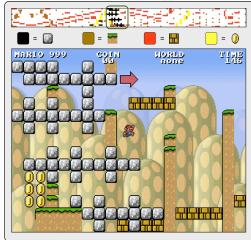


# Procedural Content Generation for Computer Games

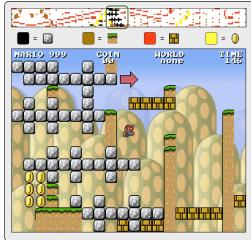
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Author: Tom Smith ([taes1g09@ecs.soton.ac.uk](mailto:taes1g09@ecs.soton.ac.uk))  
Supervisor: Rikki Prince ([rfp@ecs.soton.ac.uk](mailto:rfp@ecs.soton.ac.uk))



# What is Procedural Content Generation?

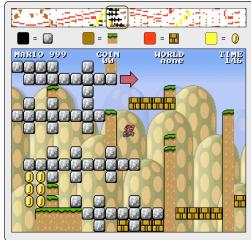
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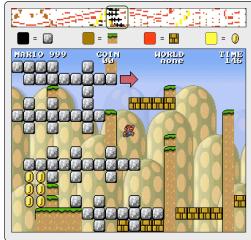


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Procedural Content Generation has been used by hundreds of commercially successful games, from Elite (1984) to Assassins Creed 3 (2012). But what is it?

“the application of computers to generate game content, distinguish interesting instances among the ones generated, and select entertaining instances on behalf of the players.”

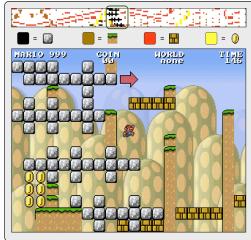
- Hendrikx et al.



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“the algorithmical creation of game content with limited or indirect user input.”  
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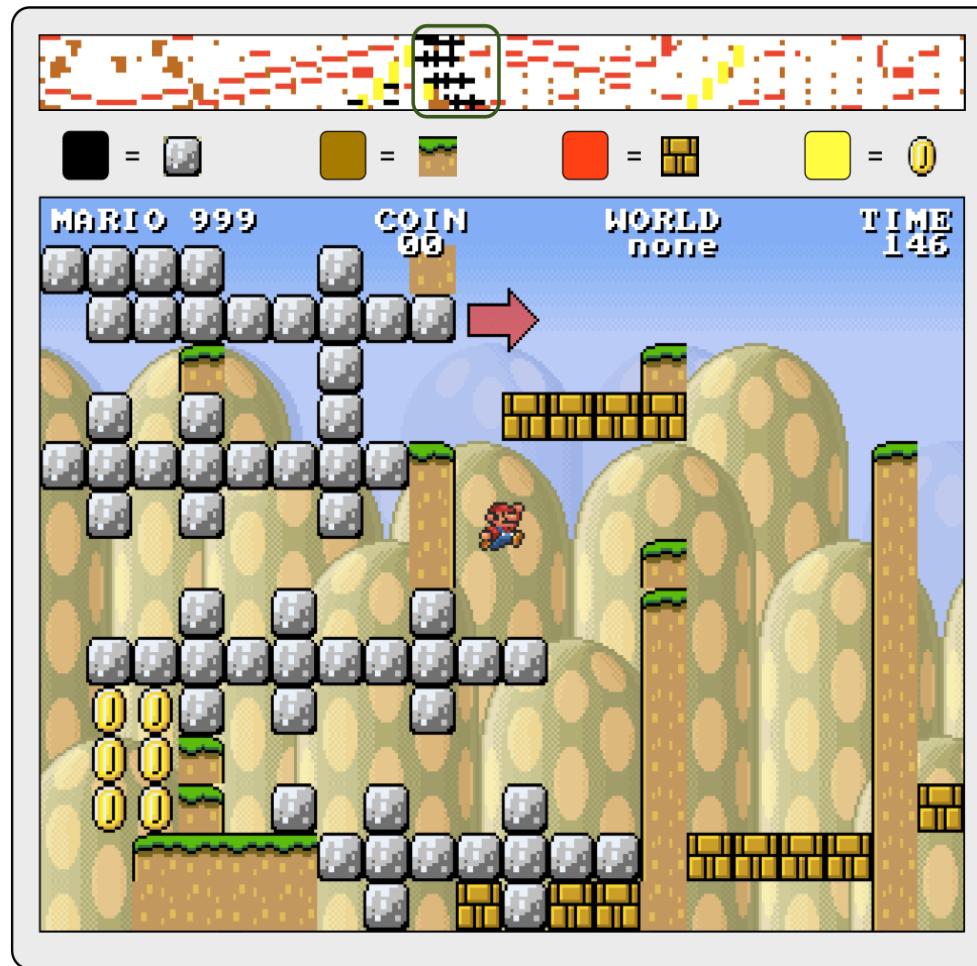
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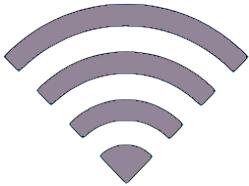
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PCG techniques often use methods from the related fields of dynamic difficulty adjustment, particle systems, evolutionary algorithms, cellular automata and AI.



# What is Procedural Content Generation?

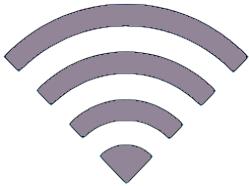




# Online PCG vs. Offline PCG

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PCG can be performed at a number of different stages.

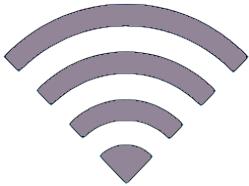


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Traditional  
Offline

**Reduced Workload**



**Reduced Storage**



**More Variety**





# Online PCG vs. Offline PCG

PCG can be performed at a number of different stages.

- ▶ “Offline” PCG techniques
  - ▷ Performed at development or load time
- ▶ “Online” PCG methods
  - ▷ Performed during game execution
  - ▷ Can use runtime information

Traditional  
Offline  
Online

**Reduced Workload**

✓ ✓

**Reduced Storage**

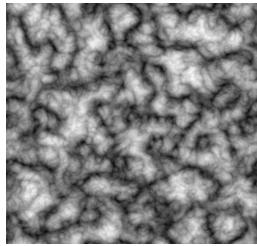
✓ ✓

**More Variety**

✓ ✓

**Responsive**

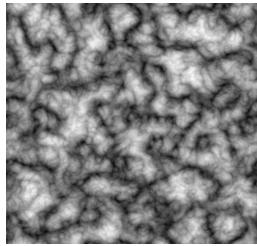
✓



## PCG for Artists

---

Artists use a range PCG techniques to generate many content types. These typically generate static content, and are widely used in other GGI industries.

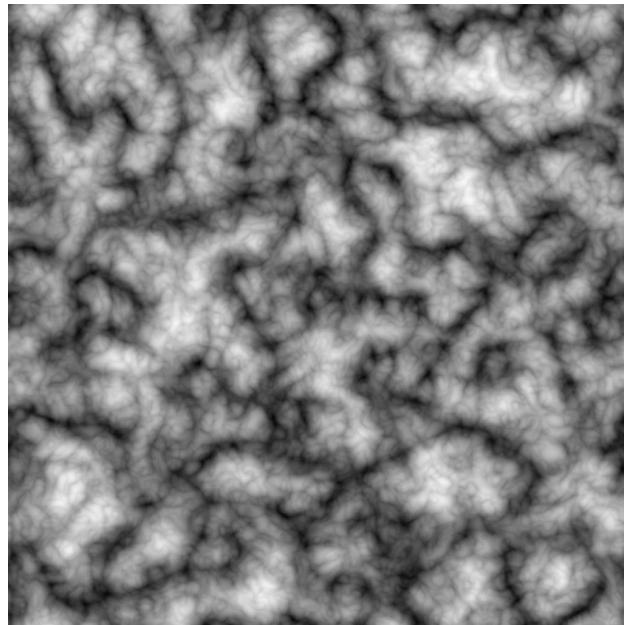


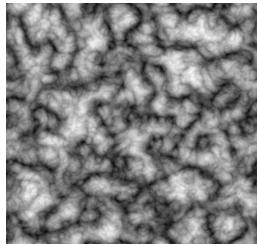
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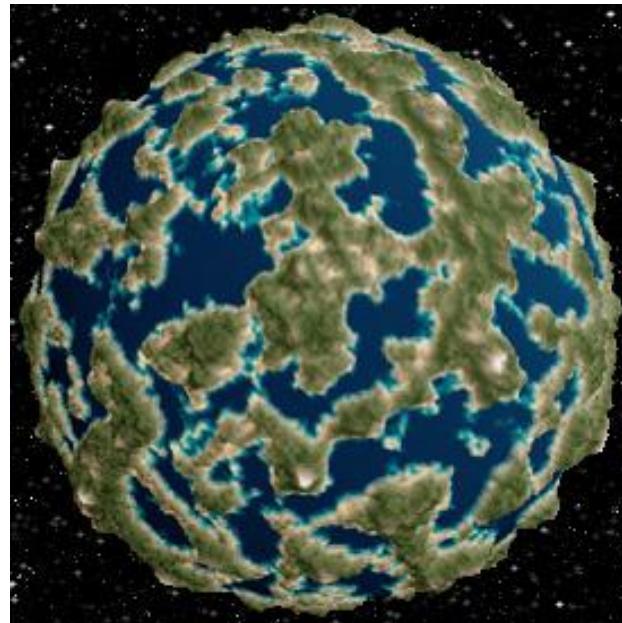


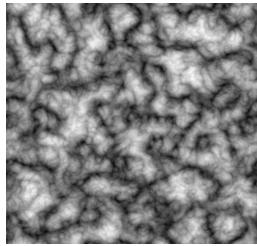


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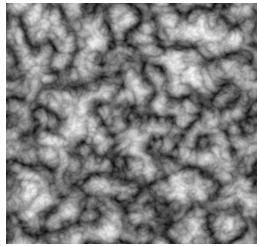


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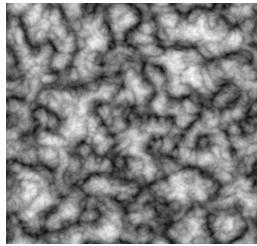


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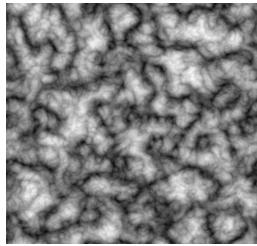


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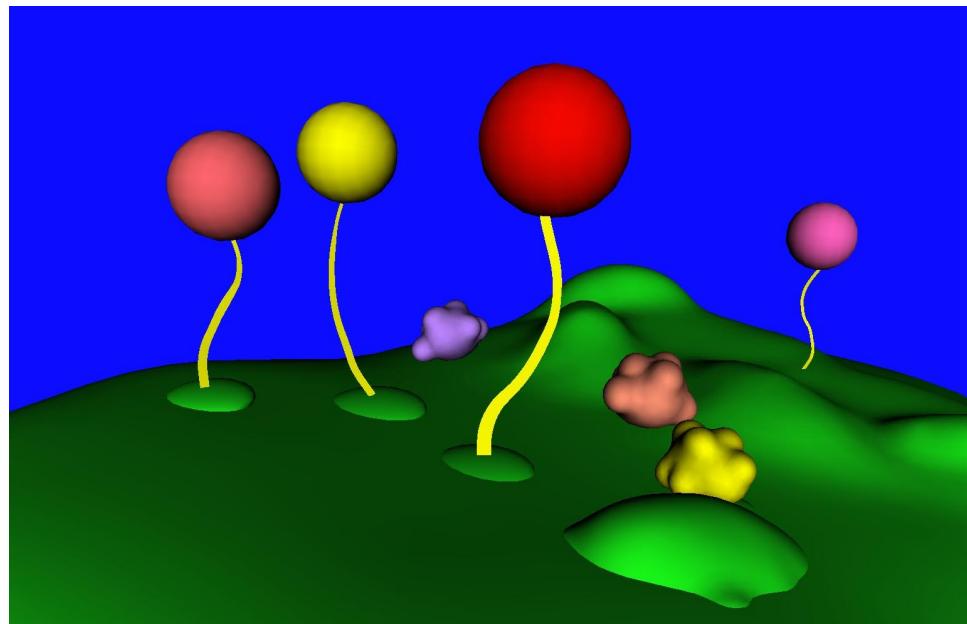


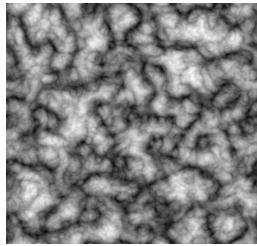


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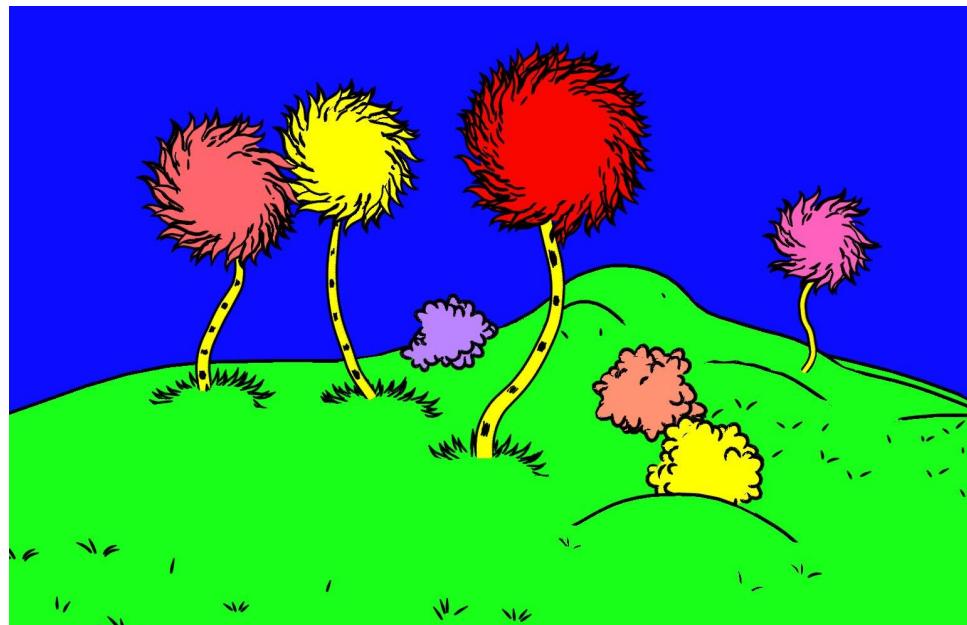




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- ▶ Search-based PCG techniques
- ▶ Mixed-Initiative content creation



## PCG for Consumers

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Some games use information about the player to tailor content at runtime.



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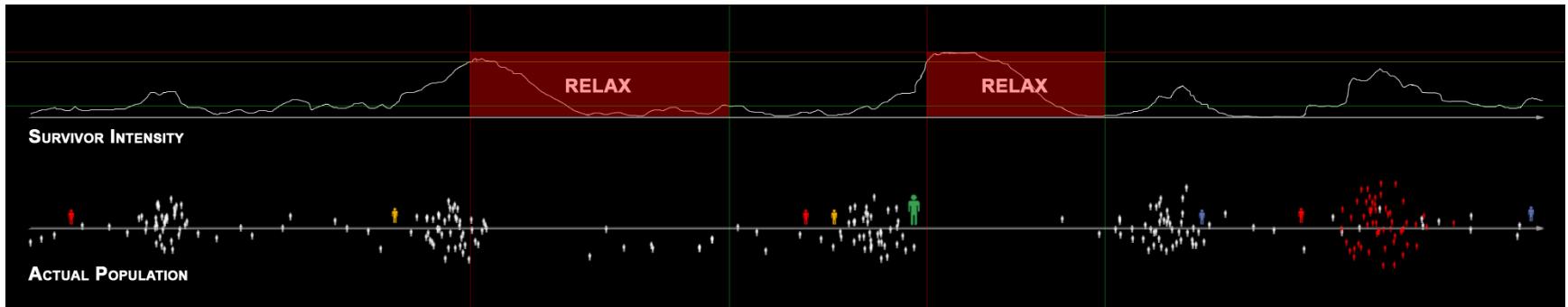
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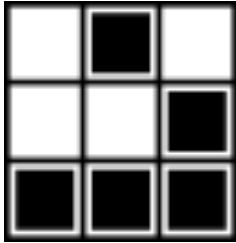


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  - ▷ 'Creature Creator' in Spore

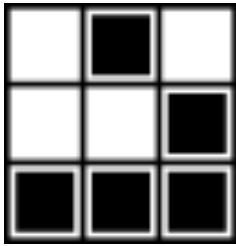




## Conclusions & Future Work

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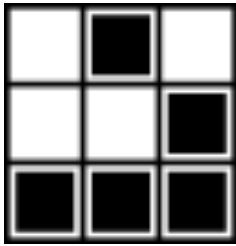


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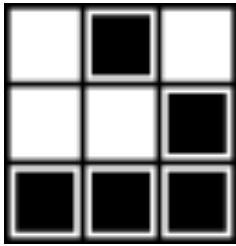


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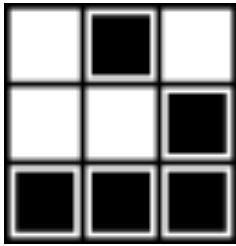


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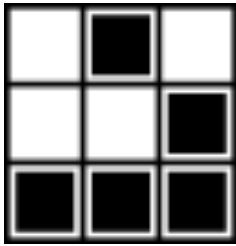
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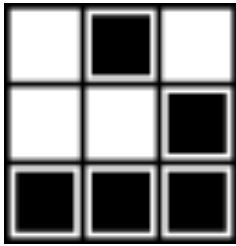
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- ▶ Investigate combination with related research areas

# Questions?

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Procedural Content Generation for Computer Games

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Supervisor: Rikki Prince ([rfp@ecs.soton.ac.uk](mailto:rfp@ecs.soton.ac.uk))