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Packages

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Hierarchy For All Packages

Package Hierarchies:

[edu.mit.six825.bn.bayesnet](#), [edu.mit.six825.bn.functiontable](#), [edu.mit.six825.bn.inputs](#)

Class Hierarchy

- class java.lang.Object
 - class edu.mit.six825.bn.functiontable.[Assignment](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.functiontable.[BaseFunctionConstructor](#) (implements edu.mit.six825.bn.functiontable.[FunctionConstructor](#))
 - class edu.mit.six825.bn.inputs.[AdapterFunctionConstructor](#)
 - class edu.mit.six825.bn.bayesnet.[BayesNet](#)
 - class edu.mit.six825.bn.bayesnet.[BayesNetNode](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.bayesnet.[BayesNetNodeSet](#)
 - class edu.mit.six825.bn.inputs.[Burglary](#)
 - class edu.mit.six825.bn.functiontable.[ComparableBoolean](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.functiontable.[Compute](#)
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 - class edu.mit.six825.bn.functiontable.[DomainIndex](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.functiontable.[Function](#)
 - class edu.mit.six825.bn.functiontable.[FunctionEntry](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.functiontable.[FunctionVariable](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.functiontable.[FunctionVariableSet](#) (implements java.lang.Comparable)
 - class edu.mit.six825.bn.inputs.[Nets](#)
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Interface Hierarchy

- interface edu.mit.six825.bn.functiontable.[FunctionConstructor](#)

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Package edu.mit.six825.bn.bayesnet

Class Summary

BayesNet	Immutable.
BayesNetNode	A variable in a BayesNet.
BayesNetNodeSet	A set of BayesNetNodes.
EnumerationSolver	An implementation of the most basic solver for the BayesNets.
Solver	Provides some helpful functionality, like maintaining the evidence variables that are needed for implementing BayesNet solvers.

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Package edu.mit.six825.bn.functiontable

Interface Summary

FunctionConstructor	A closure that constructs a Function by enumerating through it.
-------------------------------------	---

Class Summary

Assignment	Maps variables to values in their domain.
BaseFunctionConstructor	Some basic functionality for reuse.
ComparableBoolean	Basically the same as java.lang.Boolean, except java.lang.Boolean is not Comparable, and we need that.
Compute	Container for static methods that do computations with Functions.
Domain	A domain that a variable may vary over.
DomainIndex	An index into a specific Domain.
Function	Maps Assignments to double values.
FunctionEntry	Maps an Assignment to a double value.
FunctionVariable	Immutable and totally ordered (based on name).
FunctionVariableSet	An immutable set of FunctionVariables.
Utility	

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Package edu.mit.six825.bn.inputs

Class Summary

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[Burglary](#)

[Nets](#)

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edu.mit.six825.bn.inputs

Class AdapterFunctionConstructor

java.lang.Object

└ [edu.mit.six825.bn.functiontable.BaseFunctionConstructor](#)└ [edu.mit.six825.bn.inputs.AdapterFunctionConstructor](#)**All Implemented Interfaces:**[FunctionConstructor](#)public class **AdapterFunctionConstructor**extends [BaseFunctionConstructor](#)**Author:**

drayside

Field Summary

Fields inherited from class edu.mit.six825.bn.functiontable.[BaseFunctionConstructor](#)[assignmentIterator](#), [vars](#)

Constructor Summary

[AdapterFunctionConstructor](#)([FunctionVariableSet](#) set,
techniques.BN.ProbTable table)

Method Summary

static Function	compute (FunctionVariableSet set, techniques.BN.ProbTable table)
FunctionEntry	next ()

Methods inherited from class edu.mit.six825.bn.functiontable.[BaseFunctionConstructor](#)

[getVariableSet](#), [hasNext](#), [size](#)

Methods inherited from class java.lang.Object

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

Constructor Detail

AdapterFunctionConstructor

```
public AdapterFunctionConstructor(FunctionVariableSet set,  
                                techniques.BN.ProbTable table)
```

Method Detail

compute

```
public static Function compute(FunctionVariableSet set,  
                                techniques.BN.ProbTable table)
```

next

```
public FunctionEntry next()
```

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Class Assignment

`java.lang.Object``└ edu.mit.six825.bn.functiontable.Assignment`

All Implemented Interfaces:

`java.lang.Comparable``public class Assignment``extends java.lang.Object``implements java.lang.Comparable`

Maps variables to values in their domain. Domains are expected to be small. Backed by arrays and binary search. Immutable.

Author:

`drayside`

Field Summary

FunctionVariableSet	variables
-------------------------------------	---------------------------

Constructor Summary

[Assignment](#)([Assignment](#) a, [FunctionVariable](#) variable,
`java.lang.Comparable` value)

Create a new assignment that is similar to the given assignment, except for the value associated with the given variable.

Assignment([FunctionVariableSet](#) vars)

assigns all vars to the minimum value of their respective domains

Assignment([FunctionVariableSet](#) vars, java.lang.Comparable[] inValues)

Method Summary

int	compareTo (java.lang.Object obj)
int	computePosition ()
int	computePosition (FunctionVariableSet otherVariables) compute the position as if only variables were in this assignment
boolean	congruent (Assignment fa) a.congruent(b) means that a.variables is a subset of b.variables, and all values agree
boolean	contains (FunctionVariable v)
boolean	equals (java.lang.Object obj)
java.lang.Comparable	getAssignedValue (FunctionVariable v)
int	hashCode ()
Assignment	increment () What happens when this gets to the end? Wrap-around?
Assignment	subtract (Assignment a)
Assignment	subtract (FunctionVariable v)
java.lang.String	toString ()

Methods inherited from class java.lang.Object

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

Field Detail

variables

```
public final FunctionVariableSet variables
```

Constructor Detail

Assignment

```
public Assignment(FunctionVariableSet vars)
```

assigns all vars to the minimum value of their respective domains

Parameters:

vars -

Assignment

```
public Assignment(FunctionVariableSet vars,  
                  java.lang.Comparable[] inValues)
```

Parameters:

vars -

inValues - may be longer than vars, in which case only the first |vars| items are taken

Assignment

```
public Assignment(Assignment a,  
                  FunctionVariable variable,
```

```
java.lang.Comparable value)
```

Create a new assignment that is similar to the given assignment, except for the value associated with the given variable.

Parameters:

a - the base assignment

variable - a variable that's going to get a different value

value - the new value for the variable

Method Detail

increment

```
public Assignment increment()
```

What happens when this gets to the end? Wrap-around?

Returns:

a new Assignment

computePosition

```
public int computePosition()
```

computePosition

```
public int computePosition(FunctionVariableSet otherVariables)
```

compute the position as if only variables were in this assignment

Returns:

getAssignedValue

```
public java.lang.Comparable getAssignedValue(FunctionVariable v)
```

Parameters:

v -

Returns:

the value assigned to variable v, or null if no value is assigned to v in this assignment.

contains

```
public boolean contains(FunctionVariable v)
```

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface java.lang.Comparable

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

toString

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

subtract

```
public Assignment subtract(FunctionVariable v)
```

subtract

```
public Assignment subtract(Assignment a)
```

congruent

```
public boolean congruent(Assignment fa)
```

a.congruent(b) means that a.variables is a subset of b.variables, and all values agree

Parameters:

fa -

Returns:

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edu.mit.six825.bn.functiontable

Class BaseFunctionConstructor

java.lang.Object

└ edu.mit.six825.bn.functiontable.BaseFunctionConstructor

All Implemented Interfaces:

[FunctionConstructor](#)

Direct Known Subclasses:

[AdapterFunctionConstructor](#)public abstract class **BaseFunctionConstructor**

extends java.lang.Object

implements [FunctionConstructor](#)

Some basic functionality for reuse.

Author:

drayside

Field Summary

protected java.util.Iterator [assignmentIterator](#)protected [FunctionVariableSet](#) [vars](#)

Constructor Summary

protected	BaseFunctionConstructor (FunctionVariableSet set)
-----------	--

Method Summary

FunctionVariableSet	getVariableSet ()
-------------------------------------	-----------------------------------

boolean	hasNext ()
---------	----------------------------

int	size ()
-----	-------------------------

Methods inherited from class java.lang.Object

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

Methods inherited from interface edu.mit.six825.bn.functiontable.[FunctionConstructor](#)

[next](#)

Field Detail

vars

protected final [FunctionVariableSet](#) **vars**

assignmentIterator

protected final java.util.Iterator **assignmentIterator**

Constructor Detail

BaseFunctionConstructor

```
protected BaseFunctionConstructor(FunctionVariableSet set)
```

Method Detail

getVariableSet

```
public final FunctionVariableSet getVariableSet()
```

Specified by:

[getVariableSet](#) in interface [FunctionConstructor](#)

size

```
public final int size()
```

Specified by:

[size](#) in interface [FunctionConstructor](#)

hasNext

```
public final boolean hasNext()
```

Specified by:

[hasNext](#) in interface [FunctionConstructor](#)

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edu.mit.six825.bn.bayesnet

Class BayesNet

java.lang.Object

└ edu.mit.six825.bn.bayesnet.BayesNet

public class **BayesNet**
extends java.lang.Object

Immutable.

Author:

drayside

Field Summary

BayesNetNodeSet	nodes
---------------------------------	-----------------------

Constructor Summary

[BayesNet](#) ([BayesNetNodeSet](#) set)

Methods inherited from class java.lang.Object

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

Field Detail

nodes

```
public final BayesNetNodeSet nodes
```

Constructor Detail

BayesNet

```
public BayesNet(BayesNetNodeSet set)
```

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edu.mit.six825.bn.bayesnet

Class BayesNetNode

java.lang.Object

└─ edu.mit.six825.bn.bayesnet.BayesNetNode

All Implemented Interfaces:

java.lang.Comparable

public class **BayesNetNode**
extends java.lang.Object
implements java.lang.Comparable

A variable in a BayesNet. Immutable. Comparable based on the underlying FunctionVariable.

Author:

drayside

Field Summary

Function	cpt
BayesNetNodeSet	parents
FunctionVariable	var

Constructor Summary

```
BayesNetNode(FunctionVariable var, BayesNetNodeSet parents,
Function cpt)
```

Constructs a new BayesNetNode.

```
BayesNetNode( java.lang.String booleanFunctionVarName,
BayesNetNodeSet parents, Function cpt)
```

Method Summary

int	compareTo (java.lang.Object obj)
boolean	equals (java.lang.Object obj)
int	hashCode ()
java.lang.String	toString ()

Methods inherited from class java.lang.Object

clone, finalize, getClass, notify, notifyAll, wait, wait, wait

Field Detail

var

```
public final FunctionVariable var
```

parents

```
public final BayesNetNodeSet parents
```


cpt

```
public final Function cpt
```

Constructor Detail

BayesNetNode

```
public BayesNetNode(FunctionVariable var,
                    BayesNetNodeSet parents,
                    Function cpt)
```

Constructs a new BayesNetNode. Ensures that the Conditional Probability Table (cpt) for this node contains just this node and its parents.

Parameters:

var - FunctionVariable that this node represents
 parents - BayesNetNodeSet of this node's parents
 cpt - Conditional Probability Table for this node

BayesNetNode

```
public BayesNetNode(java.lang.String booleanFunctionVarName,
                    BayesNetNodeSet parents,
                    Function cpt)
```

Method Detail

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface `java.lang.Comparable`

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

toString

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

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edu.mit.six825.bn.bayesnet

Class BayesNetNodeSet

java.lang.Object

└─ edu.mit.six825.bn.bayesnet.BayesNetNodeSet

public class **BayesNetNodeSet**

extends java.lang.Object

A set of BayesNetNodes. Immutable.

Author:

drayside

Field Summary

static [BayesNetNodeSet](#) [EMPTY_BAYES_NET_VARIABLE_SET](#)

Constructor Summary

[BayesNetNodeSet](#) ()[BayesNetNodeSet](#) ([BayesNetNode](#) [] inVars)[BayesNetNodeSet](#) ([BayesNetNode](#) v1, [BayesNetNode](#) v2)

Method Summary

boolean	<code>contains</code> (BayesNetNode other)
FunctionVariableSet	<code>getFunctionVariableSet</code> ()
BayesNetNode	<code>getNode</code> (int i)
BayesNetNode	<code>getNode</code> (java.lang.String name)
java.util.List	<code>getNodesWithTopologicalOrdering</code> () Returns nodes in the net sorted in topological order from parents to children, i.e.
java.util.Iterator	<code>iterator</code> ()
int	<code>size</code> ()
java.lang.String	<code>toString</code> ()

Methods inherited from class java.lang.Object

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

Field Detail

EMPTY_BAYES_NET_VARIABLE_SET

```
public static final BayesNetNodeSet EMPTY_BAYES_NET_VARIABLE_SET
```

Constructor Detail

BayesNetNodeSet

```
public BayesNetNodeSet()
```

BayesNetNodeSet

```
public BayesNetNodeSet(BayesNetNode v1,  
                        BayesNetNode v2)
```

Parameters:

v1 -

v2 -

BayesNetNodeSet

```
public BayesNetNodeSet(BayesNetNode[] inVars)
```

Method Detail

getNodesWithTopologicalOrdering

```
public java.util.List getNodesWithTopologicalOrdering()
```

Returns nodes in the net sorted in topological order from parents to children, i.e. if possible makes all parents show up before their children.

Returns:

list of nodes

getFunctionVariableSet

```
public FunctionVariableSet getFunctionVariableSet()
```

size

```
public int size()
```

iterator

```
public java.util.Iterator iterator()
```

getNode

```
public BayesNetNode getNode(int i)
```

getNode

```
public BayesNetNode getNode(java.lang.String name)
```

toString

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

contains

```
public boolean contains(BayesNetNode other)
```

Parameters:

other -

Returns:

true if this contains other

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edu.mit.six825.bn.inputs

Class Burglary

java.lang.Object

└ edu.mit.six825.bn.inputs.Burglary

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

Author:

drayside

Field Summary

static [FunctionVariable](#) [Alarm](#)static [Function](#) [cptJohn](#)static [FunctionVariable](#) [John](#)

Constructor Summary

[Burglary](#)()

Methods inherited from class java.lang.Object


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

Field Detail

John

```
public static FunctionVariable John
```

Alarm

```
public static FunctionVariable Alarm
```

cptJohn

```
public static Function cptJohn
```

Constructor Detail

Burglary

```
public Burglary()
```

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edu.mit.six825.bn.functiontable

Class ComparableBoolean

java.lang.Object

└─ edu.mit.six825.bn.functiontable.ComparableBoolean

All Implemented Interfaces:

java.lang.Comparable

public class **ComparableBoolean**

extends java.lang.Object

implements java.lang.Comparable

Basically the same as java.lang.Boolean, except java.lang.Boolean is not Comparable, and we need that.

Author:

drayside

Field Summary

static ComparableBoolean	FALSE
static ComparableBoolean	TRUE
boolean	value

Method Summary

int	compareTo (java.lang.Object obj)
boolean	equals (java.lang.Object obj)
int	hashCode ()
java.lang.String	toString ()

Methods inherited from class java.lang.Object

clone, finalize, getClass, notify, notifyAll, wait, wait, wait

Field Detail

value

public final boolean **value**

FALSE

public static final [ComparableBoolean](#) **FALSE**

TRUE

public static final [ComparableBoolean](#) **TRUE**

Method Detail

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

`compareTo` in interface `java.lang.Comparable`

toString

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

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edu.mit.six825.bn.functiontable

Class Compute

java.lang.Object

└ edu.mit.six825.bn.functiontable.Compute

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

Container for static methods that do computations with Functions.

Author:

drayside

Constructor Summary

[Compute](#) ()

Method Summary

static Function	makeBoolean (FunctionVariable var, double trueValue)
---------------------------------	---

static Function	makeBoolean (FunctionVariable var, double[] values)
---------------------------------	--

static Function	makeBoolean (FunctionVariable var, double trueValue, double falseValue)
---------------------------------	--

static Function	makeBoolean (FunctionVariableSet vars, double[] values)
static Function	makeConstantFunction (FunctionVariable var)
static Function	makeConstantFunction (FunctionVariableSet vars)
static Function	makeConstantFunction (FunctionVariableSet vars, double value)
static Function	makeEvidenceFunction (FunctionVariable var, Assignment evidence)
static Function	makeEvidenceFunction (FunctionVariableSet vars, Assignment evidence)
static Function	normalize (Function f)

Methods inherited from class java.lang.Object

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

Constructor Detail

Compute

```
public Compute()
```

Method Detail

makeConstantFunction

```
public static Function makeConstantFunction(FunctionVariable var)
```

Returns:

a new function with the same value in every entry, where the sum of all entries == 1.

makeConstantFunction

```
public static Function makeConstantFunction(FunctionVariableSet vars)
```

Returns:

a new function with the same value in every entry, where the sum of all entries == 1.

makeConstantFunction

```
public static Function makeConstantFunction(FunctionVariableSet vars,  
                                             double value)
```

Returns:

a new function with the same (given) value in every entry

makeBoolean

```
public static Function makeBoolean(FunctionVariable var,  
                                   double trueValue)
```

makeBoolean

```
public static Function makeBoolean(FunctionVariable var,  
                                   double trueValue,  
                                   double falseValue)
```

makeBoolean

```
public static Function makeBoolean(FunctionVariable var,
                                   double[] values)
```

makeBoolean

```
public static Function makeBoolean(FunctionVariableSet vars,
                                   double[] values)
```

makeEvidenceFunction

```
public static Function makeEvidenceFunction(FunctionVariable var,
                                             Assignment evidence)
```

makeEvidenceFunction

```
public static Function makeEvidenceFunction(FunctionVariableSet vars,
                                             Assignment evidence)
```

normalize

```
public static Function normalize(Function f)
```

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edu.mit.six825.bn.functiontable

Class Domain

java.lang.Object

└ edu.mit.six825.bn.functiontable.Domain

public class **Domain**
extends java.lang.Object

A domain that a variable may vary over. Domains are totally ordered. Immutable.

Author:

drayside

Field Summary

static [Domain](#) [BOOLEAN DOMAIN](#)

java.lang.Boolean is not Comparable, so we construct an anonymous sub-class to deal with this important special case.

Constructor Summary

[Domain](#)(java.lang.Comparable[] v)

Method Summary

boolean	equals (java.lang.Object obj)
DomainIndex	getIndex (java.lang.Comparable val)
java.lang.Object	getMaxValue ()
java.lang.Comparable	getMinValue ()
java.lang.Comparable	getNextValue (java.lang.Comparable value)
java.lang.Comparable	getValue (DomainIndex i)
java.lang.Comparable	getValue (int i)
int	hashCode ()
java.util.Iterator	iterator ()
int	size ()
java.lang.String	toString ()

Methods inherited from class java.lang.Object

clone, finalize, getClass, notify, notifyAll, wait, wait, wait

Field Detail

BOOLEAN_DOMAIN

```
public static final Domain BOOLEAN_DOMAIN
```

java.lang.Boolean is not Comparable, so we construct an anonymous sub-class to deal with this important special case.

Constructor Detail

Domain

```
public Domain(java.lang.Comparable[] v)
```

Method Detail

getValue

```
public java.lang.Comparable getValue(DomainIndex i)
```

getValue

```
public java.lang.Comparable getValue(int i)
```

size

```
public int size()
```

hashCode

```
public int hashCode()
```

equals

```
public boolean equals(java.lang.Object obj)
```

toString

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

iterator

```
public java.util.Iterator iterator()
```

getIndex

```
public DomainIndex getIndex(java.lang.Comparable val)
```

Returns:

may return null if the value is not in this domain

getMaxValue

```
public java.lang.Object getMaxValue()
```

Returns:

the maximum value in this domain

getMinValue

```
public java.lang.Comparable getMinValue()
```

Returns:

the minimum value in this domain

getNextValue

```
public java.lang.Comparable getNextValue(java.lang.Comparable value)
```

Parameters:

value -

Returns:

the value after the given one, or null if at the last value already

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edu.mit.six825.bn.functiontable

Class DomainIndex

java.lang.Object

└─ edu.mit.six825.bn.functiontable.DomainIndex

All Implemented Interfaces:

java.lang.Comparable

public class **DomainIndex**

extends java.lang.Object

implements java.lang.Comparable

An index into a specific Domain. Immutable.

Author:

drayside

Field Summary

Domain	domain
int	i

Constructor Summary

[DomainIndex](#)([Domain](#) d, int i)

Method Summary

int	<code>compareTo</code> (java.lang.Object obj)
boolean	<code>equals</code> (java.lang.Object obj)
java.lang.Comparable	<code>getValue</code> ()
int	<code>hashCode</code> ()
java.lang.String	<code>toString</code> ()

Methods inherited from class java.lang.Object

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

Field Detail

domain

public final [`Domain`](#) **domain**

i

public final int **i**

Constructor Detail

DomainIndex

```
public DomainIndex(Domain d,  
                  int i)
```

Method Detail

getValue

```
public java.lang.Comparable getValue()
```

hashCode

```
public int hashCode()
```

equals

```
public boolean equals(java.lang.Object obj)
```

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface java.lang.Comparable

toString

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

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edu.mit.six825.bn.bayesnet

Class EnumerationSolver

java.lang.Object

└ [edu.mit.six825.bn.bayesnet.Solver](#)└ **edu.mit.six825.bn.bayesnet.EnumerationSolver**public class **EnumerationSolver**extends [Solver](#)

An implementation of the most basic solver for the BayesNets. The algorithm has been implemented as per the pseudo-code provided in AIMA, 2nd Ed., pg. 506

Author:

vineet, drayside

Field Summary

Fields inherited from class edu.mit.six825.bn.bayesnet.[Solver](#)[_bn](#), [_evidence](#), [reportingLevel](#), [VERBOSE](#)

Constructor Summary

[EnumerationSolver](#) ()[EnumerationSolver](#) ([BayesNet](#) [_bn](#))

Method Summary

static void	<code>main</code> (java.lang.String[] args)
Function	<code>query</code> (BayesNetNode variable)
java.lang.String	<code>toString</code> ()

Methods inherited from class edu.mit.six825.bn.bayesnet.[Solver](#)

[getEvidence](#), [report](#), [setBayesNet](#), [setEvidence](#), [setReportingLevel](#)

Methods inherited from class java.lang.Object

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

Constructor Detail

EnumerationSolver

```
public EnumerationSolver(BayesNet _bn)
```

EnumerationSolver

```
public EnumerationSolver()
```

Method Detail

toString

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

main

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

query

```
public Function query(BayesNetNode variable)
```

Specified by:

[query](#) in class [Solver](#)

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edu.mit.six825.bn.functiontable

Class Function

java.lang.Object
└─ edu.mit.six825.bn.functiontable.Function

public class **Function**
extends java.lang.Object

Maps Assignments to double values. Contains a FunctionEntry for each point in the domain. Functions are total over their domain. Immutable.

Author:
drayside

Field Summary	
	FunctionVariableSet variables

Constructor Summary	
Function	FunctionConstructor c)
Function	FunctionVariable var, double[] values)
Function	FunctionVariableSet vars, double[] values)

Method Summary

boolean	<code>equals</code> (<code>java.lang.Object obj</code>)
double	<code>evaluate</code> (<code>Assignment</code> a)
int	<code>hashCode</code> ()
double	<code>sum</code> ()
<code>java.lang.String</code>	<code>toString</code> ()

Methods inherited from class `java.lang.Object`

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

Field Detail

variables

`public final FunctionVariableSet variables`

Constructor Detail

Function

`public Function(FunctionConstructor c)`

Function

```
public Function(FunctionVariableSet vars,  
                double[] values)
```

Function

```
public Function(FunctionVariable var,  
                double[] values)
```

Parameters:

var -

values -

Method Detail

evaluate

```
public double evaluate(Assignment a)
```

Parameters:

a - an assignment that contains a superset of the variables in this function

Returns:

sum

```
public double sum()
```

Returns:

sum of all the entries (usually used for normalizing)

toString

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

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

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edu.mit.six825.bn.functiontable

Interface FunctionConstructor

All Known Implementing Classes:

[BaseFunctionConstructor](#)

public interface **FunctionConstructor**

A closure that constructs a Function by enumerating through it.

Author:
drayside

Method Summary

FunctionVariableSet	getVariableSet ()
boolean	hasNext ()
FunctionEntry	next ()
int	size ()

Method Detail

getVariableSet

```
public FunctionVariableSet getVariableSet()
```

size

```
public int size()
```

hasNext

```
public boolean hasNext()
```

next

```
public FunctionEntry next()
```

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edu.mit.six825.bn.functiontable

Class FunctionEntry

java.lang.Object

└─ edu.mit.six825.bn.functiontable.FunctionEntry

All Implemented Interfaces:

java.lang.Comparable

public class **FunctionEntry**
extends java.lang.Object
implements java.lang.Comparable

Maps an Assignment to a double value. Immutable.

Author:

drayside

Field Summary

Assignment	assignment
double	value

Constructor Summary

[FunctionEntry](#)([Assignment](#) a, double d)

Method Summary

int	<code>compareTo</code> (java.lang.Object obj)
boolean	<code>equals</code> (java.lang.Object obj)
int	<code>hashCode</code> ()
java.lang.String	<code>toString</code> ()

Methods inherited from class java.lang.Object

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

Field Detail

assignment

```
public final Assignment assignment
```

value

```
public final double value
```

Constructor Detail

FunctionEntry

```
public FunctionEntry(Assignment a,  
                     double d)
```

Method Detail

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface java.lang.Comparable

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

toString

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

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edu.mit.six825.bn.functiontable

Class FunctionVariable

java.lang.Object
└─ edu.mit.six825.bn.functiontable.FunctionVariable

All Implemented Interfaces:

java.lang.Comparable

public class **FunctionVariable**
extends java.lang.Object
implements java.lang.Comparable

Immutable and totally ordered (based on name). Note that two FunctionVariables with the same name should have the equivalent domains, and this class will throw RuntimeExceptions if it finds that this is not the case.

Author:

drayside

Field Summary

	Domain	domain
java.lang.String		name

Constructor Summary

[FunctionVariable](#)(java.lang.String n)

Construct a new FunctionVariable over the ComparableBoolean domain.

[FunctionVariable](#)(java.lang.String n, [Domain](#) d)

Method Summary

int	compareTo (java.lang.Object obj)
boolean	equals (java.lang.Object obj)
int	hashCode ()
java.lang.String	toString ()

Methods inherited from class java.lang.Object

clone, finalize, getClass, notify, notifyAll, wait, wait, wait

Field Detail

name

public final java.lang.String **name**

domain

public final [Domain](#) **domain**

Constructor Detail

FunctionVariable

```
public FunctionVariable(java.lang.String n)
```

Construct a new FunctionVariable over the ComparableBoolean domain.

Parameters:

n - the name of the variable

FunctionVariable

```
public FunctionVariable(java.lang.String n,  
                        Domain d)
```

Method Detail

hashCode

```
public int hashCode()
```

equals

```
public boolean equals(java.lang.Object obj)
```

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface `java.lang.Comparable`

toString

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

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edu.mit.six825.bn.functiontable

Class FunctionVariableSet

java.lang.Object

└─ edu.mit.six825.bn.functiontable.FunctionVariableSet

All Implemented Interfaces:

java.lang.Comparable

public class **FunctionVariableSet**

extends java.lang.Object

implements java.lang.Comparable

An immutable set of FunctionVariables.

Author:

drayside

Constructor Summary

[FunctionVariableSet](#)([FunctionVariable](#) fv)

construct a singleton set

[FunctionVariableSet](#)([FunctionVariable](#)[] v)**[FunctionVariableSet](#)**([FunctionVariable](#)[] v, int length)

Method Summary

java.util.Iterator	<u>assignmentIterator</u> ()
int	<u>cartesianProductSize</u> ()
int	<u>compareTo</u> (java.lang.Object obj)
boolean	<u>contains</u> (<u>FunctionVariable</u> variable)
boolean	<u>containsAnyOf</u> (<u>FunctionVariableSet</u> set)
boolean	<u>equals</u> (java.lang.Object obj)
<u>FunctionVariable</u>	<u>getVariable</u> (int i)
int	<u>hashCode</u> ()
boolean	<u>isSubsetOf</u> (<u>FunctionVariableSet</u> superSet)
int	<u>size</u> ()
<u>FunctionVariableSet</u>	<u>subtract</u> (<u>FunctionVariable</u> v)
<u>FunctionVariableSet</u>	<u>subtract</u> (<u>FunctionVariableSet</u> set) subtract the variables in set from this set
java.lang.String	<u>toString</u> ()
static <u>FunctionVariableSet</u>	<u>union</u> (<u>Function</u> [] functions)
static <u>FunctionVariableSet</u>	<u>union</u> (<u>FunctionVariableSet</u> set, <u>FunctionVariable</u> variable)

static FunctionVariableSet	union (FunctionVariableSet s1, FunctionVariableSet s2)
--	--

Methods inherited from class java.lang.Object

clone, finalize, getClass, notify, notifyAll, wait, wait, wait

Constructor Detail

FunctionVariableSet

```
public FunctionVariableSet(FunctionVariable fv)
```

construct a singleton set

Parameters:

fv -

FunctionVariableSet

```
public FunctionVariableSet(FunctionVariable[] v)
```

FunctionVariableSet

```
public FunctionVariableSet(FunctionVariable[] v,  
                           int length)
```

Method Detail

size

```
public int size()
```

assignmentIterator

```
public java.util.Iterator assignmentIterator()
```

cartesianProductSize

```
public int cartesianProductSize()
```

Returns:

compareTo

```
public int compareTo(java.lang.Object obj)
```

Specified by:

compareTo in interface java.lang.Comparable

equals

```
public boolean equals(java.lang.Object obj)
```

hashCode

```
public int hashCode()
```

union

```
public static FunctionVariableSet union(FunctionVariableSet s1,  
                                           FunctionVariableSet s2)
```

union

```
public static FunctionVariableSet union(FunctionVariableSet set,  
                                           FunctionVariable variable)
```

Parameters:

set -

variable -

Returns:

union

```
public static FunctionVariableSet union(Function[] functions)
```

getVariable

```
public FunctionVariable getVariable(int i)
```

toString

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

isSubsetOf

```
public boolean isSubsetOf(FunctionVariableSet superSet)
```

Returns:

contains

```
public boolean contains(FunctionVariable variable)
```

Parameters:

variable -

Returns:

containsAnyOf

```
public boolean containsAnyOf(FunctionVariableSet set)
```

Parameters:

set -

Returns:

subtract

```
public FunctionVariableSet subtract(FunctionVariableSet set)
```

subtract the variables in set from this set

Parameters:

set -

Returns:

subtract

```
public FunctionVariableSet subtract(FunctionVariable v)
```

Parameters:

v -

Returns:

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edu.mit.six825.bn.inputs

Class Nets

java.lang.Object

└ edu.mit.six825.bn.inputs.Nets

public class **Nets**

extends java.lang.Object

Author:

drayside

Constructor Summary

[Nets](#)()

Method Summary

static [BayesNet](#) [convertOldToNew](#)(techniques.BN.BayesNet oldNet)static [BayesNet](#) [getBurglary](#)()static [BayesNet](#) [getCarpo](#)()static [BayesNet](#) [getInsurance](#)()

Methods inherited from class java.lang.Object

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

Constructor Detail

Nets

```
public Nets()
```

Method Detail

getInsurance

```
public static BayesNet getInsurance()
```

getBurglary

```
public static BayesNet getBurglary()
```

getCarpo

```
public static BayesNet getCarpo()
```

convertOldToNew

```
public static BayesNet convertOldToNew(techniques.BN.BayesNet oldNet)
```

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edu.mit.six825.bn.bayesnet

Class Solver

java.lang.Object

└ edu.mit.six825.bn.bayesnet.Solver

Direct Known Subclasses:

[EnumerationSolver](#)

public abstract class **Solver**

extends java.lang.Object

Provides some helpful functionality, like maintaining the evidence variables that are needed for implementing BayesNet solvers.

Author:

vineet

Field Summary

protected BayesNet	_bn
protected Assignment	_evidence
protected int	reportingLevel
static int	VERBOSE

Constructor Summary

[Solver](#)()

[Solver](#)([BayesNet](#) bn)

Method Summary

[Assignment](#) [getEvidence](#)()

abstract [Function](#) [query](#)([BayesNetNode](#) variable)

protected void [report](#)(int msgLevel, java.lang.String msg)

void [setBayesNet](#)([BayesNet](#) bn)

void [setEvidence](#)([Assignment](#) e)

void [setReportingLevel](#)(int r)

Methods inherited from class java.lang.Object

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

Field Detail

_bn

protected [BayesNet](#) **_bn**

_evidence

protected [Assignment](#) **_evidence**

reportingLevel

protected int **reportingLevel**

VERBOSE

public static final int **VERBOSE**

See Also:

[Constant Field Values](#)

Constructor Detail

Solver

public **Solver**([BayesNet](#) bn)

Parameters:

bn -

Solver

public **Solver**()

Method Detail

setBayesNet

```
public void setBayesNet(BayesNet bn)
```

setReportingLevel

```
public void setReportingLevel(int r)
```

report

```
protected void report(int msgLevel,  
                      java.lang.String msg)
```

setEvidence

```
public void setEvidence(Assignment e)
```

getEvidence

```
public Assignment getEvidence()
```

query

```
public abstract Function query(BayesNetNode variable)
```

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edu.mit.six825.bn.functiontable

Class Utility

java.lang.Object

└ edu.mit.six825.bn.functiontable.Utility

public class **Utility**

extends java.lang.Object

Author:

drayside

Constructor Summary

[Utility](#)()

Method Summary

static boolean [allElementsUnique](#)(java.lang.Object[] a)static java.lang.String [arrayToString](#)(java.lang.Object[] a)static int [compareTwoArrays](#)(java.lang.Comparable[] a1,
java.lang.Comparable[] a2)static boolean [equals_basedOnCompareTo](#)(java.lang.Comparable obj1,
java.lang.Object obj2)

static boolean	<u>isSortedAndUnique</u> (java.lang.Comparable[] a, int length)
----------------	--

Methods inherited from class java.lang.Object

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

Constructor Detail

Utility

```
public Utility()
```

Method Detail

compareTwoArrays

```
public static int compareTwoArrays(java.lang.Comparable[] a1,  
                                     java.lang.Comparable[] a2)
```

Parameters:

a1 -

a2 -

Returns:

-1 if a1 is less than a2; 1 if a1 is greater than a2; 0 if they're equal

equals_basedOnCompareTo

```
public static boolean equals_basedOnCompareTo(java.lang.Comparable obj1,  
                                                java.lang.Object obj2)
```

Parameters:

obj1 -

obj2 - this should be a Comparable, but not statically enforced

Returns:

true if these two objects are equals

isSortedAndUnique

```
public static boolean isSortedAndUnique(java.lang.Comparable[] a,
                                         int length)
```

Parameters:

a - the array to examine

length - how far down the array to look

Returns:

true if the array is sorted and has no two elements equal to each other

allElementsUnique

```
public static boolean allElementsUnique(java.lang.Object[] a)
```

arrayToString

```
public static java.lang.String arrayToString(java.lang.Object[] a)
```

Parameters:

a - the array to get a string representation of

Returns:

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Classes

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Hierarchy For Package edu.mit.six825.bn.inputs

Package Hierarchies:

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Class Hierarchy

- class java.lang.Object
 - class edu.mit.six825.bn.functiontable.[BaseFunctionConstructor](#) (implements edu.mit.six825.bn.functiontable.[FunctionConstructor](#))
 - class edu.mit.six825.bn.inputs.[AdapterFunctionConstructor](#)
 - class edu.mit.six825.bn.inputs.[Burglary](#)
 - class edu.mit.six825.bn.inputs.[Nets](#)

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edu.mit.six825.bn.bayesnet

Classes

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[BayesNetNode](#)

[BayesNetNodeSet](#)

[EnumerationSolver](#)

[Solver](#)

[edu.mit.six825.bn.functiontable](#)

Interfaces

[*FunctionConstructor*](#)

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[Assignment](#)

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