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Tecnomatix Plant Simulation World Wide User Conference 2016

SimTalk 2.0

Moderate enhancements to increase user-friendliness

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 Realize innovation.

Working with Old Models

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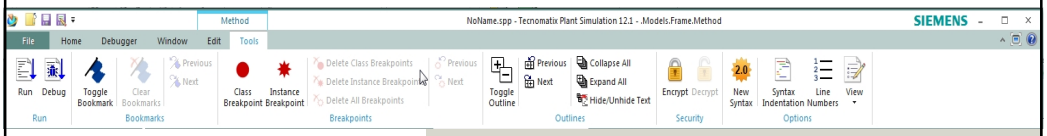

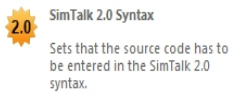

- When you load a model, which you saved in a previous version of Plant Simulation, it will run without changes.
- SimTalk 1.0 Methods and SimTalk 2.0 Methods can be used in the same model in parallel.
- The ribbon button Method > Tools > New Syntax independently sets for each Method if the source code has to be entered in SimTalk 1.0 or SimTalk 2.0 syntax.

Less is More

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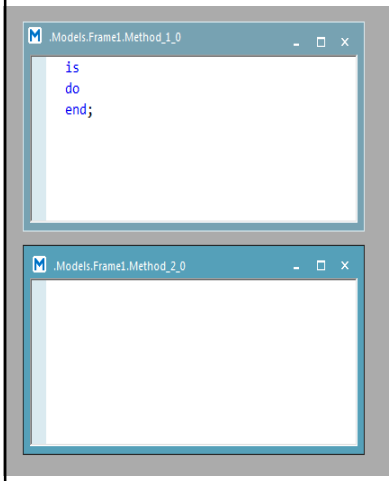

`is do end;` is obsolete in SimTalk 2.0.

A completely empty Method is a correct Method.

Semicolon is not required anymore

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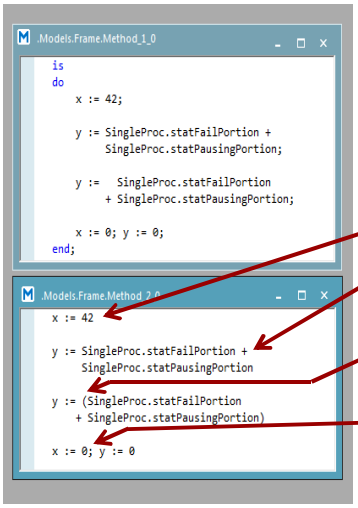

- SimTalk 2.0 does not require a semicolon after a statement
- The line end defines the end of the statement
- If the statement is not yet complete (e.g. `y:=x+`) then it will automatically continue in the next line
- You can use parentheses to force the statement to continue in the next line
- The semicolon separates multiple statements in one line

If-Then-Else

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.Models.Frame1.Method_1_0

```
is
do
    if a = 5 then
        print 5;
    end;
end;
```

.Models.Frame1.Method_2_0

```
if a = 5
    print 5
end
```

The `if`-statement does not require the keyword `then` anymore

- Less source code to write
- `then` is still allowed if you prefer to use it

While-Loop

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.Models.Frame1.Method_1_0

```
is
do
    while a > 5 loop
        a := a - 1;
    end;
end;
```

.Models.Frame1.Method_2_0

```
while a > 5
    a := a - 1
end
```

The `while`-loop does not require the keyword `loop` anymore

- Less source code to write
- `loop` is still allowed if you prefer to use it

For-Loop

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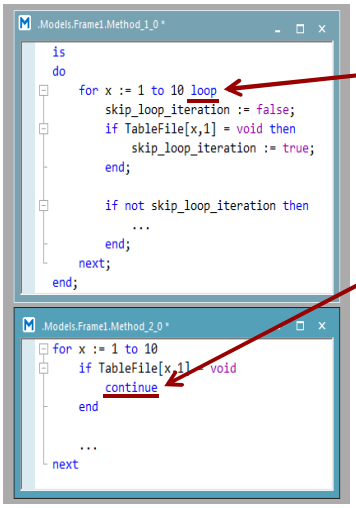

The `for`-loop does not require the keyword `loop` anymore

- Less source code to write
- `loop` is still allowed if you prefer to use it

The `continue`-statement skips the rest of the loop iteration and continues with the next iteration

The `exitloop`-statement (which is available in both SimTalk 1.0 and in SimTalk 2.0) exits the loop

Local Variable Declaration

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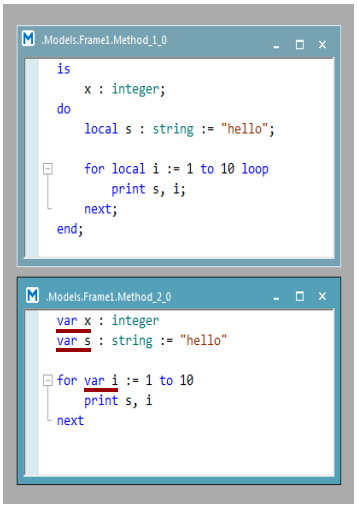

Local variables are declared with the keyword `var`

`var` is shorter than `local` and is used in Java and JavaScript too

Switch-Statement

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.Models.Frame1.Method_1_0

```
is
do
    inspect number
    when 1 then
        print "One";
    when 2, 3, 5, 7 then
        print "Prime number";
    else
        print "No special number";
    end;
end;
```

.Models.Frame1.Method_2_0

```
switch number
case 1
    print "One"
case 2, 3, 5, 7
    print "Prime number"
else
    print "No special number"
end
```

The `inspect`-`when`-statement was replaced by the `switch`-`case`-statement

`switch` is used in C++, Java and JavaScript too

Parameter and Return Value Declaration

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.Models.Frame1.Method_1_0

```
(obj: object;
 x, y: integer) : string
is
do
    obj.XPos := x;
    obj.YPos := y;
    return obj.Name;
end;
```

.Models.Frame1.Method_2_0

```
param obj: object,
      x, y: integer -> string

obj.XPos := x
obj.YPos := y
return obj.Name
```

- `param` declares method parameters
- Different parameter types (here *object* and *integer*) are separated with a comma instead of a semicolon. This reflects the call syntax better, for example `Method_2_0(SingleProc, 10, 20)`
- The return value of a method is now declared with `->` instead of `:`

Default Arguments (1/2)

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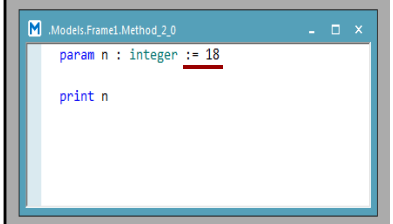

Parameters can be predefined with *default arguments* in the declaration (starting with Plant Simulation 12.2).

- If an argument is passed to the parameter, it will be used in the Method
- If no argument is passed, the *default value* will be used instead

Example:

```
param n: integer := 18

Method_2_0      -- prints 18
Method_2_0(19)  -- prints 19
```


Default Arguments (2/2)

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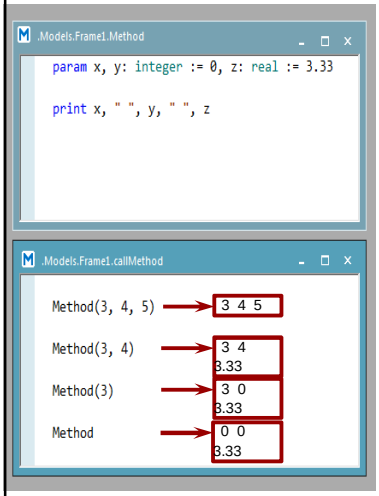

A default argument is allowed for the data types `integer`, `real`, `length`, `speed`, `acceleration`, `weight`, `time`, `boolean`, `string`, `object`, `table`, `list`, `stack` and `queue`.

It is not allowed for the data types `date`, `datetime` and arrays.

For the data types *object*, *table*, *list*, *stack* and *queue*, the only allowed default value is `void`.

A default argument is only allowed for the *n last parameters*. It cannot be used in the middle of a declaration.

```
param x:real, s:string, z:integer:=42
```

O.K.

```
param x:real, s:string:="Hello", z:integer:=42
```

O.K.

Mathematical Operators Modulo and Integer Division

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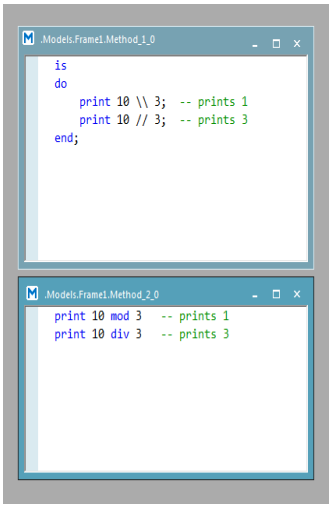

The mathematical operators *modulo* and *integer division* now use the more intuitive keywords `mod` and `div`.

- `\\` was replaced by `mod`
- `//` was replaced by `div`

Easier Change of Values

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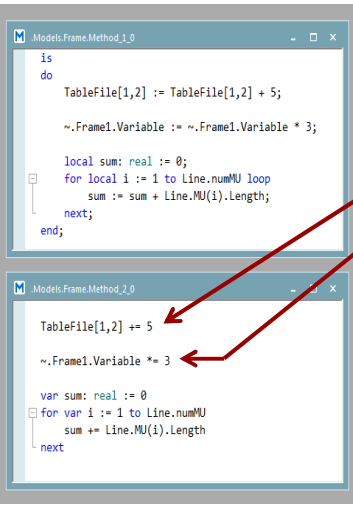

New operators `+=` , `-=` , `*=`

Example:

`i:=i+1 -> i+=1`

The value in the table cell [1,2] can be directly increased by 5

The value of the *global Variable* can be directly multiplied by 3

`x+=y` is short for `x:=x+y`

`x-=y` is short for `x:=x-y`

`x*=y` is short for `x:=x*y` ⚠

`x/=y` is "unequal" as in SimTalk 1.0

More is possible, for example `SingleProc.cont.Length -= 0.5`

The new operators also increase performance.

About-Equal-Operator

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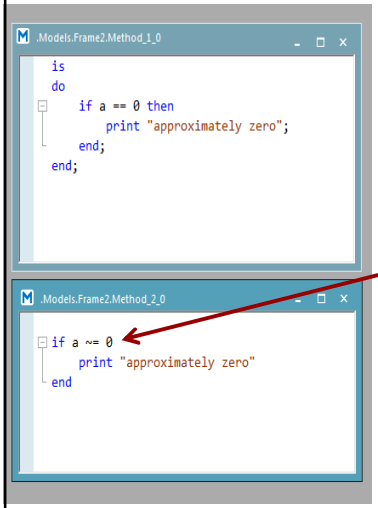

The about-equal-operator has been changed

- Improved readability
- Avoids misinterpretation as C++ or Java syntax

You now have to use:

- For *about equal*: `~=` instead of `==`
- For *less than or about equal*: `<~=` instead of `<==`
- For *greater than or about equal*: `>~=` instead of `>==`

Reading CardFiles

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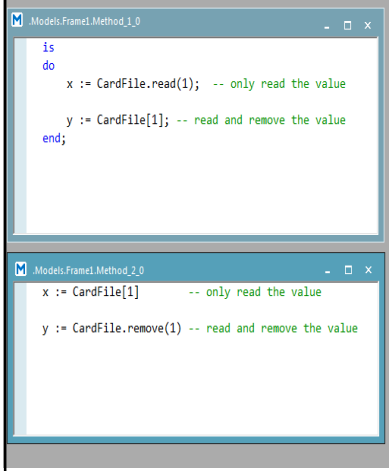


```
x := CardFile[1]
```

Formulas behave differently without warning!

SimTalk 1.0:

When reading the contents of a cell of a *CardFile* or *stack* with the bracket operator, Plant Simulation *reads and removes* the cell.
The remaining cells move up one position.

SimTalk 2.0:

When reading the contents of a cell of a *CardFile* or *stack* with the bracket operator, Plant Simulation *reads the cell and leaves it* in the *CardFile/stack*.

Ref-Operator Replaced By &

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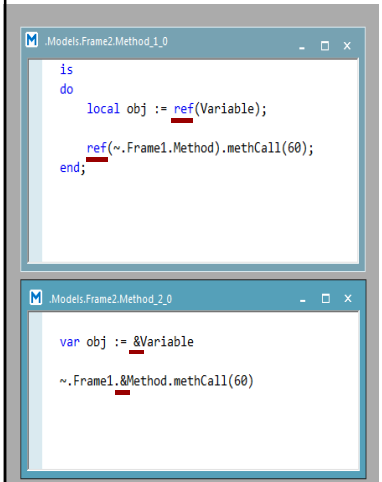

The `ref`-operator is replaced by `&`

- Leads to more readable code
- `ref()` raised questions as it looked like a function
- The parentheses are not needed anymore
- The `&` is positioned where it is expected (right in front of the *Variable/Method*)

`&` prevents the evaluation of a *Variable* or the execution of a *Method*

Dereferencing using Parentheses

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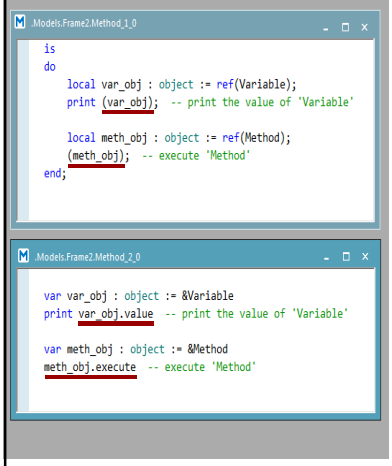


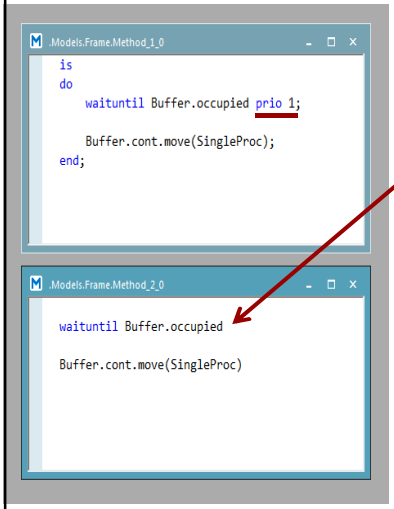
In SimTalk 1.0 parentheses could be used to dereference an object.

This was hard to comprehend.

In SimTalk 2.0 you need to use the built-in method *value* to dereference a *global Variable*, and *execute* to dereference a *Method*.

(This is also possible in SimTalk 1.0)

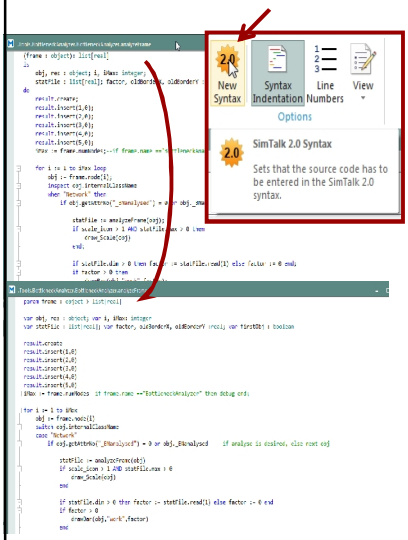
Waituntil/Stopuntil



The priority definition of the *waituntil*-statement and the *stopuntil*-statement is now optional.

If you do not define it explicitly, the priority is 1.

SimTalk 1.0 to 2.0 Converter (1/2)



For a single *Method*:

- Click the New Syntax button
- Press F7 or click the Apply Changes button to apply the converted source code

Bracket operators on *CardFiles* will be detected and automatically handled correctly:

```
CardFile[1] := CardFile[2];
```

will be converted to

```
CardFile.insert(1, CardFile.remove(2))
```

SimTalk 1.0 to 2.0 Converter (2/2)

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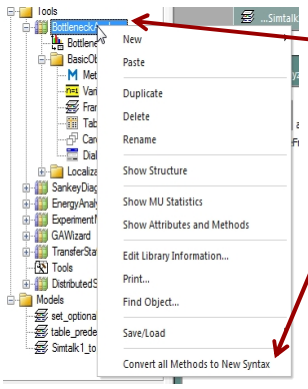

For all *Methods* inside a folder or all *Methods* in the entire model:

- Shift + right mouse click on a *Folder* or the *basis* in the class library
- Select Convert all Methods to New Syntax

When you convert all *Methods* of the model, locked libraries will *not* be converted.

Thank you!

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