Disease_Simulator

1.0

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Namespace Index

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MyWorld 12
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Interface IWorld allows initializing and setting diseases for a world . . . 38
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This class has its default constructor, inherited methods from the World class, and the methods specified in the IWorld interface . . . 42
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Chapter 5

Namespace Documentation

5.1 Actor Namespace Reference

Classes

- class Actor

5.1.1 Detailed Description

Actor class, which is the base class for Disease objects.

Author

Paulo Cavalcanti

Date

20/02/2020

5.2 ActorTest Namespace Reference

Classes

- class ActorTest

Functions

- def test_actOutput (capsys)

5.2.1 Detailed Description

A class for testing the Actor.

Usage:

- py.test ActorTest.py

Author

Paulo Roma

Since

22/02/2020

5.2.2 Function Documentation

5.2.2.1 test_actOutput()

```
def ActorTest.test_actOutput (
              capsys )
```

Definition at line 23 of file ActorTest.py.

5.3 Disease Namespace Reference

Classes

- class Disease

  This Disease class is a sub-class of the Actor class.

5.4 DiseaseTest Namespace Reference

Classes

- class DiseaseTest

5.4.1 Detailed Description

A class for testing the Disease.

Author

Paulo Roma

Since

23/02/2020

5.5 IDisease Namespace Reference

Classes

- class IDisease

  Interface IDisease allows setting the strength and growth condition of a disease.

Variables

- ABC = object

5.5.1 Detailed Description

Disease Interface.

5.5.2 Variable Documentation

5.5.2.1 ABC

```
IDisease.ABC = object
```

Definition at line 12 of file IDisease.py.

5.6 IWorld Namespace Reference

Classes

- class IWorld

  Interface IWorld allows initializing and setting diseases for a world.

Variables

- ABC = object

5.6.1 Variable Documentation

5.6.1.1 ABC

```
IWorld.ABC = object
```

Definition at line 12 of file IWorld.py.

5.7 MyWorld Namespace Reference

Classes

- class MyWorld

  This class has its default constructor, inherited methods from the World class, and the methods specified in the IWorld interface.

Functions

- def main ()

5.7.1 Function Documentation

5.7.1.1 main()

```
def MyWorld.main ( )
```

Definition at line 279 of file MyWorld.py.

5.8 MyWorldTest Namespace Reference

Classes

- class MyWorldTest

5.8.1 Detailed Description

A class for testing the MyWorld.

Author

Paulo Roma

Since

01/03/2020

5.9 SimulationPanel Namespace Reference

Classes

- class SimulationPanel
  Class for presenting the simulation in a graphical form.
- class Timer

Functions

- def main (argv=None)
  Create a canvas and keep iterating at a rate of approximately 30 circles per second.

5.9.1 Detailed Description

SimulationPanel is a class for filling a rectangle with non-intersecting circles representing diseases.

Author

Paulo Roma Cavalcanti

Date

14/05/2020

See also

https://bic-berkeley.github.io/psych-214-fall-2016/sys_path.html

5.9.2 Function Documentation

5.9.2.1 main()

```
def SimulationPanel.main (
              argv = None )
```

Create a canvas and keep iterating at a rate of approximately 30 circles per second.

Parameters

argv	command line arguments: • h help • w width of the grid • h height of the grid. • v verbose mode

Usage:

- SimulationPanel.py -w 6 -h 7 -v or
- SimulationPanel.py –width=6 –height=7 -v or
- SimulationPanel.py –help

Definition at line 308 of file SimulationPanel.py.

5.10 Simulator Namespace Reference

Functions

- def main (args=None)
  This is the main method that sets up a virtual world and simulates the growth of diseases in the world.

5.10.1 Detailed Description

Simulates the growth of diseases in a virtual world.

5.10.2 Function Documentation

5.10.2.1 main()

```
def Simulator.main (
              args = None )
```

This is the main method that sets up a virtual world and simulates the growth of diseases in the world.

Parameters

args	command line arguments: • Number of iterations.

Author

Paulo Cavalcanti

Date

22/02/2020

Definition at line 24 of file Simulator.py.

5.11 World Namespace Reference

Classes

- class World

  Class for holding Actor objects in cells of a grid in the world.

Functions

- def main ()

5.11.1 Function Documentation

5.11.1.1 main()

```
def World.main ( )
```

Definition at line 290 of file World.py.

5.12 WorldTest Namespace Reference

Classes

- class WorldTest

5.12.1 Detailed Description

A class for testing the World.

Author

Paulo Roma

Since

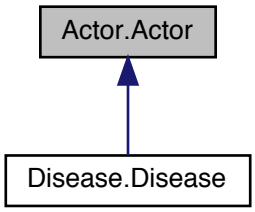
23/02/2020

Chapter 6

Class Documentation

6.1 Actor.Actor Class Reference

Inheritance diagram for Actor.Actor:



Public Member Functions

- def __init__ (self)

  Construct a new Actor object.
- def getID (self)

  Used for testing.
- def Iteration (self)

  Used for testing.
- def act (self)

  Prints on screen in the format "Iteration <ID>: Actor <Actor ID>".
- def setLocation (self, x, y)

  Sets the cell coordinates of this object.
- def addedToWorld (self, world)

Sets the world this actor is into.

- def getWorld (self)

  Gets the world this object in into.

- def getX (self)

  Gets the X coordinate of the cell this actor object is into.

- def getY (self)

  Gets the Y coordinate of the cell this actor object is into.

- def __str__ (self)

  Return a string with this actor ID and position.

Private Attributes

- __locX

  X coordinate of this actor.

- __locY

  Y coordinate of this actor.

- __world

  World this actor belongs to.

- __actorID

  Unique identifier for this actor.

- __itCounter

  Iteration counter.

Static Private Attributes

- int __ID = 0

  Holds the value of the next "free" id.

6.1.1 Detailed Description

Definition at line 13 of file Actor.py.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 __init__()

```
def Actor.Actor.__init__ (
              self )
```

Construct a new Actor object.

- Sets the initial values of its member variables.
- Sets the unique ID for the object and initializes the reference to the World object to which this Actor object belongs to null.
- The ID of the first Actor object is 0.
- The ID gets incremented by one each time a new Actor object is created.
- Sets the iteration counter to zero and initialize the location of the object to cell (0,0).

Reimplemented in Disease.Disease.

Definition at line 28 of file Actor.py.

6.1.3 Member Function Documentation

6.1.3.1 __str__()

```
def Actor.Actor.__str__ (
              self )
```

Return a string with this actor ID and position.

Reimplemented in Disease.Disease.

Definition at line 146 of file Actor.py.

References Actor.Actor.getID(), Actor.Actor.getX(), and Actor.Actor.getY().

6.1.3.2 act()

```
def Actor.Actor.act (
              self )
```

Prints on screen in the format "Iteration <ID>: Actor <Actor ID>".

The $< ID >$ is replaced by the current iteration number. $< ActorID >$ is replaced by the unique ID of the Actor object that performs the act(self) method.

For instance, the actor with ID 1 shows the following result on the output screen after its act(self) method has been called twice.

```
Iteration 0: Actor 1
Iteration 1: Actor 1
```

Reimplemented in Disease.Disease.

Definition at line 72 of file Actor.py.

References Actor.Actor.__actorID, and Actor.Actor.__itCounter.

6.1.3.3 addedToWorld()

```
def Actor.Actor.addedToWorld (
              self,
              world )
```

Sets the world this actor is into.

Parameters

world	Reference to the World object this Actor object is added.

Exceptions

RuntimeError	when world is null.

Definition at line 109 of file Actor.py.

References Actor.Actor.__world.

6.1.3.4 getID()

```
def Actor.Actor.getID (
              self )
```

Used for testing.

Returns

ActorID

Definition at line 46 of file Actor.py.

References Actor.Actor.__actorID.

Referenced by Actor.Actor.__str__().

6.1.3.5 getWorld()

```
def Actor.Actor.getWorld (
              self )
```

Gets the world this object in into.

Returns

the world this object belongs to

Definition at line 120 of file Actor.py.

References Actor.Actor.__world.

Referenced by Disease.Disease.__str__(), Disease.Disease.act(), and Disease.Disease.getQuadrant().

6.1.3.6 getX()

```
def Actor.Actor.getX (
              self )
```

Gets the X coordinate of the cell this actor object is into.

Returns

the x coordinate of this Actor object.

Definition at line 131 of file Actor.py.

References Actor.Actor.__locX.

Referenced by Actor.Actor.__str__(), and Disease.Disease.getQuadrant().

6.1.3.7 getY()

```
def Actor.Actor.getY (
              self )
```

Gets the Y coordinate of the cell this actor object is into.

Returns

the y coordinate of this Actor object.

Definition at line 140 of file Actor.py.

References Actor.Actor.__locY.

Referenced by Actor.Actor.__str__(), and Disease.Disease.getQuadrant().

6.1.3.8 Iteration()

```
def Actor.Actor.Iteration (
              self )
```

Used for testing.

Returns

number of iterations

Definition at line 54 of file Actor.py.

References Actor.Actor.__itCounter.

6.1.3.9 setLocation()

```
def Actor.Actor.setLocation (
              self,
              x,
              y )
```

Sets the cell coordinates of this object.

Parameters

x	the column.
y	the row.

Exceptions

ValueError	when x $<$ 0 or x $>$= world width,
ValueError	when y $<$ 0 or y $>$= world height,
RuntimeError	when the world is null.

Definition at line 90 of file Actor.py.

References Actor.Actor.__locX, Actor.Actor.__locY, and Actor.Actor.__world.

6.1.4 Member Data Documentation

6.1.4.1 __actorID

```
Actor.Actor.__actorID  [private]
```

Unique identifier for this actor.

Definition at line 36 of file Actor.py.

Referenced by Actor.Actor.act(), and Actor.Actor.getID().

6.1.4.2 __ID

```
int Actor.Actor.__ID = 0  [static], [private]
```

Holds the value of the next "free" id.

Definition at line 16 of file Actor.py.

6.1.4.3 __itCounter

```
Actor.Actor.__itCounter  [private]
```

Iteration counter.

Definition at line 39 of file Actor.py.

Referenced by Actor.Actor.act(), MyWorld.MyWorld.act(), and Actor.Actor.Iteration().

6.1.4.4 __locX

`Actor.Actor.__locX [private]`

X coordinate of this actor.

Definition at line 30 of file Actor.py.

Referenced by Actor.Actor.getX(), and Actor.Actor.setLocation().

6.1.4.5 __locY

`Actor.Actor.__locY [private]`

Y coordinate of this actor.

Definition at line 32 of file Actor.py.

Referenced by Actor.Actor.getY(), and Actor.Actor.setLocation().

6.1.4.6 __world

`Actor.Actor.__world [private]`

World this actor belongs to.

Definition at line 34 of file Actor.py.

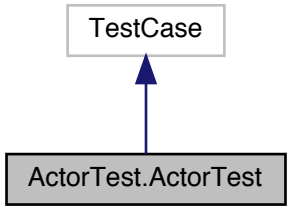
Referenced by Actor.Actor.addedToWorld(), Actor.Actor.getWorld(), and Actor.Actor.setLocation().

The documentation for this class was generated from the following file:

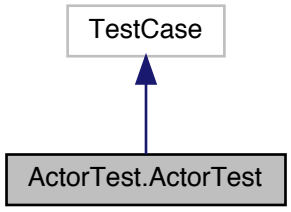
- Actor.py

6.2 ActorTest.ActorTest Class Reference

Inheritance diagram for ActorTest.ActorTest:



Collaboration diagram for ActorTest.ActorTest:



Public Member Functions

- def test_constructor (self)
- def test_setLocation1 (self)

  Exception tests for setLocation()
- def test_setLocation2 (self)

  Exception tests for setLocation()
- def test_setLocation3 (self)

  SetLocation() test.
- def test_setLocation4 (self)

  SetLocation() test.
- def test_getWorld (self)
- def test_addedtoWorld (self)

6.2.1 Detailed Description

Definition at line 29 of file ActorTest.py.

6.2.2 Member Function Documentation

6.2.2.1 test_addedtoWorld()

```
def ActorTest.ActorTest.test_addedtoWorld (
              self )
```

Definition at line 90 of file ActorTest.py.

6.2.2.2 test_constructor()

```
def ActorTest.ActorTest.test_constructor (
              self )
```

Definition at line 31 of file ActorTest.py.

6.2.2.3 test_getWorld()

```
def ActorTest.ActorTest.test_getWorld (
              self )
```

Definition at line 83 of file ActorTest.py.

6.2.2.4 test_setLocation1()

```
def ActorTest.ActorTest.test_setLocation1 (
              self )
```

Exception tests for setLocation()

Definition at line 42 of file ActorTest.py.

6.2.2.5 test_setLocation2()

```
def ActorTest.ActorTest.test_setLocation2 (
              self )
```

Exception tests for setLocation()

Definition at line 53 of file ActorTest.py.

6.2.2.6 test_setLocation3()

```
def ActorTest.ActorTest.test_setLocation3 (
              self )
```

SetLocation() test.

Definition at line 64 of file ActorTest.py.

6.2.2.7 test_setLocation4()

```
def ActorTest.ActorTest.test_setLocation4 (
              self )
```

SetLocation() test.

Definition at line 75 of file ActorTest.py.

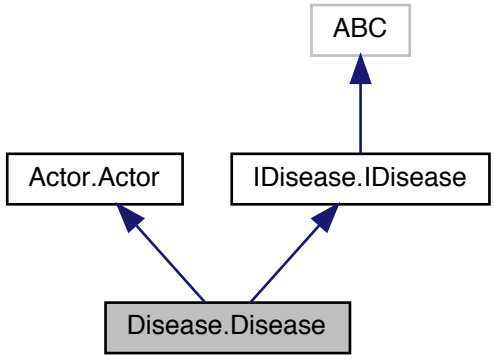
The documentation for this class was generated from the following file:

- ActorTest.py

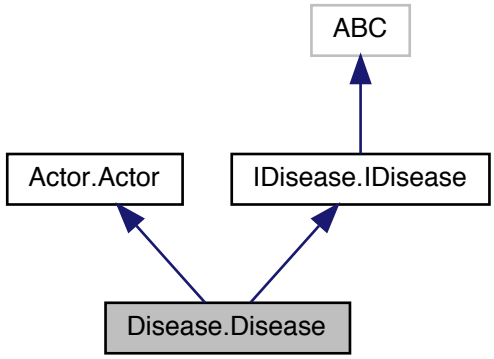
6.3 Disease.Disease Class Reference

This Disease class is a sub-class of the Actor class.

Inheritance diagram for Disease.Disease:



Collaboration diagram for Disease.Disease:



Public Member Functions

- def __init__ (self)

Constructor.

- def setGrowthCondition (self, lTemp, hTemp, gRate)

  Sets the disease growth rate, lower temperature and higher temperature.
- def getGrowthCondition (self)

  Returns the disease growth rate, lower temperature and higher temperature.
- def getQuadrant (self)

  Returns the quadrant of this disease.
- def act (self)

  Print on screen in the format "Iteration <ID>: Actor <Actor ID>.".
- def getStrength (self)

  Return the disease strength of this object.
- def __str__ (self)

  Return a string with the strength, growth and quadrant of this disease.

Private Attributes

- __growthRate

  Rate at which the disease grows when subjected to the appropriate temperature range.
- __lowerTemp

  Minimum temperature for the disease development.
- __higherTemp

  Maximum temperature for the disease development.
- __dStrength

  Disease strength.

6.3.1 Detailed Description

This Disease class is a sub-class of the Actor class.

Author

Paulo Cavalcanti

Date

22/02/2020

Definition at line 16 of file Disease.py.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 __init__()

```
def Disease.Disease.__init__ (
              self )
```

Constructor.

- Call its superclass's default constructor.
- Initialize the lower bound and the upper bound temperatures for the growth rate to 0.
- Set the growth rate to 0.
- Set the disease strength to 1.

Reimplemented from Actor.Actor.

Definition at line 26 of file Disease.py.

6.3.3 Member Function Documentation

6.3.3.1 __str__()

```
def Disease.Disease.__str__ (
              self )
```

Return a string with the strength, growth and quadrant of this disease.

Reimplemented from Actor.Actor.

Definition at line 103 of file Disease.py.

References Disease.Disease.getGrowthCondition(), Disease.Disease.getQuadrant(), Disease.Disease.getStrength(), and Actor.Actor.getWorld().

6.3.3.2 act()

```
def Disease.Disease.act (
              self )
```

Print on screen in the format "Iteration <ID>: Actor <Actor ID>.".

- The $< ID >$ is replaced by the current iteration number.
- $< ActorID >$ is replaced by the unique ID of the Actor object that performs the act() method.

Reimplemented from Actor.Actor.

Definition at line 86 of file Disease.py.

References Disease.Disease.__dStrength, Disease.Disease.__growthRate, Disease.Disease.__higherTemp, Disease.↩
Disease.__lowerTemp, Disease.Disease.getQuadrant(), and Actor.Actor.getWorld().

6.3.3.3 getGrowthCondition()

```
def Disease.Disease.getGrowthCondition (
              self )
```

Returns the disease growth rate, lower temperature and higher temperature.

Returns

growth rate, lower temp and higher temp

Definition at line 54 of file Disease.py.

References Disease.Disease.__growthRate, Disease.Disease.__higherTemp, and Disease.Disease.__lowerTemp.

Referenced by Disease.Disease.__str__().

6.3.3.4 getQuadrant()

```
def Disease.Disease.getQuadrant (
              self )
```

Returns the quadrant of this disease.

Upper left corner is at (0,0).

Returns

0, 1, 2 or 3.

Definition at line 63 of file Disease.py.

References Actor.Actor.getWorld(), Actor.Actor.getX(), and Actor.Actor.getY().

Referenced by Disease.Disease.__str__(), and Disease.Disease.act().

6.3.3.5 getStrength()

```
def Disease.Disease.getStrength (
              self )
```

Return the disease strength of this object.

Returns

disease strength of the object.

Reimplemented from IDisease.IDisease.

Definition at line 97 of file Disease.py.

References Disease.Disease.__dStrength.

Referenced by Disease.Disease.__str__().

6.3.3.6 setGrowthCondition()

```
def Disease.Disease.setGrowthCondition (
              self,
              lTemp,
              hTemp,
              gRate )
```

Sets the disease growth rate, lower temperature and higher temperature.

Parameters

lTemp	Lower bound temperature for the disease to grow at this gRate.
hTemp	Upper bound temperature for the disease to grow at this gRate.
gRate	The growth rate.

Reimplemented from IDisease.IDisease.

Definition at line 44 of file Disease.py.

References Disease.Disease.__growthRate, Disease.Disease.__higherTemp, and Disease.Disease.__lowerTemp.

6.3.4 Member Data Documentation

6.3.4.1 __dStrength

```
Disease.Disease.__dStrength  [private]
```

Disease strength.

Definition at line 35 of file Disease.py.

Referenced by Disease.Disease.act(), and Disease.Disease.getStrength().

6.3.4.2 __growthRate

```
Disease.Disease.__growthRate  [private]
```

Rate at which the disease grows when subjected to the appropriate temperature range.

Definition at line 29 of file Disease.py.

Referenced by Disease.Disease.act(), Disease.Disease.getGrowthCondition(), and Disease.Disease.setGrowth↩ Condition().

6.3.4.3 __higherTemp

```
Disease.Disease.__higherTemp  [private]
```

Maximum temperature for the disease development.

Definition at line 33 of file Disease.py.

Referenced by Disease.Disease.act(), Disease.Disease.getGrowthCondition(), and Disease.Disease.setGrowth↩ Condition().

6.3.4.4 __lowerTemp

```
Disease.Disease.__lowerTemp  [private]
```

Minimum temperature for the disease development.

Definition at line 31 of file Disease.py.

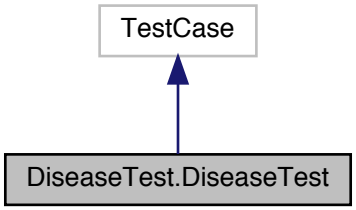
Referenced by Disease.Disease.act(), Disease.Disease.getGrowthCondition(), and Disease.Disease.setGrowth↩ Condition().

The documentation for this class was generated from the following file:

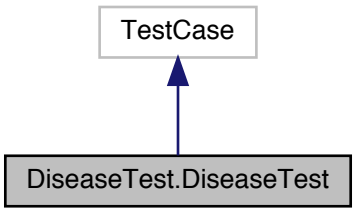
- Disease.py

6.4 DiseaseTest.DiseaseTest Class Reference

Inheritance diagram for DiseaseTest.DiseaseTest:



Collaboration diagram for DiseaseTest.DiseaseTest:



Public Member Functions

- def test_checkTemp (self)

  Sets the temperature in each quadrant.
- def test_getStrength (self)

  GetStrength() test.
- def test_getStrength2 (self)
- def test_quadrant2 (self)
- def test_quadrant_invalid (self)
- def test_quadrant3 (self)

6.4.1 Detailed Description

Definition at line 19 of file DiseaseTest.py.

6.4.2 Member Function Documentation

6.4.2.1 test_checkTemp()

```
def DiseaseTest.DiseaseTest.test_checkTemp (
            self )
```

Sets the temperature in each quadrant.

Exceptions

FileNotFoundException	

Definition at line 25 of file DiseaseTest.py.

6.4.2.2 test_getStrength()

```
def DiseaseTest.DiseaseTest.test_getStrength (
              self )
```

GetStrength() test.

Definition at line 40 of file DiseaseTest.py.

6.4.2.3 test_getStrength2()

```
def DiseaseTest.DiseaseTest.test_getStrength2 (
              self )
```

Definition at line 46 of file DiseaseTest.py.

6.4.2.4 test_quadrant2()

```
def DiseaseTest.DiseaseTest.test_quadrant2 (
              self )
```

Definition at line 60 of file DiseaseTest.py.

6.4.2.5 test_quadrant3()

```
def DiseaseTest.DiseaseTest.test_quadrant3 (
              self )
```

Definition at line 75 of file DiseaseTest.py.

6.4.2.6 test_quadrant_invalid()

```
def DiseaseTest.DiseaseTest.test_quadrant_invalid (
              self )
```

Definition at line 67 of file DiseaseTest.py.

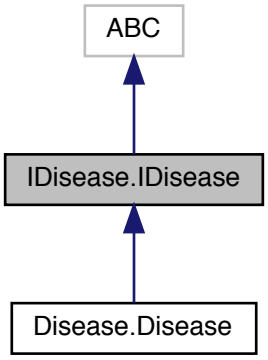
The documentation for this class was generated from the following file:

- DiseaseTest.py

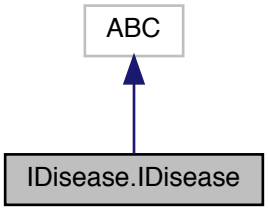
6.5 IDisease.IDisease Class Reference

Interface IDisease allows setting the strength and growth condition of a disease.

Inheritance diagram for IDisease.IDisease:



Collaboration diagram for IDisease.IDisease:



Public Member Functions

- def setGrowthCondition (self, lTemp, hTemp, gRate)

  Set the growth condition of a Disease object to gRate.
- def getStrength (self)

  Return the disease strength of the object implements this interface.

Static Private Attributes

- __metaclass__ = ABCMeta

6.5.1 Detailed Description

Interface IDisease allows setting the strength and growth condition of a disease.

Author

Paulo Cavalcanti

Date

22/02/2020

Definition at line 21 of file IDisease.py.

6.5.2 Member Function Documentation

6.5.2.1 getStrength()

```
def IDisease.IDisease.getStrength (
              self )
```

Return the disease strength of the object implements this interface.

Reimplemented in Disease.Disease.

Definition at line 36 of file IDisease.py.

6.5.2.2 setGrowthCondition()

```
def IDisease.IDisease.setGrowthCondition (
              self,
              lTemp,
              hTemp,
              gRate )
```

Set the growth condition of a Disease object to gRate.

The value of gRate gets multiplied to the current disease strength only when the disease is located in the world region with the average temperature in between the values of lTemp and hTemp.

Reimplemented in Disease.Disease.

Definition at line 31 of file IDisease.py.

6.5.3 Member Data Documentation

6.5.3.1 __metaclass__

```
IDisease.IDisease.__metaclass__ = ABCMeta  [static], [private]
```

Definition at line 22 of file IDisease.py.

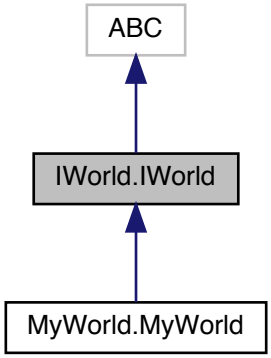
The documentation for this class was generated from the following file:

- IDisease.py

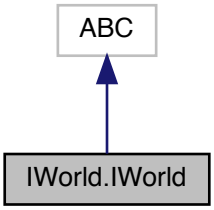
6.6 IWorld.IWorld Class Reference

Interface IWorld allows initializing and setting diseases for a world.

Inheritance diagram for IWorld.IWorld:



Collaboration diagram for IWorld.IWorld:



Public Member Functions

- def prepare (self)
- def setTemp (self, quad, temp)
- def getTemp (self, quad)
- def getObjects (self)
- def getSumStrength (self)
- def initDiseases (self, numDisStr)
- def initLocations (self, locationsStr, diseaseArr)
- def initGrowthConditions (self, growthStr, diseaseArr)
- def initTemps (tempStr)

Static Private Attributes

- __metaclass__ = ABCMeta

6.6.1 Detailed Description

Interface IWorld allows initializing and setting diseases for a world.

Author

Paulo Cavalcanti

Date

22/02/2020

Definition at line 20 of file IWorld.py.

6.6.2 Member Function Documentation

6.6.2.1 getObjects()

```
def IWorld.IWorld.getObjects (
              self )
```

Definition at line 30 of file IWorld.py.

Referenced by MyWorld.MyWorld.getSumStrength().

6.6.2.2 getSumStrength()

```
def IWorld.IWorld.getSumStrength (
              self )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 32 of file IWorld.py.

Referenced by MyWorld.MyWorld.act().

6.6.2.3 getTemp()

```
def IWorld.IWorld.getTemp (
              self,
              quad )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 28 of file IWorld.py.

6.6.2.4 initDiseases()

```
def IWorld.IWorld.initDiseases (
              self,
              numDisStr )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 34 of file IWorld.py.

Referenced by MyWorld.MyWorld.prepare().

6.6.2.5 initGrowthConditions()

```
def IWorld.IWorld.initGrowthConditions (
              self,
              growthStr,
              diseaseArr )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 38 of file IWorld.py.

Referenced by MyWorld.MyWorld.prepare().

6.6.2.6 initLocations()

```
def IWorld.IWorld.initLocations (
              self,
              locationsStr,
              diseaseArr )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 36 of file IWorld.py.

Referenced by MyWorld.MyWorld.prepare().

6.6.2.7 initTemps()

```
def IWorld.IWorld.initTemps (
              tempStr )
```

Definition at line 40 of file IWorld.py.

Referenced by MyWorld.MyWorld.prepare().

6.6.2.8 prepare()

```
def IWorld.IWorld.prepare (
              self )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 24 of file IWorld.py.

6.6.2.9 setTemp()

```
def IWorld.IWorld.setTemp (
              self,
              quad,
              temp )
```

Reimplemented in MyWorld.MyWorld.

Definition at line 26 of file IWorld.py.

Referenced by MyWorld.MyWorld.initTemps().

6.6.3 Member Data Documentation

6.6.3.1 __metaclass__

```
IWorld.IWorld.__metaclass__ = ABCMeta  [static], [private]
```

Definition at line 21 of file IWorld.py.

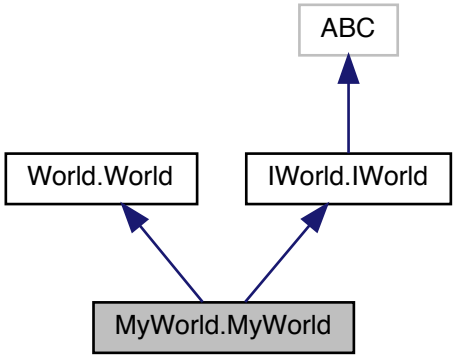
The documentation for this class was generated from the following file:

- IWorld.py

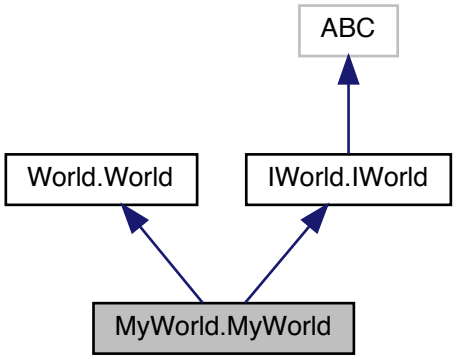
6.7 MyWorld.MyWorld Class Reference

This class has its default constructor, inherited methods from the World class, and the methods specified in the IWorld interface.

Inheritance diagram for MyWorld.MyWorld:



Collaboration diagram for MyWorld.MyWorld:



Public Member Functions

- def __init__ (self)

  Constructor.
- def setTemp (self, quad, temp)

  Sets the temperature of the given quadrant.
- def getTemp (self, quad)

  Gets the temperature of the given quadrant.
- def getSumStrength (self)

  Return the total disease strength of all the diseases in this world.
- def initDiseases (self, numDisStr)

  Create Disease objects.
- def initLocations (self, locationsStr, diseaseArr)

  Add each Disease object into this MyWorld object, according to the information in locationStr.
- def initGrowthConditions (self, growthStr, diseaseArr)

  Set the lower bound and upper bound temperature and the growth rate for each disease according to the input growthStr.
- def initTemps (self, tempStr)

  Sets the temperature for each quadrant of the MyWord according to the value of the tempStr.
- def prepare (self)

  Prepare the world.
- def act (self)

  This method overrides the act() method in the World class.

Private Attributes

- __temperature

  Array holding the temperatures of the four quadrants.
- __itCounter

  Iteration counter.

6.7.1 Detailed Description

This class has its default constructor, inherited methods from the World class, and the methods specified in the IWorld interface.

Author

Paulo Cavalcanti

Date

22/02/2020

See also

https://br.godaddy.com/engineering/2018/12/20/python-metaclasses/

Definition at line 19 of file MyWorld.py.

6.7.2 Constructor & Destructor Documentation

6.7.2.1 __init__()

```
def MyWorld.MyWorld.__init__ (
              self )
```

Constructor.

Calls the constructor of the World class with the width and height of 720 and 640 cells, respectively. Initialize an array to keep the average temperature of each world region (quadrant). Call the prepare() method.

Definition at line 28 of file MyWorld.py.

6.7.3 Member Function Documentation

6.7.3.1 act()

```
def MyWorld.MyWorld.act (
              self )
```

This method overrides the act() method in the World class.

This method prints "Iteration <ITRID>: World disease strength is <WorldDisease>", where $< ITRID >$ is replaced by the current iteration number and $< WorldDisease >$ is replaced by the returned value of getSumStrength() in 2 decimal places. An example is below:

```
Iteration 0: World disease strength is 2.00
Iteration 1: World disease strength is 3.00
```

Reimplemented from World.World.

Definition at line 275 of file MyWorld.py.

References MyWorld.MyWorld.__itCounter, Actor.Actor.__itCounter, and IWorld.IWorld.getSumStrength().

6.7.3.2 getSumStrength()

```
def MyWorld.MyWorld.getSumStrength (
              self )
```

Return the total disease strength of all the diseases in this world.

See also

http://docs.python.org/reference/expressions.html#generator-expressions

Reimplemented from IWorld.IWorld.

Definition at line 55 of file MyWorld.py.

References IWorld.IWorld.getObjects().

6.7.3.3 getTemp()

```
def MyWorld.MyWorld.getTemp (
              self,
              quad )
```

Gets the temperature of the given quadrant.

Reimplemented from IWorld.IWorld.

Definition at line 45 of file MyWorld.py.

References MyWorld.MyWorld.__temperature.

6.7.3.4 initDiseases()

```
def MyWorld.MyWorld.initDiseases (
              self,
              numDisStr )
```

Create Disease objects.

The number of the objects equals to the value passed in numDisStr. An example of a valid numDisStr is: "2".

If numDisStr is null or it cannot be converted to a positive integer, print a message on screen: "Check the NumDiseases line in simulation.config." and return null.

Returns

an array of object references to the created Disease objects.

Reimplemented from IWorld.IWorld.

Definition at line 69 of file MyWorld.py.

6.7.3.5 initGrowthConditions()

```
def MyWorld.MyWorld.initGrowthConditions (
              self,
              growthStr,
              diseaseArr )
```

Set the lower bound and upper bound temperature and the growth rate for each disease according to the input growthStr.

An example of a valid string for 2 Disease objects is: "10.0,15.0,2.010.0,13.0,3.0" If growthStr is empty or not in the correct format or does not have all the growth for all the Disease objects in the Disease array, print on screen "Check the DiseasesGrowth line in simulation.config." and return -1.

Returns

return 0 for a successful initialization of the Disease growth conditions.

Reimplemented from IWorld.IWorld.

Definition at line 140 of file MyWorld.py.

6.7.3.6 initLocations()

```
def MyWorld.MyWorld.initLocations (
              self,
              locationsStr,
              diseaseArr )
```

Add each Disease object into this MyWorld object, according to the information in locationStr.

An example of a locationStr is "200,200400,480". This means that the first Disease is planted at cell (200,200) and the second Disease is at cell (400, 480). If the locationStr is empty or not in the correct format or does not have all the cell coordinates of all the Disease objects, print on screen "Check the Locations line in simulation.config" and return -1.

Returns

0 for a successful initialization of the Disease locations.

Reimplemented from IWorld.IWorld.

Definition at line 100 of file MyWorld.py.

References World.World.addObject().

6.7.3.7 initTemps()

```
def MyWorld.MyWorld.initTemps (
              self,
              tempStr )
```

Sets the temperature for each quadrant of the MyWord according to the value of the tempStr.

An example of tempStr is below. The region temperatures for regions 0, 1, 2, and 3 are 12, 20, 50, and 100, respectively. Ex: "122050100"

Definition at line 176 of file MyWorld.py.

References IWorld.IWorld.setTemp().

6.7.3.8 prepare()

```
def MyWorld.MyWorld.prepare (
              self )
```

Prepare the world.

Open a text file named "simulation.config" in the current path (directly under the project directory). Parse the configuration file for the number of Disease objects, the cell locations of these objects, the growth rates, and the temperature ranges associated with individual growth rates.

Exceptions

IOError	

Reimplemented from IWorld.IWorld.

Definition at line 201 of file MyWorld.py.

References IWorld.IWorld.initDiseases(), IWorld.IWorld.initGrowthConditions(), IWorld.IWorld.initLocations(), and IWorld.IWorld.initTemps().

6.7.3.9 setTemp()

```
def MyWorld.MyWorld.setTemp (
              self,
              quad,
              temp )
```

Sets the temperature of the given quadrant.

Reimplemented from IWorld.IWorld.

Definition at line 39 of file MyWorld.py.

References MyWorld.MyWorld.__temperature.

6.7.4 Member Data Documentation

6.7.4.1 __itCounter

```
MyWorld.MyWorld.__itCounter  [private]
```

Iteration counter.

Definition at line 33 of file MyWorld.py.

Referenced by MyWorld.MyWorld.act().

6.7.4.2 __temperature

```
MyWorld.MyWorld.__temperature  [private]
```

Array holding the temperatures of the four quadrants.

Definition at line 31 of file MyWorld.py.

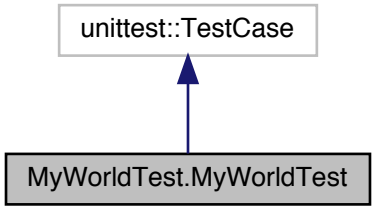
Referenced by MyWorld.MyWorld.getTemp(), and MyWorld.MyWorld.setTemp().

The documentation for this class was generated from the following file:

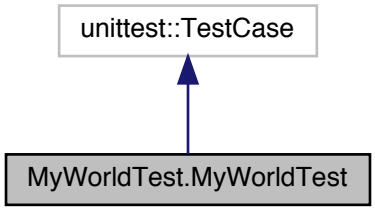
- MyWorld.py

6.8 MyWorldTest.MyWorldTest Class Reference

Inheritance diagram for MyWorldTest.MyWorldTest:



Collaboration diagram for MyWorldTest.MyWorldTest:



Public Member Functions

- def setUp (self)

  Run for all tests.
- def test_numberofObjects (self)

  Test number of objects.
- def test_quadTemp (self)

  Test quadrant temperatures.
- def test_diseasePos (self)

  Test disease position.
- def test_strength (self)

  Test disease strength.
- def test_diseaseGrowth (self)

  Test disease growth.

Public Attributes

- wd

  world object.
- nd

  number of objects (diseases) in wd.
- objs

  list of objects (diseases) in wd.
- lines

6.8.1 Detailed Description

Author

Paulo Roma

Definition at line 24 of file MyWorldTest.py.

6.8.2 Member Function Documentation

6.8.2.1 setUp()

```
def MyWorldTest.MyWorldTest.setUp (
            self )
```

Run for all tests.

Definition at line 29 of file MyWorldTest.py.

6.8.2.2 test_diseaseGrowth()

```
def MyWorldTest.MyWorldTest.test_diseaseGrowth (
              self )
```

Test disease growth.

Definition at line 93 of file MyWorldTest.py.

References MyWorldTest.MyWorldTest.lines, and MyWorldTest.MyWorldTest.objs.

6.8.2.3 test_diseasePos()

```
def MyWorldTest.MyWorldTest.test_diseasePos (
              self )
```

Test disease position.

Definition at line 63 of file MyWorldTest.py.

References MyWorldTest.MyWorldTest.lines, and MyWorldTest.MyWorldTest.objs.

6.8.2.4 test_numberofObjects()

```
def MyWorldTest.MyWorldTest.test_numberofObjects (
              self )
```

Test number of objects.

Definition at line 47 of file MyWorldTest.py.

References MyWorldTest.MyWorldTest.lines, and MyWorldTest.MyWorldTest.nd.

6.8.2.5 test_quadTemp()

```
def MyWorldTest.MyWorldTest.test_quadTemp (
              self )
```

Test quadrant temperatures.

Definition at line 54 of file MyWorldTest.py.

References MyWorldTest.MyWorldTest.lines, and MyWorldTest.MyWorldTest.wd.

6.8.2.6 test_strength()

```
def MyWorldTest.MyWorldTest.test_strength (
              self )
```

Test disease strength.

- $10 < 12 < 15$ - disease in region 0 (grows with rate 2)
- $10 < 100 > 13$ - disease in region 4 (does not grow)

Definition at line 75 of file MyWorldTest.py.

References MyWorldTest.MyWorldTest.objs, and MyWorldTest.MyWorldTest.wd.

6.8.3 Member Data Documentation

6.8.3.1 lines

```
MyWorldTest.MyWorldTest.lines
```

Definition at line 42 of file MyWorldTest.py.

Referenced by MyWorldTest.MyWorldTest.test_diseaseGrowth(), MyWorldTest.MyWorldTest.test_diseasePos(), MyWorldTest.MyWorldTest.test_numberofObjects(), and MyWorldTest.MyWorldTest.test_quadTemp().

6.8.3.2 nd

```
MyWorldTest.MyWorldTest.nd
```

number of objects (diseases) in wd.

Definition at line 33 of file MyWorldTest.py.

Referenced by MyWorldTest.MyWorldTest.test_numberofObjects().

6.8.3.3 objs

`MyWorldTest.MyWorldTest.objs`

list of objects (diseases) in wd.

Definition at line 35 of file MyWorldTest.py.

Referenced by MyWorldTest.MyWorldTest.test_diseaseGrowth(), MyWorldTest.MyWorldTest.test_diseasePos(), and MyWorldTest.MyWorldTest.test_strength().

6.8.3.4 wd

`MyWorldTest.MyWorldTest.wd`

world object.

Definition at line 31 of file MyWorldTest.py.

Referenced by MyWorldTest.MyWorldTest.test_quadTemp(), and MyWorldTest.MyWorldTest.test_strength().

The documentation for this class was generated from the following file:

- MyWorldTest.py

6.9 SimulationPanel.SimulationPanel Class Reference

Class for presenting the simulation in a graphical form.

Public Member Functions

- def __init__ (self, world, canvas)
  Constructor.
- def distance2Circles (self, p, circ, inTest=False)
  Return the distance between a point p given as a tuple (x,y), and the closest circle among all circles kept in the dictionary circ.
- def draw (self)
  Create the border of the self.world as a rectangle and draw all objects in it as circles.
- def resize (self, event=None)
  Resize window.
- def mousePressed1 (self, event)
  Callback for mouse button 1 pressed.
- def mousePressed3 (self, event)
  Callback for mouse button 3 pressed.
- def printData (self, fname)
  Save simulation data onto a file.
- def animation (self, p)
  Toggle animation.
- def help (self, event)
  Help.

Public Attributes

- wsizex
  Canvas width.
- wsizey
  Canvas height.
- world
  Simulation world.
- canvas
  Canvas for drawing.
- wvmap
  Mapper for going to and from viewport.
- dcirc
  dictionary of circles: (xc,yc) -> r
- cindex
  color index to address COLORS table.
- running
  animation state.

Static Public Attributes

- int WSIZE = 720
  Initial window size.
- int margin = 10
  Viewport margin.

Private Attributes

- _debug
  Debugging state.

6.9.1 Detailed Description

Class for presenting the simulation in a graphical form.

Definition at line 36 of file SimulationPanel.py.

6.9.2 Constructor & Destructor Documentation

6.9.2.1 __init__()

```
def SimulationPanel.SimulationPanel.__init__ (
            self,
            world,
            canvas )
```

Constructor.

Parameters

canvas	drawing object.
world	Simulation environment.

Definition at line 48 of file SimulationPanel.py.

6.9.3 Member Function Documentation

6.9.3.1 animation()

```
def SimulationPanel.SimulationPanel.animation (
              self,
              p )
```

Toggle animation.

Parameters

p	Timer controlling animation.

Definition at line 247 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel.running.

6.9.3.2 distance2Circles()

```
def SimulationPanel.SimulationPanel.distance2Circles (
              self,
              p,
              circ,
              inTest = False )
```

Return the distance between a point p given as a tuple (x,y), and the closest circle among all circles kept in the dictionary circ.

Each circle in circ is represented as a tuple (xc,yc) associated to r:

- where x,y are the coordinates of its center
- and r is its radius.

Parameters

p	a point.
circ	dictionary of circles.
inTest	whether to check if p is into any circle.

Returns

- (xc,yc) if p is into any circle and inTest is True, or
- a big number if circ is empty, or
- the minimum distance from p to any circle in circ.

Definition at line 93 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), and SimulationPanel.SimulationPanel.mousePressed3().

6.9.3.3 draw()

```
def SimulationPanel.SimulationPanel.draw (
              self )
```

Create the border of the self.world as a rectangle and draw all objects in it as circles.

Definition at line 115 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel._debug, SimulationPanel.SimulationPanel.canvas, SimulationPanel.SimulationPanel.cindex, SimulationPanel.SimulationPanel.dcirc, SimulationPanel.SimulationPanel.distance2Circles(), SimulationPanel.SimulationPanel.world, and SimulationPanel.SimulationPanel.wvmap.

Referenced by SimulationPanel.SimulationPanel.mousePressed1(), and SimulationPanel.SimulationPanel.resize().

6.9.3.4 help()

```
def SimulationPanel.SimulationPanel.help (
              self,
              event )
```

Help.

Definition at line 256 of file SimulationPanel.py.

6.9.3.5 mousePressed1()

```
def SimulationPanel.SimulationPanel.mousePressed1 (
              self,
              event )
```

Callback for mouse button 1 pressed.

Definition at line 181 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel._debug, SimulationPanel.SimulationPanel.canvas, SimulationPanel.↩ SimulationPanel.draw(), SimulationPanel.SimulationPanel.world, and SimulationPanel.SimulationPanel.wvmap.

6.9.3.6 mousePressed3()

```
def SimulationPanel.SimulationPanel.mousePressed3 (
              self,
              event )
```

Callback for mouse button 3 pressed.

Definition at line 206 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel.canvas, SimulationPanel.SimulationPanel.dcirc, SimulationPanel.↩ SimulationPanel.distance2Circles(), SimulationPanel.SimulationPanel.world, and SimulationPanel.SimulationPanel.↩ wvmap.

6.9.3.7 printData()

```
def SimulationPanel.SimulationPanel.printData (
              self,
              fname )
```

Save simulation data onto a file.

Parameters

fname	file to be written.

Definition at line 222 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel.world.

6.9.3.8 resize()

```
def SimulationPanel.SimulationPanel.resize (
              self,
              event = None )
```

Resize window.

Definition at line 165 of file SimulationPanel.py.

References SimulationPanel.SimulationPanel.canvas, SimulationPanel.SimulationPanel.dcirc, SimulationPanel.↩ SimulationPanel.draw(), SimulationPanel.SimulationPanel.world, SimulationPanel.SimulationPanel.wsizex, Simulation↩ Panel.SimulationPanel.wsizey, and SimulationPanel.SimulationPanel.wvmap.

6.9.4 Member Data Documentation

6.9.4.1 _debug

```
SimulationPanel.SimulationPanel._debug  [private]
```

Debugging state.

Definition at line 56 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), and SimulationPanel.SimulationPanel.mousePressed1().

6.9.4.2 canvas

```
SimulationPanel.SimulationPanel.canvas
```

Canvas for drawing.

Definition at line 62 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), SimulationPanel.SimulationPanel.mousePressed1(), Simulation↩ Panel.SimulationPanel.mousePressed3(), and SimulationPanel.SimulationPanel.resize().

6.9.4.3 cindex

`SimulationPanel.SimulationPanel.cindex`

color index to address COLORS table.

Definition at line 71 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw().

6.9.4.4 dcirc

`SimulationPanel.SimulationPanel.dcirc`

dictionary of circles: (xc,yc) -> r

Definition at line 68 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), SimulationPanel.SimulationPanel.mousePressed3(), and SimulationPanel.SimulationPanel.resize().

6.9.4.5 margin

`int SimulationPanel.SimulationPanel.margin = 10  [static]`

Viewport margin.

Definition at line 41 of file SimulationPanel.py.

6.9.4.6 running

`SimulationPanel.SimulationPanel.running`

animation state.

Definition at line 74 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.animation().

6.9.4.7 world

`SimulationPanel.SimulationPanel.world`

Simulation world.

Definition at line 59 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), SimulationPanel.SimulationPanel.mousePressed1(), SimulationPanel.SimulationPanel.mousePressed3(), SimulationPanel.SimulationPanel.printData(), and SimulationPanel.SimulationPanel.resize().

6.9.4.8 WSIZE

`int SimulationPanel.SimulationPanel.WSIZE = 720  [static]`

Initial window size.

Definition at line 38 of file SimulationPanel.py.

6.9.4.9 wsizex

`SimulationPanel.SimulationPanel.wsizex`

Canvas width.

Definition at line 50 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.resize().

6.9.4.10 wsizey

`SimulationPanel.SimulationPanel.wsizey`

Canvas height.

Definition at line 53 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.resize().

6.9.4.11 wvmap

```
SimulationPanel.SimulationPanel.wvmap
```

Mapper for going to and from viewport.

Definition at line 65 of file SimulationPanel.py.

Referenced by SimulationPanel.SimulationPanel.draw(), SimulationPanel.SimulationPanel.mousePressed1(), SimulationPanel.SimulationPanel.mousePressed3(), and SimulationPanel.SimulationPanel.resize().

The documentation for this class was generated from the following file:

- SimulationPanel.py

6.10 SimulationPanel.Timer Class Reference

Public Member Functions

- def __init__ (self, root, callback, delay)
- def run (self)
- def stop (self)
- def restart (self)

Public Attributes

- root
- callback
- delay
- task

6.10.1 Detailed Description

```
Keep packing (drawing) circles, after a certain time interval.
```

Definition at line 269 of file SimulationPanel.py.

6.10.2 Constructor & Destructor Documentation

6.10.2.1 __init__()

```
def SimulationPanel.Timer.__init__ (
              self,
              root,
              callback,
              delay )
```

Definition at line 272 of file SimulationPanel.py.

6.10.3 Member Function Documentation

6.10.3.1 restart()

```
def SimulationPanel.Timer.restart (
              self )
```

```
Restart the drawing process.
```

Definition at line 289 of file SimulationPanel.py.

References SimulationPanel.Timer.run(), and SimulationPanel.Timer.stop().

6.10.3.2 run()

```
def SimulationPanel.Timer.run (
              self )
```

```
"Run the callback function every delay ms.
```

Definition at line 278 of file SimulationPanel.py.

References SimulationPanel.Timer.callback, SimulationPanel.Timer.delay, SimulationPanel.Timer.root, SimulationPanel.Timer.run(), and SimulationPanel.Timer.task.

Referenced by SimulationPanel.Timer.restart(), and SimulationPanel.Timer.run().

6.10.3.3 stop()

```
def SimulationPanel.Timer.stop (
              self )
```

Stop the drawing process.

Definition at line 283 of file SimulationPanel.py.

References SimulationPanel.Timer.root, and SimulationPanel.Timer.task.

Referenced by SimulationPanel.Timer.restart().

6.10.4 Member Data Documentation

6.10.4.1 callback

SimulationPanel.Timer.callback

Definition at line 274 of file SimulationPanel.py.

Referenced by SimulationPanel.Timer.run().

6.10.4.2 delay

SimulationPanel.Timer.delay

Definition at line 275 of file SimulationPanel.py.

Referenced by SimulationPanel.Timer.run().

6.10.4.3 root

SimulationPanel.Timer.root

Definition at line 273 of file SimulationPanel.py.

Referenced by SimulationPanel.Timer.run(), and SimulationPanel.Timer.stop().

6.10.4.4 task

`SimulationPanel.Timer.task`

Definition at line 276 of file SimulationPanel.py.

Referenced by SimulationPanel.Timer.run(), and SimulationPanel.Timer.stop().

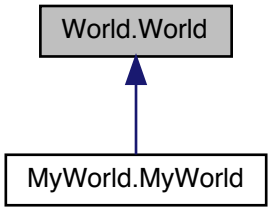
The documentation for this class was generated from the following file:

- SimulationPanel.py

6.11 World.World Class Reference

Class for holding Actor objects in cells of a grid in the world.

Inheritance diagram for World.World:



Public Member Functions

- def __init__ (self, worldWidth, worldHeight)
  Constructor.
- def createGrid (self, h, w, d)
  Initializes each object of the array as None.
- def __str__ (self)
  Return a string representation of the grid.
- def __repr__ (self)
  Return a string representation of the grid.
- def act (self)
  Blank method body.
- def addObject (self, object, x, y)
  Adds a new actor to this world at a given position.

- def getHeight (self)

  Returns the world height.
- def getWidth (self)

  Returns the world width.
- def getDepth (self)

  Returns the world depth.
- def numberOfObjects (self)

  Returns the total number of objects in this world.
- def getObjects (self)

  Returns an array with all Actor objects in this world.
- def setGrid (self, aGrid, numObjs)

  It checks if aGrid is a 3D array with the same positive length in each dimension.

Private Attributes

- __grid

  A 3D array of Actors.
- __objCounter

  Counter for the number of added objects.
- __width

  Width of the world.
- __height

  Height of the world.
- __depth

  Depth of the world.

Static Private Attributes

- int __MAXDIM = 1000

  Maximum dimension.

6.11.1 Detailed Description

Class for holding Actor objects in cells of a grid in the world.

The world is represented by a 2 dimensional array of cells, with the specified width and height. One cell can keep at most 5 Actor objects.

Author

Paulo Cavalcanti

Date

20/02/2020

Definition at line 20 of file World.py.

6.11.2 Constructor & Destructor Documentation

6.11.2.1 __init__()

```
def World.World.__init__ (
              self,
              worldWidth,
              worldHeight )
```

Constructor.

Creates a world with the given width and height.

- The maximum width and height are 1000.
- The maximum number of Actor objects in a cell is 5.

```
If worldWidth <= 0 or worldWidth > maximum width
    use the maximum width instead.
If worldHeight <=0 or worldHeight > maximum height
    use the maximum height instead.
```

Parameters

worldWidth	Width in number of cells
worldHeight	Height in number of cells

Definition at line 40 of file World.py.

6.11.3 Member Function Documentation

6.11.3.1 __repr__()

```
def World.World.__repr__ (
              self )
```

Return a string representation of the grid.

List by depth. Each slice is height x width.

Returns

string with the grid.

See also

https://www.ict.social/python/basics/multidimensional-lists-in-python

Definition at line 102 of file World.py.

References World.World.__grid, World.World.getDepth(), World.World.getHeight(), and World.World.getWidth().

6.11.3.2 __str__()

```
def World.World.__str__ (
              self )
```

Return a string representation of the grid.

List by width. Each slice is height x depth.

Returns

string with the grid.

Definition at line 90 of file World.py.

References World.World.__grid, World.World.getDepth(), World.World.getHeight(), and World.World.getWidth().

6.11.3.3 act()

```
def World.World.act (
              self )
```

Blank method body.

Overriden in subclasses as appropriate

Reimplemented in MyWorld.MyWorld.

Definition at line 123 of file World.py.

6.11.3.4 addObject()

```
def World.World.addObject (
              self,
              object,
              x,
              y )
```

Adds a new actor to this world at a given position.

- The new object will be added at the cell (x,y) if there are less than 5 objects in this cell.
- Be sure to make the added object know that it is in this world and it is at this cell.
- Check which methods of the Actor class to call.

Parameters

object	the object to be added at this cell (x, y)
x	the column
y	the row

Returns

number of objects in cell (x,y).

Exceptions

SyntaxError	when already max number of objects are in that cell
ValueError	if x or y is not in the valid range
NameError	if the object is null

Definition at line 143 of file World.py.

References World.World.__depth, World.World.__grid, World.World.__objCounter, World.World.getDepth(), World.↩ World.getHeight(), and World.World.getWidth().

Referenced by MyWorld.MyWorld.initLocations().

6.11.3.5 createGrid()

```
def World.World.createGrid (
              self,
              h,
              w,
              d )
```

Initializes each object of the array as None.

Parameters

h	grid height.
w	grid width.
d	grid depth.

Returns

grid.

Definition at line 74 of file World.py.

6.11.3.6 getDepth()

```
def World.World.getDepth (
              self )
```

Returns the world depth.

Returns

the world depth.

Definition at line 187 of file World.py.

References World.World.__grid.

Referenced by World.World.__repr__(), World.World.__str__(), and World.World.addObject().

6.11.3.7 getHeight()

```
def World.World.getHeight (
              self )
```

Returns the world height.

Returns

the world height.

Definition at line 170 of file World.py.

References World.World.__grid.

Referenced by World.World.__repr__(), World.World.__str__(), and World.World.addObject().

6.11.3.8 getObjects()

```
def World.World.getObjects (
              self )
```

Returns an array with all Actor objects in this world.

Returns

Array of Actor objects that are in this world.

Comments:

- Each class in Java is a subclass of the Object class.
- Observe that you use the implicit upcast where you assign an Actor object (sub-class) in an element of the Object array.

Definition at line 210 of file World.py.

References World.World.__depth, World.World.__grid, World.World.__height, World.World.__objCounter, and World.↩ World.__width.

6.11.3.9 getWidth()

```
def World.World.getWidth (
              self )
```

Returns the world width.

Returns

the world width.

Definition at line 179 of file World.py.

References World.World.__grid.

Referenced by World.World.__repr__(), World.World.__str__(), and World.World.addObject().

6.11.3.10 numberOfObjects()

```
def World.World.numberOfObjects (
              self )
```

Returns the total number of objects in this world.

Returns

Total number of objects in this world.

Definition at line 196 of file World.py.

References World.World.__objCounter.

6.11.3.11 setGrid()

```
def World.World.setGrid (
              self,
              aGrid,
              numObjs )
```

It checks if aGrid is a 3D array with the same positive length in each dimension.

If so, it sets the grid to aGrid and the other private fields of class World to the dimension lengths of aGrid and numObjs.

Note that some checks are omitted. For example, no check is performed to make sure that numObjs is consistent with the number of Actor objects in aGrid.

Each Actor object in aGrid has to be set to this World object.

Parameters

aGrid	reference to a 3D array of Actor objects.
numObjs	the number of Actor objects in aGrid.

Exceptions

ValueError	if the length of each dimension is out of range or 2nd/3rd dimension has different lengths.

Definition at line 245 of file World.py.

References World.World.__depth, World.World.__grid, World.World.__height, World.World.__objCounter, and World.↩ World.__width.

6.11.4 Member Data Documentation

6.11.4.1 __depth

`World.World.__depth [private]`

Depth of the world.

Definition at line 54 of file World.py.

Referenced by World.World.addObject(), World.World.getObjects(), and World.World.setGrid().

6.11.4.2 __grid

`World.World.__grid [private]`

A 3D array of Actors.

Set the grid to aGrid.

Definition at line 42 of file World.py.

Referenced by World.World.__repr__(), World.World.__str__(), World.World.addObject(), World.World.getDepth(), World.World.getHeight(), World.World.getObjects(), World.World.getWidth(), and World.World.setGrid().

6.11.4.3 __height

```
World.World.__height  [private]
```

Height of the world.

Sets the private field for the number of rows to nrow.

Definition at line 51 of file World.py.

Referenced by World.World.getObjects(), and World.World.setGrid().

6.11.4.4 __MAXDIM

```
int World.World.__MAXDIM = 1000  [static], [private]
```

Maximum dimension.

Definition at line 22 of file World.py.

6.11.4.5 __objCounter

```
World.World.__objCounter  [private]
```

Counter for the number of added objects.

Sets the private field for the number of Actor objects to numObj.

Definition at line 45 of file World.py.

Referenced by World.World.addObject(), World.World.getObjects(), World.World.numberOfObjects(), and World.↩ World.setGrid().

6.11.4.6 __width

```
World.World.__width  [private]
```

Width of the world.

Sets the private field for the number of columns to ncol.

Definition at line 48 of file World.py.

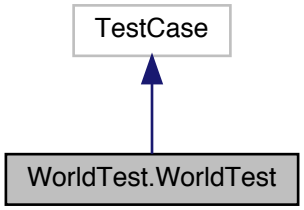
Referenced by World.World.getObjects(), and World.World.setGrid().

The documentation for this class was generated from the following file:

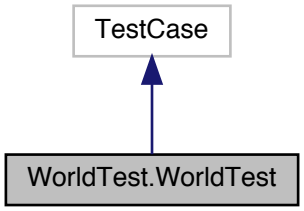
- World.py

6.12 WorldTest.WorldTest Class Reference

Inheritance diagram for WorldTest.WorldTest:



Collaboration diagram for WorldTest.WorldTest:



Public Member Functions

- def test_getWidthandHeight (self)

  Test initial height and width.
- def test_addObj (self)

  Test to see if added object to correct cell.
- def test_nullBeginning (self)

  Tests to see if the grid is completely initialized as null.
- def test_exceptions (self)

  Tests the thrown exceptions of addObject()
- def test_exceptions2 (self)

  Tests the thrown exceptions of addObject()
- def test_exceptions3 (self)

Tests the thrown exceptions of addObject()

- def test_addObject (self)
- def test_setGrid (self)

  Tests the thrown exceptions of setGrid() - nRow > 1000.
- def test_setGrid2 (self)

  Tests the thrown exceptions of setGrid() - nRow > nCol.
- def test_setGrid3 (self)

  Tests the thrown exceptions of setGrid() - nCell > 5.
- def test_setGrid4 (self)

  Tests the thrown exceptions of setGrid() - len(aGrid[j]) != ncol.
- def test_setGrid5 (self)

  Tests the thrown exceptions of setGrid() - len(aGrid[j][k]) != ncel.
- def test_largeWorld (self)

  Sets the world to an illegal size.

6.12.1 Detailed Description

Author

Paulo Roma

Definition at line 23 of file WorldTest.py.

6.12.2 Member Function Documentation

6.12.2.1 test_addObj()

```
def WorldTest.WorldTest.test_addObj (
              self )
```

Test to see if added object to correct cell.

Definition at line 38 of file WorldTest.py.

6.12.2.2 test_addObject()

```
def WorldTest.WorldTest.test_addObject (
              self )
```

Definition at line 103 of file WorldTest.py.

6.12.2.3 test_exceptions()

```
def WorldTest.WorldTest.test_exceptions (
              self )
```

Tests the thrown exceptions of addObject()

Definition at line 63 of file WorldTest.py.

6.12.2.4 test_exceptions2()

```
def WorldTest.WorldTest.test_exceptions2 (
              self )
```

Tests the thrown exceptions of addObject()

Definition at line 86 of file WorldTest.py.

6.12.2.5 test_exceptions3()

```
def WorldTest.WorldTest.test_exceptions3 (
              self )
```

Tests the thrown exceptions of addObject()

Definition at line 96 of file WorldTest.py.

6.12.2.6 test_getWidthandHeight()

```
def WorldTest.WorldTest.test_getWidthandHeight (
              self )
```

Test initial height and width.

Definition at line 28 of file WorldTest.py.

6.12.2.7 test_largeWorld()

```
def WorldTest.WorldTest.test_largeWorld (
              self )
```

Sets the world to an illegal size.

Definition at line 172 of file WorldTest.py.

6.12.2.8 test_nullBeginning()

```
def WorldTest.WorldTest.test_nullBeginning (
              self )
```

Tests to see if the grid is completely initialized as null.

Definition at line 49 of file WorldTest.py.

6.12.2.9 test_setGrid()

```
def WorldTest.WorldTest.test_setGrid (
              self )
```

Tests the thrown exceptions of setGrid() - nRow $>$ 1000.

Definition at line 121 of file WorldTest.py.

6.12.2.10 test_setGrid2()

```
def WorldTest.WorldTest.test_setGrid2 (
              self )
```

Tests the thrown exceptions of setGrid() - nRow $>$ nCol.

Definition at line 131 of file WorldTest.py.

6.12.2.11 test_setGrid3()

```
def WorldTest.WorldTest.test_setGrid3 (
              self )
```

Tests the thrown exceptions of setGrid() - nCell $>$ 5.

Definition at line 141 of file WorldTest.py.

6.12.2.12 test_setGrid4()

```
def WorldTest.WorldTest.test_setGrid4 (
              self )
```

Tests the thrown exceptions of setGrid() - len(aGrid[j]) != ncol.

Definition at line 151 of file WorldTest.py.

6.12.2.13 test_setGrid5()

```
def WorldTest.WorldTest.test_setGrid5 (
              self )
```

Tests the thrown exceptions of setGrid() - len(aGrid[j][k]) != ncel.

Definition at line 161 of file WorldTest.py.

The documentation for this class was generated from the following file:

- WorldTest.py

Chapter 7

File Documentation

7.1 Actor.py File Reference

Classes

- class Actor.Actor

Namespaces

- Actor

7.2 ActorTest.py File Reference

Classes

- class ActorTest.ActorTest

Namespaces

- ActorTest

Functions

- def ActorTest.test_actOutput (capsys)

7.3 Disease.py File Reference

Classes

- class Disease.Disease

  This Disease class is a sub-class of the Actor class.

Namespaces

- Disease

7.4 DiseaseTest.py File Reference

Classes

- class DiseaseTest.DiseaseTest

Namespaces

- DiseaseTest

7.5 IDisease.py File Reference

Classes

- class IDisease.IDisease

  Interface IDisease allows setting the strength and growth condition of a disease.

Namespaces

- IDisease

Variables

- IDisease.ABC = object

7.6 IWorld.py File Reference

Classes

- class IWorld.IWorld

  Interface IWorld allows initializing and setting diseases for a world.

Namespaces

- IWorld

Variables

- IWorld.ABC = object

7.7 MyWorld.py File Reference

Classes

- class MyWorld.MyWorld

  This class has its default constructor, inherited methods from the World class, and the methods specified in the IWorld interface.

Namespaces

- MyWorld

Functions

- def MyWorld.main ()

7.8 MyWorldTest.py File Reference

Classes

- class MyWorldTest.MyWorldTest

Namespaces

- MyWorldTest

7.9 SimulationPanel.py File Reference

Classes

- class SimulationPanel.SimulationPanel

  Class for presenting the simulation in a graphical form.
- class SimulationPanel.Timer

Namespaces

- SimulationPanel

Functions

- def SimulationPanel.main (argv=None)

  Create a canvas and keep iterating at a rate of approximately 30 circles per second.

7.10 Simulator.py File Reference

Namespaces

- Simulator

Functions

- def Simulator.main (args=None)

  This is the main method that sets up a virtual world and simulates the growth of diseases in the world.

7.11 World.py File Reference

Classes

- class World.World

  Class for holding Actor objects in cells of a grid in the world.

Namespaces

- World

Functions

- def World.main ()

7.12 WorldTest.py File Reference

Classes

- class WorldTest.WorldTest

Namespaces

- WorldTest

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