

# AD1: Programming with Graphical Interfaces

1.0.0

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# Chapter 1

## Hierarchical Index

### 1.1 Class Hierarchy

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## Chapter 2

# Class Index

### 2.1 Class List

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## Chapter 4

# Namespace Documentation

### 4.1 Actor Namespace Reference

#### Classes

- class [Actor](#)  
*[Actor](#) class, which is the base class for [Disease](#) objects.*

#### 4.1.1 Detailed Description

##### Author

Jefferson Peralva Machiqueira

##### Date

31/08/2020

### 4.2 ActorTest Namespace Reference

#### Classes

- class [ActorTest](#)  
*Class for testing [Actor](#).[Actor](#) class.*

#### Variables

- [verbosity](#)

#### 4.2.1 Variable Documentation

#### 4.2.1.1 verbosity

`ActorTest.verbosity`

## 4.3 Constants Namespace Reference

### Variables

- int [MAXIMUM\\_WIDTH](#) = 1000  
*Constant with the maximum grid width.*
- int [MAXIMUM\\_HEIGHT](#) = 1000  
*Constant with the maximum grid height.*

#### 4.3.1 Variable Documentation

##### 4.3.1.1 MAXIMUM\_HEIGHT

```
int Constants.MAXIMUM_HEIGHT = 1000
```

Constant with the maximum grid height.

##### 4.3.1.2 MAXIMUM\_WIDTH

```
int Constants.MAXIMUM_WIDTH = 1000
```

Constant with the maximum grid width.

## 4.4 Disease Namespace Reference

### Classes

- class [Disease](#)  
*This [Disease](#) class is a sub-class of the [Actor](#) class.*

#### 4.4.1 Detailed Description

##### Author

Jefferson Peralva Machiqueira

##### Date

31/08/2020



## 4.5 DiseaseTest Namespace Reference

### Classes

- class [ActorTest](#)  
*Class for testing [Disease.Disease](#) class.*

### Variables

- [verbosity](#)

#### 4.5.1 Variable Documentation

##### 4.5.1.1 verbosity

`DiseaseTest.verbosity`

## 4.6 IDisease Namespace Reference

### Classes

- class [IDisease](#)  
*Interface [IDisease](#) allows setting the strength and growth condition of a disease.*

### Variables

- [ABC](#) = object

#### 4.6.1 Detailed Description

##### Author

Jefferson Peralva Machiqueira

##### Date

31/08/2020

#### 4.6.2 Variable Documentation

#### 4.6.2.1 ABC

```
IDisease.ABC = object
```

## 4.7 IWorld Namespace Reference

### Classes

- class [IWorld](#)  
*Interface [IWorld](#) allows initializing and setting diseases for a world.*

### Variables

- [ABC](#) = object

#### 4.7.1 Detailed Description

##### Author

Jefferson Peralva Machiqueira

##### Date

31/08/2020

#### 4.7.2 Variable Documentation

#### 4.7.2.1 ABC

```
IWorld.ABC = object
```

## 4.8 MyWorld Namespace Reference

### Classes

- class [MyWorld](#)  
*SubClass of [World](#) and [IWorld](#) classes.*

## Variables

- `ArrayDisease` = `List[Disease]`  
*Type definition for use in Python Type Hinting for ArrayDisease/list-of-disease-instances.*
- `valor` = `MyWorld(720, 640)`
- `objetos` = `valor.getObjects()`

### 4.8.1 Detailed Description

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 4.8.2 Variable Documentation

#### 4.8.2.1 ArrayDisease

```
MyWorld.ArrayDisease = List[Disease]
```

Type definition for use in Python Type Hinting for ArrayDisease/list-of-disease-instances.

#### 4.8.2.2 objetos

```
MyWorld.objetos = valor.getObjects()
```

#### 4.8.2.3 valor

```
MyWorld.valor = MyWorld(720, 640)
```

## 4.9 simulator Namespace Reference

### Functions

- `def main` (args=None)  
*This is the main method that sets up a virtual world and simulates the growth of the diseases in the world if the number of iterations is given in the comand line argument, run the simulation for that number of iterations Otherwise, use the deafault number of iterations: 5.*

### 4.9.1 Detailed Description

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 4.9.2 Function Documentation

#### 4.9.2.1 main()

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

This is the main method that sets up a virtual world and simulates the growth of the diseases in the world if the number of iterations is given in the command line argument, run the simulation for that number of iterations. Otherwise, use the default number of iterations: 5.

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

## 4.10 World Namespace Reference

### Classes

- class [World](#)  
*Class for holding [Actor](#) objects in cells of a grid in the world.*

### Functions

- def [main](#) ()

### Variables

- [Grid](#) = List[List[List[int or None or [Actor](#)]]  
*Type definition for use in Python Type Hinting for Grid/3D-list.*
- [ArrayActor](#) = List[[Actor](#)]  
*Type definition for use in Python Type Hinting for ArrayActor/list-of-actor-instances.*

### 4.10.1 Detailed Description

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 4.10.2 Function Documentation

#### 4.10.2.1 main()

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

### 4.10.3 Variable Documentation

#### 4.10.3.1 ArrayActor

```
World.ArrayActor = List[Actor]
```

Type definition for use in Python Type Hinting for ArrayActor/list-of-actor-instances.

#### 4.10.3.2 Grid

```
World.Grid = List[List[List[int or None or Actor]]]
```

Type definition for use in Python Type Hinting for Grid/3D-list.

## 4.11 WorldTest Namespace Reference

### Classes

- class [WorldTest](#)

*Class for testing [World.World](#) class.*

## Variables

- [verbosity](#)

### 4.11.1 Detailed Description

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 4.11.2 Variable Documentation

#### 4.11.2.1 verbosity

`WorldTest.verbosity`

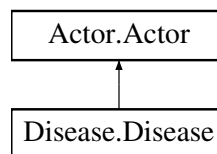
## Chapter 5

# Class Documentation

### 5.1 Actor.Actor Class Reference

[Actor](#) class, which is the base class for [Disease](#) objects.

Inheritance diagram for Actor.Actor:



#### Public Member Functions

- def [\\_\\_init\\_\\_](#) (self)  
*Construct a new [Actor](#) object.*
- int [getID](#) (self)  
*Used for testing.*
- int [Iteration](#) (self)  
*Used for testing.*
- def [act](#) (self)  
*Prints on screen in the format "Iteration <ID>: Actor <Actor ID>".*
- def [setLocation](#) (self, int x, int y)  
*Sets the cell coordinates of this object.*
- def [addedToWorld](#) (self, object world)  
*Sets the world this actor is into.*
- object [getWorld](#) (self)  
*Gets the world this object in into.*
- int [getX](#) (self)  
*Gets the X coordinate of the cell this actor object is into.*
- int [getY](#) (self)  
*Gets the Y coordinate of the cell this actor object is into.*
- def [nextIteration](#) (self)  
*Jumps for next iteration.*
- str [\\_\\_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.*
- [\\_\\_worldWidth](#)  
*World width.*
- [\\_\\_worldHeight](#)  
*World height.*

## Static Private Attributes

- `int __ID = 0`  
*Holds the value of the next "free" id.*

### 5.1.1 Detailed Description

[Actor](#) class, which is the base class for [Disease](#) objects.

Author

Jefferson Peralva Machiqueira

### 5.1.2 Constructor & Destructor Documentation

#### 5.1.2.1 `__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](#).



### 5.1.3 Member Function Documentation

#### 5.1.3.1 `__str__()`

```
str Actor.Actor.__str__ (
    self )
```

Return a string with this actor ID and position.

Reimplemented in [Disease.Disease](#).

#### 5.1.3.2 `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](#).

#### 5.1.3.3 `addedToWorld()`

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

Sets the world this actor is into.

##### Parameters

<code>world</code>	Reference to the <a href="#">World</a> object this <a href="#">Actor</a> object is added.
--------------------	---

## Exceptions

<i>RuntimeError</i>	when world is null.
---------------------	---------------------

### 5.1.3.4 getID()

```
int Actor.Actor.getID (
    self )
```

Used for testing.

#### Returns

ActorID

### 5.1.3.5 getWorld()

```
object Actor.Actor.getWorld (
    self )
```

Gets the world this object in into.

#### Returns

the world this object belongs to

### 5.1.3.6 getX()

```
int Actor.Actor.getX (
    self )
```

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

#### Returns

the x coordinate of this [Actor](#) object.

### 5.1.3.7 getY()

```
int Actor.Actor.getY (  
    self )
```

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

#### Returns

the y coordinate of this [Actor](#) object.

### 5.1.3.8 Iteration()

```
int Actor.Actor.Iteration (  
    self )
```

Used for testing.

#### Returns

number of iterations

### 5.1.3.9 nextIteration()

```
def Actor.Actor.nextIteration (  
    self )
```

Jumps for next iteration.

### 5.1.3.10 setLocation()

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

Sets the cell coordinates of this object.

#### Parameters

<i>x</i>	the column.
<i>y</i>	the row.

**Exceptions**

<i>ValueError</i>	when $x < 0$ or $x \geq \text{world width}$ ,
<i>ValueError</i>	when $y < 0$ or $y \geq \text{world height}$ ,
<i>RuntimeError</i>	when the world is null.

**5.1.4 Member Data Documentation****5.1.4.1 `__actorID`**

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

Unique identifier for this actor.

**5.1.4.2 `__ID`**

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

Holds the value of the next "free" id.

**5.1.4.3 `__itCounter`**

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

Iteration counter.

**5.1.4.4 `__locX`**

```
Actor.Actor.__locX [private]
```

X coordinate of this actor.

**5.1.4.5 `__locY`**

```
Actor.Actor.__locY [private]
```

Y coordinate of this actor.

#### 5.1.4.6 `__world`

`Actor.Actor.__world` [private]

[World](#) this actor belongs to.

#### 5.1.4.7 `__worldHeight`

`Actor.Actor.__worldHeight` [private]

[World](#) height.

#### 5.1.4.8 `__worldWidth`

`Actor.Actor.__worldWidth` [private]

[World](#) width.

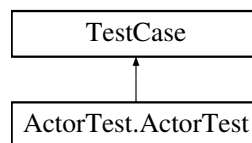
The documentation for this class was generated from the following file:

- `C:/Users/teejp/Documents/Python/AD1-PIG/Actor.py`

## 5.2 ActorTest.ActorTest Class Reference

Class for testing [Actor.Actor](#) class.

Inheritance diagram for ActorTest.ActorTest:



### Public Member Functions

- def [setUpClass](#) (cls)  
*Generate Worlds for testing purposes This method is used before execution of any other method We are using setUpClass(cls) instead of setUp(self) because in this case, because of [Actor](#) ID, we want to setUp only once not everytime a method is called by `unittest.main()`*
- def [test\\_constructor](#) (self)
- def [test\\_setLocation](#) (self)
- def [test\\_getWorld](#) (self)
- def [test\\_addedtoWorld](#) (self)

## Public Attributes

- [world\\_one](#)
- [world\\_two](#)
- [actor\\_one](#)
- [actor\\_two](#)
- [actor\\_three](#)

### 5.2.1 Detailed Description

Class for testing [Actor.Actor](#) class.

Author

Jefferson Peralva Machiqueira

### 5.2.2 Member Function Documentation

#### 5.2.2.1 setUpClass()

```
def ActorTest.ActorTest.setUpClass (
    cls )
```

Generate Worlds for testing purposes This method is used before execution of any other method We are using setUpClass(cls) instead of setUp(self) because in this case, because of [Actor](#) ID, we want to setUp only once not everytime a method is called by [unittest.main\(\)](#)

#### 5.2.2.2 test\_addedtoWorld()

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

#### 5.2.2.3 test\_constructor()

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

#### 5.2.2.4 test\_getWorld()

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

#### 5.2.2.5 test\_setLocation()

```
def ActorTest.ActorTest.test_setLocation (
    self )
```

### 5.2.3 Member Data Documentation

#### 5.2.3.1 actor\_one

```
ActorTest.ActorTest.actor_one
```

#### 5.2.3.2 actor\_three

```
ActorTest.ActorTest.actor_three
```

#### 5.2.3.3 actor\_two

```
ActorTest.ActorTest.actor_two
```

#### 5.2.3.4 world\_one

```
ActorTest.ActorTest.world_one
```

#### 5.2.3.5 world\_two

```
ActorTest.ActorTest.world_two
```

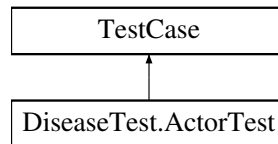
The documentation for this class was generated from the following file:

- C:/Users/teejp/Documents/Python/AD1-PIG/[ActorTest.py](#)

## 5.3 DiseaseTest.ActorTest Class Reference

Class for testing [Disease.Disease](#) class.

Inheritance diagram for DiseaseTest.ActorTest:



### Public Member Functions

- def [setUp](#) (self)  
*Generate [World](#) and disease for testing purposes.*
- def [test\\_constructor](#) (self)
- def [test\\_getStrenght](#) (self)
- def [test\\_getQuadrant](#) (self)
- def [test\\_setStrength](#) (self)

### Public Attributes

- [world\\_one](#)
- [disease\\_one](#)

### 5.3.1 Detailed Description

Class for testing [Disease.Disease](#) class.

Author

Jefferson Peralva Machiqueira

### 5.3.2 Member Function Documentation

#### 5.3.2.1 setUp()

```
def DiseaseTest.ActorTest.setUp (  
    self )
```

Generate [World](#) and disease for testing purposes.



#### 5.3.2.2 test\_constructor()

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

#### 5.3.2.3 test\_getQuadrant()

```
def DiseaseTest.ActorTest.test_getQuadrant (
    self )
```

#### 5.3.2.4 test\_getStrenght()

```
def DiseaseTest.ActorTest.test_getStrenght (
    self )
```

#### 5.3.2.5 test\_setStrength()

```
def DiseaseTest.ActorTest.test_setStrength (
    self )
```

### 5.3.3 Member Data Documentation

#### 5.3.3.1 disease\_one

```
DiseaseTest.ActorTest.disease_one
```

#### 5.3.3.2 world\_one

```
DiseaseTest.ActorTest.world_one
```

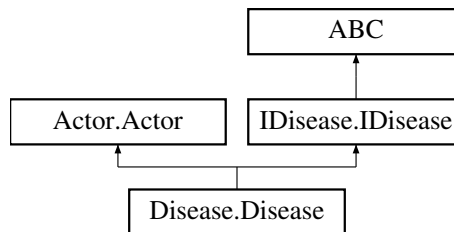
The documentation for this class was generated from the following file:

- C:/Users/teejp/Documents/Python/AD1-PIG/[DiseaseTest.py](#)

## 5.4 Disease.Disease Class Reference

This [Disease](#) class is a sub-class of the [Actor](#) class.

Inheritance diagram for Disease.Disease:



### Public Member Functions

- `def __init__ (self)`  
*Constructor.*
- `def setGrowthCondition (self, float lTemp, float hTemp, float gRate)`  
*Sets the disease growth rate, lower temperature and higher temperature.*
- `tuple getGrowthCondition (self)`  
*Returns the disease growth rate, lower temperature and higher temperature.*
- `int getQuadrant (self)`  
*Returns the quadrant of this disease.*
- `def act (self)`  
*Print on screen in the format "Iteration <ID>: Actor <Actor ID>." The < ID > is replaced by the current iteration number.*
- `def getStrength (self)`  
*Return the disease strength of this object.*
- `def setStrength (self, strength)`  
*Set Strength.*
- `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.*

### 5.4.1 Detailed Description

This [Disease](#) class is a sub-class of the [Actor](#) class.

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 5.4.2 Constructor & Destructor Documentation

#### 5.4.2.1 `__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](#).

### 5.4.3 Member Function Documentation

#### 5.4.3.1 `__str__()`

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

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

Reimplemented from [Actor.Actor](#).

#### 5.4.3.2 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](#).

#### 5.4.3.3 getGrowthCondition()

```
tuple Disease.Disease.getGrowthCondition (
    self )
```

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

**Returns**

growth rate, lower temp and higher temp

#### 5.4.3.4 getQuadrant()

```
int Disease.Disease.getQuadrant (
    self )
```

Returns the quadrant of this disease.

**Returns**

0, 1, 2 or 3.

#### 5.4.3.5 getStrength()

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

Return the disease strength of this object.

**Returns**

disease strength of the object.

Reimplemented from [IDisease.IDisease](#).

#### 5.4.3.6 setGrowthCondition()

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

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

## Parameters

<i>float</i>	lTemp Lower bound temperature for the disease to grow at this gRate.
<i>float</i>	hTemp Upper bound temperature for the disease to grow at this gRate.
<i>float</i>	gRate The growth rate.

**5.4.3.7 setStrength()**

```
def Disease.Disease.setStrength (
    self,
    strength )
```

Set Strength.

## Parameters

<i>float</i>	strength
--------------	----------

**5.4.4 Member Data Documentation****5.4.4.1 \_\_dStrength**

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

[Disease](#) strength.

**5.4.4.2 \_\_growthRate**

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

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

**5.4.4.3 \_\_higherTemp**

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

Maximum temperature for the disease development.

#### 5.4.4.4 `__lowerTemp`

`Disease.Disease.__lowerTemp` [private]

Minimum temperature for the disease development.

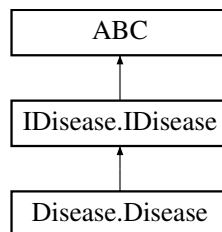
The documentation for this class was generated from the following file:

- <C:/Users/teejp/Documents/Python/AD1-PIG/Disease.py>

## 5.5 IDisease.IDisease Class Reference

Interface [IDisease](#) allows setting the strength and growth condition of a disease.

Inheritance 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

#### 5.5.1 Detailed Description

Interface [IDisease](#) allows setting the strength and growth condition of a disease.

Author

Jefferson Peralva Machiqueira

#### 5.5.2 Member Function Documentation

### 5.5.2.1 getStrength()

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

Return the disease strength of the object implements this interface.

Reimplemented in [Disease.Disease](#).

### 5.5.2.2 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.

## 5.5.3 Member Data Documentation

### 5.5.3.1 \_\_metaclass\_\_

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

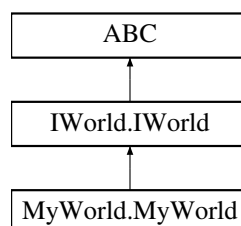
The documentation for this class was generated from the following file:

- C:/Users/teejp/Documents/Python/AD1-PIG/[IDisease.py](#)

## 5.6 IWorld.IWorld Class Reference

Interface [IWorld](#) allows initializing and setting diseases for a world.

Inheritance 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](#) (self, tempStr)

## Static Private Attributes

- [\\_\\_metaclass\\_\\_](#) = ABCMeta

### 5.6.1 Detailed Description

Interface [IWorld](#) allows initializing and setting diseases for a world.

#### Author

Jefferson Peralva Machiqueira

#### Date

31/08/2020

### 5.6.2 Member Function Documentation

#### 5.6.2.1 [getObjects\(\)](#)

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

#### 5.6.2.2 [getSumStrength\(\)](#)

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

Reimplemented in [MyWorld.MyWorld](#).



### 5.6.2.3 getTemp()

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

### 5.6.2.4 initDiseases()

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

### 5.6.2.5 initGrowthConditions()

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

### 5.6.2.6 initLocations()

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

### 5.6.2.7 initTemps()

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

### 5.6.2.8 prepare()

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

Reimplemented in [MyWorld.MyWorld](#).

### 5.6.2.9 setTemp()

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

## 5.6.3 Member Data Documentation

### 5.6.3.1 \_\_metaclass\_\_

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

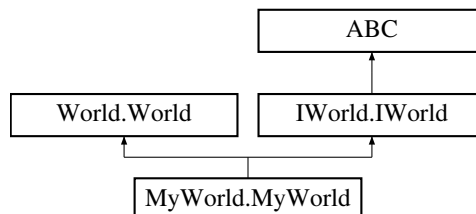
The documentation for this class was generated from the following file:

- C:/Users/teejp/Documents/Python/AD1-PIG/IWorld.py

## 5.7 MyWorld.MyWorld Class Reference

SubClass of [World](#) and [IWorld](#) classes.

Inheritance diagram for MyWorld.MyWorld:



## Public Member Functions

- def [\\_\\_init\\_\\_](#) (self, int w=720, int h=640)  
Call the constructor of the [World](#) with the width and height.
- def [prepare](#) (self)  
Prepare the world.
- [ArrayDisease](#) [initDiseases](#) (self, int numDisStr)  
Create [Disease](#) objects.
- int [initGrowthConditions](#) (self, str growthStr, [ArrayDisease](#) diseaseArr)  
Create growth conditions.
- int [initTemps](#) (self, str tempStr)  
Create Temperatures.
- int [initLocations](#) (self, str locationsStr, [ArrayDisease](#) diseaseArr)  
setup all diseases in [MyWorld](#)

- float [getSumStrength](#) (self)  
*Return the total disease strenght of all diseases.*
- float [getTemp](#) (self, int quadID)  
*Return the temperature of the region with the ID of quadID.*
- def [setTemp](#) (self, tuple quadID, float temp)  
*Set temperature of quadID quadrant.*
- def [act](#) (self)  
*Overrides the method act in the world class.*

## Private Attributes

- [\\_\\_temperature](#)
- [\\_\\_itCounter](#)

## Static Private Attributes

- tuple [\\_\\_quadID](#) = (0, 1, 2, 3)

### 5.7.1 Detailed Description

SubClass of [World](#) and [IWorld](#) classes.

Author

Jefferson Peralva Machiqueira

### 5.7.2 Constructor & Destructor Documentation

#### 5.7.2.1 [\\_\\_init\\_\\_\(\)](#)

```
def MyWorld.MyWorld.__init__ (
    self,
    int    w = 720,
    int    h = 640 )
```

Call the constructor of the [World](#) with the width and height.

Reimplemented from [World.World](#).

### 5.7.3 Member Function Documentation

### 5.7.3.1 act()

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

Overrides the method act in the world class.

Reimplemented from [World.World](#).

### 5.7.3.2 getSumStrength()

```
float MyWorld.MyWorld.getSumStrength (
    self )
```

Return the total disease strenght of all diseases.

#### Returns

float

Reimplemented from [IWorld.IWorld](#).

### 5.7.3.3 getTemp()

```
float MyWorld.MyWorld.getTemp (
    self,
    int quadID )
```

Return the temperature of the region with the ID of quadID.

#### Parameters

<i>int</i>	quadID
------------	--------

#### Returns

float with the temperature of ID

### 5.7.3.4 initDiseases()

```
ArrayDisease MyWorld.MyWorld.initDiseases (
    self,
    int numDisStr )
```

Create [Disease](#) objects.

## Parameters

<i>int</i>	numDisStr
------------	-----------

## Returns

array of diseases

**5.7.3.5 initGrowthConditions()**

```
int MyWorld.MyWorld.initGrowthConditions (
    self,
    str growthStr,
    ArrayDisease diseaseArr )
```

Create growth conditions.

## Parameters

<i>str</i>	growthStr
<i>ArrayDiseases</i>	diseaseArr

## Returns

int

**5.7.3.6 initLocations()**

```
int MyWorld.MyWorld.initLocations (
    self,
    str locationsStr,
    ArrayDisease diseaseArr )
```

setup all diseases in [MyWorld](#)

## Parameters

<i>str</i>	locationsStr
<i>diseaseArr</i>	

### 5.7.3.7 initTemps()

```
int MyWorld.MyWorld.initTemps (
    self,
    str tempStr )
```

Create Temperatures.

#### Parameters

<i>str</i>	tempStr
------------	---------

#### Returns

int

### 5.7.3.8 prepare()

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

Prepare the world.

Open a text file named "simulation.config" in the current path Parse the configuration for the number of disease objects, the cell locations of these objects, the growth rates, and the temperature ranges associates with individual growth rates

Reimplemented from [IWorld.IWorld](#).

### 5.7.3.9 setTemp()

```
def MyWorld.MyWorld.setTemp (
    self,
    tuple quadID,
    float temp )
```

Set temperature of quadID quadrant.

#### Parameters

<i>int</i>	quadID
<i>dict</i>	temp

## 5.7.4 Member Data Documentation

### 5.7.4.1 \_\_itCounter

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

### 5.7.4.2 \_\_quadID

```
tuple MyWorld.MyWorld.__quadID = (0, 1, 2, 3) [static], [private]
```

### 5.7.4.3 \_\_temperature

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

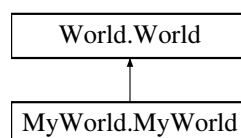
The documentation for this class was generated from the following file:

- <C:/Users/teejp/Documents/Python/AD1-PIG/MyWorld.py>

## 5.8 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, int worldWidth, int worldHeight)`  
*Constructor.*
- `Grid createGrid (self, int h, int w, int d)`  
*Initializes each object of the array as None.*
- `str __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.*
- `int addObject (self, Actor obj, int x, int y)`  
*Adds a new actor to this world at a given position.*
- `int getHeight (self)`  
*Height getter.*
- `int getWidth (self)`  
*Width getter.*
- `int getDepth (self)`  
*Depth getter.*
- `Grid getGrid (self)`  
*Grid getter.*
- `int numberOfObjects (self)`  
*Returns the total number of objects in this world.*
- `ArrayActor getObjects (self)`  
*Returns an array with all Actor objects in this world.*
- `def setGrid (self, aGrid, numObjs)`  
*todo implement set\_grid()*

## Private Attributes

- `__width`  
*Private instance attribute width.*
- `__height`  
*Private instance attribute height.*
- `__depth`  
*Private instance attribute depth.*
- `__grid`  
*Private instance attribute grid.*
- `__objCounter`  
*Private instance attribute objCounter.*

### 5.8.1 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

Jefferson Peralva Machiqueira



## 5.8.2 Constructor & Destructor Documentation

### 5.8.2.1 `__init__()`

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

Constructor.

Creates a world with the given width and height.

Parameters

<i>int</i>	world_width Width in number of cells
<i>int</i>	world_height Height in number of cells

Reimplemented in [MyWorld.MyWorld](#).

## 5.8.3 Member Function Documentation

### 5.8.3.1 `__repr__()`

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

Return a string representation of the grid.

List by depth. Each slice is height x width.

Returns

str string with the grid.

### 5.8.3.2 `__str__()`

```
str World.World.__str__ (
    self )
```

Return a string representation of the grid.

List by width. Each slice is height x depth.

Returns

str string with the grid.

### 5.8.3.3 act()

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

Blank method body.

Overriden in subclasses as appropriate

Reimplemented in [MyWorld.MyWorld](#).

### 5.8.3.4 addObject()

```
int World.World.addObject (
    self,
    Actor obj,
    int x,
    int y )
```

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

#### Parameters

<i>Actor</i>	obj
<i>int</i>	x width
<i>int</i>	y height

#### Returns

int Number of objects in that cell

#### Exceptions

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

### 5.8.3.5 createGrid()

```
Grid World.World.createGrid (
    self,
    int h,
    int w,
    int d )
```

Initializes each object of the array as None.

**Parameters**

<i>h</i>	grid height.
<i>w</i>	grid width.
<i>d</i>	grid depth.

**Returns**

grid. PS.: This method could be static, but I was oriented to keep the professor proposed skeleton

**5.8.3.6 getDepth()**

```
int World.World.getDepth (
    self )
```

Depth getter.

**Returns**

int Returns the world depth.

**5.8.3.7 getGrid()**

```
Grid World.World.getGrid (
    self )
```

Grid getter.

**Returns**

Grid Returns the grid.

**5.8.3.8 getHeight()**

```
int World.World.getHeight (
    self )
```

Height getter.

**Returns**

int Returns the world height.

#### 5.8.3.9 `getObjects()`

```
ArrayActor World.World.getObjects (
    self )
```

Returns an array with all [Actor](#) objects in this world.

Returns

ArrayActor List[[Actor](#)]

#### 5.8.3.10 `getWidth()`

```
int World.World.getWidth (
    self )
```

Width getter.

Returns

int Returns the world width.

#### 5.8.3.11 `numberOfObjects()`

```
int World.World.numberOfObjects (
    self )
```

Returns the total number of objects in this world.

Returns

int Total number of objects in this world.

#### 5.8.3.12 `setGrid()`

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

todo implement set\_grid()

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

<i>aGrid</i>	reference to a 3D array of <a href="#">Actor</a> objects.
<i>numObjs</i>	the number of <a href="#">Actor</a> objects in aGrid.

## Exceptions

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

## 5.8.4 Member Data Documentation

### 5.8.4.1 `__depth`

`World.World.__depth` [private]

Private instance attribute depth.

### 5.8.4.2 `__grid`

`World.World.__grid` [private]

Private instance attribute grid.

### 5.8.4.3 `__height`

`World.World.__height` [private]

Private instance attribute height.

### 5.8.4.4 `__objCounter`

`World.World.__objCounter` [private]

Private instance attribute objCounter.

#### 5.8.4.5 `__width`

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

Private instance attribute width.

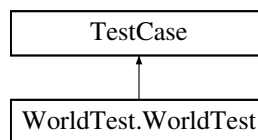
The documentation for this class was generated from the following file:

- [C:/Users/teejp/Documents/Python/AD1-PIG/World.py](#)

## 5.9 WorldTest.WorldTest Class Reference

Class for testing [World.World](#) class.

Inheritance diagram for WorldTest.WorldTest:



### Public Member Functions

- def [setUp](#) (self)  
*Generate Worlds for testing purposes This method is used before execution of any other method.*
- 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\\_setGrid](#) (self)  
*todo implement*
- def [test\\_largeWorld](#) (self)  
*Sets the world to an illegal size.*

### Public Attributes

- [world\\_one](#)
- [world\\_two](#)

### 5.9.1 Detailed Description

Class for testing [World.World](#) class.

#### Author

Jefferson Peralva Machiqueira

### 5.9.2 Member Function Documentation

#### 5.9.2.1 setUp()

```
def WorldTest.WorldTest.setUp (
    self )
```

Generate Worlds for testing purposes This method is used before execution of any other method.

#### 5.9.2.2 test\_addObj()

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

Test to see if added object to correct cell.

#### 5.9.2.3 test\_exceptions()

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

Tests the thrown exceptions of addObject()

#### 5.9.2.4 test\_getWidthandHeight()

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

Test initial height and width.

#### 5.9.2.5 test\_largeWorld()

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

Sets the world to an illegal size.

#### 5.9.2.6 test\_nullBeginning()

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

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

#### 5.9.2.7 test\_setGrid()

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

todo implement

### 5.9.3 Member Data Documentation

#### 5.9.3.1 world\_one

```
WorldTest.WorldTest.world_one
```

#### 5.9.3.2 world\_two

```
WorldTest.WorldTest.world_two
```

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

- C:/Users/teejp/Documents/Python/AD1-PIG/[WorldTest.py](#)



## Chapter 6

# File Documentation

### 6.1 C:/Users/teejp/Documents/Python/AD1-PIG/Actor.py File Reference

#### Classes

- class [Actor.Actor](#)  
*[Actor](#) class, which is the base class for [Disease](#) objects.*

#### Namespaces

- [Actor](#)

### 6.2 C:/Users/teejp/Documents/Python/AD1-PIG/ActorTest.py File Reference

#### Classes

- class [ActorTest.ActorTest](#)  
*Class for testing [Actor.Actor](#) class.*

#### Namespaces

- [ActorTest](#)
- [WorldTest](#)

#### Variables

- [ActorTest.verbosity](#)

## 6.3 C:/Users/teejp/Documents/Python/AD1-PIG/Constants.py File Reference

### Namespaces

- [Constants](#)
- [World](#)

### Variables

- int [Constants.MAXIMUM\\_WIDTH](#) = 1000  
*Constant with the maximum grid width.*
- int [Constants.MAXIMUM\\_HEIGHT](#) = 1000  
*Constant with the maximum grid height.*

## 6.4 C:/Users/teejp/Documents/Python/AD1-PIG/Disease.py File Reference

### Classes

- class [Disease.Disease](#)  
*This [Disease](#) class is a sub-class of the [Actor](#) class.*

### Namespaces

- [Disease](#)

## 6.5 C:/Users/teejp/Documents/Python/AD1-PIG/DiseaseTest.py File Reference

### Classes

- class [DiseaseTest.ActorTest](#)  
*Class for testing [Disease.Disease](#) class.*

### Namespaces

- [DiseaseTest](#)
- [WorldTest](#)

### Variables

- [DiseaseTest.verbosity](#)

## 6.6 C:/Users/teejp/Documents/Python/AD1-PIG/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

## 6.7 C:/Users/teejp/Documents/Python/AD1-PIG/IWorld.py File Reference

### Classes

- class [IWorld.IWorld](#)

*Interface [IWorld](#) allows initializing and setting diseases for a world.*

### Namespaces

- [IWorld](#)

### Variables

- [IWorld.ABC](#) = object

## 6.8 C:/Users/teejp/Documents/Python/AD1-PIG/MyWorld.py File Reference

### Classes

- class [MyWorld.MyWorld](#)

*SubClass of [World](#) and [IWorld](#) classes.*

### Namespaces

- [MyWorld](#)

## Variables

- `MyWorld.ArrayDisease` = `List[Disease]`  
*Type definition for use in Python Type Hinting for ArrayDisease/list-of-disease-instances.*
- `MyWorld.valor` = `MyWorld(720, 640)`
- `MyWorld.objetos` = `valor.getObjects()`

## 6.9 C:/Users/teejp/Documents/Python/AD1-PIG/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 the diseases in the world if the number of iterations is given in the comand line argument, run the simulation for that number of iterations Otherwise, use the deafault number of iterations: 5.*

## 6.10 C:/Users/teejp/Documents/Python/AD1-PIG/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` ()

### Variables

- `World.Grid` = `List[List[List[int or None or Actor]]]`  
*Type definition for use in Python Type Hinting for Grid/3D-list.*
- `World.ArrayActor` = `List[Actor]`  
*Type definition for use in Python Type Hinting for ArrayActor/list-of-actor-instances.*

## 6.11 C:/Users/teejp/Documents/Python/AD1-PIG/WorldTest.py File Reference

### Classes

- class [WorldTest.WorldTest](#)  
*Class for testing [World.World](#) class.*

### Namespaces

- [WorldTest](#)

### Variables

- [WorldTest.verbosity](#)



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