Using Groove for analysing RPGame models

Model Driven Engineering

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Overview

- Type graph
- Transformation rules
- Control program
- Analysis

Type graph

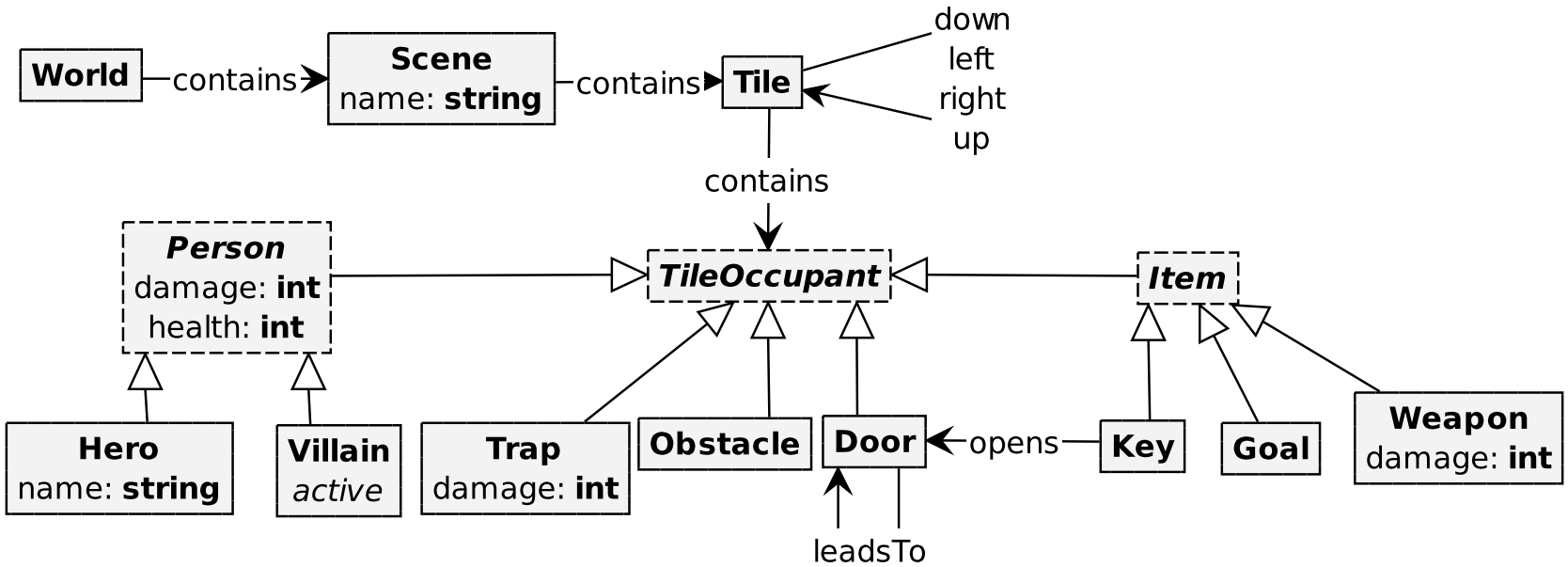


Figure : RPGame metamodel in AToMPM

Transformation rules

moving characters

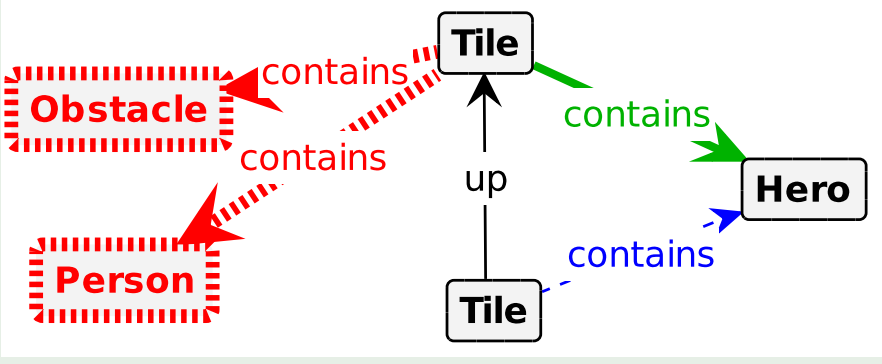


Figure : Transformation rule to move the Hero

Transformation rules

attacking characters

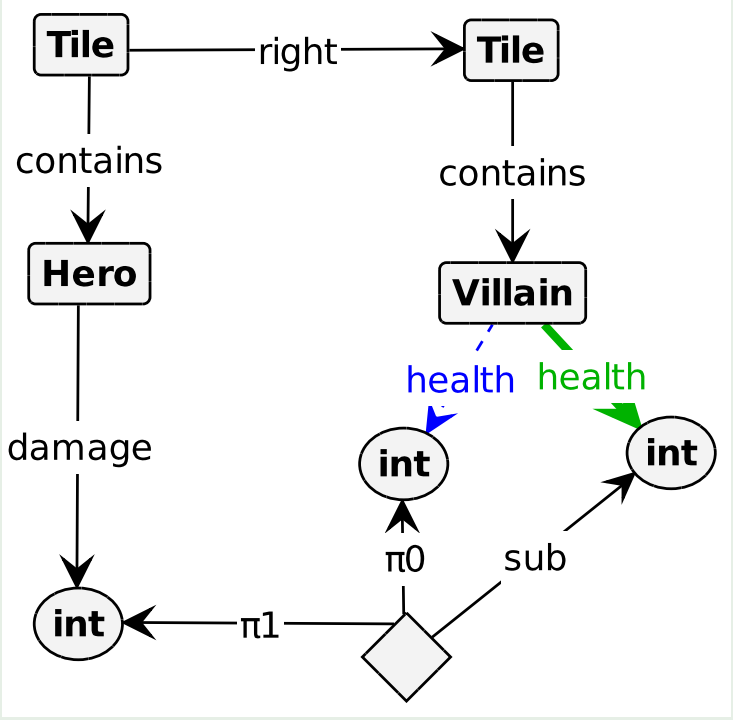


Figure : Transformation rule to let the Hero attack

Transformation rules

activating villains

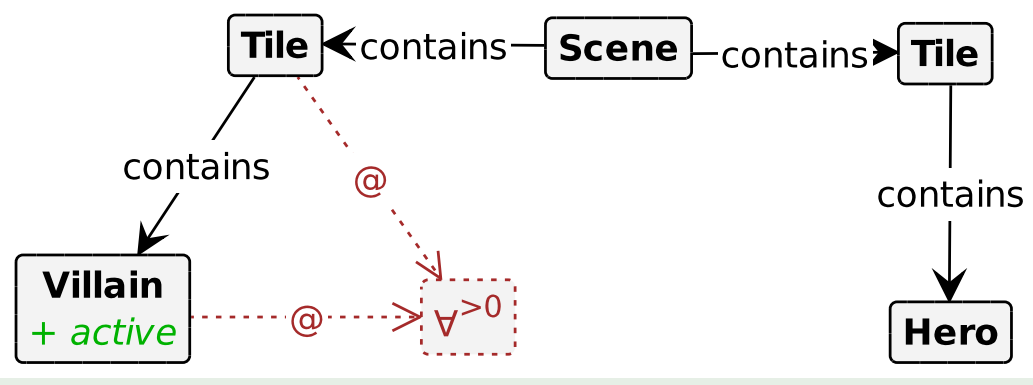


Figure : Transformation rule that activates the villains

Transformation rules

end condition

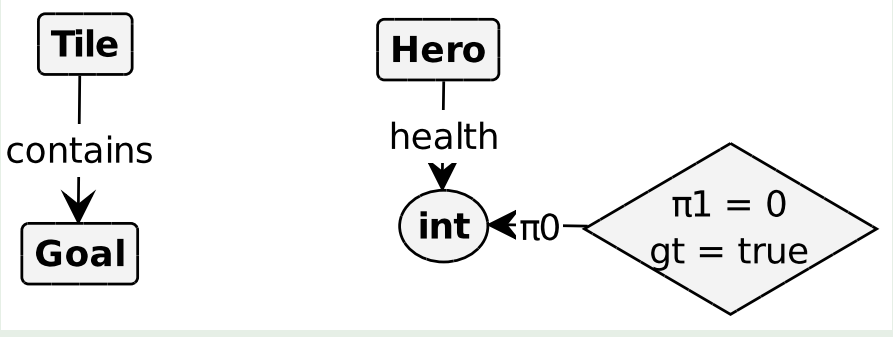
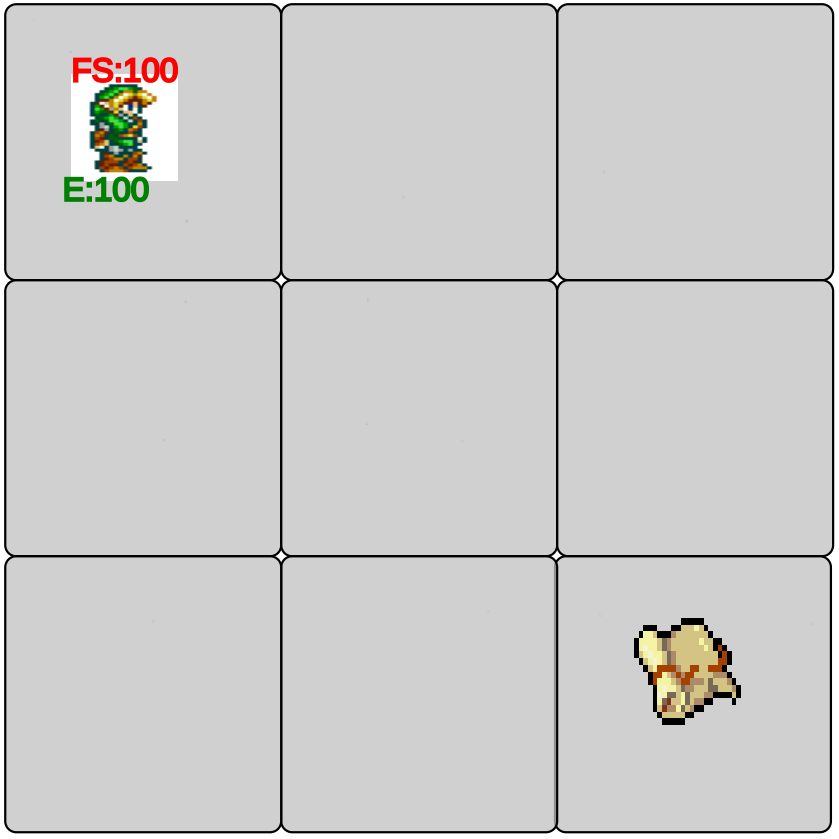


Figure : Transformation rule checking the end condition

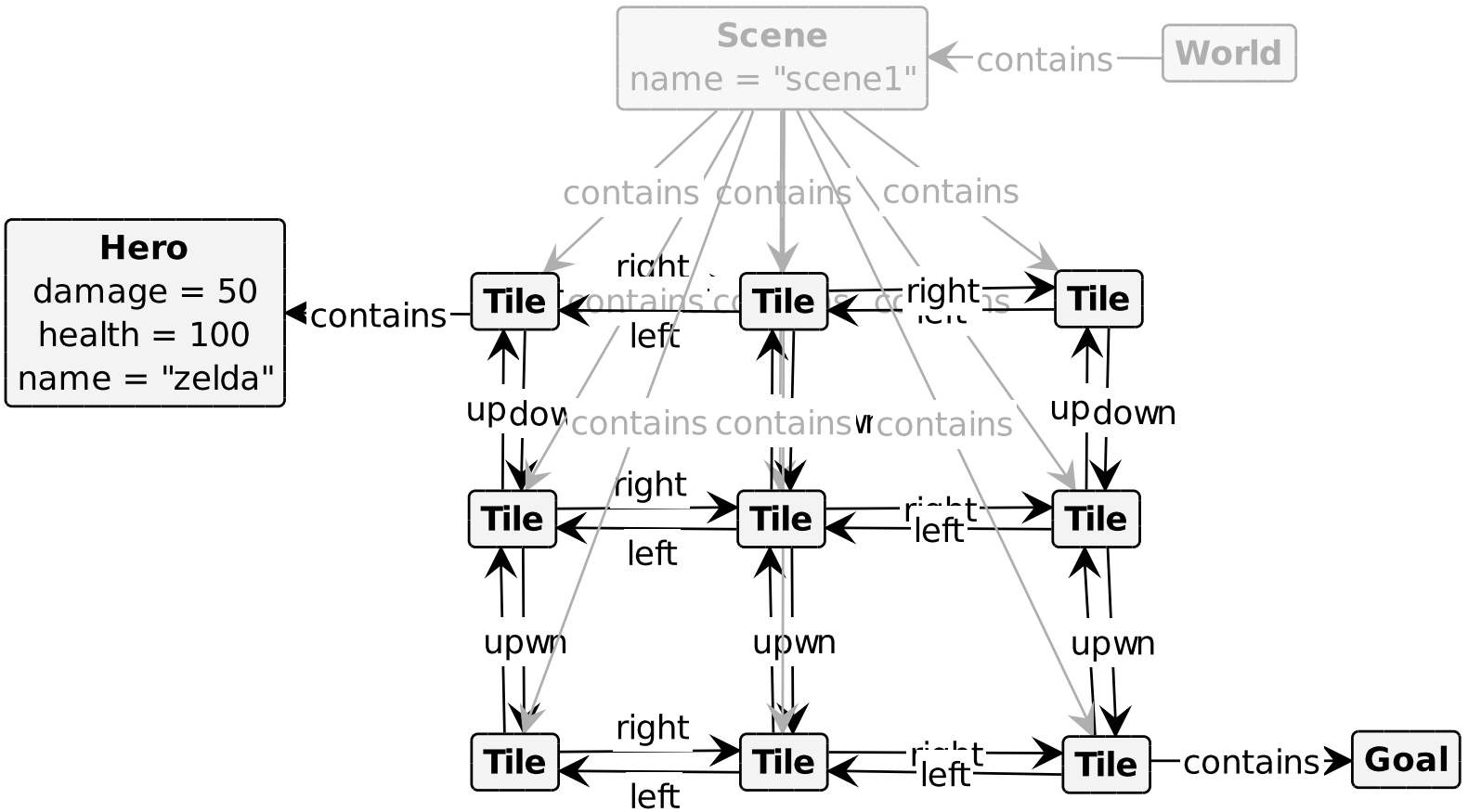
Control program

```
1  while (isNotFinished){
       choice Hero.moveDown;
3          or Hero.moveLeft;
           or Hero.moveRight;
5          or Hero.moveUp;
           or Hero.attackUp;
7          or Hero.attackDown;
           or Hero.attackLeft;
9          or Hero.attackRight;
       try Hero.takeGoal;
11     try Hero.takeKey;
       try Hero.takeWeapon;
13     try Hero.activateTrap;
       try Hero.useDoor;
15     try Villain.die;
       try Villain.activate;
17     while (isActive){
           choice Villain.moveDown;
19             or Villain.moveLeft;
               or Villain.moveRight;
21             or Villain.moveUp;
               or Villain.attackUp;
23             or Villain.attackDown;
               or Villain.attackLeft;
25             or Villain.attackRight;
   }}
```

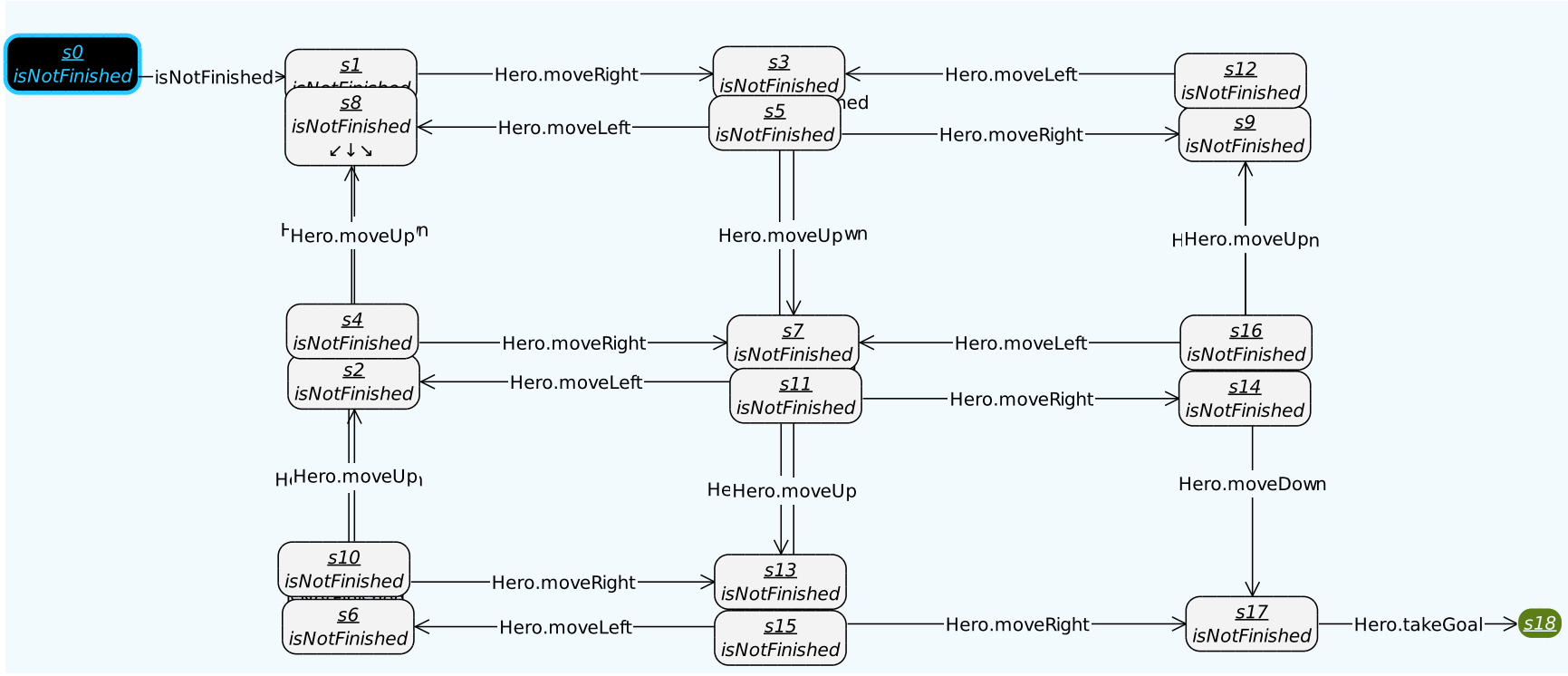
Analysis



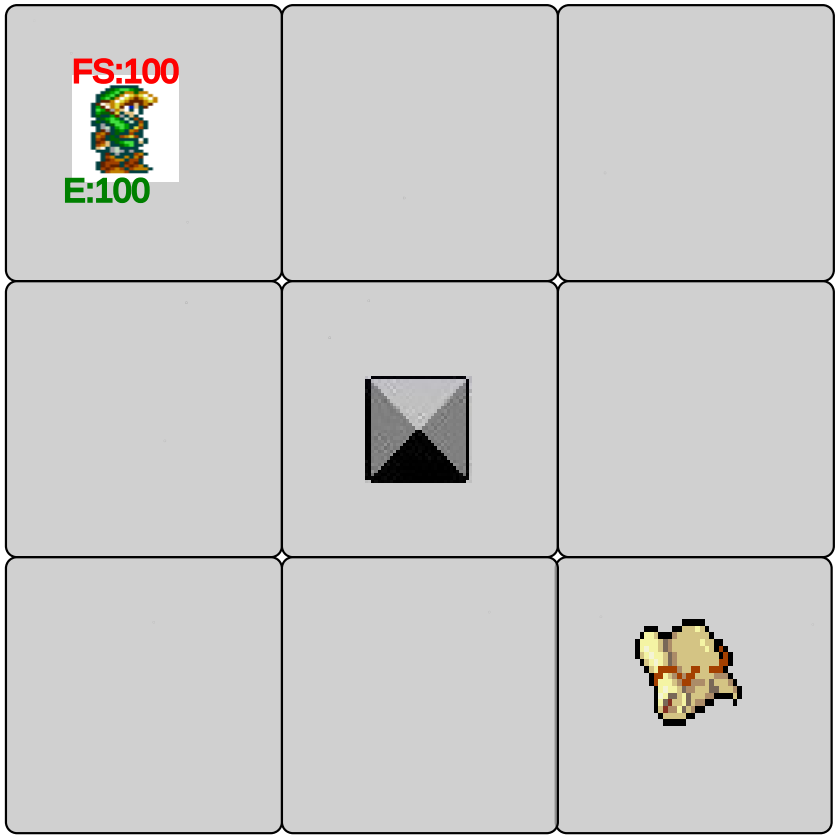
Analysis


Scene
name = "scene1"
contains
World
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
right
left
Tile
right
Tile
up
down
right
left
upwn
Goal

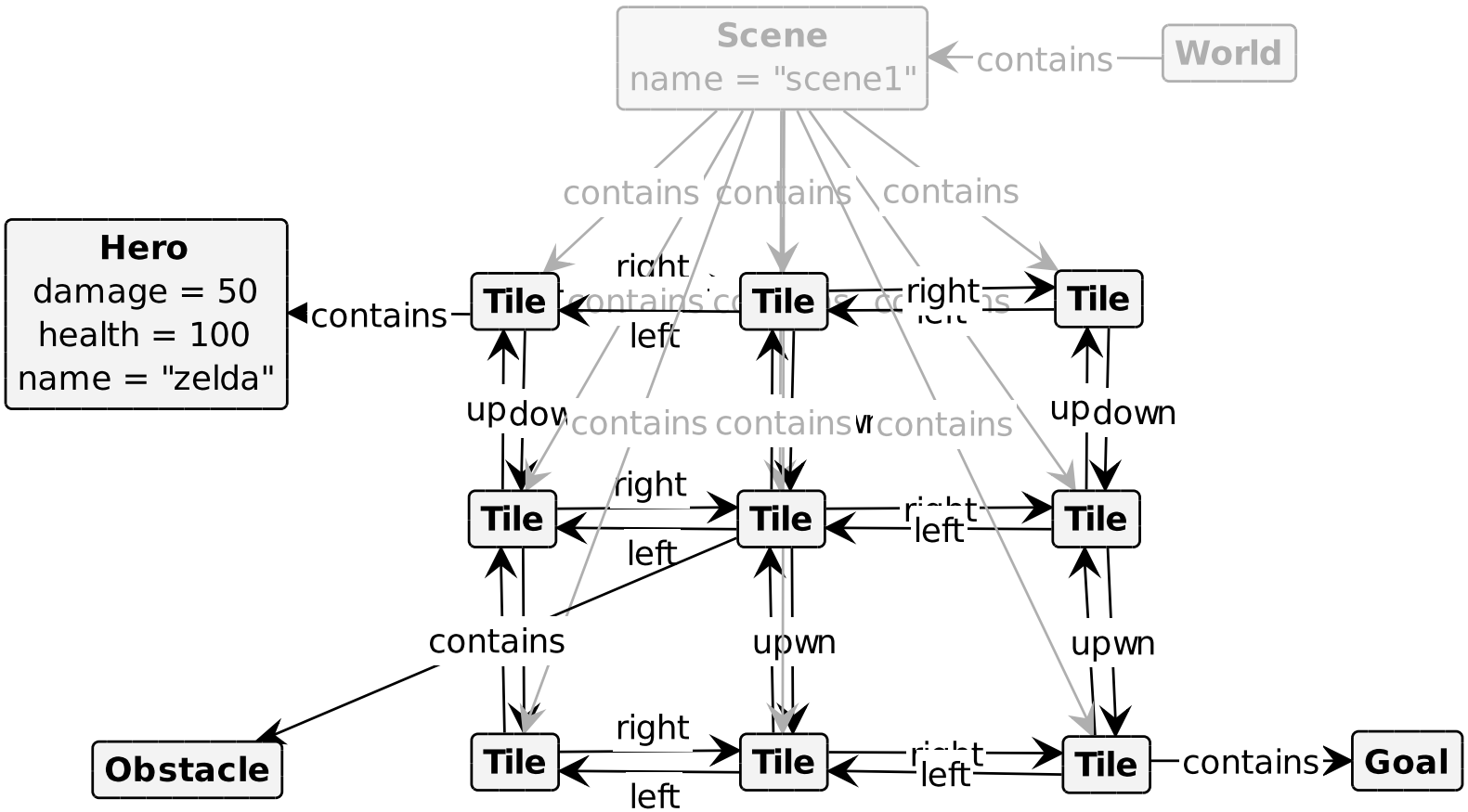
Analysis


s0
isNotFinished
isNotFinished
s1
Hero.moveRight
s3
isNotFinished
Hero.moveLeft
s12
isNotFinished
s8
isNotFinished
Hero.moveLeft
s5
isNotFinished
Hero.moveRight
s9
isNotFinished
Hero.moveUp
Hero.moveUp
Hero.moveUp
s4
isNotFinished
Hero.moveRight
s7
isNotFinished
Hero.moveLeft
s16
isNotFinished
s2
isNotFinished
Hero.moveLeft
s11
isNotFinished
Hero.moveRight
s14
isNotFinished
Hero.moveUp
Hero.moveUp
Hero.moveDown
s10
isNotFinished
Hero.moveRight
s13
isNotFinished
s6
isNotFinished
Hero.moveLeft
s15
isNotFinished
Hero.moveRight
s17
isNotFinished
Hero.takeGoal
s18

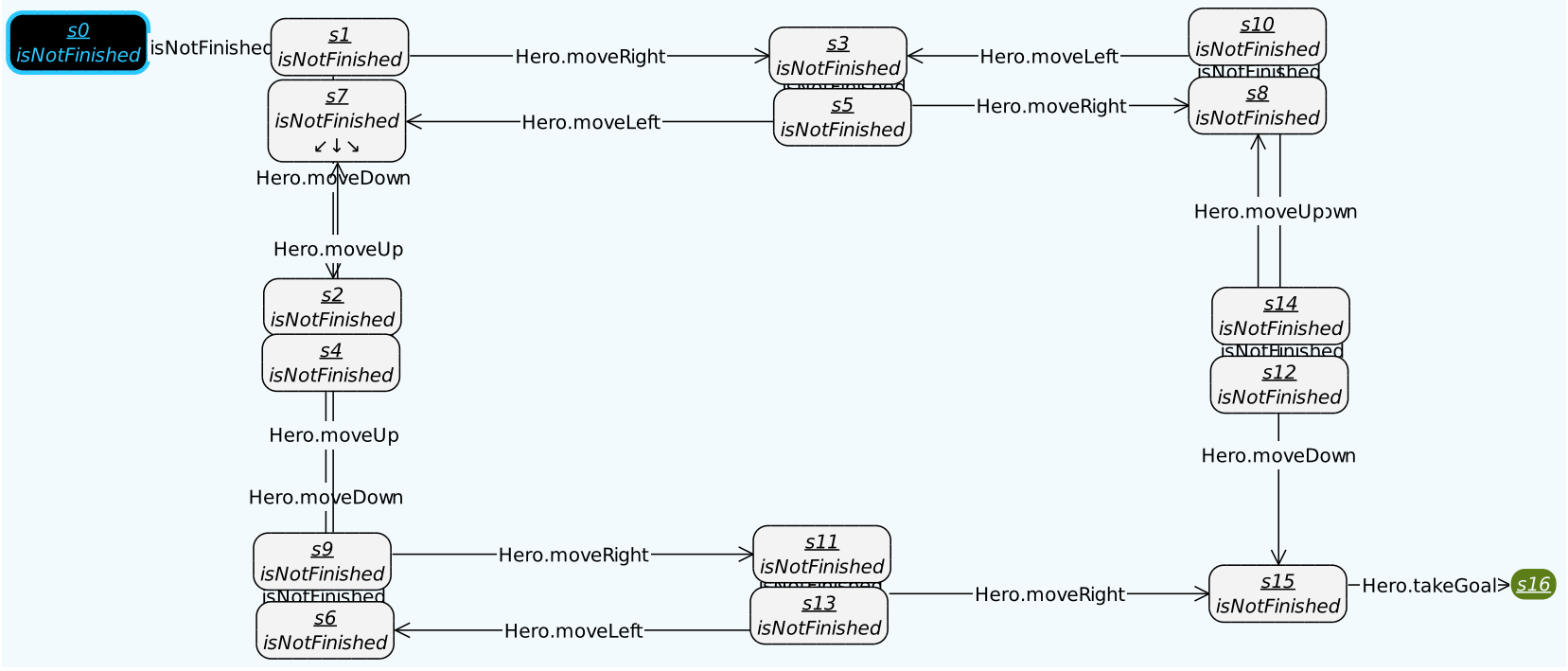
Analysis



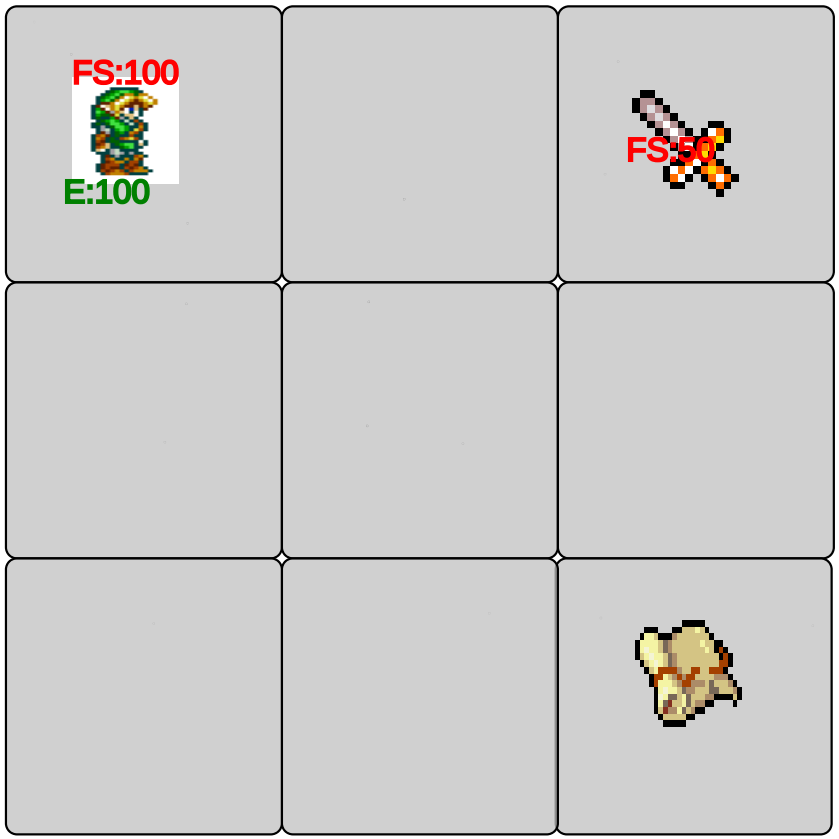
Analysis


Scene
name = "scene1"
contains
World
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
Tile
Tile
right
left
right
up
down
up
down
Tile
Tile
Tile
right
left
left
contains
upwn
upwn
Obstacle
Tile
Tile
Tile
right
left
left
contains
Goal

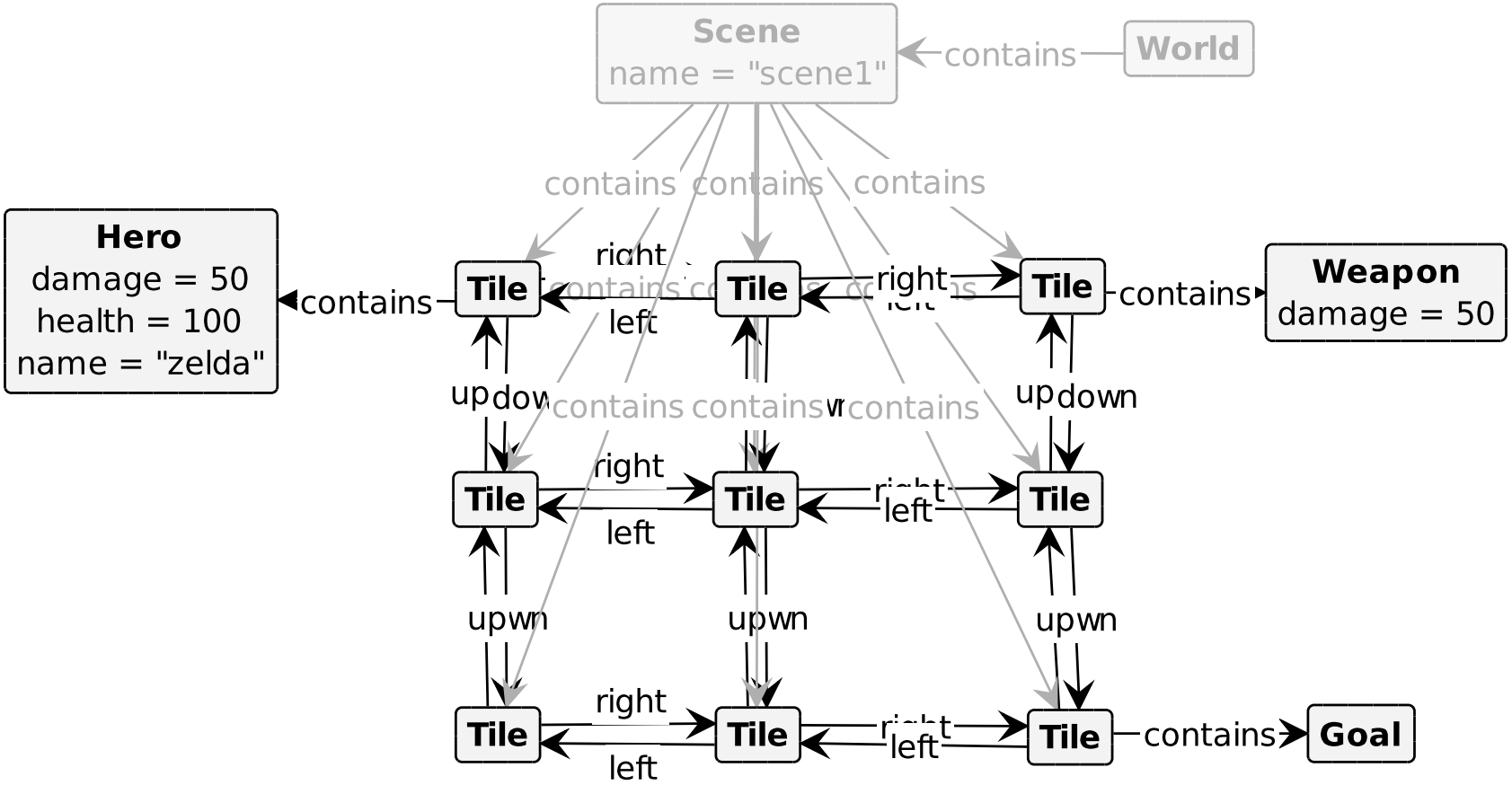
Analysis


s0
isNotFinished
isNotFinished
s1
isNotFinished
Hero.moveRight
s3
isNotFinished
Hero.moveLeft
s10
isNotFinished
s7
isNotFinished
Hero.moveLeft
s5
isNotFinished
Hero.moveRight
s8
isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
s2
isNotFinished
s4
isNotFinished
s14
isNotFinished
s12
isNotFinished
Hero.moveUp
Hero.moveDown
Hero.moveDown
s9
isNotFinished
Hero.moveRight
s11
isNotFinished
s6
isNotFinished
Hero.moveLeft
s13
isNotFinished
Hero.moveRight
s15
isNotFinished
Hero.takeGoal
s16

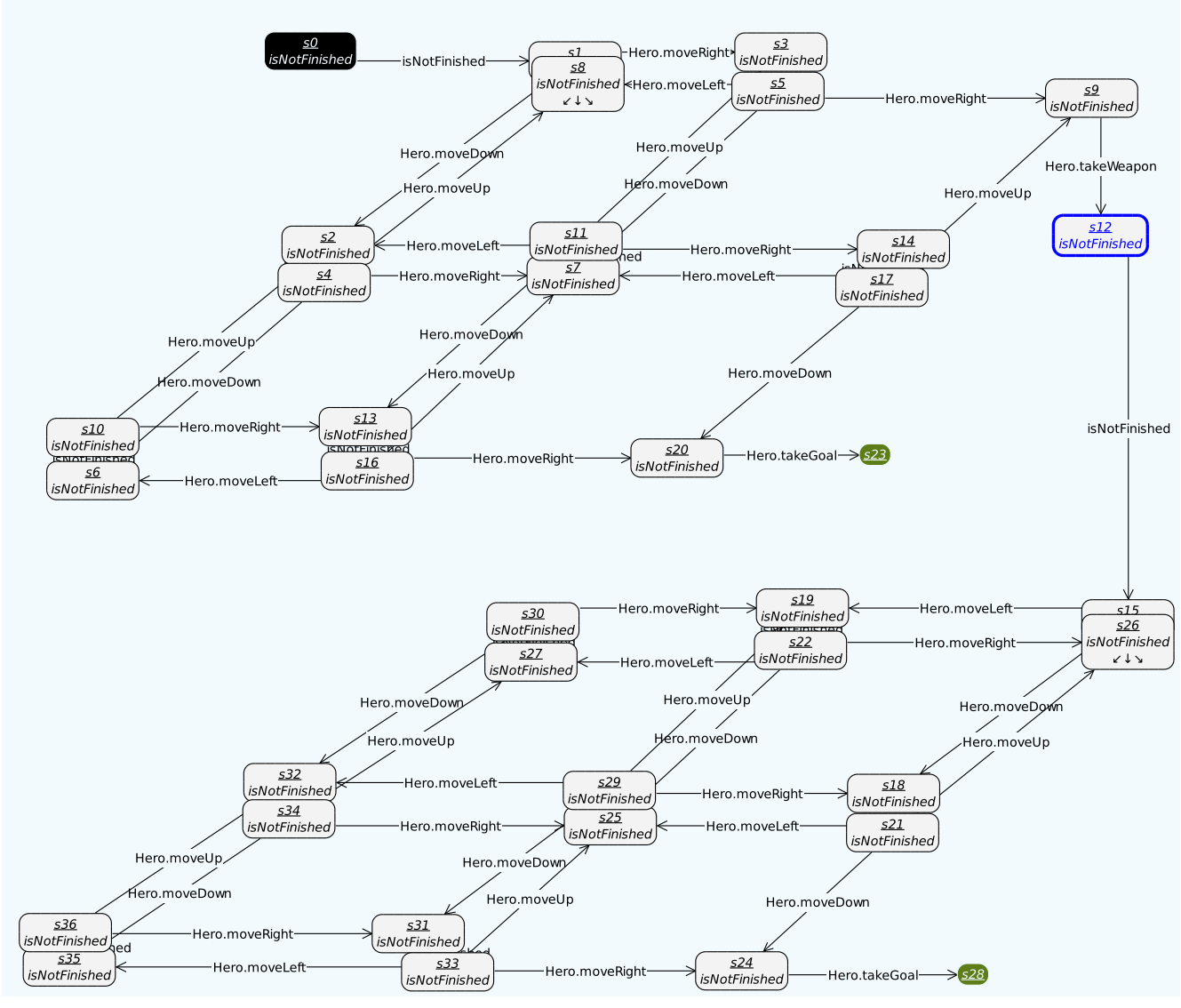
Analysis



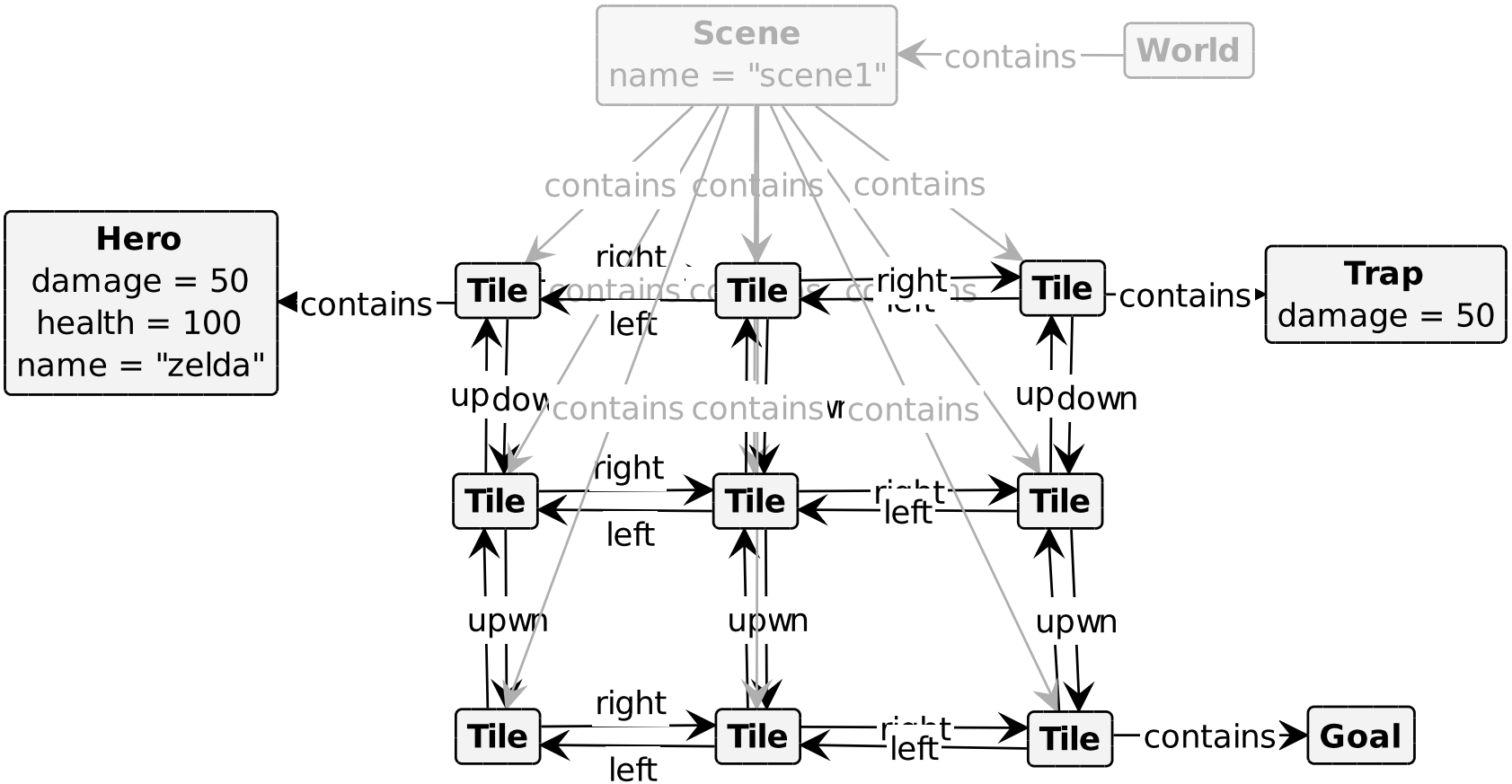
Analysis


Scene
name = "scene1"
contains
World
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
right
left
Tile
right
Tile
contains
Weapon
damage = 50
up
down
contains
contains
contains
up
down
Tile
right
left
Tile
Tile
upwn
upwn
upwn
Tile
right
left
Tile
Tile
contains
Goal

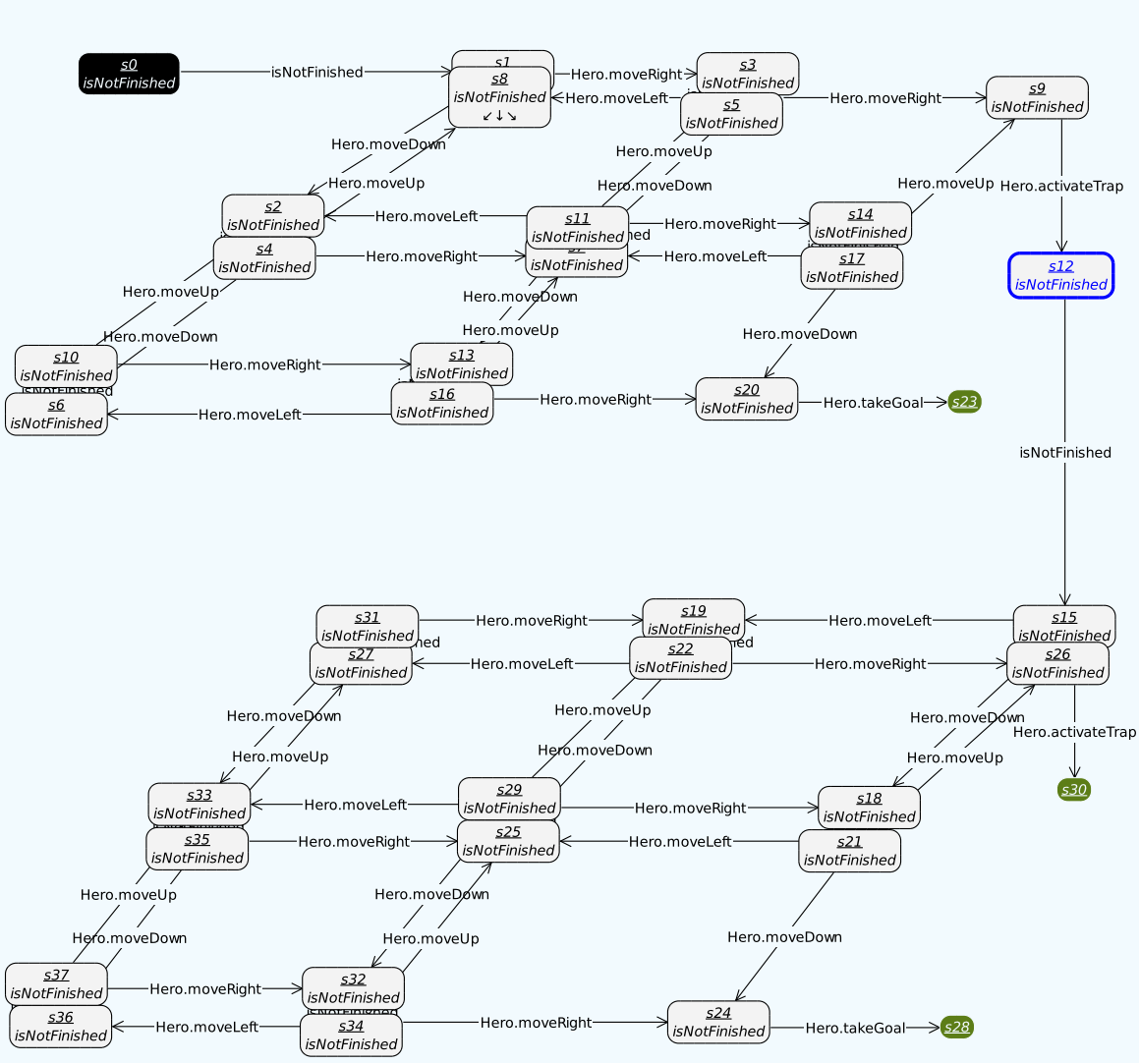
Analysis


s0 isNotFinished
isNotFinished
s1 isNotFinished
s8 isNotFinished
Hero.moveRight
s3 isNotFinished
Hero.moveLeft
s5 isNotFinished
Hero.moveRight
s9 isNotFinished
Hero.takeWeapon
s12 isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
Hero.moveUp
Hero.moveDown
s2 isNotFinished
Hero.moveLeft
s11 isNotFinished
Hero.moveRight
s14 isNotFinished
s4 isNotFinished
Hero.moveRight
s7 isNotFinished
Hero.moveLeft
s17 isNotFinished
Hero.moveUp
Hero.moveDown
Hero.moveDown
Hero.moveUp
Hero.moveDown
s10 isNotFinished
Hero.moveRight
s13 isNotFinished
s6 isNotFinished
Hero.moveLeft
s16 isNotFinished
Hero.moveRight
s20 isNotFinished
Hero.takeGoal
s23
isNotFinished
s30 isNotFinished
Hero.moveRight
s19 isNotFinished
Hero.moveLeft
s15
s27 isNotFinished
Hero.moveLeft
s22 isNotFinished
Hero.moveRight
s26 isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
Hero.moveDown
Hero.moveUp
s32 isNotFinished
Hero.moveLeft
s29 isNotFinished
Hero.moveRight
s18 isNotFinished
s34 isNotFinished
Hero.moveRight
s25 isNotFinished
Hero.moveLeft
s21 isNotFinished
Hero.moveUp
Hero.moveDown
Hero.moveDown
Hero.moveUp
Hero.moveDown
s36 isNotFinished
Hero.moveRight
s31 isNotFinished
s35 isNotFinished
Hero.moveLeft
s33 isNotFinished
Hero.moveRight
s24 isNotFinished
Hero.takeGoal
s28

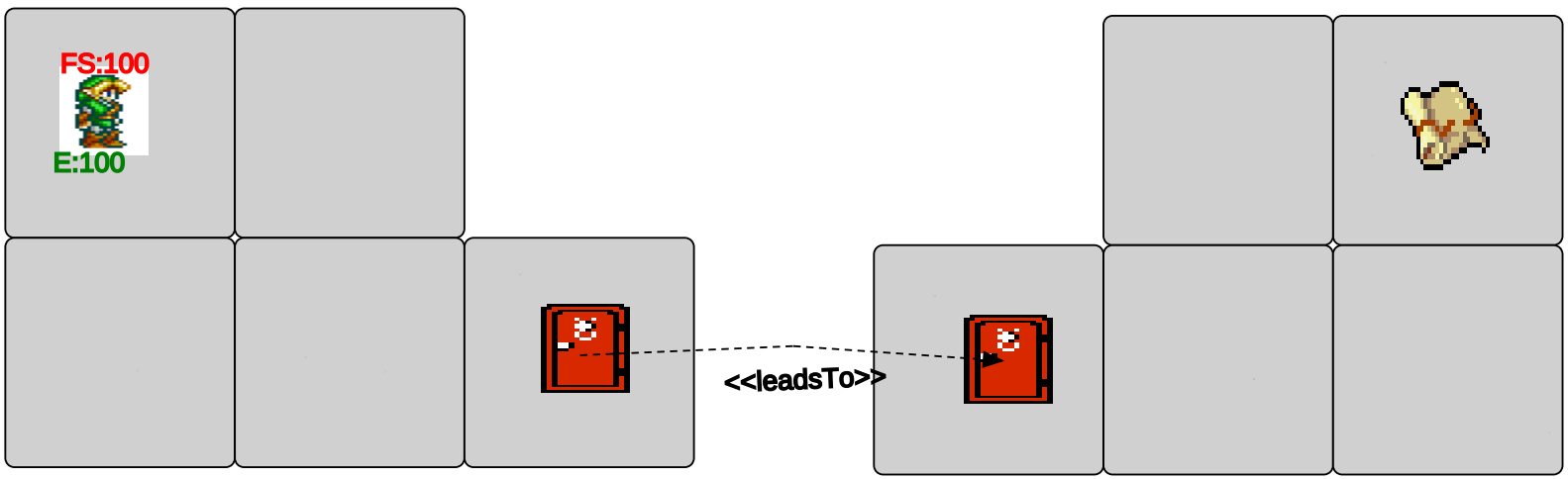
Analysis


Scene
name = "scene1"
contains
World
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
right
left
Tile
right
Tile
contains
Trap
damage = 50
up
down
contains
contains
contains
up
down
Tile
right
left
Tile
Tile
upwn
upwn
upwn
Tile
right
left
Tile
Tile
contains
Goal

Analysis


s0 isNotFinished
isNotFinished
s1 s8 isNotFinished
Hero.moveRight
Hero.moveLeft
s3 isNotFinished
s5 isNotFinished
Hero.moveRight
s9 isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
Hero.moveUp
Hero.activateTrap
s2 isNotFinished
Hero.moveLeft
s11 isNotFinished
Hero.moveRight
s14 isNotFinished
s4 isNotFinished
Hero.moveRight
Hero.moveLeft
s17 isNotFinished
s12 isNotFinished
Hero.moveUp
Hero.moveDown
Hero.moveUp
Hero.moveDown
Hero.moveDown
s10 isNotFinished
Hero.moveRight
s13 isNotFinished
s6 isNotFinished
Hero.moveLeft
s16 isNotFinished
Hero.moveRight
s20 isNotFinished
Hero.takeGoal
s23
isNotFinished
s31 isNotFinished
Hero.moveRight
s19 isNotFinished
Hero.moveLeft
s15 isNotFinished
s27 isNotFinished
Hero.moveLeft
s22 isNotFinished
Hero.moveRight
s26 isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
Hero.moveDown
Hero.moveUp
Hero.activateTrap
s30
s33 isNotFinished
Hero.moveLeft
s29 isNotFinished
Hero.moveRight
s18 isNotFinished
s35 isNotFinished
Hero.moveRight
s25 isNotFinished
Hero.moveLeft
s21 isNotFinished
Hero.moveUp
Hero.moveDown
Hero.moveDown
Hero.moveUp
Hero.moveDown
s37 isNotFinished
Hero.moveRight
s32 isNotFinished
s36 isNotFinished
Hero.moveLeft
s34 isNotFinished
Hero.moveRight
s24 isNotFinished
Hero.takeGoal
s28

Analysis



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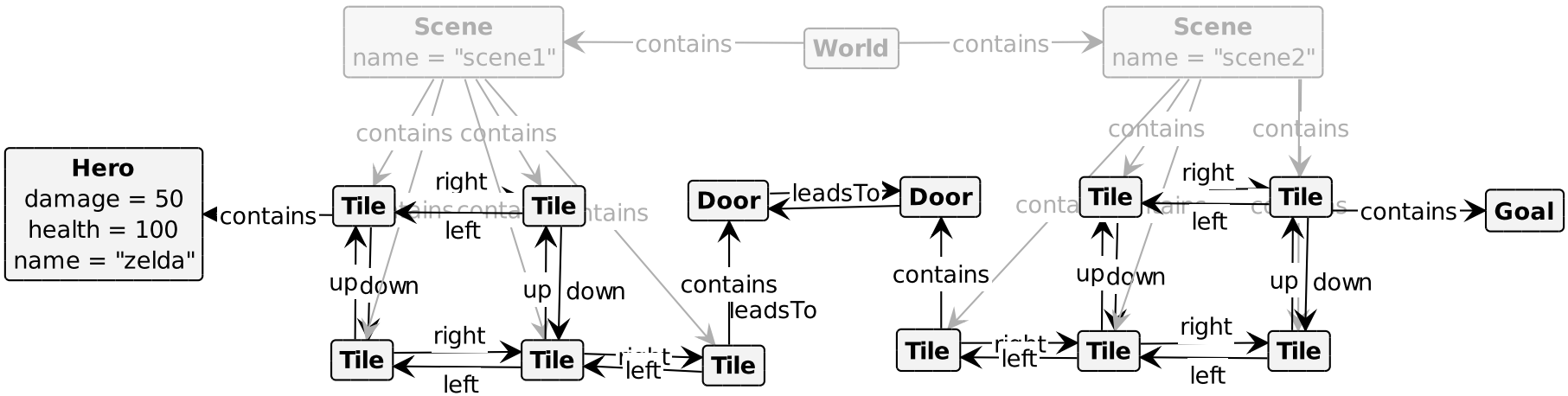
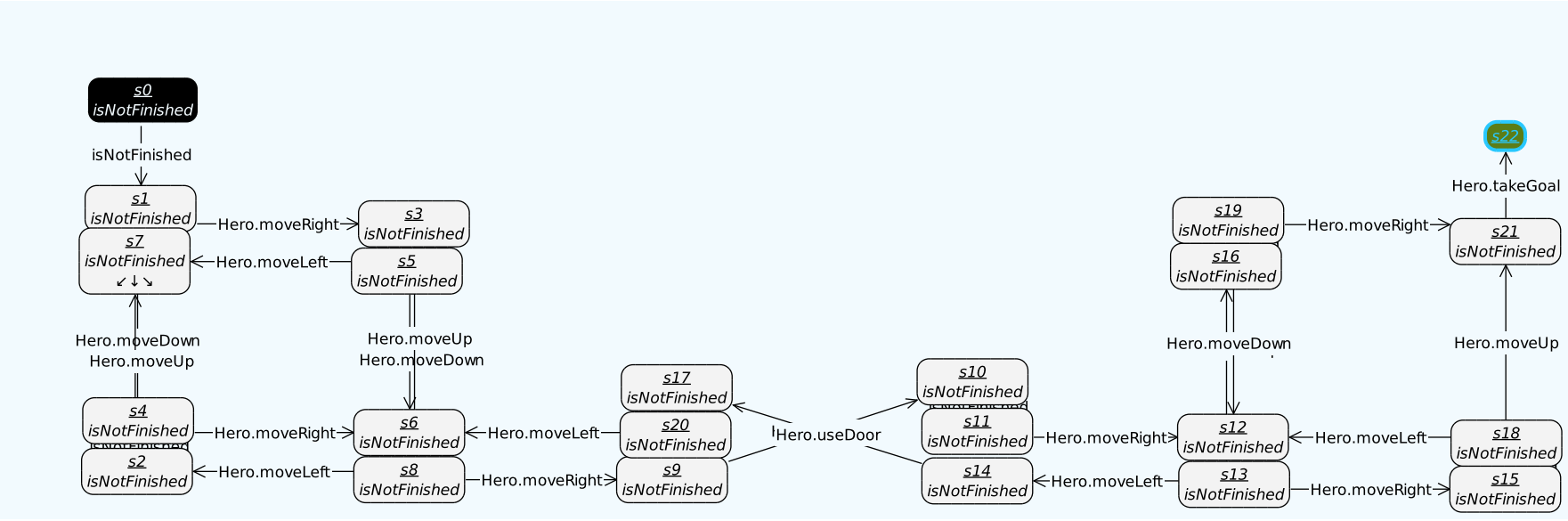
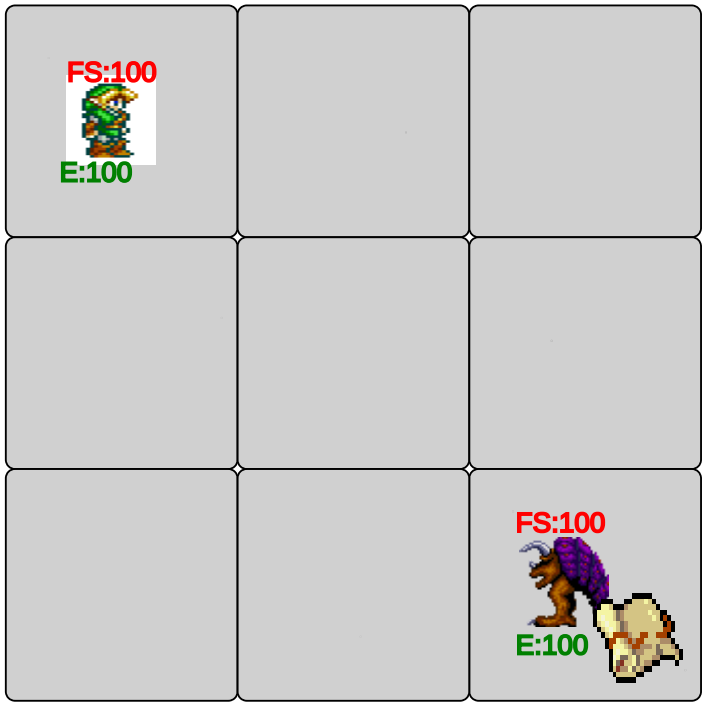

Scene
name = "scene1"
contains
World
contains
Scene
name = "scene2"
contains
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
right
left
Tile
Door
leadsTo
Door
Tile
right
left
Tile
contains
Goal
up
down
up
down
contains
leadsTo
contains
up
down
up
down
Tile
right
left
Tile
right
left
Tile
Tile
right
left
Tile
right
left
Tile

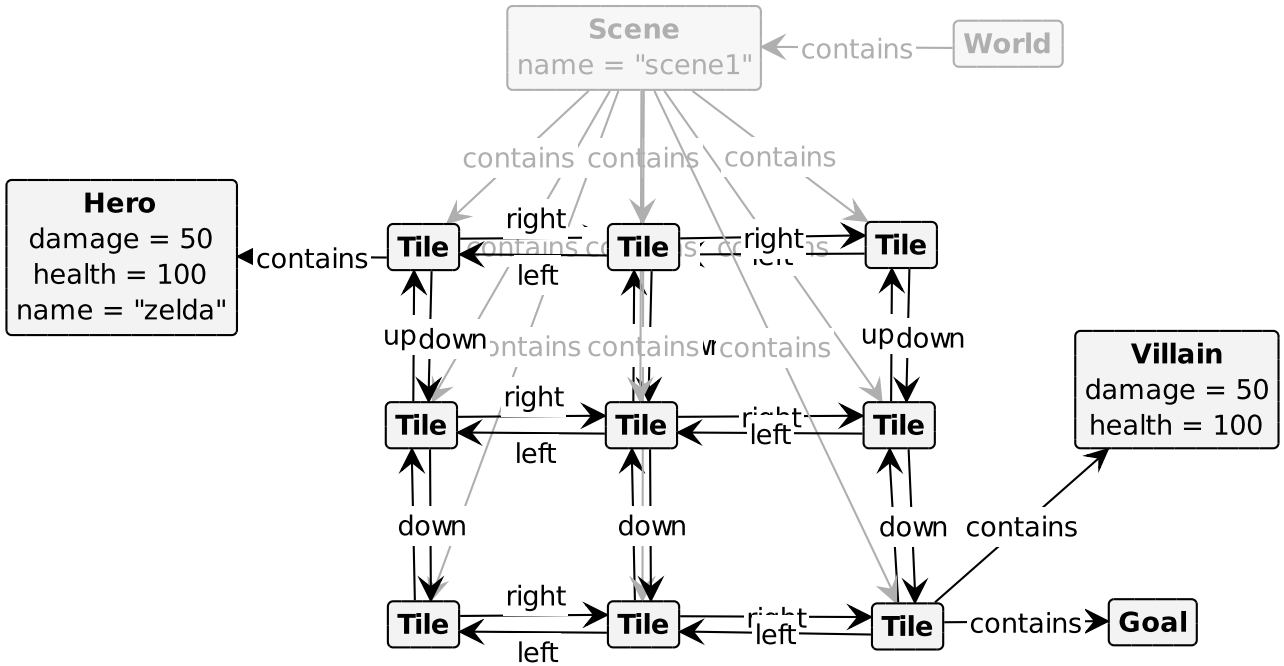
Analysis


s0
isNotFinished
isNotFinished
s1
isNotFinished
Hero.moveRight
s3
isNotFinished
s7
isNotFinished
Hero.moveLeft
s5
isNotFinished
Hero.moveDown
Hero.moveUp
Hero.moveUp
Hero.moveDown
s4
isNotFinished
Hero.moveRight
s6
isNotFinished
Hero.moveLeft
s17
isNotFinished
s20
isNotFinished
s2
isNotFinished
Hero.moveLeft
s8
isNotFinished
Hero.moveRight
s9
isNotFinished
Hero.useDoor
s10
isNotFinished
s11
isNotFinished
s14
isNotFinished
Hero.moveRight
Hero.moveLeft
s19
isNotFinished
s16
isNotFinished
Hero.moveRight
s12
isNotFinished
s13
isNotFinished
Hero.moveLeft
Hero.moveRight
s22
Hero.takeGoal
s21
isNotFinished
Hero.moveUp
s18
isNotFinished
s15
isNotFinished

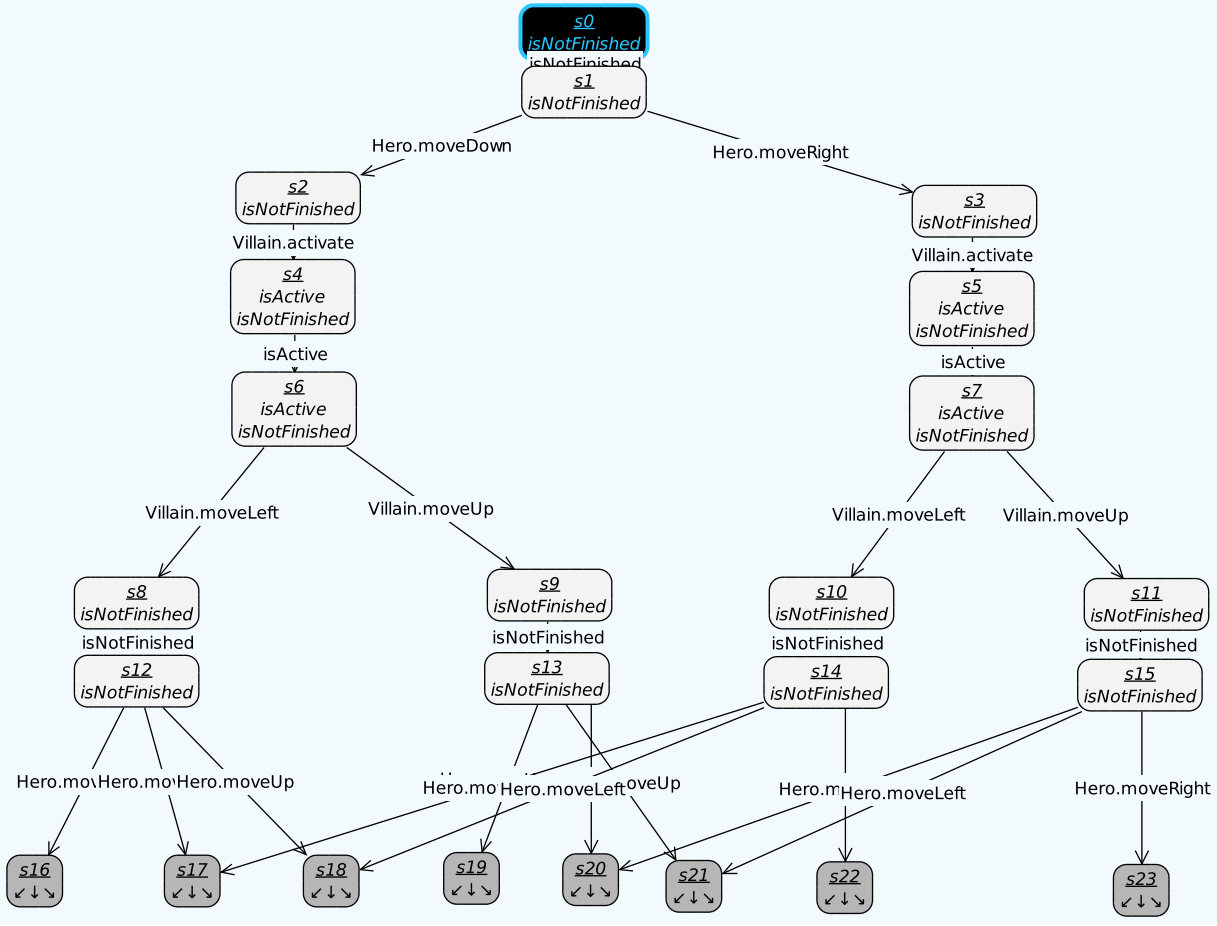
Analysis



Analysis


Scene
name = "scene1"
contains
World
contains
contains
contains
Hero
damage = 50
health = 100
name = "zelda"
contains
Tile
right
left
Tile
right
left
Tile
up
down
up
down
Villain
damage = 50
health = 100
Tile
right
left
Tile
left
Tile
down
down
down
contains
Tile
right
left
Tile
left
Tile
contains
Goal

Analysis


s0
isNotFinished
s1
isNotFinished
Hero.moveDown
Hero.moveRight
s2
isNotFinished
s3
isNotFinished
Villain.activate
Villain.activate
s4
isActive
isNotFinished
s5
isActive
isNotFinished
isActive
isActive
s6
isActive
isNotFinished
s7
isActive
isNotFinished
Villain.moveLeft
Villain.moveUp
Villain.moveLeft
Villain.moveUp
s8
isNotFinished
s9
isNotFinished
s10
isNotFinished
s11
isNotFinished
isNotFinished
isNotFinished
isNotFinished
isNotFinished
s12
isNotFinished
s13
isNotFinished
s14
isNotFinished
s15
isNotFinished
Hero.moveUp
Hero.moveLeft
Hero.moveLeft
Hero.moveRight
s16
s17
s18
s19
s20
s21
s22
s23