Scenario Generation for a 2D Videogame using Logic Programming

Rafael Alcalde Azpiazu

Adviser: Pedro Cabalar Fernández

UNIVERSIDADE DA CORUÑA

FACULTADE DE INFORMÁTICA

Department of Computer Science

Final degree project

A Coruña, 8th August 2018

Table of Contents

Table of Contents

Freeciv

- Turn-based strategy videogame.

Freeciv

- Turn-based strategy videogame.
- Created by students of Aarhus University.

Freeciv

- Turn-based strategy videogame.
- Created by students of Aarhus University.
- Today developed by a open source community.

Game design

- Player controls a group of settlers in 4000 B.C.

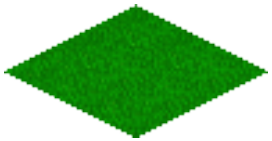
Game design

- Player controls a group of settlers in 4000 B.C.
- 5 game ends:

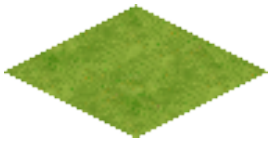
Game design

- Player controls a group of settlers in 4000 B.C.
- 5 game ends:
  - Domination victory.
  - Science victory.
  - Religion victory.
  - Culture victory.
  - Score victory.

Freeciv terrains



- Grassland: Common. Units can move easy.



- Plains: You can create roads on this cells.

- Hills: Units move slowly. +200% defense bonus.

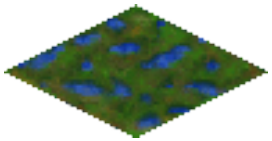
- Forest: +1 production unit. +150% defense bonus.

Freeciv terrains

- Jungle: +4 production units with gems/fruit bonus.

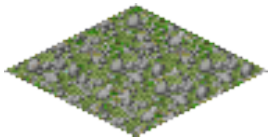
- Mountains: +300% defense bonus.

- Desert: +3 production units with oasis bonus.



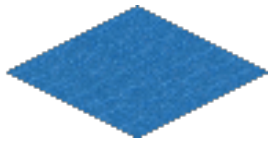
- Swamp: Fast irrigating. +5/9 production units with peat and spice bonus.

Freeciv terrains



- Tundra: Only create roads.

- Glacier: All the units cannot pass through.

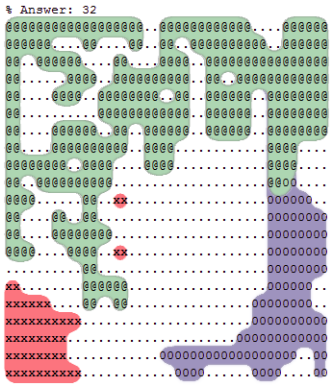


- Sea: All type of boats can pass through.

- Ocean: Only big ships can pass through.

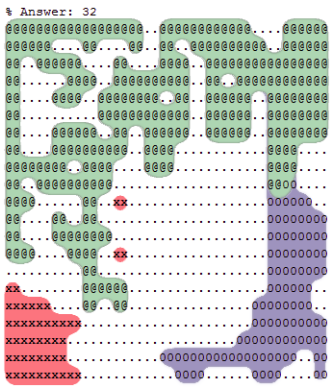
Table of Contents

First approach



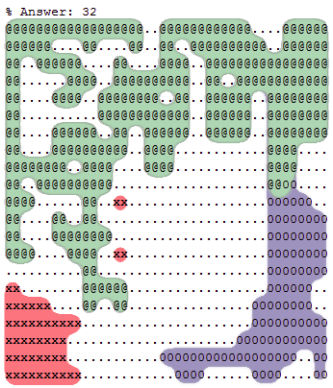
- *Answer Set Programming for Procedural Content Generation: A Design Space Approach* [Smith & Mateas 11]

First approach



- *Answer Set Programming for Procedural Content Generation: A Design Space Approach* [Smith & Mateas 11]
- This approximation creates a single solid island.

First approach



- *Answer Set Programming for Procedural Content Generation: A Design Space Approach* [Smith & Mateas 11]
- This approximation creates a single solid island.
- But I need more that one island.

First approach

- I created a starting point for generate an island.

First approach

- I created a starting point for generate an island.
- I expanded this points with adjacency rules.

First approach

- I created a starting point for generate an island.
- I expanded this points with adjacency rules.
- I added the restriction rules to the adjacent islands not stick together.

First approach

- I created a starting point for generate an island.
- I expanded this points with adjacency rules.
- I added the restriction rules to the adjacent islands not stick together.
- Problem: This approach was inefficient with large maps.

Second approach

- I divided the map in regions.

Second approach

- I divided the map in regions.
- One region is a single island.

Second approach

- I divided the map in regions.
- One region is a single island.
- I used the Lua build-in module clingo to call only one region generation.

Second approach

- I divided the map in regions.
- One region is a single island.
- I used the Lua build-in module clingo to call only one region generation.
- Once this work, I generated all the regions with build-in module.

Second approach

- I divided the map in regions.
- One region is a single island.
- I used the Lua build-in module clingo to call only one region generation.
- Once this work, I generated all the regions with build-in module.
- Finally I added the restriction rules to the regions not stick together.

Related work

- Add user restrictions to the generation.

Related work

- Add user restrictions to the generation.
- Add all types of terrain.

Related work

- Add user restrictions to the generation.
- Add all types of terrain.
- Generate player starting points.

Related work

- Add user restrictions to the generation.
- Add all types of terrain.
- Generate player starting points.
- Add a exporter to Freeciv.

Scenario Generation for a 2D Videogame using Logic Programming

Rafael Alcalde Azpiazu

Adviser: Pedro Cabalar Fernández

UNIVERSIDADE DA CORUÑA

FACULTADE DE INFORMÁTICA

Department of Computer Science

Final degree project

A Coruña, 8th August 2018