Module Interface Specification

Members

b2Vec2

b2Vec2 This imports the Box2D Vector and any associated methods.

Source: gratebox_documentation.js, line 6

camera_x

camera_x This variable keeps track of the horizontal velocity of the camera.

Source: gratebox_documentation.js, line 40

camera_y

camera_y This variable keeps track of the vertical velocity of the camera.

Source: gratebox_documentation.js, line 48

car

car This variable holds the car model

Source: gratebox_documentation.js, line 32

carsArray

carsArray This variable array contains the cars in the population cars.

Source: gratebox_documentation.js, line 112

currentMember

currentMember This variable integer indicates the current member of the group of cars.

Source: gratebox_documentation.js, line 126

diff_x

diff_x This variable keeps track of the change in the horizontal displacement of the camera.

Source: gratebox_documentation.js, line 55

diff_y

diff_y This variable keeps track of the change in the vertical displacement of the camera.

Contents

Source: gratebox_documentation.js, line 62

MUTATION_RATE

MUTATION_RATE This constant indicates the rate at which mutations occur.

Source: gratebox_documentation.js, line 103

PARENT_POOL

PARENT_POOL This constant indicates the size of the pool from which parents creat offspring.

Source: gratebox_documentation.js, line 96

points

points This variable keeps track of points on a car

Source: gratebox_documentation.js, line 25

POPULATION_SIZE

POPULATION_SIZE This constant indicates the size of the initial population of cars.

Source: gratebox_documentation.js, line 89

proc1

proc1 This variable keeps track of the game loop thread.

Source: gratebox_documentation.js, line 69

proc2

proc2 This variable keeps track of updateCar thread.

Source: gratebox_documentation.js, line 76

topCars

topCars This variable array contains the highest performing cars for the purpose of creating the next generation.

Source: gratebox_documentation.js, line 119

Functions

cameraPos()

This method sets the camera position to the position of the car.

Source: gratebox_documentation.js, line 645

Car()

This method establishes the initial values shared by all cares. All cars start with 10 health and have a fitness and carDef of 0.

Source: gratebox_documentation.js, line 818

ConnectTile()

This method connects the tiles to each other in a sequential fashion starting from the first tile at the origin.

Source: gratebox_documentation.js, line 574

createtile(world, x, y, width, height, angle) → {Body}

This method creates a box with a specified width and height rotated at a specified angle on the screen.

Parameters:

Name	Type	Description
world	b2World	The Box2D world that the box is created in
x	Integer	The x-coordinate of the upper left corner
y	Integer	The y-coordinate of the upper left corner
width	Integer	The width of the box
height	Integer	The height of the box
angle	Float	The rotation of the box, counterclockwise from the horizontal, in radians

Source: gratebox_documentation.js, line 542

Returns:

The box

Type
Body

crossOverOffsprings(cars, topCars) → {Array.<Cars>}

This method crosses over the chromosomes of the offspring cars.

Parameters:

Name	Type	Description
cars	Array.<Cars>	The array of cars to crossover
topCars	Integer	The number of cars in the surviving parent generation

Source: gratebox_documentation.js, line 690

Returns:

An array of the crossed-over cars

Type
Array.<Cars>

draw_world(world, context)

This method draws the world on the screen, before it is updated.

Parameters:

Name	Type	Description
world	b2World	The world to draw on
context	Canvas	The canvas to draw the world on

Source: gratebox_documentation.js, line 632

drawCar(world, worldScale, vertex1X, vertex1Y, vertex2X, vertex2Y, vertex3X, vertex3Y, vertex4X, vertex4Y, vertex5X, vertex5Y, vertex6X, vertex6Y, vertex7X, vertex7Y, vertex8X, vertex8Y, frontwheelPos, rearWheelPos) → {b2BodyDef}

This method creates a car to the screen.

Parameters:

Name	Type	Description
world	b2World	The Box2D world where the car will be placed in
worldScale	Integer	The scaling factor for the Box2D world
vertex1X	Integer	The x-coordinate of the first vertex
vertex1Y	Integer	The y-coordinate of the first vertex
vertex2X	Integer	The x-coordinate of the second vertex
vertex2Y	Integer	The y-coordinate of the second vertex
vertex3X	Integer	The x-coordinate of the third vertex
vertex3Y	Integer	The y-coordinate of the third vertex
vertex4X	Integer	The x-coordinate of the fourth vertex
vertex4Y	Integer	The y-coordinate of the fourth vertex
vertex5X	Integer	The x-coordinate of the fifth vertex
vertex5Y	Integer	The y-coordinate of the fifth vertex
vertex6X	Integer	The x-coordinate of the sixth vertex
vertex6Y	Integer	The y-coordinate of the sixth vertex
vertex7X	Integer	The x-coordinate of the seventh vertex
vertex7Y	Integer	The y-coordinate of the seventh vertex
vertex8X	Integer	The x-coordinate of the eighth vertex
vertex8Y	Integer	The y-coordinate of the eighth vertex
frontwheelPos	Integer	The vertex that the front wheel is attached to
rearWheelPos	Integer	The vertex that the back wheel is attached to

Source: gratebox_documentation.js, line 464

Returns:

The completed car

Type
b2BodyDef

generateNewCar()

Method that generates new car randomly.

Source: gratebox_documentation.js, line 832

getCarDef()

Method that retrieves the definition of a car.

Source: gratebox_documentation.js, line 994

getChromosome()

Method that retrieves the specific chromosome of a car.

Source: gratebox_documentation.js, line 980

getFitness()

Method that retrieves the fitness of a car.

Source: gratebox_documentation.js, line 1001

getHealth()

Method that retrieves the health of a car.

Source: gratebox_documentation.js, line 987

getRandomArbitrary(min, max) → {Float}

This method generates a random floating point number between min and max, exclusive.

Parameters:

Name	Type	Description
min	Integer	The lower bound
max	Integer	The upper bound

Source: gratebox_documentation.js, line 1028

Returns:

A floating point number between min and max.

Type
Float

getRandomArbitraryInteger(min, max) → {Integer}

This method generates a random integer between min and max, exclusive.

Parameters:

Name	Type	Description

Name	Type	Description
min	Integer	The lower bound
max	Integer	The upper bound

Source: gratebox_documentation.js, line 1015

Returns:

A random number between min and max

Type
Integer

getVertexXArray()

Method that retrieves the array of horizontal vertices of a car.

Source: gratebox_documentation.js, line 952

getVertexYArray()

Method that retrieves the array of vertical vertices of a car.

Source: gratebox_documentation.js, line 959

getWheelPosArray()

Method that retrieves the array of wheel positions of a car.

Source: gratebox_documentation.js, line 966

getWheelRadiusArray()

Method that retrieves the array of wheel radiuses of a car.

Source: gratebox_documentation.js, line 973

increaseFitness()

Method that increases the fitness value of a car by 1.

Source: gratebox_documentation.js, line 859

init()

This method initializes the Box2D environment, and any objects within the Box2D world.

Source: gratebox_documentation.js, line 137

Returns:

The created Box2D world

makeCarJoints(world, bodyA, bodyB, wheelPosX, wheelPosY) → {b2RevoluteJointDef}

This method creates joints used to connect the wheels to the car chassis.

Parameters:

Name	Type	Description
world	b2World	The Box2D world where the joint will be placed in
bodyA	b2BodyDef	The first object to connect the joint to
bodyB	b2BodyDef	The second object to connect the joint to
wheelPosX	Integer	The x-coordinate of the wheel
wheelPosY	Integer	The y-coordinate of the wheel

Source: gratebox_documentation.js, line 411

Returns:

The joint connecting bodyA to bodyB

Type
b2RevoluteJointDef

makePolygon(num, vertex1X, vertex1Y, vertex2X, vertex2Y) → {b2FixtureDef}

This method creates a polygon for the car given 4 points on the Cartesian plane. It assumes that one of the points of the polygon will be at the origin.

Parameters:

Name	Type	Description
num	Integer	The index of the polygon of the car
vertex1X	Integer	The x-coordinate of the first vertex
vertex1Y	Integer	The y-coordinate of the first vertex
vertex2X	Integer	The x-coordinate of the second vertex
vertex2Y	Integer	The y-coordinate of the second vertex

Source: gratebox_documentation.js, line 237

Returns:

The polygon created

Type
b2FixtureDef

makeWheelFixture(world, car, wheelbodyDef, wheelFixture) → {Body}

This method connects the wheel to the car chassis.

Parameters:

Name	Type	Description
world	b2World	The Box2D world where the wheel will be placed in
car	b2BodyDef	The car to connect the wheels to
wheelbodyDef	b2BodyDef	The body (physics) definition of the wheel
wheelFixture	b2FixtureDef	The shape definition of the wheel

Source: gratebox_documentation.js, line 432

Returns:

The wheel

Type
Body

makeWheelShape(world, worldScale, radius) → {b2FixtureDef}

This method creates the shape of a wheel for the car given its radius.

Parameters:

Name	Type	Description
world	b2World	The Box2D world where the wheel will be placed in
worldScale	Integer	The scaling factor
radius	Float	The radius of the wheel

Source: gratebox_documentation.js, line 390

Returns:

The shape of the wheel created

Type
b2FixtureDef

mutateOffsprings(cars, numberOfParents, mutationFactor) → {Array.<Cars>}

This method mutates the genes in the offspring's chromosomes.

Parameters:

Name	Type	Description
cars	Array.<Cars>	The array of cars to crossover
numberOfParents	Integer	The number of parents in the cars array
mutationFactor	Float	The likelihood of mutation

Source: gratebox_documentation.js, line 731

Returns:

An array of the mutated cars

Type
Array.<Cars>

nextCar()

This method selects the next car to be simulated.

Source: gratebox_documentation.js, line 206

removeHealth()

Method that reduces the health value of a car by 1.

Source: gratebox_documentation.js, line 866

resetCamera(world, context)

This method resets the camera for the next simulation.

Parameters:

Name	Type	Description
world	b2World	The world on which the camera is reset.
context	Canvas	The canvas to draw the world on

Source: gratebox_documentation.js, line 617

resetWorld(world)

This method resets the world for the next simulation.

Parameters:

Name	Type	Description
world	b2World	The world to be reset.

Source: gratebox_documentation.js, line 605

selectNextGeneration(cars, n) → {Array.<Cars>}

This method selects for the next generation of cars.

Parameters:

Name	Type	Description
cars	Array.<Cars>	The array of cars to choose from.
n	Integer	The number of cars to select for.

Source: gratebox_documentation.js, line 664

Returns:

An array of the top n cars.

Type
Array.<Cars>

setCarDef(carDef)

Method that sets the definition of a car.

Parameters:

Name	Type	Description
carDef	Float	The set value of the ar's definition.

Source: gratebox_documentation.js, line 934

setChromosome(chromosome)

Method that sets the chromosome of a car

Parameters:

Name	Type	Description
chromosome	Array.<Chromosome>	The chromosome to be altered.

Source: gratebox_documentation.js, line 942

setVertexX(vertexXArray, i)

Method that sets a specific vertex in an array of the horizontal vertices to a specific value.

Parameters:

Name	Type	Description
vertexXArray	Array. <vertexXArray>	The array of vertices where the vertex is present.
i	Integer	The identify of the specific vertex in the array that is to be altered.

Source: gratebox_documentation.js, line 883

setVertexXArray(vertexXArray)

Method that sets the array of vertices in the horizontal.

Parameters:

Name	Type	Description
vertexXArray	Array.<vertexXArray>	The array of vertices to be set.

Source: gratebox_documentation.js, line 874

setVertexY(vertexYArray, i)

Method that sets a specific vertex in an array of the vertical vertices to a specific value.

Parameters:

Name	Type	Description
vertexYArray	Array. <vertexXArray>	The array of vertices where the vertex is present.
i	Integer	The identify of the specific vertex in the array that is to be altered.

Source: gratebox_documentation.js, line 900

setVertexYArray(vertexYArray)

Method that sets the array of vertices in the vertical.

Parameters:

Name	Type	Description

Name	Type	Description
vertexYArray	Array.<vertexXArray>	The array of vertices to be set.

Source: gratebox_documentation.js, line 891

setWheelPos(wheelPos, i)

Method that sets the position of a specific wheel to a specific location.

Parameters:

Name	Type	Description
wheelPos	Array.<wheelPosArray>	The array that conatins the locations of the wheels.
i	Integer	The identify of the specific wheel position to be set in the array.

Source: gratebox_documentation.js, line 909

setWheelRadius(wheelRadius, i)

Method that sets the radius of a specific wheel.

Parameters:

Name	Type	Description
wheelRadius	Array.<wheelRadius>	The array that conatins the radiuses of the wheels.
i	Integer	The identify of the specific wheel radius to be set in the array.

Source: gratebox_documentation.js, line 918

setWheelRadiusArray(wheelRadiusArray)

Method that sets array of wheel radiuses to a specific array.

Parameters:

Name	Type	Description
wheelRadiusArray	Array.<wheelRadius>	The array that conatins the locations of the wheels.

Source: gratebox_documentation.js, line 926

update()

This method updates the screen.

Source: gratebox_documentation.js, line 187