uk.ac.reading.xj008217

Class Main

java.lang.Object
    uk.ac.reading.xj008217.Main

```
public class Main
extends java.lang.Object
```

Main class - entry point for the application.

Author:

xj008217

Constructor Summary

Constructors

Constructor and Description
`Main()`

Method Summary

Methods

Modifier and Type	Method and Description
`static void`	`main(java.lang.String[] args)` Main function - loads images and then creates a new GUI object that handles the rest of the application.

Methods inherited from class java.lang.Object

`clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait`

Constructor Detail

Main

```
public Main()
```

Method Detail

main

```
public static void main(java.lang.String[] args)
```

Main function - loads images and then creates a new GUI object that handles the rest of the application.

Parameters:

`args` -

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Class World

java.lang.Object
    uk.ac.reading.xj008217.World

All Implemented Interfaces:

java.lang.Runnable

```
public class World
extends java.lang.Object
implements java.lang.Runnable
```

Runs the simulation

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
private java.util.List<AnimatedEffect>	animatedEffects
private java.util.List<AnimatedEffect>	animatedEffectsToRemove
private WorldConfig	config
private double	deltaTime
private java.util.List<Food>	food
private java.util.List<Food>	foodToRemove
private Tile[][]	grid
private java.util.List<LifeForm>	lifeForms
private java.util.List<LifeForm>	lifeFormsToRemove
private boolean	paused
private java.util.Random	rand
private java.util.List<SheepController>	sheepControllers
private long	startTime

Constructor Summary

Constructors

Constructor and Description
World() Generates a standard world with a default world config object
World(WorldConfig config) Generates a world using the specified configuration object.

Method Summary

Methods

Modifier and Type	Method and Description
void	addAnimatedEffect(AnimatedEffect effect)
private void	addBorder() Adds border tiles to the edges of the world.
void	addFood(Food foodItem)
java.awt.Point	cartesianToIsometric(java.awt.Point point) Converts cartesian coordinates to isometric coordinates
PointDouble	cartesianToIsometric(PointDouble point) Converts cartesian coordinates to isometric coordinates
private void	generateForests() Generates forests in the world, as specified by variables in the world's config object.
private void	generateRivers() Generates rivers that run in fairly straight lines with some corners Uses a bias value that prevents the river from turning back on its self.
private void	generateSheep() Generates and places all sheep in the world (in their respective herds with SheepControllers).
private void	generateWolves() Generates and places all wolves in the world as specified by the world's config object.
private void	generateWorld(long randSeed) Generates the world through a series of procedural generation techniques.
java.util.List<AnimatedEffect>	getAnimatedEffects()
WorldConfig	getConfig()
double	getDeltaTime()
protected double	getDistanceBetweenPoints(PointDouble start, PointDouble end) Returns the distance between two points.
java.util.List<Food>	getFood()
Tile	getGridPosition(int x, int y) Returns the tile at a particular grid position
java.util.List<LifeForm>	getLifeForms()
java.util.List<SheepController>	getSheepControllers()
Tile	getTileAtScreenPosition(int x, int y) translates an x/y screen coordinate pair into a tile from the world grid
Tile	getTileAtWorldPosition(double x, double y) translates an x/y world coordinate pair (stored as doubles) into a tile from the world grid
Tile	getTileAtWorldPosition(int x, int y) translates an x/y world coordinate pair (stored as integers) into a tile from the world grid
private void	initialiseGrass() Fill all spaces in the world with grass tiles.
java.awt.Point	isometricToCartesian(java.awt.Point point) Converts cartesian coordinates to isometric coordinates.
boolean	isPathWalkable(PointDouble start, PointDouble end) checks to see whether a straight line between a start and end point is walkable.
boolean	isPaused()
double	nextRandomDouble(double val) Returns the next random double between 0.0 and val from the world's random

	number generator.
double	**nextRandomDouble**(int val) Returns the next random double between 0.0 and val from the world's random number generator.
int	**nextRandomInt**(int val) Returns the next random int between 0 and val from the world's random number generator.
void	**pause**()
void	**play**()
void	**removeAnimatedEffect**(**AnimatedEffect** effect)
void	**removeFood**(**Food** foodItem)
void	**removeLifeForm**(**LifeForm** lifeForm) adds a life form to the list of life forms that need removing.
void	**run**() Starts the world's simulation and updates all neccesary objects within the world.
void	**setAnimatedEffects**(java.util.List<**AnimatedEffect**> animatedEffects)
void	**setConfig**(**WorldConfig** config)
void	**setDeltaTime**(double deltaTime)
void	**setPaused**(boolean paused)

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

config

```
private WorldConfig config
```

grid

```
private Tile[][] grid
```

rand

```
private java.util.Random rand
```

lifeForms

```
private java.util.List<LifeForm> lifeForms
```

sheepControllers

```
private java.util.List<SheepController> sheepControllers
```

food

```
private java.util.List<Food> food
```

animatedEffects

```
private java.util.List<AnimatedEffect> animatedEffects
```

lifeFormsToRemove

```
private java.util.List<LifeForm> lifeFormsToRemove
```

foodToRemove

```
private java.util.List<Food> foodToRemove
```

animatedEffectsToRemove

```
private java.util.List<AnimatedEffect> animatedEffectsToRemove
```

startTime

```
private long startTime
```

deltaTime

```
private double deltaTime
```

paused

```
private boolean paused
```

Constructor Detail

World

```
public World()
```

Generates a standard world with a default world config object

World

```
public World(WorldConfig config)
```

Generates a world using the specified configuration object.

Parameters:

`config` - The WorldConfig object that specifies this worlds parameters.

Method Detail

run

```
public void run()
```

Starts the world's simulation and updates all neccesary objects within the world. Once started this function runs in a loop until the world panel is closed.

Specified by:

`run` in interface `java.lang.Runnable`

generateWorld

```
private void generateWorld(long randSeed)
```

Generates the world through a series of procedural generation techniques.

Parameters:

`randSeed` - sets a seed to generate the world, if 0 then a random seed is selected.

addBorder

```
private void addBorder()
```

Adds border tiles to the edges of the world. The border prevents LifeForms from leaving the world.

generateWolves

```
private void generateWolves()
```

Generates and places all wolves in the world as specified by the world's config object.

generateSheep

```
private void generateSheep()
```

Generates and places all sheep in the world (in their respective herds with SheepControllers).

initialiseGrass

```
private void initialiseGrass()
```

Fill all spaces in the world with grass tiles.

generateRivers

```
private void generateRivers()
```

Generates rivers that run in fairly straight lines with some corners Uses a bias value that prevents the river from turning back on its self.

generateForests

```
private void generateForests()
```

Generates forests in the world, as specified by variables in the world's config object.

getTileAtScreenPosition

```
public Tile getTileAtScreenPosition(int x,
                                    int y)
```

translates an x/y screen coordinate pair into a tile from the world grid

Parameters:

x - the x coordinate to be translated

y - the y coordinate to be translated

Returns:

Tiles the tile found at that position

getTileAtWorldPosition

```
public Tile getTileAtWorldPosition(int x,
                                   int y)
```

translates an x/y world coordinate pair (stored as integers) into a tile from the world grid

Parameters:

x - the x coordinate to be translated

y - the y coordinate to be translated

Returns:

Tiles the tile found at that position

getTileAtWorldPosition

```
public Tile getTileAtWorldPosition(double x,
                                   double y)
```

translates an x/y world coordinate pair (stored as doubles) into a tile from the world grid

Parameters:

x - the x coordinate to be translated

y - the y coordinate to be translated

Returns:

Tiles the tile found at that position

nextRandomInt

```
public int nextRandomInt(int val)
```

Returns the next random int between 0 and val from the world's random number generator.

Parameters:

`val` - the maximum int that can be returned.

Returns:

next random int between 0 and val.

nextRandomDouble

```
public double nextRandomDouble(int val)
```

Returns the next random double between 0.0 and val from the world's random number generator.

Parameters:

`val` - the maximum number (as an integer) that can be returned.

Returns:

next random double between 0.0 and val.

nextRandomDouble

```
public double nextRandomDouble(double val)
```

Returns the next random double between 0.0 and val from the world's random number generator.

Parameters:

`val` - the maximum double that can be returned.

Returns:

next random double between 0.0 and val.

getGridPosition

```
public Tile getGridPosition(int x,
                            int y)
```

Returns the tile at a particular grid position

Parameters:

x - the xcoordinate of the tile

y - the ycoordinate of the tile

Returns:

The tile that exists at xand y.

cartesianToIsometric

```
public java.awt.Point cartesianToIsometric(java.awt.Point point)
```

Converts cartesian coordinates to isometric coordinates

Parameters:

`point` - The Point in cartesian space

Returns:

The Point in isometric space

cartesianToIsometric

```
public PointDouble cartesianToIsometric(PointDouble point)
```

Converts cartesian coordinates to isometric coordinates

Parameters:

`point` - The PointDouble in cartesian space

Returns:

The PointDouble in isometric space

isPathWalkable

```
public boolean isPathWalkable(PointDouble start,
                              PointDouble end)
```

checks to see whether a straight line between a start and end point is walkable.

Parameters:

`start` - The PointDouble at the start of the path.

end - The PointDouble at the end of the path

Returns:

boolean true if the entire path is walkable, false otherwise.

getDistanceBetweenPoints

```
protected double getDistanceBetweenPoints(PointDouble start,
                                          PointDouble end)
```

Returns the distance between two points.

Parameters:

`start` - The PointDouble at the start of the line.

end - The PointDouble at the end of the line.

Returns:

The distance between both PointDoubles

isometricToCartesian

```
public java.awt.Point isometricToCartesian(java.awt.Point point)
```

Converts cartesian coordinates to isometric coordinates.

Parameters:

`point` - The point in isometric space.

Returns:

point The point in cartesian space.

getDeltaTime

```
public double getDeltaTime()
```

setDeltaTime

```
public void setDeltaTime(double deltaTime)
```

getAnimatedEffects

```
public java.util.List<AnimatedEffect> getAnimatedEffects()
```

setAnimatedEffects

```
public void setAnimatedEffects(java.util.List<AnimatedEffect> animatedEffects)
```

addAnimatedEffect

```
public void addAnimatedEffect(AnimatedEffect effect)
```

removeAnimatedEffect

```
public void removeAnimatedEffect(AnimatedEffect effect)
```

getLifeForms

```
public java.util.List<LifeForm> getLifeForms()
```

getSheepControllers

```
public java.util.List<SheepController> getSheepControllers()
```

addFood

```
public void addFood(Food foodItem)
```

getFood

```
public java.util.List<Food> getFood()
```

getConfig

```
public WorldConfig getConfig()
```

setConfig

```
public void setConfig(WorldConfig config)
```

removeLifeForm

```
public void removeLifeForm(LifeForm lifeForm)
```

adds a life form to the list of life forms that need removing. This prevents errors that occur when removing an object during a cycle.

Parameters:

`lifeForm` - The LifeForm to be removed.

removeFood

```
public void removeFood(Food foodItem)
```

isPaused

```
public boolean isPaused()
```

setPaused

```
public void setPaused(boolean paused)
```

pause

```
public void pause()
```

play

```
public void play()
```

uk.ac.reading.xj008217

Class WorldConfig

java.lang.Object
uk.ac.reading.xj008217.WorldConfig

```
public class WorldConfig
extends java.lang.Object
```

Represents a world configuration. Stores attributes related to the way the world generates. Responsible for loading and saving configuration (properties) files.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
private int	forestDensity
private int	forestSize
private int	forestThickness
private int	forestThicknessSquareSize
private int[]	forestThicknessThreshold
private int	grassPoisonChance
private boolean	hasSheep
private boolean	hasWolves
private int	height
private int	riverCount
private int	riverVariance
private int	sheepHerds
private int	sheepHerdSize
private int	sheepHerdSpacing
private int	sheepHerdVariance
private java.util.List<java.lang.String>	validConfigFiles
private int	width
private int	wolfCount

Constructor Summary

Constructors

Constructor and Description
WorldConfig() Creates a new WorldConfig object with default values.

Method Summary

Methods

Modifier and Type	Method and Description
java.util.List<java.lang.String>	findValidConfigFiles() Searches the users directory for valid configuration files.
int	getForestDensity()
int	getForestSize()
int	getForestThickness()
int	getForestThicknessSquareSize()
int[]	getForestThicknessThreshold()
int	getGrassPoisonChance()
int	getHeight()
int	getRiverCount()
int	getRiverVariance()
int	getSheepHerds()
int	getSheepHerdSize()
int	getSheepHerdSpacing()
int	getSheepHerdVariance()
int	getWidth()
int	getWolfCount()
boolean	hasSheep()
boolean	hasWolves()
boolean	loadWorldConfig(java.lang.String fileName) Loads a world config as specified by file name.
boolean	saveWorldConfig(java.lang.String fileName) Saves the current config values to a file.
void	setForestDensity(int forestDensity)
void	setForestSize(int forestSize)
void	setForestThickness(int forestThickness)
void	setForestThicknessSquareSize(int forestThicknessSquareSize)
void	setForestThicknessThreshold(int[] forestThicknessThreshold)
void	setGrassPoisonChance(int grassPoisonChance)
void	setHasSheep(boolean hasSheep)
void	setHasWolves(boolean hasWolves)
void	setHeight(int height)
void	setRiverCount(int riverCount)
void	setRiverVariance(int riverVariance)
void	setSheepHerds(int sheepHerds)
void	setSheepHerdSize(int sheepHerdSize)

void	setSheepHerdSpacing(int sheepHerdSpacing)
void	setSheepHerdVariance(int sheepHerdVariance)
void	setWidth(int width)
void	setWolfCount(int wolfCount)

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

width

```
private int width
```

height

```
private int height
```

grassPoisonChance

```
private int grassPoisonChance
```

riverCount

```
private int riverCount
```

riverVariance

```
private int riverVariance
```

forestDensity

```
private int forestDensity
```

forestThickness

```
private int forestThickness
```

forestSize

```
private int forestSize
```

forestThicknessSquareSize

```
private int forestThicknessSquareSize
```

forestThicknessThreshold

```
private int[] forestThicknessThreshold
```

hasSheep

```
private boolean hasSheep
```

sheepHerds

```
private int sheepHerds
```

sheepHerdSize

```
private int sheepHerdSize
```

sheepHerdVariance

```
private int sheepHerdVariance
```

sheepHerdSpacing

```
private int sheepHerdSpacing
```

hasWolves

```
private boolean hasWolves
```

wolfCount

```
private int wolfCount
```

validConfigFiles

```
private java.util.List<java.lang.String> validConfigFiles
```

Constructor Detail

WorldConfig

```
public WorldConfig()
```

Creates a new WorldConfig object with default values. Finds all valid config files in the user space.

Method Detail

loadWorldConfig

```
public boolean loadWorldConfig(java.lang.String fileName)
```

Loads a world config as specified by file name.

Parameters:

`fileName` - The name of the file to be loaded.

Returns:

true if the file loads succesfully, false otherwise.

saveWorldConfig

```
public boolean saveWorldConfig(java.lang.String fileName)
```

Saves the current config values to a file.

Parameters:

`fileName` - The name of the file to be saved.

Returns:

true if the save is succesful, false otherwise.

findValidConfigFiles

```
public java.util.List<java.lang.String> findValidConfigFiles()
```

Searches the users directory for valid configuration files.

Returns:

A list of strings representing the config file names.

getWidth

```
public int getWidth()
```

setWidth

```
public void setWidth(int width)
```

getHeight

```
public int getHeight()
```

setHeight

```
public void setHeight(int height)
```

getRiverCount

```
public int getRiverCount()
```

setRiverCount

```
public void setRiverCount(int riverCount)
```

getRiverVariance

```
public int getRiverVariance()
```

setRiverVariance

```
public void setRiverVariance(int riverVariance)
```

getForestDensity

```
public int getForestDensity()
```

setForestDensity

```
public void setForestDensity(int forestDensity)
```

getForestThickness

```
public int getForestThickness()
```

setForestThickness

```
public void setForestThickness(int forestThickness)
```

getForestSize

```
public int getForestSize()
```

setForestSize

```
public void setForestSize(int forestSize)
```

hasSheep

```
public boolean hasSheep()
```

setHasSheep

```
public void setHasSheep(boolean hasSheep)
```

getSheepHerds

```
public int getSheepHerds()
```

setSheepHerds

```
public void setSheepHerds(int sheepHerds)
```

getSheepHerdSize

```
public int getSheepHerdSize()
```

setSheepHerdSize

```
public void setSheepHerdSize(int sheepHerdSize)
```

getSheepHerdVariance

```
public int getSheepHerdVariance()
```

setSheepHerdVariance

```
public void setSheepHerdVariance(int sheepHerdVariance)
```

hasWolves

```
public boolean hasWolves()
```

setHasWolves

```
public void setHasWolves(boolean hasWolves)
```

getWolfCount

```
public int getWolfCount()
```

setWolfCount

```
public void setWolfCount(int wolfCount)
```

getGrassPoisonChance

```
public int getGrassPoisonChance()
```

setGrassPoisonChance

```
public void setGrassPoisonChance(int grassPoisonChance)
```

getSheepHerdSpacing

```
public int getSheepHerdSpacing()
```

setSheepHerdSpacing

```
public void setSheepHerdSpacing(int sheepHerdSpacing)
```

getForestThicknessSquareSize

```
public int getForestThicknessSquareSize()
```

setForestThicknessSquareSize

```
public void setForestThicknessSquareSize(int forestThicknessSquareSize)
```

getForestThicknessThreshold

```
public int[] getForestThicknessThreshold()
```

setForestThicknessThreshold

```
public void setForestThicknessThreshold(int[] forestThicknessThreshold)
```


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Class WorldPanel

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.WorldPanel

All Implemented Interfaces:

java.awt.event.MouseListener, java.awt.event.MouseMotionListener, java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, java.lang.Runnable, java.util.EventListener, javax.accessibility.Accessible

---

```
public class WorldPanel
extends javax.swing.JPanel
implements java.lang.Runnable, java.awt.event.MouseListener, java.awt.event.MouseMotionListener
```

Displays the simulation as a JPanel

Author:

xj008217

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

```
javax.swing.JPanel.AccessibleJPanel
```

Nested classes/interfaces inherited from class javax.swing.JComponent

```
javax.swing.JComponent.AccessibleJComponent
```

Nested classes/interfaces inherited from class java.awt.Container

```
java.awt.Container.AccessibleAWTContainer
```

Nested classes/interfaces inherited from class java.awt.Component

```
java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior,
java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy
```

Field Summary

Fields

Modifier and Type	Field and Description
private java.lang.Thread	**animationThread**
private int	**mouseDragStartX**

private int	mouseDragStartY
private int	originX
private int	originY
private static long	serialVersionUID
private World	world
private java.lang.Thread	worldThread

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
WorldPanel(WorldConfig config) Creates a new world panel, initialises a world using the supplied config object.

Method Summary

Methods

Modifier and Type	Method and Description
World	getWorld()
void	mouseClicked(java.awt.event.MouseEvent m)
void	mouseDragged(java.awt.event.MouseEvent m) Sets the JPanels originX and originY, this allows the user to pan through the world by clicking and dragging.
void	mouseEntered(java.awt.event.MouseEvent m)
void	mouseExited(java.awt.event.MouseEvent m)
void	mouseMoved(java.awt.event.MouseEvent m)
void	mousePressed(java.awt.event.MouseEvent m) Sets the JPanels originX and originY, this allows the user to pan through the world by clicking and dragging.
void	mouseReleased(java.awt.event.MouseEvent m)
void	paint(java.awt.Graphics g) Overrides JPanel paint function.
void	run() Calls repaint on the JPanel, pausing for ProgramConstants.UPDATE_TIME between repaints.
void	setWorld(World world)

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

`clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait`

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

originX

```
private int originX
```

originY

```
private int originY
```

world

```
private World world
```

animationThread

```
private java.lang.Thread animationThread
```

worldThread

```
private java.lang.Thread worldThread
```

mouseDragStartX

```
private int mouseDragStartX
```

mouseDragStartY

```
private int mouseDragStartY
```

Constructor Detail

WorldPanel

```
public WorldPanel(WorldConfig config)
```

Creates a new world panel, initialises a world using the supplied config object.

Parameters:

`config` - The config file that describes the world.

Method Detail

run

```
public void run()
```

Calls repaint on the JPanel, pausing for ProgramConstants.UPDATE_TIME between repaints. This in turn will call the paint function on the WorldPanel, causing the view to update.

Specified by:

`run` in interface `java.lang.Runnable`

paint

```
public void paint(java.awt.Graphics g)
```

Overrides JPanel paint function. Handles all drawing by looking at the current world state and working out how to draw the results onto the screen in a meaningful way.

Overrides:

`paint` in class `javax.swing.JComponent`

mouseDragged

```
public void mouseDragged(java.awt.event.MouseEvent m)
```

Sets the JPanels originX and originY, this allows the user to pan through the world by clicking and dragging.

Specified by:

`mouseDragged` in interface `java.awt.event.MouseMotionListener`

mouseMoved

```
public void mouseMoved(java.awt.event.MouseEvent m)
```

Specified by:

`mouseMoved` in interface `java.awt.event.MouseMotionListener`

mouseClicked

```
public void mouseClicked(java.awt.event.MouseEvent m)
```

Specified by:

`mouseClicked` in interface `java.awt.event.MouseListener`

mouseEntered

```
public void mouseEntered(java.awt.event.MouseEvent m)
```

Specified by:

mouseEntered in interface java.awt.event.MouseListener

mouseExited

```
public void mouseExited(java.awt.event.MouseEvent m)
```

Specified by:

mouseExited in interface java.awt.event.MouseListener

mousePressed

```
public void mousePressed(java.awt.event.MouseEvent m)
```

Sets the JPanels originX and originY, this allows the user to pan through the world byclicking and dragging.

Specified by:

mousePressed in interface java.awt.event.MouseListener

mouseReleased

```
public void mouseReleased(java.awt.event.MouseEvent m)
```

Specified by:

mouseReleased in interface java.awt.event.MouseListener

getWorld

```
public World getWorld()
```

setWorld

```
public void setWorld(World world)
```


uk.ac.reading.xj008217

Class WorldToolbar

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.WorldToolbar

All Implemented Interfaces:

java.awt.event.ActionListener, java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, java.util.EventListener, javax.accessibility.Accessible

---

```
public class WorldToolbar
extends javax.swing.JPanel
implements java.awt.event.ActionListener
```

Displays buttons that play pause and return to the home screen.

Author:

xj008217

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

javax.swing.JPanel.AccessibleJPanel

Nested classes/interfaces inherited from class javax.swing.JComponent

javax.swing.JComponent.AccessibleJComponent

Nested classes/interfaces inherited from class java.awt.Container

java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent,
java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy,
java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
private GUI	gui
private static long	serialVersionUID
private WorldPanel	worldPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
WorldToolbar(WorldPanel worldPanel, GUI gui) Creates a new toolbar, including pause play and home buttons.

Method Summary

Methods

Modifier and Type	Method and Description
void	actionPerformed(java.awt.event.ActionEvent e) Handles events fired from buttons on this JPanel
private void	addButtons() Adds all buttons to the toolbar
javax.swing.JButton	createHomeButton() Returns a correctly formatted home button
javax.swing.JButton	createPauseButton() Returns a correctly formatted pause button
javax.swing.JButton	createPlayButton() Returns a correctly formatted play button

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor,

getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

worldPanel

```
private WorldPanel worldPanel
```

gui

```
private GUI gui
```

Constructor Detail

WorldToolbar

```
public WorldToolbar(WorldPanel worldPanel,
            GUI gui)
```

Creates a new toolbar, including pause play and home buttons.

Parameters:

`worldPanel` - The worldpanel that the play and pause buttons refer to

`gui` - The gui that the home button refers to.

Method Detail

addButtons

```
private void addButtons()
```

Adds all buttons to the toolbar

createPlayButton

```
public javax.swing.JButton createPlayButton()
```

Returns a correctly formatted play button

createPauseButton

```
public javax.swing.JButton createPauseButton()
```

Returns a correctly formatted pause button

createHomeButton

```
public javax.swing.JButton createHomeButton()
```

Returns a correctly formatted home button

actionPerformed

```
public void actionPerformed(java.awt.event.ActionEvent e)
```

Handles events fired from buttons on this JPanel

Specified by:

`actionPerformed` in interface `java.awt.event.ActionListener`

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Summary: Nested | Field | Constr | Method Detail: Field | Constr | Method

uk.ac.reading.xj008217.animations

Class AnimatedEffect

java.lang.Object
  uk.ac.reading.xj008217.entities.Entity
    uk.ac.reading.xj008217.animations.AnimatedEffect

```
public class AnimatedEffect
extends Entity
```

Displays an animated sequence of images on the screen.

Author:

Jon

Field Summary

Fields

Modifier and Type	Field and Description
private int	currentFrame
private int	endFrame
private java.awt.image.BufferedImage[]	images
private double	secondsPassed
private double	secondsPerFrame
private World	world

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
AnimatedEffect(java.awt.image.BufferedImage[] animation, PointDouble position, World world) Creates a new animated effect with the specified images, position and in the specified world.

Method Summary

Methods

Modifier and Type	Method and Description
java.awt.image.BufferedImage	**getImage**() Returns the animations current frame
java.awt.image.BufferedImage[]	**getImages**()
double	**getSecondsPerFrame**()
void	**setImages**(java.awt.image.BufferedImage[] images)
void	**setSecondsPerFrame**(double secondsPerFrame)
void	**update**() Updates the animation, moving to the next frame on if enough time has passed.

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

currentFrame

```
private int currentFrame
```

endFrame

```
private int endFrame
```

images

```
private java.awt.image.BufferedImage[] images
```

secondsPerFrame

```
private double secondsPerFrame
```

secondsPassed

```
private double secondsPassed
```

world

```
private World world
```

Constructor Detail

AnimatedEffect

```
public AnimatedEffect(java.awt.image.BufferedImage[] animation,
              PointDouble position,
              World world)
```

Creates a new animated effect with the specified images, position and in the specified world.

Parameters:

animation -

position -

world -

Method Detail

update

```
public void update()
```

Updates the animation, moving to the next frame on if enough time has passed.

getImage

```
public java.awt.image.BufferedImage getImage()
```

Returns the animations current frame

Returns:

A BufferedImage of the current frame.

getImages

```
public java.awt.image.BufferedImage[] getImages()
```

setImages

```
public void setImages(java.awt.image.BufferedImage[] images)
```

getSecondsPerFrame

```
public double getSecondsPerFrame()
```

setSecondsPerFrame

```
public void setSecondsPerFrame(double secondsPerFrame)
```


uk.ac.reading.xj008217.entities

Class Corpse

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.Food
    - uk.ac.reading.xj008217.entities.Corpse

```
public class Corpse
extends Food
```

A dead animal (acts as food)

Author:

Jon

Field Summary

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

`position`

Constructor Summary

Constructors

Constructor and Description
Corpse(**PointDouble** position, java.awt.image.BufferedImage image, **World** world, double food) Creates a new corpse.

Method Summary

Methods

Modifier and Type	Method and Description
void	**update**() Calls update on the parent class (Food).

Methods inherited from class uk.ac.reading.xj008217.entities.Food

`eat, getDecayRate, getFoodLeft, getImage, isDecays, setDecayRate, setDecays, setFoodLeft, setImage`

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

`getPosition, setPosition`

Methods inherited from class java.lang.Object

`clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait`

Constructor Detail

Corpse

```
public Corpse(PointDouble position,
      java.awt.image.BufferedImage image,
      World world,
      double food)
```

Creates a new corpse. The corpse is in fact a Food object that has specific attributes.

Parameters:

`position` - The world location of the corpse.

`image` - The image for the corpse.

`world` - The world that the corpse exists in.

`food` - The amount of energy that the corpse is able to provide.

Method Detail

update

```
public void update()
```

Calls update on the parent class (Food).

Overrides:

`update` in class `Food`

uk.ac.reading.xj008217.entities

Class Entity

java.lang.Object
    uk.ac.reading.xj008217.entities.Entity

Direct Known Subclasses:

AnimatedEffect, Food, LifeForm, Tile

```
public abstract class Entity
extends java.lang.Object
```

Entity describes anything that can exist in a world with a specific location within that world.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
protected PointDouble	position

Constructor Summary

Constructors

Constructor and Description
Entity()

Method Summary

Methods

Modifier and Type	Method and Description
PointDouble	getPosition()
void	setPosition(PointDouble position)

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

position

```
protected PointDouble position
```

Constructor Detail

Entity

```
public Entity()
```

Method Detail

getPosition

```
public PointDouble getPosition()
```

setPosition

```
public void setPosition(PointDouble position)
```

uk.ac.reading.xj008217.entities

Class LifeForm

java.lang.Object
  uk.ac.reading.xj008217.entities.Entity
    uk.ac.reading.xj008217.entities.LifeForm

Direct Known Subclasses:

LifeForm_Sheep, LifeForm_Wolf

```
public class LifeForm
extends Entity
```

A life form is any mobile life form (eg: not plants) that can interact with the world

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
private java.awt.image.BufferedImage	corpseImage
private int	direction
private double	energy
private double	foodInCorpse
private java.lang.String	id
private java.awt.image.BufferedImage[]	image
private boolean	isPanicked
private double	panicEnergyLoss
private double	panicSpeed
private double	restEnergyLoss
private double	restSpeed
private static double	speedVariance
private PointDouble	target
private World	world

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
LifeForm(World world, PointDouble position) Initialises the life form.

Method Summary

Methods

Modifier and Type	Method and Description
int	calculateDirection(PointDouble target) Works out in which of the 8 cardinal directions the LifeForm is facing relative to a target PointDouble.
int	calculateOppositeDirection(PointDouble target) Works out the opposite of which of the 8 cardinal directions the LifeForm is facing relative to a target PointDouble.
Food	die() Causes the LifeForm to die.
double	getAngle(PointDouble target) Returns the angle from this LifeForms position to a PointDouble.
java.awt.image.BufferedImage	getCorpseImage()
int	getDirection()
protected double	getDistanceToLifeForm(LifeForm life) Returns the distance between this LifeForm and another LifeForm.
protected double	getDistanceToTarget() Returns the distance between this LifeForm and its target.
double	getEnergy()
double	getFoodInCorpse()
java.lang.String	getId()
java.awt.image.BufferedImage[]	getImage()
double	getPanicEnergyLoss()
double	getPanicSpeed()
double	getRestEnergyLoss()
double	getRestSpeed()
PointDouble	getTarget()
World	getWorld()
boolean	isPanicked()
private boolean	move(double xVal, double yVal) attempts to move the life form by xVal on the x axis and yVal on the y axis (corrected for isometric view)
protected boolean	moveAwayFromTarget() Moves the LifeForm away from its current target (eg: when fleeing a predator).
protected boolean	moveTowardsTarget() Moves towards the LifeForm's current target.

void	**setCorpseImage**(java.awt.image.BufferedImage corpseImage)
void	**setDirection**(int direction)
void	**setEnergy**(double energy)
void	**setFoodInCorpse**(double foodInCorpse)
void	**setId**(java.lang.String id)
void	**setImage**(java.awt.image.BufferedImage[] image)
void	**setPanicEnergyLoss**(double panicEnergyLoss) sets the panic energy loss attribute and adds a small amount of variance (as specified by speedVariance)
void	**setPanicked**(boolean isPanicked)
void	**setPanicSpeed**(int panicSpeed)
void	**setRestEnergyLoss**(double restEnergyLoss) sets the rest energy loss attribute and adds a small amount of variance (as specified by speedVariance)
void	**setRestSpeed**(int restSpeed)
void	**setTarget**(**PointDouble** target)
void	**setWorld**(**World** world)
void	**update**() Calculates one cycle for the life form.

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

id

```
private java.lang.String id
```

image

```
private java.awt.image.BufferedImage[] image
```

corpseImage

```
private java.awt.image.BufferedImage corpseImage
```

world

```
private World world
```

restSpeed

```
private double restSpeed
```

panicSpeed

```
private double panicSpeed
```

restEnergyLoss

```
private double restEnergyLoss
```

panicEnergyLoss

```
private double panicEnergyLoss
```

isPanicked

```
private boolean isPanicked
```

speedVariance

```
private static double speedVariance
```

target

```
private PointDouble target
```

direction

```
private int direction
```

energy

```
private double energy
```

foodInCorpse

```
private double foodInCorpse
```

Constructor Detail

LifeForm

```
LifeForm(World world,
         PointDouble position)
```

Initialises the life form.

Parameters:

`world` - The world that the life form exists in.

`position` - The position of the life form within the world.

Method Detail

update

```
public void update()
```

Calculates one cycle for the life form. One set of actions/movements will be performed when this function is called.

calculateOppositeDirection

```
public int calculateOppositeDirection(PointDouble target)
```

Works out the opposite of which of the 8 cardinal directions the LifeForm is facing relative to a target PointDouble.

Parameters:

`target` - The target to face away from.

Returns:

A number from 0-7 representing the direction away from target.

calculateDirection

```
public int calculateDirection(PointDouble target)
```

Works out in which of the 8 cardinal directions the LifeForm is facing relative to a target PointDouble.

Parameters:

`target` - A PointDouble target to point towards.

Returns:

A number from 0-7 representing the direction towards target.

getAngle

```
public double getAngle(PointDouble target)
```

Returns the angle from this LifeForms position to a PointDouble.

Parameters:

`target` - The target to measure an angle to.

Returns:

The angle between the target and this LifeForm.

getDistanceToLifeForm

```
protected double getDistanceToLifeForm(LifeForm life)
```

Returns the distance between this LifeForm and another LifeForm.

Parameters:

`life` - The life form to measure distance to.

Returns:

The distance between this life form and the life form specified by life.

getDistanceToTarget

```
protected double getDistanceToTarget()
```

Returns the distance between this LifeForm and its target.

Returns:

The distance between this LifeForm and its target.

moveAwayFromTarget

```
protected boolean moveAwayFromTarget()
```

Moves the LifeForm away from its current target (eg: when fleeing a predator).

Returns:

True if movement is succesful, false if something is in the way.

moveTowardsTarget

```
protected boolean moveTowardsTarget()
```

Moves towards the LifeForm's current target.

Returns:

True if the movement is succesful, false if something is in the way.

move

```
private boolean move(double xVal,
          double yVal)
```

attempts to move the life form by xVal on the x axis and yVal on the y axis (corrected for isometric view)

Parameters:

`xVal` - amount to move on x axis

`yVal` - amount to move on y axis

Returns:

boolean true if successful and false if an unwalkable tile is encountered

die

```
public Food die()
```

Causes the LifeForm to die.

Returns:

A food object representing the corpse of the LifeForm.

setRestEnergyLoss

```
public void setRestEnergyLoss(double restEnergyLoss)
```

sets the rest energy loss attribute and adds a small amount of variance (as specified by speedVariance)

Parameters:

`restEnergyLoss` -

getPanicEnergyLoss

```
public double getPanicEnergyLoss()
```

setPanicEnergyLoss

```
public void setPanicEnergyLoss(double panicEnergyLoss)
```

sets the panic energy loss attribute and adds a small amount of variance (as specified by speedVariance)

Parameters:

`panicEnergyLoss` -

getRestSpeed

```
public double getRestSpeed()
```

setRestSpeed

```
public void setRestSpeed(int restSpeed)
```

getPanicSpeed

```
public double getPanicSpeed()
```

setPanicSpeed

```
public void setPanicSpeed(int panicSpeed)
```

isPanicked

```
public boolean isPanicked()
```

setPanicked

```
public void setPanicked(boolean isPanicked)
```

getTarget

```
public PointDouble getTarget()
```

setTarget

```
public void setTarget(PointDouble target)
```

getCorpseImage

```
public java.awt.image.BufferedImage getCorpseImage()
```

setCorpseImage

```
public void setCorpseImage(java.awt.image.BufferedImage corpseImage)
```

getFoodInCorpse

```
public double getFoodInCorpse()
```

setFoodInCorpse

```
public void setFoodInCorpse(double foodInCorpse)
```

getId

```
public java.lang.String getId()
```

setId

```
public void setId(java.lang.String id)
```

getEnergy

```
public double getEnergy()
```

setEnergy

```
public void setEnergy(double energy)
```

getWorld

```
public World getWorld()
```

setWorld

```
public void setWorld(World world)
```

getDirection

```
public int getDirection()
```

setDirection

```
public void setDirection(int direction)
```

getImage

```
public java.awt.image.BufferedImage[] getImage()
```

setImage

```
public void setImage(java.awt.image.BufferedImage[] image)
```

getRestEnergyLoss

```
public double getRestEnergyLoss()
```

uk.ac.reading.xj008217.entities

Class LifeForm_Sheep

java.lang.Object
  uk.ac.reading.xj008217.entities.Entity
    uk.ac.reading.xj008217.entities.LifeForm
      uk.ac.reading.xj008217.entities.LifeForm_Sheep

```
public class LifeForm_Sheep
extends LifeForm
```

A herbivore that eats grass

Author:

Jon

Field Summary

Fields

Modifier and Type	Field and Description
(package private) SheepController	controller
private static double	escapeDistance
private double	grassEatenPerSecond
private static double	sightRange
private LifeForm	threat

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
LifeForm_Sheep(World world, PointDouble position, SheepController controller) Initialise attributes that make sheep different to other life forms.

Method Summary

Methods

Modifier and Type	Method and Description
Food	die() Causes the sheep to die (returns a food object because the death spawns a corpse!).
void	eatGrass() Attempts to eat the grass square that the sheep is currently stood on.
LifeForm	findThreats() Searches for threats that are closer than the sheep's sightRange.
SheepController	getController()
LifeForm	getThreat()
void	setController(SheepController controller)
void	setThreat(LifeForm threat)
void	update() Update the sheep and run its artificial intelligence logic, deciding what to do this cycle.

Methods inherited from class uk.ac.reading.xj008217.entities.LifeForm

calculateDirection, calculateOppositeDirection, getAngle, getCorpseImage, getDirection, getDistanceToLifeForm, getDistanceToTarget, getEnergy, getFoodInCorpse, getId, getImage, getPanicEnergyLoss, getPanicSpeed, getRestEnergyLoss, getRestSpeed, getTarget, getWorld, isPanicked, moveAwayFromTarget, moveTowardsTarget, setCorpseImage, setDirection, setEnergy, setFoodInCorpse, setId, setImage, setPanicEnergyLoss, setPanicked, setPanicSpeed, setRestEnergyLoss, setRestSpeed, setTarget, setWorld

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

grassEatenPerSecond

```
private double grassEatenPerSecond
```

sightRange

```
private static double sightRange
```

escapeDistance

```
private static double escapeDistance
```

threat

```
private LifeForm threat
```

controller

```
SheepController controller
```

Constructor Detail

LifeForm_Sheep

```
public LifeForm_Sheep(World world,
              PointDouble position,
              SheepController controller)
```

Initialise attributes that make sheep different to other life forms.

Method Detail

update

```
public void update()
```

Update the sheep and run its artificial intelligence logic, deciding what to do this cycle.

Overrides:

`update` in class `LifeForm`

eatGrass

```
public void eatGrass()
```

Attempts to eat the grass square that the sheep is currently stood on.

findThreats

```
public LifeForm findThreats()
```

Searches for threats that are closer than the sheep's sightRange.

Returns:

The closest threat to the sheep

die

```
public Food die()
```

Causes the sheep to die (returns a food object because the death spawns a corpse!).

Overrides:

`die` in class `LifeForm`

Returns:

A food object representing the corpse of the LifeForm.

getThreat

```
public LifeForm getThreat()
```

setThreat

```
public void setThreat(LifeForm threat)
```

getController

```
public SheepController getController()
```

setController

```
public void setController(SheepController controller)
```

uk.ac.reading.xj008217.entities

Class LifeForm_Wolf

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.LifeForm
    - uk.ac.reading.xj008217.entities.LifeForm_Wolf

```
public class LifeForm_Wolf
extends LifeForm
```

A predator that eats sheep

Author:

Jon

Field Summary

Fields

Modifier and Type	Field and Description
private boolean	**eating**
private double	**eatingSpeed**
private **Food**	**food**
private double	**hungerThreshold**
private **LifeForm**	**prey**
private int	**randomMovementRange**
private int	**sightRange**
private double	**timer**

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
LifeForm_Wolf(**World** world, **PointDouble** position) initialise the attributes that make the wolf unique

Method Summary

Methods

Modifier and Type	Method and Description
Food	**die**() Causes the wolf to die.
private void	**eat**() Eat the currently selected corpse.
LifeForm	**findPrey**() Returns the closest prey within sightRange.
PointDouble	**getNewTarget**() Returns a new target PointDouble.
void	**moveRandomly**() causes the wolf to wander around, used when it is not hungry or cant find any sheep.
void	**moveTowardsPrey**() moves the wolf towards its currently targeted prey.
void	**update**() Update the wolf and run its artificial intelligence logic, deciding what to do this cycle.

Methods inherited from class uk.ac.reading.xj008217.entities.LifeForm

calculateDirection, calculateOppositeDirection, getAngle, getCorpseImage, getDirection, getDistanceToLifeForm, getDistanceToTarget, getEnergy, getFoodInCorpse, getId, getImage, getPanicEnergyLoss, getPanicSpeed, getRestEnergyLoss, getRestSpeed, getTarget, getWorld, isPanicked, moveAwayFromTarget, moveTowardsTarget, setCorpseImage, setDirection, setEnergy, setFoodInCorpse, setId, setImage, setPanicEnergyLoss, setPanicked, setPanicSpeed, setRestEnergyLoss, setRestSpeed, setTarget, setWorld

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

timer

```
private double timer
```

prey

```
private LifeForm prey
```

food

```
private Food food
```

sightRange

```
private int sightRange
```

randomMovementRange

```
private int randomMovementRange
```

eatingSpeed

```
private double eatingSpeed
```

eating

```
private boolean eating
```

hungerThreshold

```
private double hungerThreshold
```

Constructor Detail

LifeForm_Wolf

```
public LifeForm_Wolf(World world,
             PointDouble position)
```

initialise the attributes that make the wolf unique

Method Detail

update

```
public void update()
```

Update the wolf and run its artificial intelligence logic, deciding what to do this cycle.

Overrides:

`update` in class `LifeForm`

eat

```
private void eat()
```

Eat the currently selected corpse.

getNewTarget

```
public PointDouble getNewTarget()
```

Returns a new target PointDouble.

Returns:

A PointDouble representing the new target location.

findPrey

```
public LifeForm findPrey()
```

Returns the closest prey within sightRange. If no prey can be found then the function returns null.

Returns:

Closest prey if it can be found, if not returns null.

moveTowardsPrey

```
public void moveTowardsPrey()
```

moves the wolf towards its currently targeted prey.

moveRandomly

```
public void moveRandomly()
```

causes the wolf to wander around, used when it is not hungry or cant find any sheep.

die

```
public Food die()
```

Causes the wolf to die.

Overrides:

`die` in class `LifeForm`

Returns:

A food object representing the corpse of the LifeForm.

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uk.ac.reading.xj008217.entities

Class SheepController

java.lang.Object
    uk.ac.reading.xj008217.entities.SheepController

```
public class SheepController
extends java.lang.Object
```

A sheep controller is responsible for controlling a single herd of sheep, and giving them new movement targets when they request them. It helps the sheep move as a herd towards longer grass.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
private boolean	herdIsPanicked
private int	herdSpacing
private double	nextGrassCheck
private PointDouble	position
private java.util.ArrayList<LifeForm_Sheep>	sheepList
private int	sightDistance
private java.util.List<LifeForm>	threats
private double	timeBetweenGrassChecks
private World	world

Constructor Summary

Constructors

Constructor and Description
SheepController(World world, PointDouble controllerPoint) Initialises a new SheepController

Method Summary

Methods

Modifier and Type	Method and Description
void	**addSheep**(**LifeForm_Sheep** newSheep)
void	**alertToThreat**(**LifeForm** threat) Alerts all sheep in the herd to a threat specified by threat.
PointDouble	**getNewTarget**() Returns a new target location within the bounds of the herd.
PointDouble	**getPosition**()
java.util.List<**LifeForm**>	**getThreats**()
void	**moveTowardsGrass**() Moves the sheep controller towards an area with more grass.
void	**panic**() Sets the herd into a panic state
void	**refreshLocation**() Resets the position of the controller to an average of its sheep's positions.
void	**removeSheep**(**LifeForm_Sheep** sheep)
void	**setPosition**(**PointDouble** position)
void	**update**()

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

world

```
private World world
```

sheepList

```
private java.util.ArrayList<LifeForm_Sheep> sheepList
```

position

```
private PointDouble position
```

herdIsPanicked

```
private boolean herdIsPanicked
```

threats

```
private java.util.List<LifeForm> threats
```

herdSpacing

```
private int herdSpacing
```

sightDistance

```
private int sightDistance
```

timeBetweenGrassChecks

```
private double timeBetweenGrassChecks
```

nextGrassCheck

```
private double nextGrassCheck
```

Constructor Detail

SheepController

```
public SheepController(World world,
                       PointDouble controllerPoint)
```

Initialises a new SheepController

Parameters:

`world` - The world that this controller exists within.

`controllerPoint` - The location in the world that this controller exists (controls the origin of the herd).

Method Detail

alertToThreat

```
public void alertToThreat(LifeForm threat)
```

Alerts all sheep in the herd to a threat specified by threat.

Parameters:

`threat` - The threat that the sheep will be alerted to.

refreshLocation

```
public void refreshLocation()
```

Resets the position of the controller to an average of its sheep's positions. Helps the herd recover after an attack.

update

```
public void update()
```

moveTowardsGrass

```
public void moveTowardsGrass()
```

Moves the sheep controller towards an area with more grass. This is achieved by calculating a weighted average of the grass tiles near by. EG: A grass tile with 50 food will have its position multiplied by 50 while a grass tile with 30 food will have it multiplied by 30. The total of all weighted averages added together is divided by the total amount of food in grass tiles in the area. The controller is then moved to this new position which will be closer to thicker grass. This technique works well because the controller will move faster when the thicker grass is further away.

getNewTarget

```
public PointDouble getNewTarget()
```

Returns a new target location within the bounds of the herd.

Returns:

A PointDouble within the bounds of the herd.

panic

```
public void panic()
```

Sets the herd into a panic state

getPosition

```
public PointDouble getPosition()
```

setPosition

```
public void setPosition(PointDouble position)
```

getThreats

```
public java.util.List<LifeForm> getThreats()
```

addSheep

```
public void addSheep(LifeForm_Sheep newSheep)
```

removeSheep

```
public void removeSheep(LifeForm_Sheep sheep)
```

uk.ac.reading.xj008217.entities

Class Food

java.lang.Object
  uk.ac.reading.xj008217.entities.Entity
    uk.ac.reading.xj008217.entities.Food

Direct Known Subclasses:

Corpse

```
public class Food
extends Entity
```

Food describes any source of food in the world.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
private double	decayRate
private boolean	decays
private double	foodLeft
private java.awt.image.BufferedImage	image
private World	world

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
Food(PointDouble position, java.awt.image.BufferedImage image, World world)

Method Summary

Methods

Modifier and Type	Method and Description
double	eat(double amount) Takes an amount of food (the requested amount to be eaten) and returns the actual amount eaten, accounting for any potential lack of food.
double	getDecayRate()
double	getFoodLeft()
java.awt.image.BufferedImage	getImage()
boolean	isDecays()
void	setDecayRate(double decayRate)
void	setDecays(boolean decays)
void	setFoodLeft(double foodLeft)
void	setImage(java.awt.image.BufferedImage image)
void	update() Updates the food object.

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

image

```
private java.awt.image.BufferedImage image
```

foodLeft

```
private double foodLeft
```

decays

```
private boolean decays
```

decayRate

```
private double decayRate
```

world

```
private World world
```

Constructor Detail

Food

```
public Food(PointDouble position,
    java.awt.image.BufferedImage image,
    World world)
```

Method Detail

update

```
public void update()
```

Updates the food object. Removes the food if there is no food left and lowers the amount of food left if this food object is set to decay.

eat

```
public double eat(double amount)
```

Takes an amount of food (the requested amount to be eaten) and returns the actual amount eaten, accounting for any potential lack of food. EG: the amount may be more than food left.

Parameters:

amount - The amount of food requested

Returns:

The amount of food given

getImage

```
public java.awt.image.BufferedImage getImage()
```

setImage

```
public void setImage(java.awt.image.BufferedImage image)
```

getFoodLeft

```
public double getFoodLeft()
```

setFoodLeft

```
public void setFoodLeft(double foodLeft)
```

isDecays

```
public boolean isDecays()
```

setDecays

```
public void setDecays(boolean decays)
```

getDecayRate

```
public double getDecayRate()
```

setDecayRate

```
public void setDecayRate(double decayRate)
```

uk.ac.reading.xj008217.entities

Class Tile

java.lang.Object
  uk.ac.reading.xj008217.entities.Entity
    uk.ac.reading.xj008217.entities.Tile

Direct Known Subclasses:

Tile_Border, Tile_Forest, Tile_Grass, Tile_River

```
public class Tile
extends Entity
```

A background/environment tile.

Author:

Jon

Field Summary

Fields

Modifier and Type	Field and Description
protected java.awt.Point	**gridPosition**
private java.lang.String	**id**
private java.awt.image.BufferedImage	**image**
private boolean	**isWalkable**
protected **World**	**world**

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
Tile(**World** world, int x, int y)

Method Summary

Methods

Modifier and Type	Method and Description
java.lang.String	**getId**()
java.awt.image.BufferedImage	**getImage**()
boolean	**isWalkable**()
void	**setId**(java.lang.String id)
void	**setImage**(java.awt.image.BufferedImage image)
void	**setWalkable**(boolean walkable)
void	**update**() updates the tile (image/food amounts etc).

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

isWalkable

```
private boolean isWalkable
```

image

```
private java.awt.image.BufferedImage image
```

id

```
private java.lang.String id
```

world

```
protected World world
```

gridPosition

```
protected java.awt.Point gridPosition
```

Constructor Detail

Tile

```
public Tile(World world,
    int x,
    int y)
```

Method Detail

update

```
public void update()
```

updates the tile (image/food amounts etc).

isWalkable

```
public boolean isWalkable()
```

setWalkable

```
public void setWalkable(boolean walkable)
```

getImage

```
public java.awt.image.BufferedImage getImage()
```

setImage

```
public void setImage(java.awt.image.BufferedImage image)
```

getId

```
public java.lang.String getId()
```

setId

```
public void setId(java.lang.String id)
```

uk.ac.reading.xj008217.entities

Class Tile_Border

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.Tile
    - uk.ac.reading.xj008217.entities.Tile_Border

```
public class Tile_Border
extends Tile
```

A tile that is designed to give the world a boundary, both aesthetically and physically to stop LifeForms escaping.

Author:

xj008217

Field Summary

Fields inherited from class uk.ac.reading.xj008217.entities.Tile

`gridPosition, world`

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

`position`

Constructor Summary

Constructors

Constructor and Description
`Tile_Border(World world, int x, int y)`

Method Summary

Methods

Modifier and Type	Method and Description
private void	`calculateImage()` Sets the border to the correct image.

Methods inherited from class uk.ac.reading.xj008217.entities.Tile

`getId, getImage, isWalkable, setId, setImage, setWalkable, update`

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

`getPosition, setPosition`

Methods inherited from class java.lang.Object

`clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait`

Constructor Detail

Tile_Border

```
public Tile_Border(World world,
           int x,
           int y)
```

Method Detail

calculateImage

```
private void calculateImage()
```

Sets the border to the correct image.

uk.ac.reading.xj008217.entities

Class Tile_Forest

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.Tile
    - uk.ac.reading.xj008217.entities.Tile_Forest

```
public class Tile_Forest
extends Tile
```

A forest tile - acts as a barrier that is generated in natural forest patters, that feather out towards the edges.

Author:

Jon

Field Summary

Fields inherited from class uk.ac.reading.xj008217.entities.Tile

`gridPosition, world`

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

`position`

Constructor Summary

Constructors

Constructor and Description
`Tile_Forest(World world, int x, int y)` Initialises a new forest tile

Method Summary

Methods

Modifier and Type	Method and Description
`void`	**`calculateImage()`** Calculates the image to use for the tile.

Methods inherited from class uk.ac.reading.xj008217.entities.Tile

`getId, getImage, isWalkable, setId, setImage, setWalkable, update`

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

`getPosition, setPosition`

Methods inherited from class java.lang.Object

`clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait`

Constructor Detail

Tile_Forest

```
public Tile_Forest(World world,
           int x,
           int y)
```

Initialises a new forest tile

Parameters:

`world` - The world that the tile exists in.

`x` - The tiles X Coordinate

`y` - The tiles Y Coordinate

Method Detail

calculateImage

```
public void calculateImage()
```

Calculates the image to use for the tile. The closer to the edge of a forest the tile is, the fewer trees appear in its image.

uk.ac.reading.xj008217.entities

Class Tile_Grass

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.Tile
    - uk.ac.reading.xj008217.entities.Tile_Grass

```
public class Tile_Grass
extends Tile
```

A grass tile is the basic and most abundant tile in the simulation, herbivores eat the grass. The grass grows at a steady rate, and it grows faster near rivers.

Author:

Jon

Field Summary

Fields

Modifier and Type	Field and Description
private double	foodLeft
private double	growthPerSecond
private double	maxFood
private boolean	poisoned
private static double	poisonMultiplier
private double	riverGrowthBonus

Fields inherited from class uk.ac.reading.xj008217.entities.Tile

gridPosition, world

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

position

Constructor Summary

Constructors

Constructor and Description
Tile_Grass(World world, int x, int y)
Initialises a new grass tile

Method Summary

Methods

Modifier and Type	Method and Description
double	eatGrass(double amount) Returns an amount of food based on a requested amount.
double	getFoodLeft()
boolean	isPoisoned()
void	setFoodLeft(double foodLeft)
void	setPoisoned(boolean poisoned)
void	update() Updates the grass, causing it to grow and change image if the percentage of food remaining passes set of thresholds.
void	updateGrowthPerSecond() Calculate growth per second based on surrounding features.

Methods inherited from class uk.ac.reading.xj008217.entities.Tile

getId, getImage, isWalkable, setId, setImage, setWalkable

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

getPosition, setPosition

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

foodLeft

```
private double foodLeft
```

maxFood

```
private double maxFood
```

growthPerSecond

```
private double growthPerSecond
```

riverGrowthBonus

```
private double riverGrowthBonus
```

poisoned

```
private boolean poisoned
```

poisonMultiplier

```
private static double poisonMultiplier
```

Constructor Detail

Tile_Grass

```
public Tile_Grass(World world,
          int x,
          int y)
```

Initialises a new grass tile

Parameters:

`world` - The world that the tile exists in.

`x` - The tile's X Coordinate

`y` - The tile's Y Coordinate

Method Detail

update

```
public void update()
```

Updates the grass, causing it to grow and change image if the percentage of food remaining passes set of thresholds.

Overrides:

`update` in class `Tile`

updateGrowthPerSecond

```
public void updateGrowthPerSecond()
```

Calculate growth per second based on surrounding features. EG: Rivers cause grass to grow faster.

eatGrass

```
public double eatGrass(double amount)
```

Returns an amount of food based on a requested amount.

Parameters:

`amount` - The amount of food that a life form is requesting to eat.

Returns:

The amount of food that can be eaten (will be negative if the grass is poisonous!).

isPoisoned

```
public boolean isPoisoned()
```

setPoisoned

```
public void setPoisoned(boolean poisoned)
```

getFoodLeft

```
public double getFoodLeft()
```

setFoodLeft

```
public void setFoodLeft(double foodLeft)
```

uk.ac.reading.xj008217.entities

Class Tile_River

java.lang.Object
- uk.ac.reading.xj008217.entities.Entity
  - uk.ac.reading.xj008217.entities.Tile
    - uk.ac.reading.xj008217.entities.Tile_River

```
public class Tile_River
extends Tile
```

The river tile creates impassable barriers between sections of the simulation, and is generated in a way that looks and acts like a real river. The rivers also cause grass nearby to grow faster.

Author:

Jon

Field Summary

Fields inherited from class uk.ac.reading.xj008217.entities.Tile

`gridPosition`, `world`

Fields inherited from class uk.ac.reading.xj008217.entities.Entity

`position`

Constructor Summary

Constructors

Constructor and Description
`Tile_River(World world, int x, int y)` Initialises a new river tile.

Method Summary

Methods

Modifier and Type	Method and Description
void	`calculateImage()` Selects an image for the river.
private java.awt.image.BufferedImage	`selectRiverImage(boolean n, boolean e, boolean s, boolean w)` function that returns the correct tile to be used for a section of river

Methods inherited from class uk.ac.reading.xj008217.entities.Tile

`getId`, `getImage`, `isWalkable`, `setId`, `setImage`, `setWalkable`, `update`

Methods inherited from class uk.ac.reading.xj008217.entities.Entity

`getPosition`, `setPosition`

Methods inherited from class java.lang.Object

`clone`, `equals`, `finalize`, `getClass`, `hashCode`, `notify`, `notifyAll`, `toString`, `wait`, `wait`, `wait`

Constructor Detail

Tile_River

```
public Tile_River(World world,
          int x,
          int y)
```

Initialises a new river tile.

Parameters:

`world` - The world that the tile exists in.

`x` - The tile's X Coordinate

`y` - The tile's Y Coordinate

Method Detail

calculateImage

```
public void calculateImage()
```

Selects an image for the river. This is a complex function that makes rivers connect up in lines using a total of 15 different images of the river facing different directions.

selectRiverImage

```
private java.awt.image.BufferedImage selectRiverImage(boolean n,
                                                      boolean e,
                                                      boolean s,
```

boolean w)

function that returns the correct tile to be used for a section of river

Parameters:

n - boolean indicating whether the tile to the north is a river

e - boolean indicating whether the tile to the east is a river

s - boolean indicating whether the tile to the south is a river

w - boolean indicating whether the tile to the west is a river

uk.ac.reading.xj008217.gui

Class GUI

java.lang.Object
  java.awt.Component
    java.awt.Container
      java.awt.Window
        java.awt.Frame
          javax.swing.JFrame
            uk.ac.reading.xj008217.gui.GUI

All Implemented Interfaces:

java.awt.event.ActionListener, java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, java.util.EventListener, javax.accessibility.Accessible, javax.swing.RootPaneContainer, javax.swing.WindowConstants

---

```
public class GUI
extends javax.swing.JFrame
implements java.awt.event.ActionListener
```

Controls the top level of the program and displays panels.

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JFrame
javax.swing.JFrame.AccessibleJFrame

Nested classes/interfaces inherited from class java.awt.Frame
java.awt.Frame.AccessibleAWTFrame

Nested classes/interfaces inherited from class java.awt.Window
java.awt.Window.AccessibleAWTWindow, java.awt.Window.Type

Nested classes/interfaces inherited from class java.awt.Container
java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
(package private) javax.swing.JPanel	currentPanel

Fields inherited from class javax.swing.JFrame

accessibleContext, EXIT_ON_CLOSE, rootPane, rootPaneCheckingEnabled

Fields inherited from class java.awt.Frame

CROSSHAIR_CURSOR, DEFAULT_CURSOR, E_RESIZE_CURSOR, HAND_CURSOR, ICONIFIED, MAXIMIZED_BOTH, MAXIMIZED_HORIZ, MAXIMIZED_VERT, MOVE_CURSOR, N_RESIZE_CURSOR, NE_RESIZE_CURSOR, NORMAL, NW_RESIZE_CURSOR, S_RESIZE_CURSOR, SE_RESIZE_CURSOR, SW_RESIZE_CURSOR, TEXT_CURSOR, W_RESIZE_CURSOR, WAIT_CURSOR

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface javax.swing.WindowConstants

DISPOSE_ON_CLOSE, DO_NOTHING_ON_CLOSE, HIDE_ON_CLOSE

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUI() Initialise GUI and start main menu

Method Summary

Methods

Modifier and Type	Method and Description
void	actionPerformed(java.awt.event.ActionEvent e) Listens for actions performed by buttons on the GUI.
javax.swing.JButton	createAboutButton() Function that returns a JButton that will cause the gui to open the about menu.
javax.swing.JButton	createConfigButton() Function that returns a JButton that will cause the gui to open the configuration menu.
javax.swing.JButton	createExitButton() Function that returns a JButton that will cause the program to exit.
javax.swing.JButton	createHomeButton() Function that returns a JButton that will cause the gui to open the home menu.
javax.swing.JButton	createSimulationButton() Function that returns a JButton that will cause the gui to open the simulation menu.
void	displayAboutMenu() Remove other panels and display the about menu.
void	displayConfigurationMenu() Remove other panels and display the configuration menu.
void	displayHomeMenu() Remove other panels and display the home menu.
void	displaySimulationMenu() Remove other panels and display the simulation menu.
void	displayWorld(WorldConfig config) Remove other panels and display the WorldPanel and run a simulation.
void	exit() Closes the program.

Methods inherited from class javax.swing.JFrame

addImpl, createRootPane, frameInit, getAccessibleContext, getContentPane, getDefaultCloseOperation, getGlassPane, getGraphics, getJMenuBar, getLayeredPane, getRootPane, getTransferHandler, isDefaultLookAndFeelDecorated, isRootPaneCheckingEnabled, paramString, processWindowEvent, remove, repaint, setContentPane, setDefaultCloseOperation, setDefaultLookAndFeelDecorated, setGlassPane, setIconImage, setJMenuBar, setLayeredPane, setLayout, setRootPane, setRootPaneCheckingEnabled, setTransferHandler, update

Methods inherited from class java.awt.Frame

addNotify, getCursorType, getExtendedState, getFrames, getIconImage, getMaximizedBounds, getMenuBar, getState, getTitle, isResizable, isUndecorated, remove, removeNotify, setBackground, setCursor, setExtendedState, setMaximizedBounds, setMenuBar, setOpacity, setResizable, setShape, setState, setTitle, setUndecorated

Methods inherited from class java.awt.Window

addPropertyChangeListener, addPropertyChangeListener, addWindowFocusListener, addWindowListener, addWindowStateListener, applyResourceBundle, applyResourceBundle, createBufferStrategy, createBufferStrategy, dispose, getBackground, getBufferStrategy, getFocusableWindowState, getFocusCycleRootAncestor, getFocusOwner, getFocusTraversalKeys, getIconImages, getInputContext, getListeners,

getLocale, getModalExclusionType, getMostRecentFocusOwner, getOpacity, getOwnedWindows, getOwner, getOwnerlessWindows, getShape, getToolkit, getType, getWarningString, getWindowFocusListeners, getWindowListeners, getWindows, getWindowStateListeners, hide, isActive, isAlwaysOnTop, isAlwaysOnTopSupported, isAutoRequestFocus, isFocusableWindow, isFocusCycleRoot, isFocused, isLocationByPlatform, isOpaque, isShowing, isValidateRoot, pack, paint, postEvent, processEvent, processWindowFocusEvent, processWindowStateEvent, removeWindowFocusListener, removeWindowListener, removeWindowStateListener, reshape, setAlwaysOnTop, setAutoRequestFocus, setBounds, setBounds, setCursor, setFocusableWindowState, setFocusCycleRoot, setIconImages, setLocation, setLocation, setLocationByPlatform, setLocationRelativeTo, setMinimumSize, setModalExclusionType, setSize, setSize, setType, setVisible, show, toBack, toFront

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getAlignmentX, getAlignmentY, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalPolicy, getInsets, getLayout, getMaximumSize, getMinimumSize, getMousePosition, getPreferredSize, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, print, printComponents, processContainerEvent, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusTraversalKeys, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setFont, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, contains, createImage, createImage, createVolatileImage, createVolatileImage, disable, disableEvents, dispatchEvent, enable, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBaseline, getBaselineResizeBehavior, getBounds, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getFontMetrics, getForeground, getGraphicsConfiguration, getHeight, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocation, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getSize, getTreeLock, getWidth, getX, getY, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isDoubleBuffered, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, prepareImage, prepareImage, printAll, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processKeyEvent, processMouseEvent, processMouseMotionEvent, processMouseWheelEvent, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resize, resize, revalidate, setComponentOrientation, setDropTarget, setEnabled, setFocusable,

setFocusTraversalKeysEnabled, setForeground, setIgnoreRepaint, setLocale, setMaximumSize, setName, setPreferredSize, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Methods inherited from interface java.awt.MenuContainer

getFont, postEvent

Field Detail

currentPanel

```
javax.swing.JPanel currentPanel
```

Constructor Detail

GUI

```
public GUI()
```

Initialise GUI and start main menu

Method Detail

displayHomeMenu

```
public void displayHomeMenu()
```

Remove other panels and display the home menu.

displaySimulationMenu

```
public void displaySimulationMenu()
```

Remove other panels and display the simulation menu.

displayConfigurationMenu

```
public void displayConfigurationMenu()
```

Remove other panels and display the configuration menu.

displayAboutMenu

```
public void displayAboutMenu()
```

Remove other panels and display the about menu.

displayWorld

```
public void displayWorld(WorldConfig config)
```

Remove other panels and display the WorldPanel and run a simulation.

Parameters:

`config` - The WorldConfig object that contains the World parameters.

exit

```
public void exit()
```

Closes the program.

createSimulationButton

```
public javax.swing.JButton createSimulationButton()
```

Function that returns a JButton that will cause the gui to open the simulation menu.

Returns:

JButton that opens simulation menu when clicked.

createConfigButton

```
public javax.swing.JButton createConfigButton()
```

Function that returns a JButton that will cause the gui to open the configuration menu.

Returns:

JButton that opens configuration menu when clicked.

createAboutButton

```
public javax.swing.JButton createAboutButton()
```

Function that returns a JButton that will cause the gui to open the about menu.

Returns:

JButton that opens about menu when clicked.

createHomeButton

```
public javax.swing.JButton createHomeButton()
```

Function that returns a JButton that will cause the gui to open the home menu.

Returns:

JButton that opens home menu when clicked.

createExitButton

```
public javax.swing.JButton createExitButton()
```

Function that returns a JButton that will cause the program to exit.

Returns:

JButton that exits the program when clicked.

actionPerformed

```
public void actionPerformed(java.awt.event.ActionEvent e)
```

Listens for actions performed by buttons on the GUI.

Specified by:

`actionPerformed` in interface `java.awt.event.ActionListener`

uk.ac.reading.xj008217.gui

Class GUI_HintLabel

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JLabel
          uk.ac.reading.xj008217.gui.GUI_HintLabel

All Implemented Interfaces:

java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, javax.accessibility.Accessible, javax.swing.SwingConstants

---

```
public class GUI_HintLabel
extends javax.swing.JLabel
```

Extends JLabel to create a label that displays a random hint about the simulation.

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JLabel

javax.swing.JLabel.AccessibleJLabel

Nested classes/interfaces inherited from class javax.swing.JComponent

javax.swing.JComponent.AccessibleJComponent

Nested classes/interfaces inherited from class java.awt.Container

java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
private java.lang.String[]	hints

Fields inherited from class javax.swing.JLabel

labelFor

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface javax.swing.SwingConstants

BOTTOM, CENTER, EAST, HORIZONTAL, LEADING, LEFT, NEXT, NORTH, NORTH_EAST, NORTH_WEST, PREVIOUS, RIGHT, SOUTH, SOUTH_EAST, SOUTH_WEST, TOP, TRAILING, VERTICAL, WEST

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUI_HintLabel()

Method Summary

Methods inherited from class javax.swing.JLabel

checkHorizontalKey, checkVerticalKey, getAccessibleContext, getDisabledIcon, getDisplayedMnemonic, getDisplayedMnemonicIndex, getHorizontalAlignment, getHorizontalTextPosition, getIcon, getIconTextGap, getLabelFor, getText, getUI, getUIClassID, getVerticalAlignment, getVerticalTextPosition, imageUpdate, paramString, setDisabledIcon, setDisplayedMnemonic, setDisplayedMnemonic, setDisplayedMnemonicIndex, setHorizontalAlignment, setHorizontalTextPosition, setIcon, setIconTextGap, setLabelFor, setText, setUI, setVerticalAlignment, setVerticalTextPosition, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

hints

```
private java.lang.String[] hints
```

Constructor Detail

GUI_HintLabel

```
public GUI_HintLabel()
```

uk.ac.reading.xj008217.gui

Class GUIPanel

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.gui.GUIPanel

All Implemented Interfaces:

java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, javax.accessibility.Accessible

Direct Known Subclasses:

GUIPanel_About, GUIPanel_Configuration, GUIPanel_Home, GUIPanel_Simulation

---

```
public class GUIPanel
extends javax.swing.JPanel
```

A menu panel - used to create generic menus.

Author:

xj008217

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

javax.swing.JPanel.AccessibleJPanel

Nested classes/interfaces inherited from class javax.swing.JComponent

javax.swing.JComponent.AccessibleJComponent

Nested classes/interfaces inherited from class java.awt.Container

java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
protected GUI	gui
private static long	serialVersionUID
protected javax.swing.JPanel	subPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUIPanel(GUI gui) Adds layouts, sub JPanels, a hint and repaints the panel.

Method Summary

Methods

Modifier and Type	Method and Description
private void	addHeader() Adds the banner header to the JPanel
private void	addHint() Adds a hint JLabel to the JPanel.

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

gui

```
protected GUI gui
```

subPanel

```
protected javax.swing.JPanel subPanel
```

Constructor Detail

GUIPanel

```
public GUIPanel(GUI gui)
```

Adds layouts, sub JPanels, a hint and repaints the panel.

Parameters:

`gui` - The gui that this panel exists on.

Method Detail

addHeader

```
private void addHeader()
```

Adds the banner header to the JPanel

addHint

```
private void addHint()
```

Adds a hint JLabel to the JPanel.

uk.ac.reading.xj008217.gui

Class GUIPanel_About

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.gui.GUIPanel
            uk.ac.reading.xj008217.gui.GUIPanel_About

All Implemented Interfaces:

java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, javax.accessibility.Accessible

---

```
public class GUIPanel_About
extends GUIPanel
```

The about menu.

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

`javax.swing.JPanel.AccessibleJPanel`

Nested classes/interfaces inherited from class javax.swing.JComponent

`javax.swing.JComponent.AccessibleJComponent`

Nested classes/interfaces inherited from class java.awt.Container

`java.awt.Container.AccessibleAWTContainer`

Nested classes/interfaces inherited from class java.awt.Component

`java.awt.Component.AccessibleAWTComponent`,
`java.awt.Component.BaselineResizeBehavior`, `java.awt.Component.BltBufferStrategy`,
`java.awt.Component.FlipBufferStrategy`

Field Summary

Fields

Modifier and Type	Field and Description
(package private) java.lang.String	**aboutText**
protected **GUI**	**gui**
private static long	**serialVersionUID**

Fields inherited from class uk.ac.reading.xj008217.gui.GUIPanel

subPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUIPanel_About(**GUI** gui) Adds buttons and labels as necessary.

Method Summary

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp,

list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

gui

```
protected GUI gui
```

aboutText

```
java.lang.String aboutText
```

Constructor Detail

GUIPanel_About

```
public GUIPanel_About(GUI gui)
```

Adds buttons and labels as necessary.

Parameters:

gui - The gui that this panel exists on.

uk.ac.reading.xj008217.gui

Class GUIPanel_Configuration

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.gui.GUIPanel
            uk.ac.reading.xj008217.gui.GUIPanel_Configuration

All Implemented Interfaces:

java.awt.event.ActionListener, java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, java.util.EventListener, javax.accessibility.Accessible

---

```
public class GUIPanel_Configuration
extends GUIPanel
implements java.awt.event.ActionListener
```

The configuration menu

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

javax.swing.JPanel.AccessibleJPanel

Nested classes/interfaces inherited from class javax.swing.JComponent

javax.swing.JComponent.AccessibleJComponent

Nested classes/interfaces inherited from class java.awt.Container

java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
private javax.swing.JTextField	fileNameField
private javax.swing.JSlider	forestDensitySlider
private javax.swing.JSlider	forestSizeSlider
private javax.swing.JSlider	forestThicknessSlider
protected GUI	gui
private javax.swing.JSpinner	riverCountSpinner
private javax.swing.JSlider	riverVarianceSlider
private static long	serialVersionUID
private javax.swing.JCheckBox	sheepCheckbox
private javax.swing.JSlider	sheepHerdCountSlider
private javax.swing.JSlider	sheepHerdSizeSlider
private javax.swing.JCheckBox	wolfCheckbox
private javax.swing.JSlider	wolfCountSlider
private WorldConfig	worldConfig
private javax.swing.JSlider	worldHeightSlider
private javax.swing.JSlider	worldWidthSlider

Fields inherited from class uk.ac.reading.xj008217.gui.GUIPanel

subPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUIPanel_Configuration(GUI gui)

Adds buttons,labels,sliders as necessary.

Method Summary

Methods

Modifier and Type	Method and Description
void	**actionPerformed**(java.awt.event.ActionEvent e)
javax.swing.JButton	**createLoadButton**()
javax.swing.JButton	**createSaveButton**()
void	**loadWorldConfig**(java.lang.String fileName)
void	**saveWorldConfig**(java.lang.String fileName)

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

gui

```
protected GUI gui
```

worldConfig

```
private WorldConfig worldConfig
```

worldWidthSlider

```
private javax.swing.JSlider worldWidthSlider
```

worldHeightSlider

```
private javax.swing.JSlider worldHeightSlider
```

riverCountSpinner

```
private javax.swing.JSpinner riverCountSpinner
```

riverVarianceSlider

```
private javax.swing.JSlider riverVarianceSlider
```

forestDensitySlider

```
private javax.swing.JSlider forestDensitySlider
```

forestThicknessSlider

```
private javax.swing.JSlider forestThicknessSlider
```

forestSizeSlider

```
private javax.swing.JSlider forestSizeSlider
```

sheepCheckbox

```
private javax.swing.JCheckBox sheepCheckbox
```

sheepHerdCountSlider

```
private javax.swing.JSlider sheepHerdCountSlider
```

sheepHerdSizeSlider

```
private javax.swing.JSlider sheepHerdSizeSlider
```

wolfCheckbox

```
private javax.swing.JCheckBox wolfCheckbox
```

wolfCountSlider

```
private javax.swing.JSlider wolfCountSlider
```

fileNameField

```
private javax.swing.JTextField fileNameField
```

Constructor Detail

GUIPanel_Configuration

```
public GUIPanel_Configuration(GUI gui)
```

Adds buttons,labels,sliders as necessary. Uses a gridbaglayout to correctly position elements.

Parameters:

`gui` - The GUI that this panel exists on.

Method Detail

saveWorldConfig

```
public void saveWorldConfig(java.lang.String fileName)
```

loadWorldConfig

```
public void loadWorldConfig(java.lang.String fileName)
```

createSaveButton

```
public javax.swing.JButton createSaveButton()
```

createLoadButton

```
public javax.swing.JButton createLoadButton()
```

actionPerformed

```
public void actionPerformed(java.awt.event.ActionEvent e)
```

Specified by:

actionPerformed in interface java.awt.event.ActionListener

uk.ac.reading.xj008217.gui

Class GUIPanel_Home

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.gui.GUIPanel
            uk.ac.reading.xj008217.gui.GUIPanel_Home

All Implemented Interfaces:

java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, javax.accessibility.Accessible

---

```
public class GUIPanel_Home
extends GUIPanel
```

The home menu

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

```
javax.swing.JPanel.AccessibleJPanel
```

Nested classes/interfaces inherited from class javax.swing.JComponent

```
javax.swing.JComponent.AccessibleJComponent
```

Nested classes/interfaces inherited from class java.awt.Container

```
java.awt.Container.AccessibleAWTContainer
```

Nested classes/interfaces inherited from class java.awt.Component

```
java.awt.Component.AccessibleAWTComponent,
java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy,
java.awt.Component.FlipBufferStrategy
```

Field Summary

Fields

Modifier and Type	Field and Description
protected GUI	gui
private static long	serialVersionUID

Fields inherited from class uk.ac.reading.xj008217.gui.GUIPanel

subPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUIPanel_Home(GUI gui) Adds labels and buttons as neccesary

Method Summary

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage,

prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

gui

```
protected GUI gui
```

Constructor Detail

GUIPanel_Home

```
public GUIPanel_Home(GUI gui)
```

Adds labels and buttons as neccesary

Parameters:

`gui` - The gui that this panel exists on.

uk.ac.reading.xj008217.gui

Class GUIPanel_Simulation

java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.JPanel
          uk.ac.reading.xj008217.gui.GUIPanel
            uk.ac.reading.xj008217.gui.GUIPanel_Simulation

All Implemented Interfaces:

java.awt.event.ActionListener, java.awt.image.ImageObserver, java.awt.MenuContainer, java.io.Serializable, java.util.EventListener, javax.accessibility.Accessible

---

```
public class GUIPanel_Simulation
extends GUIPanel
implements java.awt.event.ActionListener
```

The simulation menu.

Author:

Jon

See Also:

Serialized Form

Nested Class Summary

Nested classes/interfaces inherited from class javax.swing.JPanel

javax.swing.JPanel.AccessibleJPanel

Nested classes/interfaces inherited from class javax.swing.JComponent

javax.swing.JComponent.AccessibleJComponent

Nested classes/interfaces inherited from class java.awt.Container

java.awt.Container.AccessibleAWTContainer

Nested classes/interfaces inherited from class java.awt.Component

java.awt.Component.AccessibleAWTComponent, java.awt.Component.BaselineResizeBehavior, java.awt.Component.BltBufferStrategy, java.awt.Component.FlipBufferStrategy

Field Summary

Fields

Modifier and Type	Field and Description
private WorldConfig	config
private javax.swing.JComboBox<java.lang.String>	configDropDown
private java.util.List<java.lang.String>	configFiles
protected GUI	gui
private static long	serialVersionUID

Fields inherited from class uk.ac.reading.xj008217.gui.GUIPanel

subPanel

Fields inherited from class javax.swing.JComponent

accessibleContext, listenerList, TOOL_TIP_TEXT_KEY, ui, UNDEFINED_CONDITION, WHEN_ANCESTOR_OF_FOCUSED_COMPONENT, WHEN_FOCUSED, WHEN_IN_FOCUSED_WINDOW

Fields inherited from class java.awt.Component

BOTTOM_ALIGNMENT, CENTER_ALIGNMENT, LEFT_ALIGNMENT, RIGHT_ALIGNMENT, TOP_ALIGNMENT

Fields inherited from interface java.awt.image.ImageObserver

ABORT, ALLBITS, ERROR, FRAMEBITS, HEIGHT, PROPERTIES, SOMEBITS, WIDTH

Constructor Summary

Constructors

Constructor and Description
GUIPanel_Simulation(GUI gui) Adds buttons, combo boxes as necessary.

Method Summary

Methods

Modifier and Type	Method and Description
void	actionPerformed(java.awt.event.ActionEvent e) Listen for events fired by buttons on this panel.
javax.swing.JButton	createStartWorldButton() Creates and returns a JButton that starts the world.

void	**startWorld**() Starts the world with the currently selected world configuration properties file.

Methods inherited from class javax.swing.JPanel

getAccessibleContext, getUI, getUIClassID, paramString, setUI, updateUI

Methods inherited from class javax.swing.JComponent

addAncestorListener, addNotify, addVetoableChangeListener, computeVisibleRect, contains, createToolTip, disable, enable, firePropertyChange, firePropertyChange, firePropertyChange, fireVetoableChange, getActionForKeyStroke, getActionMap, getAlignmentX, getAlignmentY, getAncestorListeners, getAutoscrolls, getBaseline, getBaselineResizeBehavior, getBorder, getBounds, getClientProperty, getComponentGraphics, getComponentPopupMenu, getConditionForKeyStroke, getDebugGraphicsOptions, getDefaultLocale, getFontMetrics, getGraphics, getHeight, getInheritsPopupMenu, getInputMap, getInputMap, getInputVerifier, getInsets, getInsets, getListeners, getLocation, getMaximumSize, getMinimumSize, getNextFocusableComponent, getPopupLocation, getPreferredSize, getRegisteredKeyStrokes, getRootPane, getSize, getToolTipLocation, getToolTipText, getToolTipText, getTopLevelAncestor, getTransferHandler, getVerifyInputWhenFocusTarget, getVetoableChangeListeners, getVisibleRect, getWidth, getX, getY, grabFocus, hide, isDoubleBuffered, isLightweightComponent, isManagingFocus, isOpaque, isOptimizedDrawingEnabled, isPaintingForPrint, isPaintingOrigin, isPaintingTile, isRequestFocusEnabled, isValidateRoot, paint, paintBorder, paintChildren, paintComponent, paintImmediately, paintImmediately, print, printAll, printBorder, printChildren, printComponent, processComponentKeyEvent, processKeyBinding, processKeyEvent, processMouseEvent, processMouseMotionEvent, putClientProperty, registerKeyboardAction, registerKeyboardAction, removeAncestorListener, removeNotify, removeVetoableChangeListener, repaint, repaint, requestDefaultFocus, requestFocus, requestFocus, requestFocusInWindow, requestFocusInWindow, resetKeyboardActions, reshape, revalidate, scrollRectToVisible, setActionMap, setAlignmentX, setAlignmentY, setAutoscrolls, setBackground, setBorder, setComponentPopupMenu, setDebugGraphicsOptions, setDefaultLocale, setDoubleBuffered, setEnabled, setFocusTraversalKeys, setFont, setForeground, setInheritsPopupMenu, setInputMap, setInputVerifier, setMaximumSize, setMinimumSize, setNextFocusableComponent, setOpaque, setPreferredSize, setRequestFocusEnabled, setToolTipText, setTransferHandler, setUI, setVerifyInputWhenFocusTarget, setVisible, unregisterKeyboardAction, update

Methods inherited from class java.awt.Container

add, add, add, add, add, addContainerListener, addImpl, addPropertyChangeListener, addPropertyChangeListener, applyComponentOrientation, areFocusTraversalKeysSet, countComponents, deliverEvent, doLayout, findComponentAt, findComponentAt, getComponent, getComponentAt, getComponentAt, getComponentCount, getComponents, getComponentZOrder, getContainerListeners, getFocusTraversalKeys, getFocusTraversalPolicy, getLayout, getMousePosition, insets, invalidate, isAncestorOf, isFocusCycleRoot, isFocusCycleRoot, isFocusTraversalPolicyProvider, isFocusTraversalPolicySet, layout, list, list, locate, minimumSize, paintComponents, preferredSize, printComponents, processContainerEvent, processEvent, remove, remove, removeAll, removeContainerListener, setComponentZOrder, setFocusCycleRoot, setFocusTraversalPolicy, setFocusTraversalPolicyProvider, setLayout, transferFocusDownCycle, validate, validateTree

Methods inherited from class java.awt.Component

action, add, addComponentListener, addFocusListener, addHierarchyBoundsListener, addHierarchyListener, addInputMethodListener, addKeyListener, addMouseListener, addMouseMotionListener, addMouseWheelListener, bounds, checkImage, checkImage, coalesceEvents, contains, createImage, createImage, createVolatileImage, createVolatileImage, disableEvents, dispatchEvent, enable, enableEvents, enableInputMethods, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, firePropertyChange, getBackground, getBounds, getColorModel, getComponentListeners, getComponentOrientation, getCursor, getDropTarget, getFocusCycleRootAncestor, getFocusListeners, getFocusTraversalKeysEnabled, getFont, getForeground, getGraphicsConfiguration, getHierarchyBoundsListeners, getHierarchyListeners, getIgnoreRepaint, getInputContext, getInputMethodListeners, getInputMethodRequests, getKeyListeners, getLocale, getLocation, getLocationOnScreen, getMouseListeners, getMouseMotionListeners, getMousePosition, getMouseWheelListeners, getName, getParent, getPeer, getPropertyChangeListeners, getPropertyChangeListeners, getSize, getToolkit, getTreeLock, gotFocus, handleEvent, hasFocus, imageUpdate, inside, isBackgroundSet, isCursorSet, isDisplayable, isEnabled, isFocusable, isFocusOwner, isFocusTraversable, isFontSet, isForegroundSet, isLightweight, isMaximumSizeSet, isMinimumSizeSet, isPreferredSizeSet, isShowing, isValid, isVisible, keyDown, keyUp, list, list, list, location, lostFocus, mouseDown, mouseDrag, mouseEnter, mouseExit, mouseMove, mouseUp, move, nextFocus, paintAll, postEvent, prepareImage, prepareImage, processComponentEvent, processFocusEvent, processHierarchyBoundsEvent, processHierarchyEvent, processInputMethodEvent, processMouseWheelEvent, remove, removeComponentListener, removeFocusListener, removeHierarchyBoundsListener, removeHierarchyListener, removeInputMethodListener, removeKeyListener, removeMouseListener, removeMouseMotionListener, removeMouseWheelListener, removePropertyChangeListener, removePropertyChangeListener, repaint, repaint, repaint, resize, resize, setBounds, setBounds, setComponentOrientation, setCursor, setDropTarget, setFocusable, setFocusTraversalKeysEnabled, setIgnoreRepaint, setLocale, setLocation, setLocation, setName, setSize, setSize, show, show, size, toString, transferFocus, transferFocusBackward, transferFocusUpCycle

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, wait, wait, wait

Field Detail

serialVersionUID

```
private static final long serialVersionUID
```

See Also:

Constant Field Values

gui

```
protected GUI gui
```

config

```
private WorldConfig config
```

configFiles

```
private java.util.List<java.lang.String> configFiles
```

configDropDown

```
private javax.swing.JComboBox<java.lang.String> configDropDown
```

Constructor Detail

GUIPanel_Simulation

```
public GUIPanel_Simulation(GUI gui)
```

Adds buttons, combo boxes as necessary.

Parameters:

`gui` - The GUI that this panel exists on.

Method Detail

startWorld

```
public void startWorld()
```

Starts the world with the currently selected world configuration properties file.

createStartWorldButton

```
public javax.swing.JButton createStartWorldButton()
```

Creates and returns a JButton that starts the world.

Returns:

JButton that starts the world when clicked.

actionPerformed

```
public void actionPerformed(java.awt.event.ActionEvent e)
```

Listen for events fired by buttons on this panel.

Specified by:

`actionPerformed` in interface `java.awt.event.ActionListener`

uk.ac.reading.xj008217.utilities

Class PointDouble

java.lang.Object
    uk.ac.reading.xj008217.utilities.PointDouble

```
public class PointDouble
extends java.lang.Object
```

A point double contains x and y coordinates as doubles.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
double	x
double	y

Constructor Summary

Constructors

Constructor and Description
PointDouble() Initialises a default PointDouble (x = 0.0 and y = 0.0)
PointDouble(double x, double y) Initialises a PointDouble
PointDouble(**PointDouble** position) Initialises a PointDouble

Method Summary

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

x

```
public double x
```

y

```
public double y
```

Constructor Detail

PointDouble

```
public PointDouble()
```

Initialises a default PointDouble (x = 0.0 and y = 0.0)

PointDouble

```
public PointDouble(double x,
           double y)
```

Initialises a PointDouble

Parameters:

x - The x value of the PointDouble

y - The y value of the PointDouble

PointDouble

```
public PointDouble(PointDouble position)
```

Initialises a PointDouble

Parameters:

position - The point double to get x and y data from.

uk.ac.reading.xj008217.utilities

Class Images

java.lang.Object
    uk.ac.reading.xj008217.utilities.Images

```
public class Images
extends java.lang.Object
```

Loads and stores static variables for all images used by the program Loading the images into memory in one place prevents repeatedly loading images from the computer.

Field Summary

Fields

Modifier and Type	Field and Description
static java.awt.image.BufferedImage[]	BLOOD_SPLASH
static java.awt.image.BufferedImage	BORDER
static java.awt.image.BufferedImage	DEBUG_SQUARE
static java.awt.image.BufferedImage	FOREST
static java.awt.image.BufferedImage	FOREST_DENSE
static java.awt.image.BufferedImage	FOREST_MEDIUM
static java.awt.image.BufferedImage	FOREST_THIN
static java.awt.image.BufferedImage	FOREST_VERY_THIN
static java.awt.image.BufferedImage	GRASS
static java.awt.image.BufferedImage	GRASS_HIGH
static java.awt.image.BufferedImage	GRASS_LOW
static java.awt.image.BufferedImage	GRASS_POISONED
static java.awt.image.BufferedImage	GRASS_VERY_HIGH
static java.awt.image.BufferedImage	GUI_BUTTON_BACK
static java.awt.image.BufferedImage	GUI_HOME_HEADER
static java.awt.image.BufferedImage	MOUNTAIN
static java.awt.image.BufferedImage	RIVER
static java.awt.image.BufferedImage	RIVER_E
static java.awt.image.BufferedImage	RIVER_E_S
static java.awt.image.BufferedImage	RIVER_E_S_W
static java.awt.image.BufferedImage	RIVER_HORIZONTAL
static java.awt.image.BufferedImage	RIVER_N
static java.awt.image.BufferedImage	RIVER_N_E
static java.awt.image.BufferedImage	RIVER_N_E_S
static java.awt.image.BufferedImage	RIVER_N_E_S_W

static java.awt.image.BufferedImage	RIVER_S
static java.awt.image.BufferedImage	RIVER_S_W
static java.awt.image.BufferedImage	RIVER_S_W_N
static java.awt.image.BufferedImage	RIVER_VERTICAL
static java.awt.image.BufferedImage	RIVER_W
static java.awt.image.BufferedImage	RIVER_W_N
static java.awt.image.BufferedImage	RIVER_W_N_E
static java.awt.image.BufferedImage[]	SHEEP
static java.awt.image.BufferedImage	SHEEP_DEAD
static java.awt.image.BufferedImage	TOOLBAR_HOME
static java.awt.image.BufferedImage	TOOLBAR_PAUSE
static java.awt.image.BufferedImage	TOOLBAR_PLAY
static java.awt.image.BufferedImage[]	WOLF
static java.awt.image.BufferedImage	WOLF_DEAD

Constructor Summary

Constructors

Constructor and Description
Images()

Method Summary

Methods

Modifier and Type	Method and Description
static void	loadImages()

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

GRASS_POISONED

public static java.awt.image.BufferedImage GRASS_POISONED

GRASS_LOW

public static java.awt.image.BufferedImage GRASS_LOW

GRASS

public static java.awt.image.BufferedImage GRASS

GRASS_HIGH

public static java.awt.image.BufferedImage GRASS_HIGH

GRASS_VERY_HIGH

public static java.awt.image.BufferedImage GRASS_VERY_HIGH

FOREST

public static java.awt.image.BufferedImage FOREST

FOREST_VERY_THIN

public static java.awt.image.BufferedImage FOREST_VERY_THIN

FOREST_THIN

public static java.awt.image.BufferedImage FOREST_THIN

FOREST_MEDIUM

public static java.awt.image.BufferedImage FOREST_MEDIUM

FOREST_DENSE

public static java.awt.image.BufferedImage FOREST_DENSE

MOUNTAIN

public static java.awt.image.BufferedImage MOUNTAIN

RIVER

public static java.awt.image.BufferedImage RIVER

RIVER_VERTICAL

public static java.awt.image.BufferedImage RIVER_VERTICAL

RIVER_HORIZONTAL

public static java.awt.image.BufferedImage RIVER_HORIZONTAL

RIVER_N

public static java.awt.image.BufferedImage RIVER_N

RIVER_E

public static java.awt.image.BufferedImage RIVER_E

RIVER_S

public static java.awt.image.BufferedImage RIVER_S

RIVER_W

public static java.awt.image.BufferedImage RIVER_W

RIVER_N_E

public static java.awt.image.BufferedImage RIVER_N_E

RIVER_E_S

public static java.awt.image.BufferedImage RIVER_E_S

RIVER_S_W

public static java.awt.image.BufferedImage RIVER_S_W

RIVER_W_N

public static java.awt.image.BufferedImage RIVER_W_N

RIVER_N_E_S

public static java.awt.image.BufferedImage RIVER_N_E_S

RIVER_E_S_W

public static java.awt.image.BufferedImage RIVER_E_S_W

RIVER_S_W_N

public static java.awt.image.BufferedImage RIVER_S_W_N

RIVER_W_N_E

public static java.awt.image.BufferedImage RIVER_W_N_E

RIVER_N_E_S_W

public static java.awt.image.BufferedImage RIVER_N_E_S_W

BORDER

public static java.awt.image.BufferedImage BORDER

DEBUG_SQUARE

public static java.awt.image.BufferedImage DEBUG_SQUARE

SHEEP

public static java.awt.image.BufferedImage[] SHEEP

SHEEP_DEAD

public static java.awt.image.BufferedImage SHEEP_DEAD

WOLF

public static java.awt.image.BufferedImage[] WOLF

WOLF_DEAD

public static java.awt.image.BufferedImage WOLF_DEAD

BLOOD_SPLASH

public static java.awt.image.BufferedImage[] BLOOD_SPLASH

GUI_HOME_HEADER

public static java.awt.image.BufferedImage GUI_HOME_HEADER

GUI_BUTTON_BACK

public static java.awt.image.BufferedImage GUI_BUTTON_BACK

TOOLBAR_HOME

public static java.awt.image.BufferedImage TOOLBAR_HOME

TOOLBAR_PLAY

public static java.awt.image.BufferedImage TOOLBAR_PLAY

TOOLBAR_PAUSE

public static java.awt.image.BufferedImage TOOLBAR_PAUSE

Constructor Detail

Images

public Images()

Method Detail

loadImages

public static final void loadImages()

uk.ac.reading.xj008217.utilities

Class ProgramConstants

java.lang.Object
    uk.ac.reading.xj008217.utilities.ProgramConstants

```
public class ProgramConstants
extends java.lang.Object
```

static class holding values that must be constant across the whole program.

Author:

xj008217

Field Summary

Fields

Modifier and Type	Field and Description
static boolean	DEBUG_MODE
static java.lang.String	FILE_PREFIX
static long	PAUSE_SLEEP_TIME
static int	SCREEN_HEIGHT
static int	SCREEN_WIDTH
static int	TILE_HEIGHT
static int	TILE_WIDTH
static int	UPDATE_TIME

Constructor Summary

Constructors

Constructor and Description
ProgramConstants()

Method Summary

Methods inherited from class java.lang.Object
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

SCREEN_WIDTH

```
public static final int SCREEN_WIDTH
```

See Also:

Constant Field Values

SCREEN_HEIGHT

```
public static final int SCREEN_HEIGHT
```

See Also:

Constant Field Values

TILE_HEIGHT

```
public static final int TILE_HEIGHT
```

See Also:

Constant Field Values

TILE_WIDTH

```
public static final int TILE_WIDTH
```

See Also:

Constant Field Values

UPDATE_TIME

```
public static final int UPDATE_TIME
```

See Also:

Constant Field Values

FILE_PREFIX

```
public static final java.lang.String FILE_PREFIX
```

See Also:

Constant Field Values

DEBUG_MODE

```
public static final boolean DEBUG_MODE
```

See Also:

Constant Field Values

PAUSE_SLEEP_TIME

```
public static final long PAUSE_SLEEP_TIME
```

See Also:

Constant Field Values

Constructor Detail

ProgramConstants

```
public ProgramConstants()
```