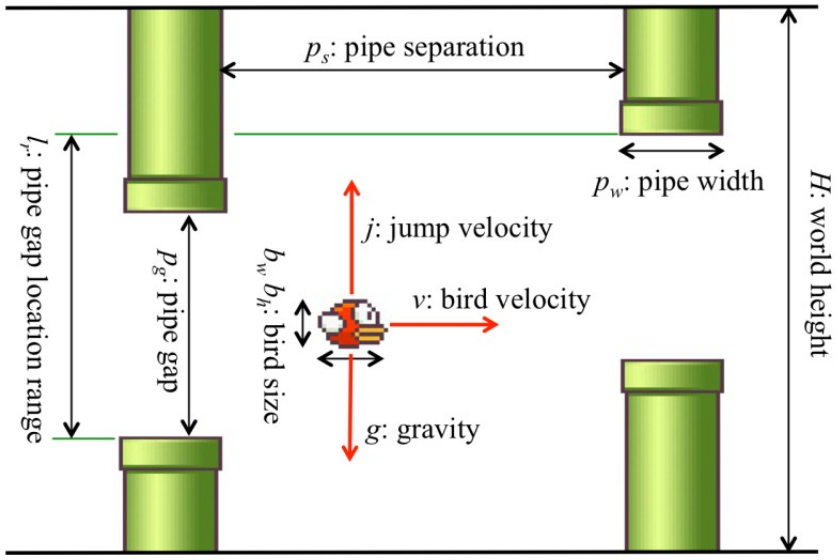
- **More challenging...**
  - Is this level passable?
  - How could we check automatically?

- **Iteration** (2)
  1) Generate some content
  2) **AI gives it a score**
  3) Tweak the generator
  4) Repeat

- **AI gives it a score**
  - But what if we want a particular aesthetic?
  - How do we give this a score?

- **Iteration** (3)
  1) Generate some content
  2) **Designer (efficiently) gives it a score**
  3) Tweak the generator
  4) Repeat

- **More difficult...**
  - But what if we want a particular aesthetic of play
  - e.g. how do we score difficulty?

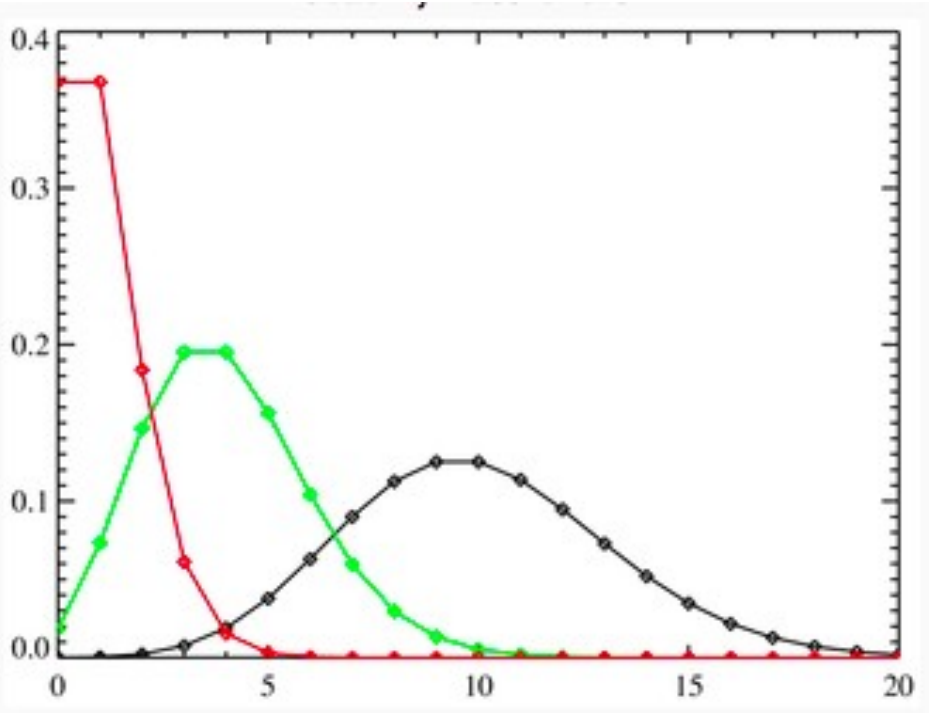


https://game.engineering.nyu.edu/projects/exploring-game-space/

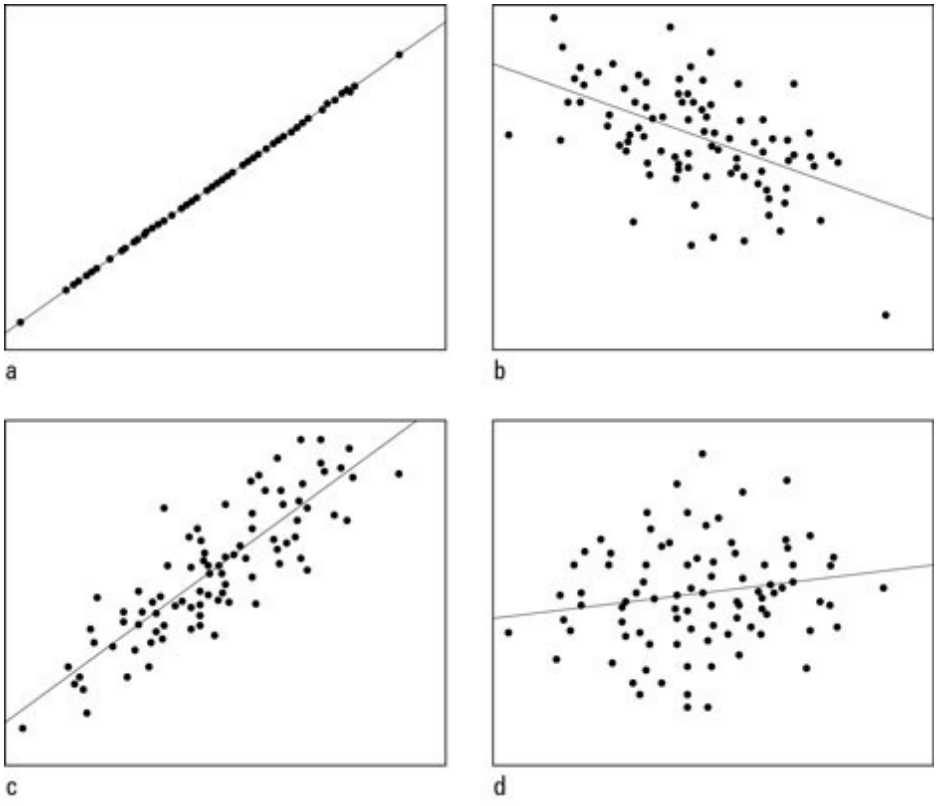
- **Iteration** (4)
  1) Generate some content / **Build a version of the game**
  2) AI or Designer (efficiently) gives it a score
  3) Tweak the generator / **develop the next version of the game**
  4) Repeat

- We also wanted our PCG to have:
  - Reliability
  - Controlability
  - Diversity
  - Creativity
- If we can **devise a statistical measure** for these, then we can evaluate them automatically

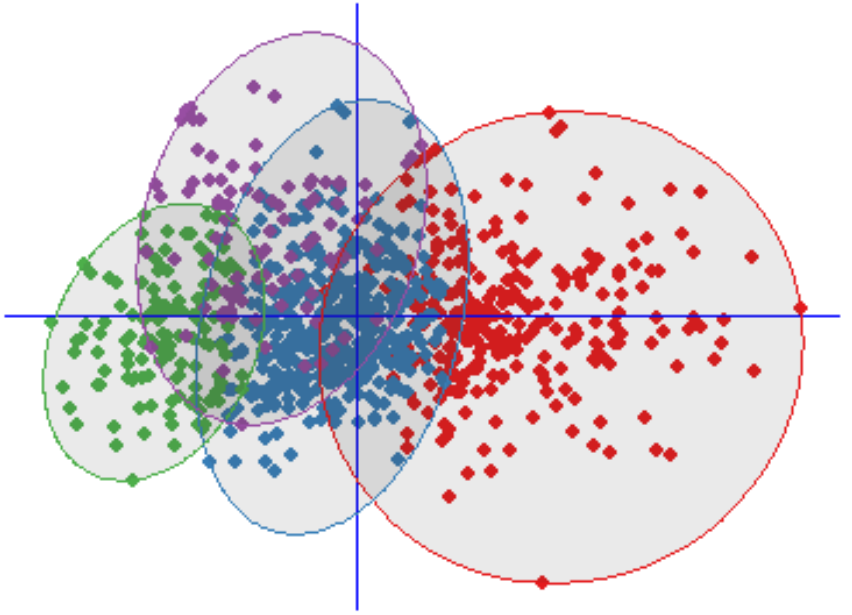
- How would we generate a statistic for:
  - **Reliability**?



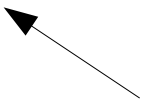
- How would we generate a statistic for:
  - **Controllability**?



- How would we generate a statistic for:
  - **Diversity**?



- **Iteration** (4)
  1) Generate some content
  2) Score it
  3) Tweak the generator **based on that score**
  4) Repeat



Still requires human intervention

- To iterate fastest, we need the **AI to re-program** the generator
- We need the generator to… **evolve!**