# Package ‘isaeditor’

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**Title**  Tools to Manipulate ISA-Tab Files  
**Version**  0.1.1  
**Description**  ISA-Tab (Investigation/Study/Assay (ISA) tab-delimited (TAB) format) is a general purpose framework for storing complex metadata in omics applications. It is notoriously hard to manipulate due to the fact that it is a graph rather than a tab-delimited data frame. The ‘isaeditor’ package is meant to facilitate reading, writing, displaying, manipulating, modifying and populating ISA-Tab files in R.  
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**R topics documented:**

- isatab-class ............................. 2  
- isa_ID_find ................................ 5  
- isa_nodes .................................. 6  
- isa_node_add ............................. 7  
- isa_properties ........................... 8  
- isa_rows_add ............................. 9  
- node_list .................................. 10
isatab-class

Class for assay and study objects

Description

Class for isatab assay and study objects

Usage

```r
## S3 method for class 'isatab'
dim(x)

## S3 method for class 'isatab'
print(x, ...)

## S3 method for class 'isatab'
as.data.frame(x, ...)

## S3 method for class 'isatab'
as_tibble(x, ...)

## S3 method for class 'isatab'
n_row(x)

## S3 replacement method for class 'isatab'
summary(object, ...)

## S3 replacement method for class 'isatab'
x[node, property = NULL, new = FALSE, n = NA, after_id = NULL] <- value

## S3 method for class 'isatab'
x[node, property = NULL, n = NA]

## S3 replacement method for class 'isatab'
x[[col_id]] <- value

## S3 method for class 'isatab'
x[[col_id]]
```

Arguments

- `x` object of class isatab
- `...` any further arguments are ignored
**Details**

Objects of this class are generated usually by reading a file with `read_isa()`.

Internally, it is a list containing as elements a data frame (tibble) describing the structure of the isatab (`isa_stru`) and a data frame (tibble) containing the actual data.

**Terminology:**

ISA-tab nodes (such as `Source Name`, `Sample Name`, `Protocol REF`, `Extract Name` or `Library Name`) can have properties. Both are represented as columns. In the ISA-tab specification, node designators such as `Sample Name` are called identifiers, although they need not be unique. IDs are internal identifiers of the package `isaeditor`; they are unique to a column. Some functions in `isaeditor` can access ISA-tab columns using node / property combination; some other require the internal ID.

**Accessing columns (nodes and properties) of an isatab:**

Note: IDs are a thing internal to this R package. They are not imported from or exported to actual ISA-tab files. However, given that the node 'identifiers' (e.g. 'Sample Name') can be ambiguous, IDs are necessary to unambiguously identify a node.

There are two ways of accessing a column: by using the `[` function to select a node identifier (e.g. 'Protocol REF') and, optionally, a property identifier (e.g. 'Performer'), or by using the `[[` function to select column IDs. The former has the disadvantage that multiple identical node / property identifier combinations may exist, and it may be necessary to specify which node is meant:

```r
isa_a <- read_isa('a_isatab.txt')
isa_a[ 'Sample Name' ]
isa_a[ 'Protocol REF', 'Performer' ]
# 3rd instance of the combination Protocol REF / Performer
isa_a[ 'Protocol REF', 'Performer', n=3 ]
isa_a[ 'Protocol REF', 'Performer', n=3 ] <- 'Rosalind Franklin'
```

Assigning a NULL value to a selected node is equivalent to removing this node and all its properties.

Assigning a NULL value to a property is equivalent with removing this property.
Using column IDs with the [[ function is not ambiguous, but column IDs are a trick used by the package isaeditor and are not exported or read from an actual ISA-tab. To view the column IDs, simply print the isatab object to the screen or inspect the isa_stru element of the object:

```r
isa_s <- read_isa('s_isatab.txt')
isa_s
isa_s$isa_stru
isa_s[['ID21']]
isa_s[['ID21']] <- 'Rosalind Franklin'
```

Both [] and [[] return a vector if a single column is specified and a data frame if more than one column is selected.

**Creating and removing nodes and properties:**

Nodes and properties can either be created with `isa_node_add()` and `isa_property_add()` or with assigning a value to a new node with <-:

```r
isa_a['Test Node'] <- c(1, 2, 3)
isa_a['Test Node', 'Test Property'] <- 5:7
```

In the above code, first the node Test Node was created and filled with values 1:3, and then the property Test Property was created and filled with 5:7. This can be shortened by assigning a data frame in one step:

```r
isa_a['Test Node', 'Test Property'] <- data.frame(1:3, 5:7)
```

A column ID can be specified to insert the node at a position relative to another node, or the property at a position relative to another property:

```r
isa_a['Test Node', after_id='ID1'] <- 1:3
```

Removing nodes and properties works by assigning `NULL` to either a node (in which case all node properties will be removed as well) or a property:

```r
# remove only one property
isa_a['Test Node', 'Test Property'] <- NULL
# remove node and its properties
isa_a['Test Node'] <- NULL
```

**Value**

An object of isatab-class is a list containing three elements:

- `isa_stru`, a data frame holding the meta-data
- `contents`, a data frame holding the data
- `type`, the type of the isatab component (study, investigation, assay).

**See Also**

`read_isa()` `isa_ID_find()`
isa_ID_find

Find IDs of nodes or properties

Description
Find IDs of nodes or properties fulfilling specified criteria

Usage
isa_ID_find(x, node_pattern = NULL, value_pattern = NULL, prop_pattern = NULL)

Arguments
x object of class isatab
node_pattern return only nodes which match the given pattern
value_pattern return only nodes which match one of the values
prop_pattern return only nodes which match one of the properties

Details
Note: IDs are a thing internal to this R package. They are not imported from or exported to actual ISA-tab files. However, given that the node 'identifiers' (e.g. 'Sample Name') can be ambiguous, IDs are necessary to unambiguously identify a node.

Value
Character vector of IDs

See Also

isatab

Examples
file <- system.file('extdata',
'a_isatab.txt',
package='isaeditor')
isa_a <- read_isa(file)
isa_ID_find(isa_a, node_pattern='.* Name')
isa_a[['ID34']]
isa_nodes

Show nodes in an isatab

Description

Show nodes in an isatab

Usage

isa_nodes(x)

Arguments

x object of class isatab

Details

Note: IDs are a thing internal to this R package. They are not imported from or exported to actual ISA-tab files. However, given that the node 'identifiers' (e.g. 'Sample Name') can be ambiguous, IDs are necessary to unambiguously identify a node.

Value

Returns a data frame (tibble) containing columns with node ID, node identifier (name), number of properties associated with that node and a summary of the values for that node.

See Also

isatab

isatab, isa_properties()

Examples

```r
file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
isa_nodes(isa_s)
```
**isa_node_add**

*Add or remove nodes and properties*

**Description**

Add or remove nodes and properties

**Usage**

```r
isa_node_add(x, node, columns = NULL, after_node = NULL)
isa_node_rm(x, node_id)
isa_property_add(x, property, values = NA, node_id = NULL, after_id = NULL)
isa_property_rm(x, prop_ids = NULL)
```

**Arguments**

- `x` isatab object
- `node` new node identifier (e.g. ’Sample Name’)
- `columns` (optional) character vector with columns to add
- `after_node` ID of the node after which the current node should be inserted
- `node_id` ID of the node in which to add the property (default: last node in the isatab).
- `property` Character vector with identifiers (such as ’Comment[Important]’) of the properties to be inserted
- `values` vector (if only one property is added) or data frame (if multiple properties are added) of values used to initialize the node / parameter. If multiple properties are added with one call (the length of the property vector is greater than one), and values is a data frame, than it has to have sufficient number of columns corresponding to the property vector.
- `after_id` ID of the property after which the parameter should be inserted (default: last property)
- `prop_ids` IDs of the properties to be removed

**Details**

These functions manipulate the structure of an isatab. `isa_node_add` and `isa_node_rm` add or remove whole nodes.

To add or remove properties (individual columns which are not nodes) belonging to a given node, use `isa_property_add` and `isa_property_rm`.

Adding and removing nodes is easier using brackets / subscripts. Read the documentation for `isatab` for details.

Note: IDs are a thing internal to this R package. They are not imported from or exported to actual ISA-tab files. However, given that the node ’identifiers’ (e.g. ’Sample Name’) can be ambiguous, IDs are necessary to unambiguously identify a node.
isa_properties

Value
These functions return an object of isatab-class.

See Also
isatab

Examples
file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
isa_s <- isa_node_add(isa_s, 'Library Name', columns='Comment[Raw File]')
isa_nodes(isa_s)
isa_s <- isa_property_add(isa_s, 'Characteristics[Age]', values=c(75, 38, 43), node_id='ID1')

isa_properties

Show properties associated with a node ID

Description
Show properties associated with a node ID

Usage
isa_properties(x, node_id)

Arguments
x object of class isatab
node_id ID of a node

Details
Note: IDs are a thing internal to this R package. They are not imported from or exported to actual ISA-tab files. However, given that the node 'identifiers' (e.g. 'Sample Name') can be ambiguous, IDs are necessary to unambiguously identify a node.

Value
Returns a named character vector. Names are the IDs of properties associated with a given node, and values are the property names.

See Also
isatab, isa_nodes()
**isa_rows_add**

### Examples

```r
file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
isa_properties(isa_s, 'ID1')
```

---

### Description

Add sample rows to an isatab

### Usage

```r
isa_rows_add(x, n, total = FALSE, replicate = TRUE)
```

### Arguments

- **x**: an isatab object
- **n**: number of rows to add
- **total**: if TRUE, the resulting isatab object will have `n` rows.
- **replicate**: If true (default), the values in the last row of the isatabs will be replicated. Otherwise, empty rows will be added.

### Details

Expand the isatab by adding rows. If `total` parameter is TRUE, the number of rows to be added will be such that the final number of rows is `n`. However, if `n` is smaller than current number of rows, no rows will be removed.

### Value

An object of class isatab with expanded rows

### See Also

`isatab`

### Examples

```r
file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
isa_new <- isa_rows_add(isa_s, 10, total=TRUE)
n_row(isa_new)
```
node_list  

*Lists all the nodes in an isatab object*

**Description**

Lists all the nodes in an isatab object

**Usage**

```r
node_list(x)
node_show(x, node_id)
node_select(x, node_id, inverse = FALSE)
prop_select(x, prop_id, inverse = FALSE)
```

**Arguments**

- `x`  
  object of class isatab
- `node_id`  
  ID of a node to show
- `inverse`  
  if TRUE, inverses the selection
- `prop_id`  
  property IDs to be selected

**Details**

- `node_list` returns a data frame with one row per node, showing the number of properties associated with a given node and a summary of values for that node.
- `node_show` returns a data frame for a given `node_id` listing all properties associated with that node and a summary of values for each of the properties.
- `node_select` returns a new object of class isatab containing only the selected nodes.
- `prop_select` returns a new object of class isatab containing only the selected property IDs (which may not be node IDs!).

**Value**

Functions `node_list` and `node_show` return a data.frame like object. Functions `node_select` and `prop_select` return an object of class isatab.

**Examples**

```r
file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
node_list(isa_s)
```
\texttt{n_row} \quad \textit{Generic replacement for \texttt{nrow}()} \\

\textbf{Description} \\
Generic replacement for \texttt{nrow}() \\

\textbf{Usage} \\
\texttt{n_row(x)} \\

\textbf{Arguments} \\
\begin{itemize} 
  \item \texttt{x} \quad \text{an array-like object} 
\end{itemize} \\

\textbf{Value} \\
an integer of length 1 or \texttt{NULL}. \\

\texttt{read_isa} \quad \textit{Read or write an isatab file} \\

\textbf{Description} \\
Read or write an isatab file \\

\textbf{Usage} \\
\texttt{read_isa(file, type = \textquote{auto})} \\
\texttt{write_isa(x, file)} \\

\textbf{Arguments} \\
\begin{itemize} 
  \item \texttt{file} \quad \text{file name to read / write} 
  \item \texttt{type} \quad \text{Either \textquote{auto}, or \textquote{investigation}, \textquote{study}, \textquote{assay} (can be abbreviated)} 
  \item \texttt{x} \quad \text{isatab object} 
\end{itemize} \\

\textbf{Value} \\
\texttt{read_isa()} returns either an object of class isatab (for study / assay files) or an object of class \texttt{isa_i} (for investigation files). \\

\textbf{See Also} \\
isatab
Examples

```r
file <- system.file('extdata', 'i_Investigation.txt', package='isaeditor')
isa_i <- read_isa(file)
print(isa_i)

file <- system.file('extdata', 's_isatab.txt', package='isaeditor')
isa_s <- read_isa(file)
print(isa_s)
```
Index

[.isatab(isatab-class), 2
[<-.isatab(isatab-class), 2
[[.isatab(isatab-class), 2
[[<-.isatab(isatab-class), 2

as.data.frame.isatab(isatab-class), 2
as_tibble.isatab(isatab-class), 2

dim.isatab(isatab-class), 2

 isa_ID_find, 5
 isa_ID_find(), 4
 isa_node_add, 7
 isa_node_add(), 4
 isa_node_rm(isa_node_add), 7
 isa_nodes, 6
 isa_nodes(), 8
 isa_properties, 8
 isa_properties(), 6
 isa_property_add(isa_node_add), 7
 isa_property_add(), 4
 isa_property_rm(isa_node_add), 7
 isa_rows_add, 9
 isatab, 5-9, 11
 isatab-class, 2

 n_row, 11
 n_row.isatab(isatab-class), 2
 node_list, 10
 node_select(node_list), 10
 node_show(node_list), 10

 print.isatab(isatab-class), 2
 prop_select(node_list), 10

 read.isa, 11
 read.isa(), 3, 4

 summary.isatab(isatab-class), 2

 write.isa(read.isa), 11