

# Package ‘R2WinBUGS’

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**Title** Running WinBUGS and OpenBUGS from R / S-PLUS

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**Description** Using this package, it is possible to call a BUGS model, summarize inferences and convergence in a table and graph, and save the simulations in arrays for easy access in R / S-PLUS. In S-PLUS, the openbugs functionality and the windows emulation functionality is not yet available.

**Depends** R (>= 2.5.0), coda (>= 0.11-0)

**Suggests** BRugs (>= 0.3-2)

**SystemRequirements** WinBUGS 1.4

**URL** <http://www.stat.columbia.edu/~gelman/bugsR/>

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**License** GPL-2

**Dialect** R, S-PLUS

**Repository** CRAN

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## R topics documented:

R2WinBUGS-package	2
as.bugs.array	2
attach.all	4
bugs	5
bugs.log	10
openbugs	11
plot.bugs	13
print.bugs	14
read.bugs	15
schools	15
write.model	16
<b>Index</b>	<b>18</b>

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R2WinBUGS-package *Running WinBUGS and OpenBUGS from R / S-PLUS*

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### Description

**R2WinBUGS** package provides possibility to call a **BUGS** model, summarize inferences and convergence in a table and graph, and save the simulations in arrays for easy access in **R / S-PLUS**. In **S-PLUS**, the **OpenBUGS** functionality and the windows emulation functionality is not yet available. The main command is `bugs`.

### Details

The following are sources of information on **R2WinBUGS** package:

DESCRIPTION file	<code>library(help="R2WinBUGS")</code>
This file	<code>package?R2WinBUGS</code>
Vignette	<code>vignette("R2WinBUGS")</code>
Some help files	<code>bugs</code> <code>write.model</code> <code>print.bugs</code> <code>plot.bugs</code>
News	<code>file.show(system.file("NEWS", package="R2WinBUGS"))</code>

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as.bugs.array *Convert to bugs object*

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## Description

Function converting results from Markov chain simulations, that might not be from BUGS, to bugs object. Used mainly to display results with `plot.bugs`.

## Usage

```
as.bugs.array(sims.array, model.file=NULL, program=NULL,
             DIC=FALSE, DICOutput=NULL, n.iter=NULL, n.burnin=0, n.thin=1)
```

## Arguments

<code>sims.array</code>	3-way array of simulation output, with dimensions <code>n.keep</code> , <code>n.chains</code> , and length of combined parameter vector.
<code>model.file</code>	file containing the model written in <b>WinBUGS</b> code
<code>program</code>	the program used
<code>DIC</code>	logical; whether DIC should be calculated, see also argument <code>DICOutput</code> and details
<code>DICOutput</code>	DIC value
<code>n.iter</code>	number of total iterations per chain used for generating <code>sims.array</code>
<code>n.burnin</code>	length of burn in, i.e. number of iterations to discarded at the beginning for generating <code>sims.array</code>
<code>n.thin</code>	thinning rate, a positive integer, used for generating <code>sims.array</code>

## Details

This function takes a 3-way array of simulations and makes it into a `bugs` object that can be conveniently displayed using `print` and `plot` and accessed using `attach.bugs`. If the third dimension of `sims()` has names, the resulting `bugs` object will respect that naming convention. For example, if the parameter names are “alpha[1]”, “alpha[2]”, ..., “alpha[8]”, “mu”, “tau”, then `as.bugs.array` will know that alpha is a vector of length 8, and mu and tau are scalar parameters. These will all be plotted appropriately by `plot` and attached appropriately by `attach.bugs`. If `DIC=TRUE` then DIC can be either already passed to argument `DICOutput` as it is done in `openbugs` or calculated from deviance values in `sims.array`.

## Value

A `bugs` object is returned

## Author(s)

Jouni Kerman, <kerman@stat.columbia.edu> with modification by Andrew Gelman, <gelman@stat.columbia.edu> packaged by Uwe Ligges, <ligges@statistik.tu-dortmund.de>.

## See Also

`bugs`

---

attach.all	<i>Attach / detach elements of (bugs) objects to search path</i>
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### Description

The database is attached/detached to the search path. See [attach](#) for details.

### Usage

```
attach.all(x, overwrite = NA, name = "attach.all")
attach.bugs(x, overwrite = NA)
detach.all(name = "attach.all")
detach.bugs()
```

### Arguments

x	An object, which must be of class <code>bugs</code> for <code>attach.bugs</code> .
overwrite	If <code>TRUE</code> , objects with identical names in the Workspace ( <code>.GlobalEnv</code> ) that are masking objects in the database to be attached will be deleted. If <code>NA</code> (the default) and an interactive session is running, a dialog box asks the user whether masking objects should be deleted. In non-interactive mode, behaviour is identical to <code>overwrite=FALSE</code> , i.e. nothing will be deleted.
name	The name of the environment where <code>x</code> will be attached / which will be detached.

### Details

While `attach.all` attaches all elements of an object `x` to a database called `name`, `attach.bugs` attaches all elements of `x$sims.list` to the database `bugs.sims` itself making use of `attach.all`.

`detach.all` and `detach.bugs` are removing the databases mentioned above. `attach.all` also attaches `n.sims` (the number of simulations saved from the MCMC runs) to the database.

Each scalar parameter in the model is attached as vectors of length `n.sims`, each vector is attached as a 2-way array (with first dimension equal to `n.sims`), each matrix is attached as a 3-way array, and so forth.

### Value

`attach.all` and `attach.bugs` invisibly return the [environment\(s\)](#).

`detach.all` and `detach.bugs` detach the [environment\(s\)](#) named `name` created by `attach.all`.

**Note**

Without detaching, do not use `attach.all` or `attach.bugs` on another (bugs) object, because instead of the given name, an object called `name` is attached. Therefore strange things may happen ...

**See Also**

[bugs](#), [attach](#), [detach](#)

**Examples**

```
# An example model file is given in:
model.file <- file.path(.path.package("R2WinBUGS"), "model", "schools.txt")
# Some example data (see ?schools for details):
data(schools)
J <- nrow(schools)
y <- schools$estimate
sigma.y <- schools$sd
data <- list ("J", "y", "sigma.y")
inits <- function(){
  list(theta = rnorm(J, 0, 100), mu.theta = rnorm(1, 0, 100),
        sigma.theta = runif(1, 0, 100))
}
parameters <- c("theta", "mu.theta", "sigma.theta")
## Not run:
## You may need to edit "bugs.directory",
## also you need write access in the working directory:
schools.sim <- bugs(data, inits, parameters, model.file,
  n.chains = 3, n.iter = 1000,
  bugs.directory = "c:/Program Files/WinBUGS14/",
  working.directory = NULL)

# Do some inferential summaries
attach.bugs(schools.sim)
# posterior probability that the coaching program in school A
# is better than in school C:
print(mean(theta[,1] > theta[,3]))
# 50
# and school C's program:
print(quantile(theta[,1] - theta[,3], c(.25, .75)))
plot(theta[,1], theta[,3])
detach.bugs()

## End(Not run)
```

## Description

The `bugs` function takes data and starting values as input. It automatically writes a **WinBUGS** script, calls the model, and saves the simulations for easy access in **R** or **S-PLUS**.

## Usage

```
bugs(data, inits, parameters.to.save, model.file="model.bug",
     n.chains=3, n.iter=2000, n.burnin=floor(n.iter/2),
     n.thin=max(1, floor(n.chains * (n.iter - n.burnin) / n.sims)),
     n.sims = 1000, bin=(n.iter - n.burnin) / n.thin,
     debug=FALSE, DIC=TRUE, digits=5, codaPkg=FALSE,
     bugs.directory="c:/Program Files/WinBUGS14/",
     program=c("WinBUGS", "OpenBUGS", "winbugs", "openbugs"),
     working.directory=NULL, clearWD=FALSE,
     useWINE=.Platform$OS.type != "windows", WINE=NULL,
     newWINE=TRUE, WINEPATH=NULL, bugs.seed=NULL, summary.only=FALSE,
     save.history=!summary.only, over.relax = FALSE)
```

## Arguments

<code>data</code>	either a named list (names corresponding to variable names in the <code>model.file</code> ) of the data for the <b>WinBUGS</b> model, <i>or</i> a vector or list of the names of the data objects used by the model. If <code>data</code> is a one element character vector (such as <code>"data.txt"</code> ), it is assumed that data have already been written to the working directory into that file, e.g. by the function <code>bugs.data</code> .
<code>inits</code>	a list with <code>n.chains</code> elements; each element of the list is itself a list of starting values for the <b>WinBUGS</b> model, <i>or</i> a function creating (possibly random) initial values. Alternatively, if <code>inits=NULL</code> , initial values are generated by <b>WinBUGS</b> . If <code>inits</code> is a character vector with <code>n.chains</code> elements, it is assumed that <code>inits</code> have already been written to the working directory into those files, e.g. by the function <code>bugs.inits</code> .
<code>parameters.to.save</code>	character vector of the names of the parameters to save which should be monitored
<code>model.file</code>	file containing the model written in <b>WinBUGS</b> code. The extension can be either <code>‘.bug’</code> or <code>‘.txt’</code> . If the extension is <code>‘.bug’</code> and <code>program=="WinBUGS"</code> , a copy of the file with extension <code>‘.txt’</code> will be created in the <code>bugs()</code> call and removed afterwards. Note that similarly named <code>‘.txt’</code> files will be overwritten. Alternatively, <code>model.file</code> can be an R function that contains a BUGS model that is written to a temporary model file (see <code>tempfile</code> ) using <code>write.model</code> .
<code>n.chains</code>	number of Markov chains (default: 3)
<code>n.iter</code>	number of total iterations per chain (including burn in; default: 2000)
<code>n.burnin</code>	length of burn in, i.e. number of iterations to discard at the beginning. Default is <code>n.iter/2</code> , that is, discarding the first half of the simulations.

<code>n.thin</code>	thinning rate. Must be a positive integer. Set <code>n.thin &gt; 1</code> to save memory and computation time if <code>n.iter</code> is large. Default is $\max(1, \text{floor}(n.chains * (n.iter - n.burnin) / 1000))$ which will only thin if there are at least 2000 simulations.
<code>n.sims</code>	The approximate number of simulations to keep after thinning.
<code>bin</code>	number of iterations between saving of results (i.e. the coda files are saved after each <code>bin</code> iterations); default is to save only at the end.
<code>debug</code>	if <code>FALSE</code> (default), <b>WinBUGS</b> is closed automatically when the script has finished running, otherwise <b>WinBUGS</b> remains open for further investigation
<code>DIC</code>	logical; if <code>TRUE</code> (default), compute deviance, <code>pD</code> , and DIC. This is done in <b>WinBUGS</b> directly using the rule $pD = \bar{D} - \hat{D}$ . If there are less iterations than required for the adaptive phase, the rule $pD = \text{var}(\text{deviance}) / 2$ is used.
<code>digits</code>	number of significant digits used for <b>WinBUGS</b> input, see <code>formatC</code>
<code>codaPkg</code>	logical; if <code>FALSE</code> (default) a <code>bugs</code> object is returned, if <code>TRUE</code> file names of <b>WinBUGS</b> output are returned for easy access by the <code>coda</code> package through function <code>read.bugs</code> (not used if <code>program="OpenBUGS"</code> ). A <code>bugs</code> object can be converted to an <code>mcmc.list</code> object as used by the <code>coda</code> package with the method <code>as.mcmc.list</code> (for which a method is provided by <code>R2WinBUGS</code> ).
<code>bugs.directory</code>	directory that contains the <b>WinBUGS</b> executable. If the global option <code>R2WinBUGS.bugs.directory</code> is not <code>NULL</code> , it will be used as the default.
<code>program</code>	the program to use, either <code>winbugs/WinBUGS</code> or <code>openbugs/OpenBUGS</code> , the latter makes use of function <code>openbugs</code> and requires the CRAN package <b>BRugs</b> . The <code>openbugs/OpenBUGS</code> choice is not available in S-PLUS.
<code>working.directory</code>	sets working directory during execution of this function; <b>WinBUGS</b> ' in- and output will be stored in this directory; if <code>NULL</code> , a temporary working directory via <code>tempdir</code> is used.
<code>clearWD</code>	logical; indicating whether the files <code>'data.txt'</code> , <code>'inits[1:n.chains].txt'</code> , <code>'log.odc'</code> , <code>'codaIndex.txt'</code> , and <code>'coda[1:n.chains].txt'</code> should be removed after <b>WinBUGS</b> has finished. If set to <code>TRUE</code> , this argument is only respected if <code>codaPkg=FALSE</code> .
<code>useWINE</code>	logical; attempt to use the Wine emulator to run <b>WinBUGS</b> , defaults to <code>FALSE</code> on Windows, and <code>TRUE</code> otherwise. Not available in S-PLUS.
<code>WINE</code>	character, path to <code>'wine'</code> binary file, it is tried hard (by a guess and the utilities <code>which</code> and <code>locate</code> ) to get the information automatically if not given.
<code>newWINE</code>	Use new versions of Wine that have <code>'winepath'</code> utility
<code>WINEPATH</code>	character, path to <code>'winepath'</code> binary file, it is tried hard (by a guess and the utilities <code>which</code> and <code>locate</code> ) to get the information automatically if not given.
<code>bugs.seed</code>	random seed for <b>WinBUGS</b> (default is no seed)
<code>summary.only</code>	If <code>TRUE</code> , only a parameter summary for very quick analyses is given, temporary created files are not removed in that case.
<code>save.history</code>	If <code>TRUE</code> (the default), trace plots are generated at the end.
<code>over.relax</code>	If <code>TRUE</code> , over-relaxed form of MCMC is used if available from <b>WinBUGS</b> .

## Details

To run:

1. Write a **BUGS** model in an ASCII file (hint: use `write.model`).
2. Go into R / S-PLUS.
3. Prepare the inputs for the `bugs` function and run it (see Example section).
4. A **WinBUGS** window will pop up and R / S-PLUS will freeze up. The model will now run in **WinBUGS**. It might take awhile. You will see things happening in the Log window within **WinBUGS**. When **WinBUGS** is done, its window will close and R / S-PLUS will work again.
5. If an error message appears, re-run with `debug=TRUE`.

BUGS version support:

- **WinBUGS** 1.4.\*default
- **OpenBUGS** 2.\*via argument `program="OpenBUGS"`

Operation system support:

- **MS Windows**no problem
- **Linux, Mac OS X and Unix** in generalpossible with Wine emulation via `useWINE=TRUE`, but only for **WinBUGS** 1.4.\*

If `useWINE=TRUE` is used, all paths (such as `working.directory` and `model.file`, must be given in native (Unix) style, but `bugs.directory` can be given in Windows path style (e.g. "c:/Program Files/WinBUGS14/") or native (Unix) style (e.g. "/path/to/wine/folder/dosdevices/c:/Program Files/WinBUGS14/"). This is done to achieve greatest portability with default argument value for `bugs.directory`.

## Value

If `codaPkg=TRUE` the returned values are the names of coda output files written by **WinBUGS** containing the Markov Chain Monte Carlo output in the CODA format. This is useful for direct access with `read.bugs`.

If `codaPkg=FALSE`, the following values are returned:

<code>n.chains</code>	see Section 'Arguments'
<code>n.iter</code>	see Section 'Arguments'
<code>n.burnin</code>	see Section 'Arguments'
<code>n.thin</code>	see Section 'Arguments'
<code>n.keep</code>	number of iterations kept per chain (equal to $(n.iter - n.burnin) / n.thin$ )
<code>n.sims</code>	number of posterior simulations (equal to $n.chains * n.keep$ )
<code>sims.array</code>	3-way array of simulation output, with dimensions <code>n.keep</code> , <code>n.chains</code> , and length of combined parameter vector
<code>sims.list</code>	list of simulated parameters: for each scalar parameter, a vector of length <code>n.sims</code> for each vector parameter, a 2-way array of simulations, for each matrix parameter, a 3-way array of simulations, etc. (for convenience, the $n.keep * n.chains$ simulations in <code>sims.matrix</code> and <code>sims.list</code> (but NOT <code>sims.array</code> ) have been randomly permuted)

<code>sims.matrix</code>	matrix of simulation output, with <code>n.chains*n.keep</code> rows and one column for each element of each saved parameter (for convenience, the <code>n.keep*n.chains</code> simulations in <code>sims.matrix</code> and <code>sims.list</code> (but NOT <code>sims.array</code> ) have been randomly permuted)
<code>summary</code>	summary statistics and convergence information for each saved parameter.
<code>mean</code>	a list of the estimated parameter means
<code>sd</code>	a list of the estimated parameter standard deviations
<code>median</code>	a list of the estimated parameter medians
<code>root.short</code>	names of argument parameters <code>.to.save</code> and “deviance”
<code>long.short</code>	indexes; programming stuff
<code>dimension.short</code>	dimension of <code>indexes.short</code>
<code>indexes.short</code>	indexes of <code>root.short</code>
<code>last.values</code>	list of simulations from the most recent iteration; they can be used as starting points if you wish to run <b>WinBUGS</b> for further iterations
<code>pD</code>	an estimate of the effective number of parameters, for calculations see the section “Arguments”.
<code>DIC</code>	<code>mean(deviance) + pD</code>

### Author(s)

Andrew Gelman, <gelman@stat.columbia.edu>, <http://www.stat.columbia.edu/~gelman/bugsR/>; modifications and packaged by Sibylle Sturtz, <sturtz@statistik.tu-dortmund.de>, and Uwe Ligges.

### References

- Gelman, A., Carlin, J.B., Stern, H.S., Rubin, D.B. (2003): *Bayesian Data Analysis*, 2nd edition, CRC Press.
- Sturtz, S., Ligges, U., Gelman, A. (2005): R2WinBUGS: A Package for Running WinBUGS from R. *Journal of Statistical Software* 12(3), 1-16.

### See Also

[print.bugs](#), [plot.bugs](#), as well as **coda** and **BRugs** packages

### Examples

```
# An example model file is given in:
model.file <- system.file(package="R2WinBUGS", "model", "schools.txt")
# Let's take a look:
file.show(model.file)

# Some example data (see ?schools for details):
data(schools)
schools
```



**Value**

A list with components:

stats	A matrix containing summary statistics for each saved parameter. Comparable to the information in the element <code>summary</code> of a bugs object as returned by <a href="#">bugs</a> .
DIC	A matrix containing the DIC statistics as returned from <b>WinBUGS</b> .

**Author(s)**

Jouni Kerman

**See Also**

The main function that generates the log file is [bugs](#).

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openbugs	<i>Wrapper to run OpenBUGS</i>
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---

**Description**

The `openbugs` function takes data and starting values as input. It automatically calls the package **BRugs** and runs something similar to `BRugsFit`. Not available in S-PLUS.

**Usage**

```
openbugs(data, inits, parameters.to.save,
         model.file = "model.txt", n.chains = 3, n.iter = 2000,
         n.burnin = floor(n.iter/2),
         n.thin = max(1, floor(n.chains * (n.iter - n.burnin) / n.sims)),
         n.sims = 1000, DIC = TRUE,
         bugs.directory = "c:/Program Files/OpenBUGS/",
         working.directory = NULL, digits = 5, over.relax = FALSE, seed=NULL)
```

**Arguments**

data	either a named list (names corresponding to variable names in the <code>model.file</code> ) of the data for the <b>OpenBUGS</b> model, <i>or</i> a vector or list of the names of the data objects used by the model. If <code>data</code> is a one element character vector (such as <code>"data.txt"</code> ), it is assumed that data have already been written to the working directory into that file, e.g. by the function <a href="#">bugs.data</a> .
inits	a list with <code>n.chains</code> elements; each element of the list is itself a list of starting values for the <b>OpenBUGS</b> model, <i>or</i> a function creating (possibly random) initial values. Alternatively, if <code>inits</code> are missing or <code>inits = NULL</code> , initial values are generated by <b>OpenBUGS</b> .

<code>parameters.to.save</code>	character vector of the names of the parameters to save which should be monitored
<code>model.file</code>	file containing the model written in <b>OpenBUGS</b> code. The extension can be either <code>.bug</code> or <code>.txt</code> . If <code>.bug</code> , a copy of the file with extension <code>.txt</code> will be created in the <code>bugs()</code> call and removed afterwards. Note that similarly named <code>.txt</code> files will be overwritten.
<code>n.chains</code>	number of Markov chains (default: 3)
<code>n.iter</code>	number of total iterations per chain (including burn in; default: 2000)
<code>n.burnin</code>	length of burn in, i.e. number of iterations to discard at the beginning. Default is <code>n.iter/2</code> , that is, discarding the first half of the simulations.
<code>n.thin</code>	thinning rate. Must be a positive integer. Set <code>n.thin &gt; 1</code> to save memory and computation time if <code>n.iter</code> is large. Default is <code>max(1, floor(n.chains * (n.iter - n.burnin) / 1000))</code> which will only thin if there are at least 2000 simulations.
<code>n.sims</code>	The approximate number of simulations to keep after thinning.
<code>DIC</code>	logical; if TRUE (default), compute deviance, pD, and DIC. This is done in <b>BRugs</b> directly.
<code>digits</code>	number of significant digits used for <b>OpenBUGS</b> input, see <code>formatC</code>
<code>bugs.directory</code>	directory that contains the <b>OpenBUGS</b> executable - currently unused
<code>working.directory</code>	sets working directory during execution of this function; <b>WinBUGS</b> in- and output will be stored in this directory; if NULL, a temporary working directory via <code>tempdir</code> is used.
<code>over.relax</code>	If TRUE, over-relaxed form of MCMC is used if available from OpenBUGS.
<code>seed</code>	random seed (default is no seed)

**Value**

A `bugs` object.

**Note**

By default, `BRugs` (and hence `openbugs()`) is quite verbose. This can be controlled for the whole `BRugs` package by the option `'BRugsVerbose'` (see `options`) which is set to TRUE by default.

**Author(s)**

Andrew Gelman, <gelman@stat.columbia.edu>, <http://www.stat.columbia.edu/~gelman/bugsR/>; modifications and packaged by Sibylle Sturtz, <sturtz@statistik.tu-dortmund.de>, and Uwe Ligges.

**See Also**

`bugs` and the **BRugs** package

**Examples**

```

# An example model file is given in:
model.file <- system.file(package = "R2WinBUGS", "model", "schools.txt")
# Let's take a look:
file.show(model.file)

# Some example data (see ?schools for details):
data(schools)
schools

J <- nrow(schools)
y <- schools$estimate
sigma.y <- schools$sd
data <- list ("J", "y", "sigma.y")
inits <- function(){
  list(theta = rnorm(J, 0, 100), mu.theta = rnorm(1, 0, 100),
        sigma.theta = runif(1, 0, 100))
}
## or alternatively something like:
# inits <- list(
#   list(theta = rnorm(J, 0, 90), mu.theta = rnorm(1, 0, 90),
#         sigma.theta = runif(1, 0, 90)),
#   list(theta = rnorm(J, 0, 100), mu.theta = rnorm(1, 0, 100),
#         sigma.theta = runif(1, 0, 100)),
#   list(theta = rnorm(J, 0, 110), mu.theta = rnorm(1, 0, 110),
#         sigma.theta = runif(1, 0, 110)))

parameters <- c("theta", "mu.theta", "sigma.theta")

## Not run:
## both write access in the working directory and package BRugs required:
schools.sim <- bugs(data, inits, parameters, model.file,
  n.chains = 3, n.iter = 5000,
  program = "openbugs", working.directory = NULL)
print(schools.sim)
plot(schools.sim)

## End(Not run)

```

---

plot.bugs

*Plotting a bugs object*


---

**Description**

Plotting a bugs object

**Usage**

```

## S3 method for class 'bugs':
plot(x, display.parallel = FALSE, ...)

```

**Arguments**

`x` an object of class ‘bugs’, see [bugs](#) for details

`display.parallel` display parallel intervals in both halves of the summary plots; this is a convergence-monitoring tool and is not necessary once you have approximate convergence (default is `FALSE`)

`...` further arguments to [plot](#)

**See Also**

[bugs](#)

---

`print.bugs`

*Printing a bugs object*

---

**Description**

Printing a bugs object

**Usage**

```
## S3 method for class 'bugs':
print(x, digits.summary = 1, ...)
```

**Arguments**

`x` an object of class ‘bugs’, see [bugs](#) for details

`digits.summary` rounding for tabular output on the console (default is to round to 1 decimal place)

`...` further arguments to [print](#)

**See Also**

[bugs](#)

---

read.bugs	<i>Read output files in CODA format</i>
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---

### Description

This function reads Markov Chain Monte Carlo output in the CODA format produced by **WinBUGS** and returns an object of class `mcmc.list` for further output analysis using the **coda** package.

### Usage

```
read.bugs(codafiles, ...)
```

### Arguments

`codafiles` character vector of filenames (e.g. returned from `bugs` in call such as `bugs(..., codaPkg=TRUE, ...)`). Each of the files contains coda output for one chain produced by **WinBUGS**, the *directory* name of the corresponding file ‘`codaIndex.txt`’ is extracted from the first element of `codafiles`.

`...` further arguments to be passed to `read.coda`

### See Also

[bugs](#), [read.coda](#), [mcmc.list](#)

---

<code>schools</code>	<i>8 schools analysis</i>
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---

### Description

8 schools analysis

### Usage

```
data(schools)
```

### Format

A data frame with 8 observations on the following 3 variables.

**school** See Source.

**estimate** See Source.

**sd** See Source.

**Source**

Rubin, D.B. (1981): Estimation in Parallel Randomized Experiments. *Journal of Educational Statistics* 6(4), 377-400.

Section 5.5 of Gelman, A., Carlin, J.B., Stern, H.S., Rubin, D.B. (2003): *Bayesian Data Analysis*, 2nd edition, CRC Press.

---

write.model	<i>Creating a WinBUGS model file</i>
-------------	--------------------------------------

---

**Description**

Convert R / S-PLUS function to a **WinBUGS** model file

**Usage**

```
write.model(model, con = "model.bug", digits = 5)
```

**Arguments**

model	R / S-PLUS function containing the BUGS model in the BUGS model language, for minor differences see Section Details.
con	passed to <code>writeLines</code> which actually writes the model file
digits	number of significant digits used for <b>WinBUGS</b> input, see <code>formatC</code>

**Details**

BUGS models follow closely S syntax. It is therefore possible to write most BUGS models as R functions.

As a difference, BUGS syntax allows truncation specification like this: `dnorm(...)` `I(...)` but this is illegal in R and S-PLUS. To overcome this incompatibility, use dummy operator `%_%` before `I(...)`: `dnorm(...)` `%_%` `I(...)`. The dummy operator `%_%` will be removed before the BUGS code is saved.

In S-PLUS, a warning is generated when the model function is defined if the last statement in the model is an assignment. To avoid this warning, add the line `"invisible()"` to the end of the model definition. This line will be removed before the BUGS code is saved.

**Value**

Nothing, but as a side effect, the model file is written

**Author(s)**

original idea by Jouni Kerman, modified by Uwe Ligges

**See Also**[bugs](#)**Examples**

```
## Same "schoolsmodel" that is used in the examples in ?bugs:
schoolsmodel <- function(){
  for (j in 1:J){
    y[j] ~ dnorm (theta[j], tau.y[j])
    theta[j] ~ dnorm (mu.theta, tau.theta)
    tau.y[j] <- pow(sigma.y[j], -2)
  }
  mu.theta ~ dnorm (0.0, 1.0E-6)
  tau.theta <- pow(sigma.theta, -2)
  sigma.theta ~ dunif (0, 1000)
}

if (is.R()){ # for R
  ## some temporary filename:
  filename <- file.path(tempdir(), "schoolsmodel.bug")
} else{ # for S-PLUS
  ## put the file in the working directory:
  filename <- "schoolsmodel.bug"
}

## write model file:
write.model(schoolsmodel, filename)
## and let's take a look:
file.show(filename)
```

# Index

## \*Topic **IO**

bugs.log, 10  
read.bugs, 14  
write.model, 15

## \*Topic **datasets**

schools, 15

## \*Topic **data**

attach.all, 3

## \*Topic **file**

bugs.log, 10  
read.bugs, 14  
write.model, 15

## \*Topic **hplot**

plot.bugs, 13

## \*Topic **interface**

as.bugs.array, 2  
bugs, 5  
openbugs, 11

## \*Topic **manip**

as.bugs.array, 2

## \*Topic **models**

bugs, 5  
openbugs, 11

## \*Topic **package**

R2WinBUGS-package, 2

## \*Topic **print**

print.bugs, 14

as.bugs.array, 2

as.mcmc.list, 6

attach, 3, 4

attach.all, 3

attach.bugs (*attach.all*), 3

BRugsFit, 11

bugs, 2–4, 5, 10, 12–14, 16

bugs.data, 6, 11

bugs.inits, 6

bugs.log, 10

detach, 4

detach.all (*attach.all*), 3

detach.bugs (*attach.all*), 3

environment, 4

formatC, 6, 12, 15

mcmc.list, 14

openbugs, 3, 7, 11

options, 12

plot, 13

plot.bugs, 2, 9, 13

print, 14

print.bugs, 2, 9, 14

R2WinBUGS (*R2WinBUGS-package*), 2

R2WinBUGS-package, 2

read.bugs, 6, 8, 14

read.coda, 14

schools, 15

tempdir, 7, 12

tempfile, 6

write.model, 2, 6, 7, 15

writeLines, 15