type

名称	説明
Agt	An agent itself. An agent's value
AgtSet	A set of agents
Boolean	if true, True. if false, False
Double	numeric value with multiple number after the decimal point in the following range(artifical real number) (in case of negative) −1.79769313486232*10308 to −4.94065645841247*10−324 (in case of positive) 4.94065645841247*10324 to 1.79769313486232*10308
Integer	integer in the following range −2.147,483,648 to 2,147,483,647
Long	integer in the following range −9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
Space	space defined by model tree ※space size is the width of longitudinal 1 to 10,000 and the width 1 to 10,000
String	characters number is 0 to (unlimited)

Agt

An agent itself. An agent's value

[形式]

```
agent
Dim one As Agt    (one is an agent variable)
```

AgtSet

A set of agents

[形式]

```
agent set
```

Boolean

if true, True. if false, False

[形式]

```
Boolean
variable = True  or  False
```

Double

numeric value with multiple number after the decimal point in the following range(artifical real number) (in case of negative) −1.79769313486232*10308 to −4.94065645841247*10−324 (in case of positive) 4.94065645841247*10324 to 1.79769313486232*10308

[形式]

```
number
Dim one As Double    (one is a real number variable)
```

Integer

integer in the following range -2.147,483,648 to 2,147,483,647

[形式]

integer
Dim one As Integer　(one is a integer variable)

Long

integer in the following range -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807

[形式]

long integer
Dim one As Long　(one is a long integer variable)

Space

space defined by model tree ※space size is the width of longitudinal 1 to 10,000 and the width 1 to 10,000

[形式]

space

String

characters number is 0 to (unlimited)

[形式]

type of string
Dim one As String　(one is a string variable)

operator

arithmetic operator

名称	説明
*	multiplication
+	adding
-	operation of subtraction
/	division to get the quotient as real number value
Mod	of division of integral(coset) (round down the value after the decimal point)
¥	division to get the quotient as integer value (round down the value after the decimal point)
^	exponentiation

---

*

multiplication

[形式]

```
one = 2 * 3    (assign 6 to one)
```

+

adding

[形式]

```
one = 1 + 2    (assign 3 to one)
```

-

operation of subtraction

[形式]

```
one = 2 - 1    (assign -1 to one)
```

/

division to get the quotient as real number value

[形式]

```
one = 5 / 3    (assign 1.6666... to one )
two = 5 / 3.0    (assign 1.6666... to two)
```

Mod

of division of integral(coset) (round down the value after the decimal point)

[形式]

```
one = 5 Mod 3   (assign 2 to one)
two = 7 Mod 3   (assign 1 to two)
```

¥

division to get the quotient as integer value (round down the value after the decimal point)

[形式]

```
one = 5 ¥ 3   (assign 1 to one)
two = 5 ¥ 3.0   (assign 1 to two)
```

---

^

exponentiation

[形式]

```
one = 2 ^ 3   (assign 8 to one)
two = 2 ^ 4   (assign 16 to two)
```

character string operator

名称	説明
&	link of string

&

link of string

[形式]

one = "a" & "b"　(assign ab to one)

relevant operator

名称	説明
!=	the left-hand side is not equal to the right-hand side
==	the left-hand side is equal to the right-hand side ※notice:「==」mean to equal.「=」mean to assign
>	the left-hand side is greater than the right-hand side
>=	the left-hand side is greater than or equal to the right-hand side(greater than or equal to)
<	the left-hand side is smaller than the right-hand side
<=	the left-hand side is smaller than or equal to the right-hand side(less than or equal to)
<>	the left-hand side is not equal to the right-hand side

!=

the left-hand side is not equal to the right-hand side

[形式]

```
one != 3  (one is not equal to 3)
```

==

the left-hand side is equal to the right-hand side ※notice:「==」mean to equal.「=」mean to assign

[形式]

```
one == 3  (one is equal to 3 )
```

>

the left-hand side is greater than the right-hand side

[形式]

```
one > 3  (one is greater than 3)
```

>=

the left-hand side is greater than or equal to the right-hand side(greater than or equal to)

[形式]

```
one >= 3  (one is less than or equal to 3)
```

<

the left-hand side is smaller than the right-hand side

[形式]

one < 3　(one is smaller than 3)

<=

the left-hand side is smaller than or equal to the right-hand side(less than or equal to)

[形式]

one <= 3　(one is less than 3)

<>

the left-hand side is not equal to the right-hand side

[形式]

one <> 3　(one is not equal to 3)

logic operator

名称	説明
And	and (AND)
Not	not(negative)
Or	or(OR)
Xor	either is true(or else)

And

and (AND)

[形式]

A And B　(A and B)

Not

not(negative)

[形式]

Or

or(OR)

[形式]

A Or B　(A or B)

Xor

either is true(or else)

[形式]

A Xor B　(either A or B is true)

assignment operator

名称	説明
=	assign the result of formula (assign)

=

assign the result of formula (assign)

[形式]

```
one = 1 + 2   (assign 3 to one)
two = 2 * 3   (assign 6 to two)
```

conditional judgment statement

名称	説明
IFStatement	branch a process up to condition

IFStatement

branch a process up to condition

[形式]

```
(1) execute the block statement if the value of formula is a true
If formula Then
       block statement
End If

(2) execute the block statement 1 if the value of formula is a true. execute
    the block statement 2 if it is a false
If formula Then
       block statement 1
Else
       block statement 2
End If


(3) execute the appropriate block statement if the value of formula is a true
If formula 1 Then
       block statement 1
Elself formula 2  Then
       block statement 2
Elself formula 3  Then
       block statement 3
Else
Endlf
End If
```

repetition statement

名称	説明
Do Until Statement	repeat until the conditional formula is fulfilled (value of formula is false)
Do While Statement	repeat while the conditional formula is fulfilled (value of formula is true)
For Each ? In ? Next Statement	execute the same operation for each agent of agent set
For ? To ? Next Statement	termined number of times

Do Until Statement

repeat until the conditional formula is fulfilled (value of formula is false)

[形式]

```
Do Until formula
       block statement
Loop
```

Do While Statement

repeat while the conditional formula is fulfilled (value of formula is true)

[形式]

```
Do While formula
       block statement
Loop
```

For Each ? In ? Next Statement

execute the same operation for each agent of agent set

[形式]

```
For Each loop agent  In agent set
       block statement
Next loop agent
```

For ? To ? Next Statement

termined number of times

[形式]

```
For loop variable = default value To final value  (Step increment value , the ellipsis is 1)
  block statement
Next loop variable
```

※The Step increment value is specified by the positive integer

名称	説明
Break Statement	stop the repetition operation by the repetition statement

---

Break Statement

stop the repetition operation by the repetition statement

[形式]

```
(1) in case of breaking out the loop of the While statement in the middle
Do While conditional formula
    Do While conditional formula
        If break out conditional formula Then
            Break      ⇒※break out one to outside
        End If
    Loop
Loop

(2) in case of  breaking out the loop of or statement in the middle
For i = default value To final value
    For j =  default value To final value
        If break out conditional formula  Then
            Break    ⇒break out one to outside
        End If
    Next j
Next i
```

include statement

名称	説明
Include Statement	read the function defined in the external file (hereinafter called include file).by describing the function that use extensively in the include file, enable to call the identical function from multiple agent. regularly describe it in the head line of rule editor.

Include Statement

read the function defined in the external file (hereinafter called include file).by describing the function that use extensively in the include file, enable to call the identical function from multiple agent. regularly describe it in the head line of rule editor.

[形式]

include "include file name"

※create an include file:copy the self-produced user-defined function in the text editor and save it in extension 「.inc」
※environmental arrangement to use an include file:save the include file to the same folder with the model file
※use the function in the include file:after describing as 「include "include file name"」 in the head of rule editor, use it as same as the built-in function
※available to write many user-defined functions in the include file
※describe one line per one file in case of defining multiple include statements
※both the function defined in the Universe and the function defined as the include file in the Universe can be called 「@function name」 from agent

comment out

名称	説明
/* */	the statement from「/*」to「*/」is a comment and are not reflected in the rule
//	the statement from「//」to the end of line is a comment and are not reflected in the rule

---

/* */

the statement from「/*」to「*/」is a comment and are not reflected in the rule

[形式]

```
/*
  Commentout Statement
*/
```

//

the statement from「//」to the end of line is a comment and are not reflected in the rule

[形式]

```
// Commentout Statement
```

other

名称	説明
Return　Statement	finish the execution of user-defined function and return the control of execution in the calling side. If the function is defined as the function to return back the return value, return the value.

Return　Statement

finish the execution of user-defined function and return the control of execution in the calling side. If the function is defined as the function to return back the return value, return the value.

[形式]

```
Return (formula)

※available to describe the several Return statements in the function
※the following cases are translation  error
・define as the function to return value and a formula is omitted
・define as the function to return value and in case that the type of
  return value is differ from the formula
・define as the function not to return value and in case of describing a formula
```

function

numeric calculation

名称	説明
Abs	returns absolute value
Atn	returns arctangent value
Cos	returns cosine value
Cosh	returns hyperbolic cosine value
DegreeToRad	Converts angle unit into radians from degree
Exp	Returns the exponentiation of the value to the base natural logarithmic e
FlatDegree	Converts angle (degree) into value of 0° to 360°
FlatRad	Converts angle(Rad) into value of 0 to 2 π
GetRandomSeed	Get random number seed value
Log	Returns the value of In(x) to the base natural logarithmic e
NormDist	Returns the value of normal distribution function for specified average and standard deviation
NormInv	Returns the inverse function value of normal cumulative distribution function corresponding to the specified average and the standard deviation (use this to return the value complying the normal distribution in random order)
PI	Gets the value of π
PoissonRnd	Gets the randam number by giving Poisson distribution
RadToDegree	Converts angle (rad) into angle (degree)
Rnd	returns uniform random number which is greater than or equal to 0.0 and less than 1.0
Round	Rounds off less than or equal to decimal point
SetRandomSeed	Sets random seed value
Sin	Returns sine value
Sinh	Returns hyperbolicsine value
Sqr	returns the square root
Tan	returns the tangent value
Tanh	returns the hyperbolic tangent value

Abs

returns absolute value

[形式]

Abs(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value

[戻り値]

型	説明

Double	absolute value

Atn

returns arctangent value

[形式]

Atn(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	arctangent value:−π/2?π/2

Cos

returns cosine value

[形式]

Cos(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	cosine value

Cosh

returns hyperbolic cosine value

[形式]

Cosh(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	hyperbolic cosine value

DegreeToRad

Converts angle unit into radians from degree

[形式]

DegreeToRad(arg1)

[引数]

引数名	型	説明
arg1	Double	angle (degree)

[戻り値]

型	説明
Double	angle (Rad)

Exp

Returns the exponentiation of the value to the base natural logarithmic e

[形式]

Exp(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value

[戻り値]

型	説明
Double	the exponentiation of the value to the base natural logarithmic e

---

FlatDegree

Converts angle (degree) into value of 0° to 360°

[形式]

FlatDegree(arg1)

[引数]

引数名	型	説明
arg1	Double	angle (degree)

[戻り値]

型	説明
Double	angle (degree)

FlatRad

Converts angle(Rad) into value of 0 to 2π

[形式]

FlatRad(arg1)

[引数]

引数名	型	説明
arg1	Double	angle(rad)

[戻り値]

型	説明
Double	angle (rad)

GetRandomSeed

Get random number seed value

[形式]

GetRandomSeed()

[戻り値]

型	説明
Long	random number seed value

Log

Returns the value of In(x) to the base natural logarithmic e

[形式]

Log(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value

[戻り値]

型	説明
Double	ln(x) value

NormDist

Returns the value of normal distribution function for specified average and standard deviation

[形式]

NormDist(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	Double	value assigning to function
arg2	Double	arithmetic average of target distribution (arithmetic average)
arg3	Double	standard deviation of target distribution
arg4	Boolean	Ffunction Format ※If specify True, calculate cumulative distribution function ※If specify False, calculate frequency function

[戻り値]

型	説明
Double	normal distribution function value against specified average and standard deviation

---

NormInv

Returns the inverse function value of normal cumulative distribution function corresponding to the specified average and the standard deviation (use this to return the value complying the normal distribution in random order)

[形式]

NormInv(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Double	probability in the normal distribution(random number over 0 and less than 1 uniform)
arg2	Double	arithmetic average of target distribution
arg3	Double	standard deviation of target distribution

[戻り値]

型	説明
Double	inverse function value of normal cumulative distribution function

---

PI

Gets the value of π

[形式]

PI()

[戻り値]

型	説明
Double	value of π

PoissonRnd

Gets the randam number by giving Poisson distribution

[形式]

PoissonRnd(arg1)

[引数]

引数名	型	説明
arg1	Double	value of λ (average), real number value greater than 0

[戻り値]

型	説明
Integer	random number by Poisson distribution

RadToDegree

Converts angle (rad) into angle (degree)

[形式]

RadToDegree(arg1)

[引数]

引数名	型	説明
arg1	Double	angle(Rad)

[戻り値]

型	説明
Double	angle(degree)

Rnd

returns uniform random number which is greater than or equal to 0.0 and less than 1.0

[形式]

Rnd()

[戻り値]

型	説明
Double	uniform random number value

Round

Rounds off less than or equal to decimal point

[形式]

Round(arg1)

[引数]

引数名	型	説明
arg1	Double	positive or negative value

[戻り値]

型	説明
Integer	integer value

SetRandomSeed

Sets random seed value

[形式]

SetRandomSeed(arg1)

[引数]

引数名	型	説明
arg1	Long	random seed value

Sin

Returns sine value

[形式]

Sin(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	sine value

Sinh

Returns hyperbolicsine value

[形式]

Sinh(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	hyperbolicsine value

Sqr

returns the square root

[形式]

Sqr (arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value

[戻り値]

型	説明
Double	square root value

Tan

returns the tangent value

[形式]

Tan(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	tangent value

Tanh

returns the hyperbolic tangent value

[形式]

Tanh(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long	positive or negative value:unit is radians

[戻り値]

型	説明
Double	hyperbolic tangent value

string operation

名称	説明
CountToken	Count to the number of partial string of the string that is separated comma delimiter. Count by a number of comma, if empty:0, if not empty and does not have gomma delimiter:1
GetToken	Gets the specified string from comma-delimited string
InStr	Search for the specified comparison string within the target string, and return the position of the first character found (characters from specified string) .
Left	Extracts the string with the specified characters number from the leftmost of the target string
Len	returns the characters number in a string
Mid	Extracts the string with the specified characters number from the specified position in the string
Replace	Replace string
Right	Extracts the sting with the specified characters number from the rightmost of the target string
StrComp	Compares string
Trim	Deletes the half-width space character with before and vehind the string

---

CountToken

Count to the number of partial string of the string that is separated comma delimiter. Count by a number of comma, if empty:0, if not empty and does not have gomma delimiter:1

[形式]

CountToken(arg1)

[引数]

引数名	型	説明
arg1	String	string

[戻り値]

型	説明
Integer	number of partial string

GetToken

Gets the specified string from comma-delimited string

[形式]

GetToken(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	string
arg2	Integer	position of required string (integral number greater than or equal to 0)

[戻り値]

型	説明

String	get string (If failure, return a null)

InStr

Search for the specified comparison string within the target string, and return the position of the first character found (characters from specified string) .

[形式]

InStr(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Integer	starting position to search (greater than or equal to 1)
arg2	String	target string
arg3	String	comparison string

[戻り値]

型	説明
Integer	character position (If unfound, return 0)

Left

Extracts the string with the specified characters number from the leftmost of the target string

[形式]

Left(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	target string
arg2	Integer	extracting characters number

[戻り値]

型	説明
String	extract string

Len

returns the characters number in a string

[形式]

Len(arg1)

[引数]

引数名	型	説明
arg1	String	target string

[戻り値]

型	説明
Integer	characters number in a string

Mid

Extracts the string with the specified characters number from the specified position in the string

[形式]

Mid(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	target string
arg2	Integer	starting position to extract (greater than or equal to 1)
arg3	Integer	extract characters number

[戻り値]

型	説明
String	extract string

Replace

Replace string

[形式]

Replace(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	target string
arg2	String	search string
arg3	String	replace string

[戻り値]

型	説明
String	string after replacing

Right

Extracts the sting with the specified characters number from the rightmost of the target string

[形式]

Right(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	target string.
arg2	Integer	extract characters number

[戻り値]

型	説明
String	extract string

StrComp

Compares string

[形式]

StrComp(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	target string
arg2	String	compare string

[戻り値]

型	説明
Integer	Result value (※If the result value is =0, arg 1and arg2 are completely equal <0, arg1is located at top of ascending sort >0, arg1is located at bottom of ascending sort)

Trim

Deletes the half-width space character with before and vehind the string

[形式]

Trim(arg1)

[引数]

引数名	型	説明
arg1	String	target string

[戻り値]

型	説明
String	string which deleted the half-width space character with before and vehind the string

convert data

名称	説明
CAgt	Converts value for type of integer(Integer) and string(String) to Agent value(Agt)
CBool	Converts to False if value for a type of real number (Double), type of integer(Integer)、type of long integerr(Long) and type of string(String) is 0, otherwise converts to True.
CDbl	Converts value for type of Boolean(Boolean), type of integer(Integer), type of long integer(Long) and type of string(String) to type of real number (Double)
CInt	Converts value for type of boolean(Boolean),type of real number(Double), type of string(String) and type of Agent(Agt) to type of integer
CLong	Converts value for type of boolean(Boolean), type of real number(Double), type of integer(Integer) and type of string(String) to type of long integer(Long)
CSpace	Converts value for type of string to type of space(Space)
CStr	Converts value for type of boolean(Boolean),type of real number(Double), type of integer(Integer), type of long integer(Long), type of space(Space),type of agent class(AgtType) and agent type(Agt) to type for string

---

CAgt

Converts value for type of integer(Integer) and string(String) to Agent value(Agt)

[形式]

CAgt(arg1)

[引数]

引数名	型	説明
arg1	Integer, String	Value before conversion

[戻り値]

型	説明
Agt	Value after conversion

CBool

Converts to False if value for a type of real number (Double), type of integer(Integer)、type of long integerr(Long) and type of string(String) is 0, otherwise converts to True.

[形式]

CBool(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long, String	Value before conversion

[戻り値]

型	説明
Boolean	Value after conversion

CDbl

Converts value for type of Boolean(Boolean), type of integer(Integer), type of long integer(Long) and type of string(String) to type of real number (Double)

[形式]

CDbl(arg1)

[引数]

引数名	型	説明
arg1	Boolean, Integer, Long, String	Value before conversion

[戻り値]

型	説明
Double	Value after conversion

CInt

Converts value for type of boolean(Boolean),type of real number(Double), type of string(String) and type of Agent(Agt) to type of integer

[形式]

CInt(arg1)

[引数]

引数名	型	説明
arg1	Boolean, Double, String, Agt	Value before conversion

[戻り値]

型	説明
Integer	Value after conversion

CLong

Converts value for type of boolean(Boolean), type of real number(Double), type of integer(Integer) and type of string(String) to type of long integer(Long)

[形式]

CLong(arg1)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, String,	Value before conversion

[戻り値]

型	説明
Long	Value after conversion

CSpace

Converts value for type of string to type of space(Space)

[形式]

CSpace(arg1)

[引数]

引数名	型	説明
arg1	String	Value before conversion

[戻り値]

型	説明
Space	Value after conversion

CStr

Converts value for type of boolean(Boolean),type of real number(Double), type of integer(Integer), type of long integer(Long), type of space(Space),type of agent class(AgtType) and agent type(Agt) to type for string

[形式]

CStr(arg1)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, Space, AgtType, Agt	Value before conversion

[戻り値]

型	説明
String	Value after conversion

agent operation

名称	説明
AddAgt	Adds an agent to an agent set variable
ClearAgtSet	Clears contents in the agent set variable
CopyAgtSet	Copies agent set variable 1 into agent set variable 2 ※use DuplicateAgtSet, not CpyAgtSet as long as possible
CountAgt	Gets the number of agents of the specified agent class type
CountAgtSet	Gets the number of agent belonging to the specified agents set variable
CountAliveAgt	Gets the number of agents that the Kill flag is not set from the specified agent class ※Actually agent is deleted by KillAgt when the step is end
CreateAgt	Create one agent
DelAgtSet	Delete agent include agent set variable 2 from agent set variable 1
DelAgtSet2	Deletes specified agent from agent set variable1
DuplicateAgtSet	Copies agent set variable 2 into agent set variable 1
Forward	Advance to the agent direction for number of bracket (direction of movement depends on Direction variable) The return value, if function completes normally, will be −1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be returned.
ForwardDirectionCell	Moves to specified direction on the cell
ForwardX	Advance to the direction of X axis for number of bracket.The return value, if function completes normally, will be −1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be returned.
ForwardXCell	Advance to X axis direction for number of bracket on the cell. The return value, if function completes normally, will be −1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be returned.
ForwardY	ped space, the distance not to advance will be returned.
ForwardYCell	Advance to Y axis direction for number of bracket on the cell. The return value, if function completes normally, will be −1. if unable to advance by the specified distance due to dead end on unlooped space,the distance not to advance will be returned.
GetAgt	Gets the agent at the specified position (integer greater than or equal to 0) in the specified agent set variable
GetAgtEntry	Check whether or not the specified agent is contained in the specified agent set variable. If the specified agent is contained, the smallest sequence number (element number) starting from the head of the agent set variable is found as a integer larger than 0. If not contained, −1 is returned.
GetDirection	Gets the angle from A sport to B spot. If on looped space, gets the angle by shorter distance
GetHeightSpaceOwn	Gets the height of the space which the agent itself is present
GetHistory	Get a value recorded for a variable
GetUniqueID	Gets agent's UniqueID from agent ID
JoinAgtSet	Adds agent set variable 2 to agent set variable 1 (permit duplicate elements)

KillAgt	Removes an agent (agent will be actually removed in the end of step)
MakeAgtSet	Stores all agents of the specified class agent type into an agent set variable
MakeAgtSetAroundOwnCell	Pick out agent around agent itself (on the cell) from specified agent set and stores into agent set variable
MakeAgtSetAroundPositionCell	Pick out agent located around specified position coordinate (on the cell) from specified agent set and save it into specified agent set variable
MakeAgtSetSpace	Store all agent existed in the specified space into specified agent set variable
MakeAllAgtSetAroundOwn	Creates agent set variable of all agents which are existing around the agent itself (list up all agents around scope range in agent set variable)
MakeAllAgtSetAroundOwnCell	Creates agent set variable of all agents which are existing around the agent itself (on the cell) (list up all agents around scope(grid) range in agent set variable)
MakeAllAgtSetAroundPosition	Creates agent set variable of all agents around specified position coordinate(list up all agents around specified position coordinate in agent set variable)
MakeAllAgtSetAroundPositionCell	Creates agent set variable of all agents around specified position coordinate on the cell(list up all agents around specified position coordinate on the cell in agent set variable)
MakeCommonAgtSet	Creates agent set variable 1 consisting of agents contained in both agent set variable 2 and agent set variable 3
MakeDiffAgtSet	Creates agent set variable 1 consisting of agents contained in only one or the other of agent set variable 2 and agent set variable 3
MakeOneAgtSetAroundOwn	Creates agent set variable of specified agent class around agent itself (list up all agent class around scope range in agent set variable)
MakeOneAgtSetAroundOwnCell	Creates agent set variable of specified agent class around agent itself (on the cell)(list up all agent class around scope (grid) range in agent set variable)
MakeOneAgtSetAroundPosition	Creates agent set variable of specified class agents around specified position coordinate (list up specified class agents around specified position coordinate in agent set variable)
MakeOneAgtSetAroundPositionCell	Creates agent set variable of all agents around specified position coordinate on the cell(list up all agents around specified position coordinate on the cell in agent set variable)
MergeAgtSet	Add agent set variable 2 to agent set variable 1 (not permit duplicate elements)
MoveLayerSpace	Move only layer which wishing to move to another Layer
MoveToCenter	Moves to the center of the space ride on agent
MoveToSpaceAgtSetCell	Searches for an unoccupied space (cell) near the specified coordinates, not overlapping with agents belonging to the specified agent set variable, and moves to it. C
MoveToSpaceOwnCell	Searches for an unoccupied space (cell) near agent itself and moves to it. (If there are multiple unoccupied cells in the searched region, selects a movement location randomly)
MoveToSpacePositionCell	Searches for an unoccupied space (cell) near the specified coordinates and moves to it ((If there are multiple unoccupied cells in the searched region, selects a movement location randomly)

OnLayerSpace	Move to a specified Layer
PickupAgt	Gets the agent at the specified position (integer greater than or equal to 0) in the specified agent variable and delete that agent from agent set variable
PurifyAgtSet	Creates agent set variable 1 which is deleted duplication from agent set variable 2
Pursue	Move toward the target agent. Updated value of Direction variable complying with move direction
RandomPutAgtSet	Places the specified agent set randomly
RandomPutAgtSetCell	Places the specified agent set randomly on the cell
RemoveAgt	Remove the specified agent from an agent set variable
ReverseDirectionCell	Gets the reverse direction
SortAgtSet	Sort agent set variable as specified variable key
SpecifyAgtType	get agent class of specified agent
SpecifyKillAgt	Get the value of the Kill flag
TerminateAgt	completely delete agent ※agent is deleted immediately even if agent is running rule ※assign variable included appropriate agent to −1 in the agent set variable ※if appropriate agent is included in the agent ser variable, it will be also deleted from agent set variable
Turn	on will be reversed when original point at left upper is set.
TurnAgt	Changes direction toward specified agent

AddAgt

Adds an agent to an agent set variable

[形式]

AddAgt(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Agt	agent variable

ClearAgtSet

Clears contents in the agent set variable

[形式]

ClearAgtSet(arg1)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable

CopyAgtSet

Copies agent set variable 1 into agent set variable 2 ※use DuplicateAgtSet, not CpyAgtSet as long as possible

[形式]

CopyAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable 1
arg2	AgtSet	agent set variable 2

CountAgt

Gets the number of agents of the specified agent class type

[形式]

CountAgt(arg1)

[引数]

引数名	型	説明
arg1	AgtType	agent class variable

[戻り値]

型	説明
Integer	number of agent

CountAgtSet

Gets the number of agent belonging to the specified agents set variable

[形式]

CountAgtSet(arg1)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable

[戻り値]

型	説明
Integer	number of agent

CountAliveAgt

Gets the number of agents that the Kill flag is not set from the specified agent class ※Actually agent is deleted by KillAgt when the step is end

[形式]

CountAliveAgt(arg1)

[引数]

引数名	型	説明

arg1	AgtType	agent class variable

[戻り値]

型	説明
Integer	agent number not set Kill flag

CreateAgt

Create one agent

[形式]

CreateAgt(arg1)

[引数]

引数名	型	説明
arg1	AgtType	agent class variable

[戻り値]

型	説明
Agt	agent variable

DelAgtSet

Delete agent include agent set variable 2 from agent set variable 1

[形式]

DelAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable1
arg2	AgtSet	agent set variable2

DelAgtSet2

Deletes specified agent from agent set variable1

[形式]

DelAgtSet2(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable1
arg2	Agt	agent variable

DuplicateAgtSet

Copies agent set variable 2 into agent set variable 1

[形式]

DuplicateAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable1
arg2	AgtSet	agent set variable2

Forward

Advance to the agent direction for number of bracket (direction of movement depends on Direction variable)The return value, if function completes normally, will be -1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be returned.

[形式]

Forward(arg1)

[引数]

引数名	型	説明
arg1	Double	distance

[戻り値]

型	説明
Double	ending value (if normally completed, -1. if not, the distance not to advance)

ForwardDirectionCell

Moves to specified direction on the cell

[形式]

ForwardDirectionCell(arg1, arg2)

[引数]

引数名	型	説明
arg1	Integer	//direction ＜in case of original point at left lower＞ ※grid model、0:right 、1:right upper、2:upper、3:left upper、4:left、5:left lower、6:lower、7:right lower ※hexagon model、0:right、1:right upper、2:left upper、3:left、4:left lower、5:right lower ＜original point at left upper＞ ※grid model、0:right、1:right lower、2:lower、3:left lower、4:left、5:left upper、6:upper、7:right upper ※ hexagon model、0:right、1:right lower、2:left lower、3:left、4:left upper、5:right upper
arg2	Integer	distance

[戻り値]

型	説明
Integer	ending value (if normally completed, -1. if argument is unfair, -2. if not advance specified distance, the distance not to advance)

ForwardX

Advance to the direction of X axis for number of bracket.The return value, if function completes normally, will be -1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be

returned.

[形式]

ForwardX(arg1)

[引数]

引数名	型	説明
arg1	Double	distance

[戻り値]

型	説明
Double	ending value(if normally completed, -1. if not advance, the distance not to advance)

ForwardXCell

Advance to X axis direction for number of bracket on the cell. The return value, if function completes normally, will be -1. if unable to advance by the specified distance due to dead end on unlooped space, the distance not to advance will be returned.

[形式]

ForwardXCell(arg1)

[引数]

引数名	型	説明
arg1	Integer	distance

[戻り値]

型	説明
Integer	ending value(if normally completed, -1. if not advance, the distance not to advance)

ForwardY

ped space, the distance not to advance will be returned.

[形式]

ForwardY(arg1)

[引数]

引数名	型	説明
arg1	Double	distance

[戻り値]

型	説明
Double	ending value(if normally completed, -1. if not advance, the distance not to advance)

ForwardYCell

Advance to Y axis direction for number of bracket on the cell. The return value, if function completes normally, will be -1. if unable to advance by the specified distance due to dead end on unlooped space,the distance not to advance will be returned.

[形式]

ForwardYCell(arg1)

[引数]

引数名	型	説明
arg1	Integer	distance

[戻り値]

型	説明
Integer	ending value(if normally completed, -1. if not advance, the distance not to advance)

GetAgt

Gets the agent at the specified position (integer greater than or equal to 0) in the specified agent set variable

[形式]

GetAgt(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Integer	get position

[戻り値]

型	説明
Agt	agent variable (if failure to get, -1)

GetAgtEntry

Check whether or not the specified agent is contained in the specified agent set variable. If the specified agent is contained, the smallest sequence number (element number) starting from the head of the agent set variable is found as a integer larger than 0. If not contained, -1 is returned.

[形式]

GetAgtEntry(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Agt	agent variable willing check

[戻り値]

型	説明
Integer	element number (if agent is not exist, -1)

GetDirection

Gets the angle from A sport to B spot. If on looped space, gets the angle by shorter distance

[形式]

GetDirection(arg1, arg2, arg3, arg4, arg5)

[引数]

引数名	型	説明
arg1	Double	An X coordinate of an A sport
arg2	Double	An Y coordinate of an A sport
arg3	Double	An X coordinate of an B sport
arg4	Double	An Y coordinate of an B sport
arg5	Space	space

[戻り値]

型	説明
Double	angle

GetHeightSpaceOwn

Gets the height of the space which the agent itself is present

[形式]

GetHeightSpaceOwn()

[戻り値]

型	説明
Integer	heights of space

GetHistory

Get a value recorded for a variable

[形式]

GetHistory(arg1, arg2)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, String, Agt	variable name
arg2	Integer	history number(step number to go back to a past condition from present)

[戻り値]

型	説明
Boolean, Double, Integer, Long, String, Agt	variable value (if referring to past value not existing, return that value of boolean type is False, value of string type is "", value of integer type is 0 and value of real number type is 0.0)

GetUniqueID

Gets agent's UniqueID from agent ID

[形式]

GetUniqueID(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtType	agent class variable
arg2	Integer	agentID

[戻り値]

型	説明
Agt	agent's UniqueID

JoinAgtSet

Adds agent set variable 2 to agent set variable 1(permit duplicate elements)

[形式]

JoinAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable 1
arg2	AgtSet	agent set variable 2

KillAgt

Removes an agent (agent will be actually removed in the end of step)

[形式]

KillAgt(arg1)

[引数]

引数名	型	説明
arg1	Agt	agent variable

MakeAgtSet

Stores all agents of the specified class agent type into an agent set variable

[形式]

MakeAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	created agent set variable
arg2	AgtType	agent class variable

MakeAgtSetAroundOwnCell

Pick out agent around agent itself (on the cell) from specified agent set and stores into agent set variable

[形式]

MakeAgtSetAroundOwnCell(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Integer	scope
arg3	AgtSet	specified agent set variable
arg4	Boolean	existing flag of agetnt itself (If the agent itself is included, True. If not, False)

MakeAgtSetAroundPositionCell

Pick out agent located around specified position coordinate (on the cell) from specified agent set and save it into specified agent set variable

[形式]

MakeAgtSetAroundPositionCell(arg1, arg2, arg3, arg4, arg5, arg6, arg7)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Space	space
arg3	Integer	X coordinate
arg4	Integer	Y coordinate
arg5	Integer	Layer
arg6	Integer	scope
arg7	AgtSet	specified agent set variable

MakeAgtSetSpace

Store all agent existed in the specified space into specified agent set variable

[形式]

MakeAgtSetSpace(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Space	space

MakeAllAgtSetAroundOwn

Creates agent set variable of all agents which are existing around the agent itself (list up all agents around scope range in agent set variable)

[形式]

MakeAllAgtSetAroundOwn(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Double	scope
arg3	Boolean	existing flag of agent itself (If the agent itself is included, True. If not, False)

MakeAllAgtSetAroundOwnCell

Creates agent set variable of all agents which are existing around the agent itself (on the cell) (list up all agents around scope(grid) range in agent set variable)

[形式]

MakeAllAgtSetAroundOwnCell(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	AgtSet	agent ser variable
arg2	Integer	scope
arg3	Boolean	existing flag of agent itself (If the agent itself is included, True. If not, False)

MakeAllAgtSetAroundPosition

Creates agent set variable of all agents around specified position coordinate(list up all agents around specified position coordinate in agent set variable)

[形式]

MakeAllAgtSetAroundPosition(arg1, arg2, arg3, arg4, arg5, arg6)

[引数]

引数名	型	説明
arg1	AgtSet	agent ser variable
arg2	Space	space
arg3	Double	X coordinate
arg4	Double	Y coordinate
arg5	Integer	Layer
arg6	Double	scope

MakeAllAgtSetAroundPositionCell

Creates agent set variable of all agents around specified position coordinate on the cell(list up all agents around specified position coordinate on the cell in agent set variable)

[形式]

MakeAllAgtSetAroundPositionCell(arg1, arg2, arg3, arg4, arg5, arg6)

[引数]

引数名	型	説明
arg1	AgtSet	agent ser variable
arg2	Space	space
arg3	Integer	X coordinate

arg4	Integer	Y coordinate
arg5	Integer	Layer
arg6	Integer	scope

MakeCommonAgtSet

Creates agent set variable 1 consisting of agents contained in both agent set variable 2 and agent set variable 3

[形式]

MakeCommonAgtSet(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable 1
arg2	AgtSet	agent set variable 2
arg3	AgtSet	agent set variable 3

MakeDiffAgtSet

Creates agent set variable 1 consisting of agents contained in only one or the other of agent set variable 2 and agent set variable 3

[形式]

MakeDiffAgtSet(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable 1
arg2	AgtSet	agent set variable 2
arg3	AgtSet	agent set variable 3

MakeOneAgtSetAroundOwn

Creates agent set variable of specified agent class around agent itself (list up all agent class around scope range in agent set variable)

[形式]

MakeOneAgtSetAroundOwn(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Double	scope
arg3	AgtType	agent class variable
arg4	Boolean	existing flag of agetnt itself (If the agent itself is included, True. If not, False)

MakeOneAgtSetAroundOwnCell

Creates agent set variable of specified agent class around agent itself (on the cell)(list up all agent class around scope (grid) range in agent set variable)

[形式]

MakeOneAgtSetAroundOwn(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Integer	scope
arg3	AgtType	agent class variable
arg4	Boolean	existing flag of agent itself (If the agent itself is included, True. If not, False)

MakeOneAgtSetAroundPosition

Creates agent set variable of specified class agents around specified position coordinate (list up specified class agents around specified position coordinate in agent set variable)

[形式]

MakeOneAgtSetAroundPosition(arg1, arg2, arg3, arg4, arg5, arg6, arg7)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Space	space
arg3	Double	X coordinate
arg4	Double	Y coordinate
arg5	Integer	Layer
arg6	Double	scope
arg7	AgtType	agent class variable

MakeOneAgtSetAroundPositionCell

Creates agent set variable of all agents around specified position coordinate on the cell(list up all agents around specified position coordinate on the cell in agent set variable)

[形式]

MakeOneAgtSetAroundPositionCell(arg1, arg2, arg3, arg4, arg5, arg6, arg7)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Space	space
arg3	Integer	X coordinate
arg4	Integer	Y coordinate
arg5	Integer	Layer
arg6	Double	scope
arg7	AgtType	agent class variable

MergeAgtSet

Add agent set variable 2 to agent set variable 1 (not permit duplicate elements)

[形式]

MergeAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set value 1
arg2	AgtSet	agent set value 2

MoveLayerSpace

Move only layer which wishing to move to another Layer

[形式]

MoveLayerSpace(arg1)

[引数]

引数名	型	説明
arg1	Integer	Layer number wishing to move

[戻り値]

型	説明
Integer	ending value (if normally completed, -1. if unable to move because the highest or lowest layer was reached, layer number)

MoveToCenter

Moves to the center of the space ride on agent

[形式]

MoveToCenter()

MoveToSpaceAgtSetCell

Searches for an unoccupied space (cell) near the specified coordinates, not overlapping with agents belonging to the specified agent set variable, and moves to it. C

[形式]

MoveToSpaceAgtSetCell(arg1, arg2, arg3, arg4, arg5, arg6)

[引数]

引数名	型	説明
arg1	Space	space
arg2	Integer	X coordinate
arg3	Integer	Y coordinate
arg4	Integer	Layer
arg5	Integer	scope
arg6	AgtSet	agent set variable

[戻り値]

型	説明
Boolean	movement error value (if unable to move, True if able to move, False)

MoveToSpaceOwnCell

Searches for an unoccupied space (cell) near agent itself and moves to it. (If there are multiple unoccupied cells in the searched region, selects a movement location randomly)

[形式]

MoveToSpaceOwnCell(arg1)

[引数]

引数名	型	説明
arg1	Integer	scope

[戻り値]

型	説明
Boolean	move error value (if unable to move, True if able to move, False)

MoveToSpacePositionCell

Searches for an unoccupied space (cell) near the specified coordinates and moves to it ((If there are multiple unoccupied cells in the searched region, selects a movement location randomly)

[形式]

MoveToSpaceAgtSetCell(arg1, arg2, arg3, arg4, arg5)

[引数]

引数名	型	説明
arg1	Space	space
arg2	Integer	X coordinate
arg3	Integer	Y coordinate
arg4	Integer	Layer
arg5	Integer	scope

[戻り値]

型	説明
Boolean	move error value (if unable to move, True if able to move, False)

OnLayerSpace

Move to a specified Layer

[形式]

OnLayerSpace(arg1)

[引数]

引数名	型	説明
arg1	Integer	moving Layer number

[戻り値]

型	説明
Integer	ending value (if normally completed, -1. if not, 0)

PickupAgt

Gets the agent at the specified position (integer greater than or equal to 0) in the specified agent variable and delete that agent from agent set variable

[形式]

PickupAgt(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Integer	get position

[戻り値]

型	説明
Agt	agent variable (if failure to get, -1)

PurifyAgtSet

Creates agent set variable 1 which is deleted duplication from agent set variable 2

[形式]

PurifyAgtSet(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable 1
arg2	AgtSet	agent set variable 2

Pursue

Move toward the target agent. Updated value of Direction variable complying with move direction

[形式]

Pursue(arg1, arg2)

[引数]

引数名	型	説明
arg1	Agt	target agent
arg2	Double	movement distance

[戻り値]

型	説明
Double	ending value (if normally completed, -1. if not, the distance not to advance)

RandomPutAgtSet

Places the specified agent set randomly

[形式]

RandomPutAgtSet(arg1)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable

RandomPutAgtSetCell

Places the specified agent set randomly on the cell

[形式]

RandomPutAgtSetCell(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Boolean	duplication with other agent (If duplication is OK, True. If not, False)

[戻り値]

型	説明
Integer	ending value (if normally completed, -1. when agent number is overlapped because agent number is larger than the space size, nonetheless overlap with other agent is False, the agent number)

RemoveAgt

Remove the specified agent from an agent set variable

[形式]

RemoveAgt(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	Agt	agent variable

ReverseDirectionCell

Gets the reverse direction

[形式]

ReverseDirectionCell(arg1)

[引数]

引数名	型	説明

arg1	Integer	//direction ＜in case of original point at left lower＞ ※grid model、0:right、1:right upper、2:upper、3:left upper、4:left、5:left lower、6:lower、7:right lower ※hexagon model、0:right、1:right upper、2:left upper、3:left、4:left lower、5:right lower ＜in case of original point at left upper＞ ※grid model、0:right、1:right lower、2:lower、3:left lower、4:left、5:left upper、6:upper、7:right upper ※hexagon model、0:right、1:right lower、2:left lower、3:left、4:left upper、5:right upper

[戻り値]

型	説明
Integer	//reverse direction ＜in case of original point at left lower＞ ※grid model、0:right、1:right upper、2:upper、3:left upper、4:left、5:left lower、6:lower、7:right lower ※hexagon model、0:right、1:right upper、2:left upper、3:left、4:left lower、5:right lower ＜in case of original point at left upper＞ ※grid model、0:右、1:right lower、2:lower、3:left lower、4:left、5:left upper、6:upper、7:right upper ※hexagon model、0:right、1:right lower、2:left lower、3:left、4:left upper、5:right upper ※if argument is unfair, -2

SortAgtSet

Sort agent set variable as specified variable key

[形式]

SortAgtSet(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	AgtSet	agent set variable
arg2	String	string indicating variable as sort key
arg3	Boolean	sort order (if ascending order is True、if descending order is False)

SpecifyAgtType

get agent class of specified agent

[形式]

SpecifyAgtType(arg1)

[引数]

引数名	型	説明
arg1	Agt	agent variable

[戻り値]

型	説明
AgtType	agent class variable

SpecifyKillAgt

Get the value of the Kill flag

[形式]

SpecifyKillAgt(arg1)

[引数]

引数名	型	説明
arg1	Agt	agent variable

[戻り値]

型	説明
Boolean	result value(if Kill flag is on, True, if Kill flag is off, False)

TerminateAgt

completely delete agent ※agent is deleted immediately even if agent is running rule ※assign variable included appropriate agent to -1 in the agent set variable ※if appropriate agent is included in the agent ser variable, it will be also deleted from agent set variable

[形式]

TerminateAgt(arg1)

[引数]

引数名	型	説明
arg1	Agt	agent set variable

[戻り値]

型	説明
Boolean	result value(if success, True, if failure, False)

Turn

on will be reversed when original point at left upper is set.

[形式]

Turn(arg1)

[引数]

引数名	型	説明
arg1	Double	angle (angle is specified by degree(°)

TurnAgt

Changes direction toward specified agent

[形式]

TurnAgt(arg1)

[引数]

引数名	型	説明
arg1	Double	specified agent

space operation

名称	説明
GetHeightSpace	Gets the height of the specified space
GetHeightSpaceOwn	Gets the height of the space which the agent itself is present
GetLayerSpace	Gets the number of layers in the specified space
GetRideSpace	Gets the pace the specified agent class is ridden
GetWidthSpace	Gets the width of the specified space
MeasureDistance	Measures the shortest distance between two points
SpecifyLoop	Gets the loop setting of the specified space
SpecifySpace	Gets the type of the specified space

GetHeightSpace

Gets the height of the specified space

[形式]

GetHeightSpace(arg1)

[引数]

引数名	型	説明
arg1	Space	space

[戻り値]

型	説明
Integer	height space

GetHeightSpaceOwn

Gets the height of the space which the agent itself is present

[形式]

GetHeightSpaceOwn()

[戻り値]

型	説明
Integer	heights of space

GetLayerSpace

Gets the number of layers in the specified space

[形式]

GetLayerSpace(arg1)

[引数]

引数名	型	説明

arg1	Space	space

[戻り値]

型	説明
Integer	layer number in the space

GetRideSpace

Gets the pace the specified agent class is ridden

[形式]

GetRideSpace(arg1)

[引数]

引数名	型	説明
arg1	AgtType	agent class variable

[戻り値]

型	説明
Space	space

GetWidthSpace

Gets the width of the specified space

[形式]

GetWidthSpace(arg1)

[引数]

引数名	型	説明
arg1	Space	space

[戻り値]

型	説明
Integer	width space

MeasureDistance

Measures the shortest distance between two points

[形式]

MeasureDistance(arg1, arg2, arg3, arg4, arg5)

[引数]

引数名	型	説明
arg1	Double	X coordinate1
arg2	Double	Y coordinate1
arg3	Double	X coordinate2
arg4	Double	Y coordinate2
arg5	Space	space

[戻り値]

型	説明
Double	shortest distance between two points

SpecifyLoop

Gets the loop setting of the specified space

[形式]

SpecifyLoop(arg1)

[引数]

引数名	型	説明
arg1	Space	space

[戻り値]

型	説明
Boolean	result value (If looping, True、if not looping, False)

SpecifySpace

Gets the type of the specified space

[形式]

SpecifySpace(arg1)

[引数]

引数名	型	説明
arg1	Space	space

[戻り値]

型	説明
Integer	space type (grid model is 0、hexagon model is 1)

XML data operation

名称	説明
CloseFile	Closes a text file
CloseFileCSV	Closes CSV file
CloseFileXML	Closes a XML file ※The value changed by the SetXMLValue function is reflected on the XML file.
DeleteXMLDom	Delete XML data
FlushXMLDom	Confirms the XML data operation
GetXMLValue	Gets value from XML data
IsEofFile	Jedge final line of the text file reading
MakeXMLDom	Defines the specified string variable as XML data
OpenFileXML	Opens a XML file
RemoveXMLValue	Removes node specified with a Xpath string in the XML data specified by the XML data identification number. Be fixed value when CloseFileXML function or FlushXMLDom function is issued.
SetXMLValue	Sets the value of a XML data . Be fixed value when CloseFileXML function or FlushXMLDom function is issued.

CloseFile

Closes a text file

[形式]

```
CloseFile(arg1)
```

[引数]

引数名	型	説明
arg1	Integer	specify the file identification number to close

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

CloseFileCSV

Closes CSV file

[形式]

```
CloseFileCSV(arg1)
```

[引数]

引数名	型	説明
arg1	Integer	specify the file identification number to close

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

CloseFileXML

Closes a XML file ※The value changed by the SetXMLValue function is reflected on the XML file.

[形式]

CloseFileXML(arg1)

[引数]

引数名	型	説明
arg1	Integer	XML data identification number to close

[戻り値]

型	説明
Boolean	result value (if success,True. if failure,False)

DeleteXMLDom

Delete XML data

[形式]

DeleteXMLDom(arg1)

[引数]

引数名	型	説明
arg1	Integer	XML data identification number to delete

[戻り値]

型	説明
Boolean	result value (if success,True. if failure,False)

FlushXMLDom

Confirms the XML data operation

[形式]

FlushXMLDom(arg1)

[引数]

引数名	型	説明
arg1	Integer	XML identification number to confirm the operation

GetXMLValue

Gets value from XML data

[形式]

GetXMLValue(arg1, arg2)

[引数]

引数名	型	説明
arg1	Integer	XML data identification number to get value
arg2	String	Xpath string

[戻り値]

型	説明
String	string

IsEofFile

Jedge final line of the text file reading

[形式]

```
IsEofFile(arg1)
```

[引数]

引数名	型	説明
arg1	Integer	specify the file identification number to close

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

MakeXMLDom

Defines the specified string variable as XML data

[形式]

```
MakeXMLDom(arg1, arg2)
```

[引数]

引数名	型	説明
arg1	String	string variable
arg2	Integer	specify XML data identification number (integer greater than or equal to 1)

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

OpenFileXML

Opens a XML file

[形式]

```
OpenFileXML(arg1, arg2)
```

[引数]

引数名	型	説明
arg1	String	file name to open

arg2	Integer	XML data identification number (integer greater than or equal to 1)

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

RemoveXMLValue

Removes node specified with a Xpath string in the XML data specified by the XML data identification number. Be fixed value when CloseFileXML function or FlushXMLDom function is issued.

[形式]

RemoveXMLValue(arg1, arg2)

[引数]

引数名	型	説明
arg1	Integer	XML data identification number
arg2	String	Xpath string

SetXMLValue

Sets the value of a XML data . Be fixed value when CloseFileXML function or FlushXMLDom function is issued.

[形式]

SetXMLValue(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Integer	XML data identification number to set value
arg2	String	Xpath string
arg3	String	set value

input-output file

名称	説明
OpenFile	Opens a text file
OpenFileCSV	Opens CSV file
OpenFileCode	Opens with specifying a taxt file by the character code
ReadFile	Reads 1 line from text file
ReadFileCSV	Reads one token-string from a CSV file ※reading format is not available to double quotation mark (" ")
WriteFile	Writes 1 data to a text file
WriteFileCSV	Writes 1 data to a CSV file
WriteLnFile	result value (If success,True. if failure, False)

OpenFile

Opens a text file

[形式]

OpenFile(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	file name to open
arg2	Integer	specify file identification number (integer greater than or equal to 1)
arg3	Integer	Open mode (if Read, 1:open to read data in file、if Write, 2:open to delete data in file and write from 0、if Append, 3:open to keep data in file and add to final line)

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

OpenFileCSV

Opens CSV file

[形式]

OpenFileCSV(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	file name to open
arg2	Integer	specify file identification number (integer larger than 1)
arg3	Integer	open mode (if Read, 1、if Write, 2、if Append, 3)

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

OpenFileCode

Opens with specifying a taxt file by the character code

[形式]

OpenFileCode(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	String	file name to open
arg2	Integer	specify file identification number (integer larger than 1)
arg3	Integer	open mode (if Read, 1、if Write, 2、if Append, 3)
arg4	String	character code name ("ISO-8859-1"、"UTF8"、"Shift_JIS"、"Windows-31"、"EUC-JP"、"ISO-2022-JP")

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

ReadFile

Reads 1 line from text file

[形式]

ReadFile(arg1)

[引数]

引数名	型	説明
arg1	Integer	file identification number to read

[戻り値]

型	説明
String	reading string

ReadFileCSV

Reads one token-string from a CSV file ※reading format is not available to double quotation mark (" ")

[形式]

ReadFileCSV(arg1)

[引数]

引数名	型	説明
arg1	Integer	file identification number to read

[戻り値]

型	説明
String	reading string

WriteFile

Writes 1 data to a text file

[形式]

WriteFile(arg1, arg2)

[引数]

引数名	型	説明
arg1	Integer	file identification number to write
arg2	Boolean, Double, Integer, Long, String	contents to write

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

WriteFileCSV

Writes 1 data to a CSV file

[形式]

WriteFileCSV(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Integer	file identification number to write
arg2	Boolean, Double, Integer, Long, String	contents to write
arg3	Boolean	linefeed flag (if True, linefeed is occurred after output. If False, add「,」without linefeed

[戻り値]

型	説明
Boolean	result value (If success,True. if failure, False)

WriteLnFile

result value (If success,True. if failure, False)

[形式]

WriteLnFile(arg1, arg2)

[引数]

引数名	型	説明
arg1	Integer	file identification number to write
arg2	Boolean, Double, Integer, Long, String	contents to write

[戻り値]

型	説明

Boolean	result value (If success,True. if failure, False)

名称	説明
InputBox	Displays dialog for input ※simulation is paused until finishing to input

---

InputBox

Displays dialog for input ※simulation is paused until finishing to input

[形式]

InputBox(arg1, arg2)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, String	input variable name
arg2	String	displayed message (if specify「¥n」in the string of displayed message, sentence is started a new line)

database operation

名称	説明
CloseDB	Close opened data base
CommitDB	Commit a database ※Commit to be normally completed all sequence of update process on database (update database after fixing process
GetValueDB	Gets the value of the specified field ※Executes this function after a QueryDB function was issued
MakeXMLDomSelectDB	Holds a value which issued SQL query and got as XML data
NextDB	Executes the following contents about the record matching with the specified content of QueryDB function executing at the last minute ※Available to execute only if QueryDB function is succeeded ※Refer to the forehand record in the first execution ※Advance one reference record number every execution ※if the record data to reference is existed, True. if not, return False.
OpenDB	Open a database ※corresponding database is PostgreSQL 8.1/8.2、SQL Server 2000/2005
QueryDB	Issues the specified SQL query against opened database ※Execute CommitDB function or Rollback DB function when changes a database
RollbackDB	Rollbacks a database
UpdateDB	Issues the specified SQL query against opened database ※ UpdateDB function is applied if UPDATE sentence, CREATE sentence, DROP sentence INSERT sentence or DELETE sentence is used. SELECT sentence is used in the QueryDB function ※Execute CommitDB function or Rollback DB function when changes a database

---

CloseDB

Close opened data base

[形式]

```
CloseDB()
```

[戻り値]

型	説明
Boolean	execute result (If success,True. if failure, False)

CommitDB

Commit a database ※Commit to be normally completed all sequence of update process on database (update database after fixing process

[形式]

```
CommitDB()
```

GetValueDB

Gets the value of the specified field ※Executes this function after a QueryDB function was issued

[形式]

GetValueDB(arg1)

[引数]

引数名	型	説明
arg1	String	field name

[戻り値]

型	説明
String	value of specified field

MakeXMLDomSelectDB

Holds a value which issued SQL query and got as XML data

[形式]

MakeXMLDomSelectDB(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	SQL string
arg2	Integer	XML data identification number (integer greater than or equal to 1)

[戻り値]

型	説明
Integer	number of record

NextDB

Executes the following contents about the record matching with the specified content of QueryDB function executing at the last minute ※Available to execute only if QueryDB function is succeeded ※Refer to the forehand record in the first execution ※Advance one reference record number every execution ※if the record data to reference is existed, True. if not, return False.

[形式]

NextDB()

[戻り値]

型	説明
Boolean	execute result (If next record is existed,True. if not, False)

OpenDB

Open a database ※corresponding database is PostgreSQL 8.1/8.2、SQL Server 2000/2005

[形式]

OpenDB(arg1, arg2, arg3, arg4, arg5)

[引数]

引数名	型	説明

arg1	String	JDBC URL (if it is PostgreSQL 8.1/8.2, 「jdbc:postgresql://localhost:5432」、if it is SQL Server 2000/2005,「jdbc:sqlserver://localhost:1433;DatabaseName=database name」)
arg2	String	JDBC driver name (if it is PostgreSQL 8.1/8.2, 「org.postgresql.Driver」、if SQL Server 2000/2005, com.microsoft.sqlserver.jdbc.SQLServerDriver」)
arg3	String	database name (if it is PostgreSQL 8.1/8.2, 「database name」、if it is SQL Server 2000/2005, 「""」)
arg4	String	database user name
arg5	String	pass word

[戻り値]

型	説明
Boolean	association result (If success,True. if failure, False)

QueryDB

Issues the specified SQL query against opened database ※Execute CommitDB function or Rollback DB function when changes a database

[形式]

QueryDB(arg1)

[引数]

引数名	型	説明
arg1	String	SQL string

[戻り値]

型	説明
Integer	execute result (if success, integral number greater than or equal to 0. if failure, integer smaller than or equal to -1)

RollbackDB

Rollbacks a database

[形式]

RollbackDB()

UpdateDB

Issues the specified SQL query against opened database ※ UpdateDB function is applied if UPDATE sentence, CREATE sentence, DROP sentence INSERT sentence or DELETE sentence is used. SELECT sentence is used in the QueryDB function ※Execute CommitDB function or Rollback DB function when changes a database

[形式]

UpdateDB()

[引数]

引数名	型	説明
arg1	String	SQL string

[戻り値]

型	説明
Integer	execute result (if success, integer greater than or equal to 0. if failure, integer smaller than or equal to −1)

network

名称	説明
DeliverRemoteInfo	Delivers setting information about global space to each address registered in the list of the remote identification name in the remote setting ※be able to execute in Univ_Init only
GetLocalX	Converts X coordinate on global space into X coordinate on local space ※available to execute except for the Univ_Init and Agt_Init
GetLocalY	Converts Y coordinate on global space into Y coordinate on local space ※available to execute except for the Univ_Init and Agt_Init
GetRemoteArray	Gets value of remote array variable ※available to execute except for the Univ_Init and Agt_Init
GetRemoteName	Gets the remote identification name ※available to execute except for the Univ_Init and Agt_Init
GetRemoteValue	Gets the value of a remote variable ※available to execute except for the Univ_Init and Agt_Init
GoogleSearch	Searchs by Google
MakeHtmlDom	import HTML text from the specified URL and dave it as XML data
RegistHtmlPage	Specify the variable to save the displayed HTML as to the request for the specified relative URL path ※execute WebStart function in advance
RegistHtmlPageToXML	Specify the variable to save the displayed HTML about request to specified relative URL path and save
RemoteFinish	Stops all of remote machines which have been defined in remote settings ※ available to execute except for Univ_Init and Agt_Init
RemoteInitialize	Sends initialization requests to remote machines which have been defined in remote settings. A machine which is running will stop and restart. A machine which is stopping will simply start. ※available to execute except for Univ_Init and Agt_Init
RemoteName	Defines a remote identification name ※available to execute only Univ_Init
RemoteStep	Defines execution of a counterpart specified by a remote identification name ※ available to execute except for Univ_Init and Agt_Init
RemoteSyncStep	Implement the step execution in counterpart synchronization mode defined by remote setting. Processing will finish either at all of the defined counterpart execution completed, or at passing the defined time by time out. ※available to execute except for Univ_Init and Agt_Init
SetRemoteArray	Assigns the value of a remote array variable ※available to execute except for Univ_Init and Agt_Init
SetRemoteValue	Assigns the value of a remote variable ※available to execute except for Univ_Init and Agt_Init
TeleportationAgt	Transfers agents to other artisoc model (the agent defined on the space can't transfer) ※available to execute except for Univ_Init and Agt_Init
WebLock	impossible to update the value of string which hold XML data of return value defined by RegistHtmlPageToXML function
WebStart	Starts Web server. If simulation terminates, web server will stop ※available to execute only Univ_Init
WebUnLock	possible to update the value of string which hold XML data of return value defined by RegistHtmlPageToXML function

DeliverRemoteInfo

Delivers setting information about global space to each address registered in the list of the remote identification name in the remote setting ※be able to execute in Univ_Init only

[形式]

DeliverRemoteInfo()

[戻り値]

型	説明
Integer	result value (if normal, 0 if error, value except for 0)

GetLocalX

Converts X coordinate on global space into X coordinate on local space ※available to execute except for the Univ_Init and Agt_Init

[形式]

GetLocalX(arg1)

[引数]

引数名	型	説明
arg1	Double	X coordinate on global space

[戻り値]

型	説明
Double	X coordinate on local space

GetLocalY

Converts Y coordinate on global space into Y coordinate on local space ※available to execute except for the Univ_Init and Agt_Init

[形式]

GetLocalY(arg1)

[引数]

引数名	型	説明
arg1	Double	X coordinate on global space

[戻り値]

型	説明
Double	X coordinate on local space

GetRemoteArray

Gets value of remote array variable ※available to execute except for the Univ_Init and Agt_Init

[形式]

GetRemoteArray(arg1, arg2, arg3)

[引数]

引数名	型	説明

arg1	Boolean, Double, Integer, Long, String	array variable
arg2	String	remote identification name of address to connect
arg3	String	pass name of remote array variable

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

GetRemoteName

Gets the remote identification name ※available to execute except for the Univ_Init and Agt_Init

[形式]

GetRemoteName()

[戻り値]

型	説明
String	remote identification name

GetRemoteValue

Gets the value of a remote variable ※available to execute except for the Univ_Init and Agt_Init

[形式]

GetRemoteValue(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, String	variable to save
arg2	String	remote identification name of address to connect
arg3	String	pass name of remote array variable

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

GoogleSearch

Searchs by Google

[形式]

GoogleSearch(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	string variable to hold the search result as XML data
arg2	String	key code of Google Web API
arg3	String	search string

[戻り値]

型	説明
Boolean	execute result (If success,True. if failure, False)

MakeHtmlDom

import HTML text from the specified URL and dave it as XML data

[形式]

MakeHtmlDom(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	URL string
arg2	String	string variable to hold HTML data
arg3	Integer	specify XML data identification number (integer greater than or equal to 1)

[戻り値]

型	説明
Boolean	execute result (If success,True. if failure, False)

RegistHtmlPage

Specify the variable to save the displayed HTML as to the request for the specified relative URL path ※execute WebStart function in advance

[形式]

RegistHtmlPage(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	URL string
arg2	String	variable name of string to hold HTML data

[戻り値]

型	説明
String	execute result (if normal, null. if error, display error message)

RegistHtmlPageToXML

Specify the variable to save the displayed HTML about request to specified relative URL path and save

[形式]

RegistHtmlPageToXML(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	String	URL return value
arg2	String	variable name of string to hold HTML data

arg3	String	variable name of string to hold HTML data of return value

[戻り値]

型	説明
String	execute result (if normal, null. if error, display error message)

RemoteFinish

Stops all of remote machines which have been defined in remote settings ※available to execute except for Univ_Init and Agt_Init

[形式]

```
RemoteFinish()
```

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

RemoteInitialize

Sends initialization requests to remote machines which have been defined in remote settings. A machine which is running will stop and restart. A machine which is stopping will simply start. ※available to execute except for Univ_Init and Agt_Init

[形式]

```
RemoteInitialize()
```

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

RemoteName

Defines a remote identification name ※available to execute only Univ_Init

[形式]

```
RemoteName(arg1, arg2)
```

[引数]

引数名	型	説明
arg1	String	remote identification name
arg2	String	synchronization mode (if waiting for interrupting processing for distributed execution, True. If not waiting, False.)

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

RemoteStep

Defines execution of a counterpart specified by a remote identification name ※available to execute except for Univ_Init and Agt_Init

[形式]

RemoteStep(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	remote identification name for counterpart
arg2	String	synchronization mode (if waiting to finish the remote step processing, True. If not waiting, False.)

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

RemoteSyncStep

Implement the step execution in counterpart synchronization mode defined by remote setting. Processing will finish either at all of the defined counterpart execution completed, or at passing the defined time by time out. ※available to execute except for Univ_Init and Agt_Init

[形式]

RemoteSyncStep(arg1)

[引数]

引数名	型	説明
arg1	Integer	time by time out (millisecond)

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

SetRemoteArray

Assigns the value of a remote array variable ※available to execute except for Univ_Init and Agt_Init

[形式]

g2, arg3)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, String	array variable
arg2	String	remote identification name of address to connect
arg3	String	path name of remote array variable

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

SetRemoteValue

Assigns the value of a remote variable ※available to execute except for Univ_Init and Agt_Init

[形式]

SetRemoteValue(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Boolean, Double, Integer, Long, String	value of variable
arg2	String	remote identification name of address to connect
arg3	String	path name of remote array variable

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

TeleportationAgt

Transfers agents to other artisoc model (the agent defined on the space can't transfer) ※available to execute except for Univ_Init and Agt_Init

[形式]

TeleportationAgt(arg1, arg2)

[引数]

引数名	型	説明
arg1	Agt	agent variable
arg2	String	remote identification name of address to connect

[戻り値]

型	説明
Integer	result value (if normal, 0. if error, value except for 0)

WebLock

impossible to update the value of string which hold XML data of return value defined by RegistHtmlPageToXML function

[形式]

WebLock()

WebStart

Starts Web server. If simulation terminates, web server will stop ※available to execute only Univ_Init

[形式]

WebStart(arg1)

[引数]

引数名	型	説明
arg1	Integer	port number

WebUnLock

possible to update the value of string which hold XML data of return value defined by RegistHtmlPageToXML function

[形式]

WebUnLock()

time

名称	説明
GetDayOfWeek	Gets the day of the week from the elapsed time (millisecond) in the Greenwich Mean Time 00:00:00.00 of 1st of January 1970
GetRealTime	Gets the elasped time(millisecond) from the Greenwich Mean Time00:00:00.000 of 1st of January 1970
Sleep	Pauses the execution of the simulation only for the specified time(milliseconds)
StrToTime	e(millisoconds) from the Greenwich Mean Time 00:00:00.000 of 1st of January 1970 in the string showed day and time
TimeToStr	Gets a string representing the year, month, day, hour and second from the elasped time(millisoconds) of the Greeenwich Mean Time 00:00:00.000 of 1st of January 1970

GetDayOfWeek

Gets the day of the week from the elapsed time (millisecond) in the Greenwich Mean Time 00:00:00.00 of 1st of January 1970

[形式]

GetDayOfWeek(arg1)

[引数]

引数名	型	説明
arg1	Long	millisecond from 1st of January 1970

[戻り値]

型	説明
Integer	day of the week (0 means Sunday, 1 means Monday, 2 means Tuesday, 3 means Wednesday, 4 means Thursday, 5 means Friday, 6 means Saturday)

GetRealTime

Gets the elasped time(millisecond) from the Greenwich Mean Time00:00:00.000 of 1st of January 1970

[形式]

GetRealTime()

[戻り値]

型	説明
Long	millisecond from 1st of January 1970

Sleep

Pauses the execution of the simulation only for the specified time(milliseconds)

[形式]

Sleep(arg1)

[引数]

引数名	型	説明

arg1	Long	milliseconds to pause

StrToTime

e(millisoconds) from the Greenwich Mean Time 00:00:00.000 of 1st of January 1970 in the string showed day and time

[形式]

StrToTime(arg1)

[引数]

引数名	型	説明
arg1	String	day and time string (specify in yyyy/MM/dd HH:mm:ss or yyyy/MM/dd)

[戻り値]

型	説明
Long	elasped time from 1st of January 1970(milliseccond)

TimeToStr

Gets a string representing the year, month, day, hour and second from the elasped time(millisoconds) of the Greeenwich Mean Time 00:00:00.000 of 1st of January 1970

[形式]

TimeToStr(arg1, arg2)

[引数]

引数名	型	説明
arg1	Long	millisecond from 1st of January 1970
arg2	String	output format is as follows; (y means year(AD, yyyy), M means month(MM specify), d means day(dd specify), H means time(HH specify), m means minute(mm specify), s means second(ss specify). If single figures, complement the head with 0) ※specify「yyyy/MM/dd HH:mm:ss」,「yMd」and etc.

[戻り値]

型	説明
String	string for year, month, day, hour, minute and second

sound

名称	説明
Beep	Sounds the beep sound
StartSound	Plays the sound file (*.wav、*.mid、*.mp3)
StopSound	Stops to replay the sound file

Beep

Sounds the beep sound

[形式]

Beep()

StartSound

Plays the sound file (*.wav、*.mid、*.mp3)

[形式]

StartSound(arg1)

[引数]

引数名	型	説明
arg1	String	path name of sound file

StopSound

Stops to replay the sound file

[形式]

StopSound()

名称	説明
AddOutputDefinition	add output setting screen
AgtTypeToPath	Gets path name from agent variable
ChangeAgtRule	Changes agent rule
ChangeOutputDefinition	Changes output setting
CreateAgtByString	Creates agent from path name
CreateAgtMulti	create a number of agents
DefineAgtType	Defines agent
DefineSpace	Defines a space
DefineVariable	Defines new variable
SaveModel	Saves a model file
SpaceToPath	Gets path name from the value of space variable
TranscriptValue	Transcribes the value of variable which agent holds on other agent

---

AddOutputDefinition

add output setting screen

[形式]

```
AddOutputDefinition(arg1)
```

[引数]

引数名	型	説明
arg1	String	setting file name of output screen to add

AgtTypeToPath

Gets path name from agent variable

[形式]

```
AgtTypeToPath(arg1)
```

[引数]

引数名	型	説明
arg1	AgtType	agent variable

[戻り値]

型	説明
String	path name

ChangeAgtRule

Changes agent rule

[形式]

ChangeAgtRule(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	path name of agent
arg2	String	file name of agent rule to change

ChangeOutputDefinition

Changes output setting

[形式]

ChangeOutputDefinition(arg1)

[引数]

引数名	型	説明
arg1	String	file name of output setting after change

CreateAgtByString

Creates agent from path name

[形式]

CreateAgtByString(arg1)

[引数]

引数名	型	説明
arg1	String	path name of agent to create

[戻り値]

型	説明
Agt	agent variable

CreateAgtMulti

create a number of agents

[形式]

CreateAgtMulti(arg1, arg2)

[引数]

引数名	型	説明
arg1	AgtType	agent variable
arg2	Integer	agent number to create

[戻り値]

型	説明
AgtSet	created agent set

DefineAgtType

Defines agent

[形式]

DefineAgtType(arg1, arg2, arg3, arg4)

[引数]

引数名	型	説明
arg1	String	path name of additional address
arg2	String	agent name to add
arg3	String	file name of agent variable to add
arg4	String	file name of agent rule to add

DefineSpace

Defines a space

[形式]

DefineSpace(arg1, arg2, arg3, arg4, arg5, arg6, arg7, arg8)

[引数]

引数名	型	説明
arg1	String	path name to additional address
arg2	String	space name to add a space
arg3	String	space class to add a space (if grid model, Squre_2D. if hexagon model, Hexagon_2D)
arg4	Integer	space size X to add
arg5	Integer	space size Y to add
arg6	String	space loop class to add (if looping, Loop. if not looping, !Loop)
arg7	String	original location (necessarily input "North")
arg8	Integer	layer number

DefineVariable

Defines new variable

[形式]

DefineVariable(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	path name to additional address
arg2	String	file name of variable to add

SaveModel

Saves a model file

[形式]

SaveModel(arg1)

[引数]

引数名	型	説明
arg1	String	model file name to save

SpaceToPath

Gets path name from the value of space variable

[形式]

SpaceToPath(arg1)

[引数]

引数名	型	説明
arg1	Space	space variable

[戻り値]

型	説明
String	path name

TranscriptValue

Transcribes the value of variable which agent holds on other agent

[形式]

TranscriptValue(arg1, arg2)

[引数]

引数名	型	説明
arg1	Agt	agent of transcribing address
arg2	Agt	agent of former transcribing

user-defined

名称	説明
Function	user-defined function to return the return value. Used when the value of the result (Return value) is returned during executing the user-defined function.
Sub	user-defined function with no return value. Used when the value of the result is not found during executing the user-defined function.

Function

user-defined function to return the return value. Used when the value of the result (Return value) is returned during executing the user-defined function.

[形式]

```
Function user-defined function name (paraneter declarations) As data type of function return value
{
      statement to declare the type of variable
      statement to execute
      Return(formula)
}
```

Sub

user-defined function with no return value. Used when the value of the result is not found during executing the user-defined function.

[形式]

```
Sub function name (parameter declarations)
{
      statement to declare the type of variable
      statement to execute
}
```

other

名称	説明
ClearConsoleScreen	Clears the consloe screen
ClearDebugScreen	Clears the debug screen ※feasible in debug screen only
EvalPnuts	Calls the function defined in ExecPnuts
EvalScript	execute script string
ExecPnuts	Executes Pnuts script ※available to execute in Univ_Init
ExecScript	Executes script file
ExitSimulation	Exits the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.
ExitSimulationMsg	Outputs the string to message and exits the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.
ExitSimulationMsgLn	Output string to message (with line brake) and exit the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.
GetArraySize	Gets the array size at the specified array variable
GetClickedMapPosition	Returns the X-Y coordinates in the map clicked on the map output screen ※ this function is available to use only when the IsMouseClickedOnMap returns True
GetCountSimulationNumber	Gets the current simulation execution count
GetCountStep	get the current step count
GetIPAddress	Gets the IP address
GetLastErrorMsg	Gets the error occurred during exexcuting
Gradation	Gets the gradation color
IsMouseClickedOnMap	Returns if the mouse click is executed on the map output screen or not
Print	Outputs to the console screen without a linefeed
PrintLn	Outputs to the console screen with a linefeed
RGB	Returns RGB value
ScreenShot	Takes the screenshot of output screen on the foremost side and save it as JPEG formatted file
ScreenShotJPG	Takes the screenshot of specific output screen (Map or Graph) and save it as JPEG formatted file
ScreenShotPNG	Takes the screenshot of specific output screen (Map or Graph) and save it as PNG formatted file
Shell	Executes an executable external program

ClearConsoleScreen

Clears the consloe screen

[形式]

```
ClearConsoleScreen()
```

ClearDebugScreen

Clears the debug screen ※feasible in debug screen only

[形式]

```
ClearDebugScreen()
```

EvalPnuts

Calls the function defined in ExecPnuts

[形式]

```
EvalPnuts(arg1)
```

[引数]

引数名	型	説明
arg1	String	function name defined in ExecPnuts

[戻り値]

型	説明
String	string of result that evaluated a function

EvalScript

execute script string

[形式]

```
EvalScript(arg1, arg2)
```

[引数]

引数名	型	説明
arg1	String	script language name (available to specify「ruby」)
arg2	String	script string

[戻り値]

型	説明
String	string of execute result

ExecPnuts

Executes Pnuts script ※available to execute in Univ_Init

[形式]

```
ExecPnuts(arg1)
```

[引数]

引数名	型	説明
arg1	String	relative path from a model file of a Pnuts script

[戻り値]

型	説明
Integer	error value (if normal, 0. if error, -1)

ExecScript

Executes script file

[形式]

ExecScript(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	script language name (available to specify「ruby」)
arg2	String	relative path from a model file of a script file

ExitSimulation

Exits the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.

[形式]

ExitSimulation()

ExitSimulationMsg

Outputs the string to message and exits the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.

[形式]

ExitSimulationMsg(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long, String	string to output

ExitSimulationMsgLn

Output string to message (with line brake) and exit the simulation. After executing function, Univ_Finish is exexcuted and the simulation is exited.

[形式]

ExitSimulationMsgLn(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long, String	string to output

GetArraySize

Gets the array size at the specified array variable

[形式]

GetArraySize(arg1)

[引数]

引数名	型	説明
arg1	Boolean(), Double(), Integer(), Long(), String(), Agt()	array variable

[戻り値]

型	説明
Integer	size of array variable

GetClickedMapPosition

Returns the X-Y coordinates in the map clicked on the map output screen ※this function is available to use only when the IsMouseClickedOnMap returns True

[形式]

GetClickedMapPosition(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Double	X coordinate
arg2	Double	Y coordinate
arg3	String	map name

GetCountSimulationNumber

Gets the current simulation execution count

[形式]

GetCountSimulationNumber()

[戻り値]

型	説明
Integer	simulation execution count

GetCountStep

get the current step count

[形式]

GetCountStep()

[戻り値]

型	説明
Long	step count

GetIPAddress

Gets the IP address

[形式]

GetIPAddress()

[戻り値]

型	説明
String	IP address

GetLastErrorMsg

Gets the error occurred during exexcuting

[形式]

GetLastErrorMsg()

[戻り値]

型	説明
String	error message

Gradation

Gets the gradation color

[形式]

Gradation(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Integer	starting color
arg2	Integer	ending color
arg3	Double	rate (specify in 0 to 1)

[戻り値]

型	説明
Integer	graation color (if argument is unfair, -1)

IsMouseClickedOnMap

Returns if the mouse click is executed on the map output screen or not

[形式]

IsMouseClickedOnMap()

[戻り値]

型	説明
Boolean	result value (if click mouse, True. if not, False.)

Print

Outputs to the console screen without a linefeed

[形式]

Print(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long, String	string to output

PrintLn

Outputs to the console screen with a linefeed

[形式]

PrintLn(arg1)

[引数]

引数名	型	説明
arg1	Double, Integer, Long, String	string to output

RGB

Returns RGB value

[形式]

RGB(arg1, arg2, arg3)

[引数]

引数名	型	説明
arg1	Integer	R value (0 to 255)
arg2	Integer	G value (0 to 255)
arg3	Integer	B value (0 to 255)

[戻り値]

型	説明
Integer	RGB value (if either R value, G value or B value is invalid value, -1)

ScreenShot

Takes the screenshot of output screen on the foremost side and save it as JPEG formatted file

[形式]

ScreenShot(arg1)

[引数]

引数名	型	説明
arg1	String	path name of JPEG image file

ScreenShotJPG

Takes the screenshot of specific output screen (Map or Graph) and save it as JPEG formatted file

[形式]

tJPG(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	name of Graph or Map
arg2	String	path name of JPEG image file

ScreenShotPNG

Takes the screenshot of specific output screen (Map or Graph) and save it as PNG formatted file

[形式]

ScreenShotPNG(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	name of Graph or Map
arg2	String	path name of PNG image file

Shell

Executes an executable external program

[形式]

Shell(arg1, arg2)

[引数]

引数名	型	説明
arg1	String	path name of the executable external program
arg2	Boolean	executiton mode (if execute in the synchronizatio, True, if execute in the asychronization, False)

reserved words

constant

名称	説明
COLOR_BLACK	describe black
COLOR_BLUE	describe blue
COLOR_CYAN	describe cyan
COLOR_GREEN	describe green
COLOR_MAGENTA	describe magenta
COLOR_RED	describe red
COLOR_WHITE	describe white
COLOR_YELLOW	describe yellow
FILE_APPEND	describe append mode
FILE_READ	describe reading mode
FILE_WRITE	describe overwrite mode
False	describe the false by value of Boolean
True	describe the true by value of Boolean

COLOR_BLACK

describe black

[形式]

COLOR_BLUE

describe blue

[形式]

COLOR_CYAN

describe cyan

[形式]

COLOR_GREEN

describe green

[形式]

COLOR_MAGENTA

describe magenta

[形式]

COLOR_RED

describe red

[形式]

COLOR_WHITE

describe white

[形式]

COLOR_YELLOW

describe yellow

[形式]

FILE_APPEND

describe append mode

[形式]

FILE_READ

describe reading mode

[形式]

FILE_WRITE

describe overwrite mode

[形式]

False

describe the false by value of Boolean

[形式]

True

describe the true by value of Boolean

[形式]

operator

名称	説明
And	and (AND)
Mod	of division of integral(coset) (round down the value after the decimal point)
Not	not(negative)
Or	or(OR)
Xor	either is true(or else)

And

and (AND)

[形式]

```
A And B   (A and B)
```

Mod

of division of integral(coset) (round down the value after the decimal point)

[形式]

```
one = 5 Mod 3   (assign 2 to one)
two = 7 Mod 3   (assign 1 to two)
```

Not

not(negative)

[形式]

Or

or(OR)

[形式]

```
A Or B   (A or B)
```

Xor

either is true(or else)

[形式]

```
A Xor B   (either A or B is true)
```

execution control

名称	説明
Break	use in the interlace statement
Do	use in the Do While statement and Do Until statement
Each	use in the For statement
Else	use in the If statement
ElseIf	use in the If statement
End	use in the If statement
For	use in the For statement
Goto	use in the Goto statement
If	use in the If statement
In	use in the For statement
Loop	use in the Do While statement and Do Until statement
Next	use in the For statement
Step	use in the For statement
Then	use in the If statement
To	use in the For statement
Until	use in the Do Until statement
While	use in the Do While statement

Break

use in the interlace statement

[形式]

Do

use in the Do While statement and Do Until statement

[形式]

Each

use in the For statement

[形式]

Else

use in the If statement

[形式]

ElseIf

use in the If statement

[形式]

End

use in the If statement

[形式]

For

use in the For statement

[形式]

Goto

use in the Goto statement

[形式]

If

use in the If statement

[形式]

In

use in the For statement

[形式]

Loop

use in the Do While statement and Do Until statement

[形式]

Next

use in the For statement

[形式]

Step

use in the For statement

[形式]

Then

use in the If statement

[形式]

To

use in the For statement

[形式]

Until

use in the Do Until statement

[形式]

While

use in the Do While statement

［形式］

identifier declaration and referencing

名称	説明
Agt_Init	the function name to execute only once at the beginning of the simulation
Agt_Step	the function name to repeat and execute in the simulation
As	use to declare
By	※reserve for the future
Dim	use to declare
Univ_Step_Begin	the function name to execute at the beginning of the simulation step
Univ_Step_End	the function name to execute at the beginning to the simulation step
Val	※reserve for the future

Agt_Init

the function name to execute only once at the beginning of the simulation

[形式]

```
Agt_Init{
     the rule to execute only once at the beginning
}
```

Agt_Step

the function name to repeat and execute in the simulation

[形式]

```
Agt_Step{
     the rule to execute every step
}
```

As

use to declare

[形式]

By

※reserve for the future

[形式]

Dim

use to declare

[形式]

Univ_Step_Begin

the function name to execute at the beginning of the simulation step

[形式]

```
Univ_Step_Begin{
    the rule to execute every step at the beginning
}
```

Univ_Step_End

the function name to execute at the beginning to the simulation step

[形式]

```
Univ_Step_End{
    the rule to execute every step at the end
}
```

Val

※reserve for the future

[形式]

other

名称	説明
Static	※reserve for the future
Variant	※reserve for the future

Static

※reserve for the future

[形式]

Variant

※reserve for the future

[形式]