

# AutoDoc

**Generate documentation from GAP  
source code**

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## Abstract

AutoDoc is a GAP package whose purpose is to aid GAP package authors in creating and maintaining the documentation of their packages.

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## Acknowledgements

This documentation was prepared using the GAPDoc package [\[LN24\]](#).

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# Chapter 1

## What AutoDoc offers

AutoDoc helps you create and maintain package manuals for GAP. It is built on top of GAPDoc and generates the XML input that GAPDoc consumes. So AutoDoc complements GAPDoc instead of replacing it.

The package is designed for a “mix and match” workflow: you can adopt only the parts that help you today, and add more over time.

### 1.1 Core features

- Build package manuals via one reproducible command, usually `gap makedoc .g`.
- Generate and maintain a title page from metadata in `PackageInfo.g`.
- Generate and maintain a main XML file that includes your chapters.
- Extract manual examples into `.tst` files via `extract_examples := true`.
- Document declarations directly in source files via AutoDoc comments beginning with `# !`.
- Organize chapter and section text either in source comments or in standalone `.autodoc` files.
- Combine AutoDoc comments, classic GAPDoc source comments, and hand-written XML chapters in one manual.

### 1.2 Adopting AutoDoc incrementally

You do not have to switch everything at once. Typical adoption paths include:

- Use only AutoDoc (4.2.1) to rebuild an existing GAPDoc manual.
- Enable only title-page generation, while keeping your custom main XML.
- Keep your existing title page but use generated entities such as `&VERSION;`, `&RELEASEYEAR;`, and `&RELEASEDATE;`.
- Add AutoDoc comments only for new code, and leave old documentation as-is.

- Keep existing XML chapters, or gradually add source comments and `.autodoc` files where they fit your preferred workflow.
- Later, gradually move chapters or source documentation to your preferred style.

This flexibility is central: **AutoDoc** should make your current setup better, without forcing a full rewrite first.

### 1.3 Where to continue

For practical setup and migration workflows, continue with [chapter 2](#). For the command reference of documentation comments, including standalone `.autodoc` files, see [chapter 3](#).

## Chapter 2

# Getting started using AutoDoc

This chapter gives practical workflows for adding AutoDoc to a package. For a high-level feature overview and adoption strategy, see chapter 1.

### 2.1 Choose your workflow

You can use AutoDoc in several ways, and it is fine to combine them:

- Start a new package manual from scratch (Section 2.2).
- Integrate AutoDoc into an existing GAPDoc manual (Section 2.4).
- Use only selected features, such as title-page generation or example extraction, while keeping everything else unchanged.

This incremental approach is encouraged: start with the smallest helpful step, then adopt additional features when useful.

### 2.2 Creating a package manual from scratch

Suppose your package is already up and running, but so far has no manual. Then you can rapidly generate a “scaffold” for a package manual using the AutoDoc (4.2.1) command like this:

```
LoadPackage( "AutoDoc" );  
AutoDoc( rec( scaffold := true ) );
```

When called from a file such as `makedoc.g`, AutoDoc uses the directory containing that file as the package directory. Otherwise, it falls back to the current directory. In either case it then reads the `PackageInfo.g` file from that package directory. It extracts information about the package from it (such as its name and version, see Section 2.5.1). It then creates two XML files `doc/_main.xml` and `doc/title.xml` inside the package directory. Finally, it runs GAPDoc on them to produce a nice initial PDF and HTML version of your fresh manual.

To ensure that the GAP help system picks up your package manual, you should also add something like the following to your `PackageInfo.g`:

```
PackageDoc := rec(
  BookName   := ~.PackageName,
  ArchiveURLSubset := ["doc"],
  HTMLStart  := "doc/chap0.html",
  PDFFile    := "doc/manual.pdf",
  SixFile    := "doc/manual.six",
  LongTitle  := ~.Subtitle,
),
```

Congratulations, your package now has a minimal working manual. Of course it will be mostly empty for now, but it already should contain some useful information, based on the data in your `PackageInfo.g`. This includes your package's name, version and description as well as information about its authors. And if you ever change the package data, (e.g. because your email address changed), just re-run the above command to regenerate the two main XML files with the latest information.

Next of course you need to provide actual content (unfortunately, we were not yet able to automate *that* for you, more research on artificial intelligence is required). To add more content, you have several options: You could add further **GAPDoc** XML files containing extra chapters, sections and so on. Or you could use classic **GAPDoc** source comments. For details on either, please refer to (**GAPDoc: Distributing a Document into Several Files**), as well as Section 2.4 of this manual on how to teach the `AutoDoc` (4.2.1) command to include this extra documentation. Or you could use the special documentation facilities `AutoDoc` provides (see Section 2.3).

You will probably want to re-run the `AutoDoc` (4.2.1) command frequently, e.g. whenever you modified your documentation or your `PackageInfo.g`. To make this more convenient and reproducible, we recommend putting its invocation into a file `makedoc.g` in your package directory, with content based on the following example:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := true ) );
QUIT;
```

Then you can regenerate the package manual from the command line with the following command:

```
gap makedoc.g
```

If you also want regression tests from your manual examples, enable `extract_examples := true`; this is explained in Section 2.4.1.

## 2.3 Documenting code with AutoDoc

`AutoDoc` supports several equally supported ways to organize your manual text. You can put chapter and section material directly into `#!` comments inside `.g`, `.gd`, or `.gi` files, you can put it into standalone `.autodoc` files, and you can mix either style with existing **GAPDoc** XML. Which arrangement is best is mostly a matter of taste and convenience. The detailed command reference for these styles is in chapter 3, especially Section 3.4.

To get one of your global functions, operations, attributes etc. to appear in the package manual, simply insert an **AutoDoc** comment of the form `#!` directly in front of it. For example:

```
#!
DeclareOperation( "ToricVariety", [ IsConvexObject ] );
```

This tiny change is already sufficient to ensure that the operation appears in the manual. In general, you will want to add further information about the operation, such as in the following example:

Important: the comment block must be immediately followed by the declaration it documents. Do not place other code between the comment block and the `Declare...` statement.

```
#! @Arguments conv
#! @Returns a toric variety
#! @Description
#! Creates a toric variety out
#! of the convex object <A>conv</A>.
DeclareOperation( "ToricVariety", [ IsConvexObject ] );
```

In these comment lines, you can freely use normal **GAPDoc** XML markup (with the usual exceptions for lines starting with `@`, which are interpreted as **AutoDoc** commands). So, for instance, tags like `<Ref>`, `<A>`, `<K>`, `<List>`, etc. can be written directly in `#!` comment text.

For chapter text, tutorial material, worked examples, and similar prose, some authors prefer to keep the material next to their code using `#! @Chapter`, `#! @Section`, and related commands, while others prefer standalone `.autodoc` files. In an `.autodoc` file you write the same commands without the `#!` prefix, and you list the file in `autodoc.files` or place it in a directory scanned via `autodoc.scan_dirs`. **AutoDoc** itself still uses the source-comment style in places, for example in `gap/Magic.gd`.

One caveat applies if you decide to keep prose in a standalone `.autodoc` file but want to interrupt it with the documentation of a declaration that is written in source comments. Today that requires the chunk mechanism, and that workflow is currently limited; see issue #60 in the **AutoDoc** issue tracker.

For a thorough description of what you can do with **AutoDoc** documentation comments, please refer to chapter 3.

Suppose you have not been using **GAPDoc** before but instead used the process described in section 2.2 to create your manual. Then the following **GAP** command will regenerate the manual and automatically include all newly documented functions, operations etc.:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( scaffold := true,
             autodoc := true ) );
```

If you are not using the scaffolding feature, e.g. because you already have an existing **GAPDoc** based manual, then you can still use **AutoDoc** documentation comments and standalone `.autodoc` files. Just make sure to first edit the main XML file of your documentation, and insert the line

```
&lt;#Include SYSTEM "_AutoDocMainFile.xml">
```

in a suitable place. This means that you can mix **AutoDoc** documentation comments and `.autodoc` files freely with your existing documentation; you can even still make use of any existing **GAPDoc** documentation comments in your code.



The following command should be useful for you in this case; it still scans the package code for AutoDoc documentation comments and then runs GAPDoc to produce HTML and PDF output, but does not touch your documentation XML files otherwise.

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := true ) );
```

## 2.4 Using AutoDoc in an existing GAPDoc manual

Even if you already have an existing GAPDoc manual, it might be interesting for you to use AutoDoc for two purposes:

First, with AutoDoc it is very convenient to regenerate your documentation.

Secondly, the scaffolding feature which generates a title page with all the metadata of your package in a uniform way is very handy. The somewhat tedious process of keeping your title page in sync with your PackageInfo.g is fully automated this way (including the correct version, release data, author information and so on).

There are various examples of packages using AutoDoc for this purpose only, e.g. io and orb.

In particular, this setup works well if you want to keep your existing manual structure and only adopt selected AutoDoc features first; for example automatic title-page data and predefined entities such as &VERSION;, &RELEASEYEAR; and &RELEASEDATE; (see Section 2.5.4).

### 2.4.1 Using AutoDoc on a complete GAPDoc manual

Suppose you already have a complete XML manual, with some main and title XML files and some documentation for operations distributed over all your .g, .gd, and .gi files. Suppose the main XML file is named PACKAGENAME.xml and is in the /doc subdirectory of your package. Then you can rebuild your manual by executing the following two GAP commands from a GAP session started in the root directory of your package:

```
LoadPackage( "AutoDoc" );
AutoDoc( );
```

Note that in particular, you do not have to worry about keeping a list of your implementation files up-to-date.

But there is more. AutoDoc can create .tst files from the examples in your manual to test your package. This can be achieved via

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( extract_examples := true ) );
```

Now files PACKAGENAME01.tst, PACKAGENAME02.tst and so appear in the tst/ subdirectory of your package, and can be tested as usual using Test (**Reference: Test**) respectively TestDirectory (**Reference: TestDirectory**).

If you prefer to keep generated tests in a separate location, set extract\_examples.subdir to a path relative to the package root:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( extract_examples := rec( subdir := "tst/generated" ) ) );
```

This writes the extracted examples into `tst/generated/` instead.

### 2.4.2 Setting different GAPDoc options

Sometimes, the default values for the **GAPDoc** command used by **AutoDoc** may not be suitable for your manual.

Suppose your main XML file is *not* named `PACKAGENAME.xml`, but rather something else, e.g. `main.xml`. Then you can tell **AutoDoc** to use this file as the main XML file via

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( gapdoc := rec( main := "main" ) ) );
```

**AutoDoc** can scan directories for documentation input automatically. In fact there are two separate scanning steps. The option `autodoc.scan_dirs` controls where it looks for source comments beginning with `#!` and for standalone `.autodoc` files. By default, it scans the package root directory and the subdirectories `gap`, `lib`, `examples` and `examples/doc`; the listed subdirectories are scanned recursively, while the package root itself is only scanned at top level. If you keep that kind of input in other directories, adjust `autodoc.scan_dirs`. The following example instructs **AutoDoc** to only search in the subdirectory `package_sources` of the package's root directory for those files.

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := rec( scan_dirs := [ "package_sources" ] ) ) );
```

The separate option `gapdoc.scan_dirs` serves a different purpose: it controls where **GAPDoc** comments are searched for.

You can also specify an explicit list of files containing documentation, which will be searched in addition to any files located within the scan directories:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := rec( files := [ "path/to/some/hidden/file.gd" ] ) ) );
```

Giving such a file does not prevent the standard `scan_dirs` from being scanned for other files.

Next, **GAPDoc** supports the documentation to be built with relative paths. This means, links to manuals of other packages or the **GAP** library will not be absolute, but relative from your documentation. This can be particularly useful if you want to build a release tarball or move your **GAP** installation around later. Suppose you are starting **GAP** in the root path of your package as always, and the standard call of **AutoDoc** (4.2.1) will then build the documentation in the `doc` subdirectory of your package. From this directory, the gap root directory has the relative path `../../..`. Then you can enable the relative paths by

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( gapdoc := rec( gap_root_relative_path := "../../.." ) ) );
```

or, since `../../..` is the standard option for `gap_root_relative_path`, by

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( gapdoc := rec( gap_root_relative_path := true ) ) );
```

The same behavior is also available via the global option `relativePath`. This is particularly convenient in a short `makedoc.g` script, and it overrides `gapdoc.gap_root_relative_path` if both are given. Since this is a GAP global option, you can also set it outside the eventual `AutoDoc` (4.2.1) call and let it propagate through nested calls; see (**Reference: Options Stack**) for more information about GAP's global options system:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := true ) : relativePath := ".././.." );
```

If you pass `relativePath := true`, then `AutoDoc` uses the default relative path `.././..`.

For example, if your `makedoc.g` reads the manual via `AutoDoc` (4.2.1), then the following command sets both `relativePath` and `nopdf` to `true` for that nested call:

```
Read( "makedoc.g" : nopdf, relativePath );
```

Finally, if you only want HTML and text output, you can suppress PDF generation with the global option `nopdf`:

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( autodoc := true ) : nopdf );
```

This is useful if `pdflatex` is unavailable, or when you want a faster documentation rebuild while editing.

You can also request the same behavior from the shell by setting the environment variable `NOPDF` before invoking `makedoc.g`. For example:

```
NOPDF=1 gap makedoc.g
```

If `NOPDF` is set, `AutoDoc` skips PDF generation even if no `nopdf` option is given in the GAP code.

### 2.4.3 Checklist for converting an existing GAPDoc manual to use AutoDoc

Here is a checklist for authors of a package `PackageName`, *which already has a GAPDoc based manual*, who wish to use `AutoDoc` to build the manual from now on. We assume that the manual is currently built by reading a file `makedoc.g` and that the main `.xml` file is named `manual.xml`.

The files `PackageInfo.g`, `makedoc.g`, `doc/title.xml` and `doc/_main.xml` (if it exists) will be altered by this procedure, so it may be wise to keep backup copies.

You should have copies of the `AutoDoc` files `PackageInfo.g` and `makedoc.g` to hand when reading these instructions.

- Copy `AutoDoc/makedoc.g` to `PackageName/makedoc.g`.
- Edit `PackageName/makedoc.g` as follows.
  - Change the header comment to match other files in your package.
  - After `LoadPackage("AutoDoc");` add `LoadPackage("PackageName");`.
  - In the `AutoDoc` record delete `autodoc := true;`.

- In the `scaffold` record change the `includes` list to be the list of your `.xml` files that are contained in `manual.xml`.
- If you do not have a bibliography you may delete the `bib := "bib.xml"`, field in the `scaffold`. Otherwise, edit the file name if you have a different file. If you only have a `.bib` file (`manual.bib` or `bib.xml.bib` say) you should rename this file `PackageName.bib`.
- In the `LaTeXOptions` record, which is in the `gapdoc` record, enter any  $\text{\LaTeX}$  newcommands previously in `manual.xml`. (If there are none you may safely delete this record.) To illustrate this option, the `AutoDoc` file `makedoc.g` defines the command `\bbZ` by `\newcommand{\bbZ}{\mathbb{Z}}`, which may be used to produce the  $\text{\LaTeX}$  formula  $f: \mathbb{Z}^2 \rightarrow \mathbb{Z}$ . However, note that this only works in the PDF version of the file.
- Now edit `PackageName/PackageInfo.g` as follows.
  - Delete any `PKGVERSIONDATA` chunk that may be there. One reason for converting your manual to use `AutoDoc` is to stop using entities such as `PACKAGENAMEVERSION`.
  - Copy the `AutoDoc` record from `AutoDoc/PackageInfo.g` to the end of your file (just before the final `")) ; "`).
  - Replace the `Copyright`, `Abstract` and `Acknowledgements` fields of the `TitlePage` record with the corresponding material from your `manual.xml`. (If you do not have an abstract, then delete the `Abstract` field, etc.)
  - In the `entities` record enter any entities previously stored in your `manual.xml`. (Again, if you have none, you may safely delete this record.) To illustrate this option the `AutoDoc` file `PackageInfo.g` defines entities for the names of packages `io` and `PackageName`.
- If you are using a GitHub repository, as well as running `"git add"` on files `makedoc.g`, `PackageInfo.g` and `doc/PackageName.bib`, you should run `"git rm -f"` on files `doc/manual.xml`, and `doc/title.xml`.

You should now be ready to run `GAP` and `Read("makedoc.g")`; in your package root directory.

## 2.5 Scaffolds

### 2.5.1 Generating a title page

For most (if not all) `GAP` packages, the title page of the package manual lists information such as the release date, version, names and contact details of the authors, and so on.

All this data is also contained in your `PackageInfo.g`, and whenever you make a change to that file, there is a risk that you forget to update your manual to match. And even if you don't forget it, you of course have to spend some time to adjust the manual. `GAPDoc` can help to a degree with this via entities. Thus, you will sometimes see code like this in `PackageInfo.g` files:

```
Version      := "1.2.3",
Date         := "20/01/2015",
## <#GAPDoc Label="PKGVERSIONDATA">
## <!ENTITY VERSION "1.2.3">
## <!ENTITY RELEASEDATE "20 January 2015">
## <!ENTITY RELEASEYEAR "2015">
## <#/GAPDoc>
```

However, it is still easy to forget both of these versions. And it doesn't solve the problem of updating package authors addresses. Neither of these is a big issue, of course, but there have been plenty examples in the past where people forget either of these two things, and it can be slightly embarrassing. It may even require you to make a new release just to fix the issue, which in our opinion is a sad waste of your valuable time.

So instead of worrying about manually synchronising these things, you can instruct **AutoDoc** to generate a title page for your manual based on the information in your `PackageInfo.g`. The following commands do just that (in addition to building your manual), by generating a file called `doc/title.xml`.

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( scaffold := rec( MainPage := false ) ) );
```

Note that this only outputs `doc/title.xml` but does not touch any other files of your documentation. In particular, you need to explicitly include `doc/title.xml` from your main XML file.

However, you can also tell **AutoDoc** to maintain the main XML file for you, in which case this is automatic. In fact, this is the default if you enable scaffolding; the above example command explicitly told **AutoDoc** not to generate a main page.

### 2.5.2 Generating the main XML file

The following generates a main XML file for your documentation in addition to the title page. The main XML file includes the title page by default, as well as any documentation generated from **AutoDoc** documentation comments.

```
LoadPackage( "AutoDoc" );
AutoDoc( rec( scaffold := true ) );
```

You can instruct **AutoDoc** to include additional XML files by giving it a list of filenames, as in the following example:

```
LoadPackage( "AutoDoc" );
AutoDoc(rec(
  scaffold := rec(
    includes := [ "somefile.xml", "anotherfile.xml" ]
  )
));
```

For more information, please consult the documentation of the `AutoDoc` ([4.2.1](#)) function.

### 2.5.3 What data is used from `PackageInfo.g`?

**AutoDoc** can use data from `PackageInfo.g` in order to generate a title page. Specifically, the following components of the package info record are taken into account:

#### **PackageName**

This is used to set the `<Title>` element of the title page.

#### **Subtitle**

This is used to set the `<Subtitle>` element of the title page.

**Version**

This is used to set the `<Version>` element of the title page, with the string “Version ” prepended.

**Date** This is used to set the `<Date>` element of the title page.

**Persons**

This is used to generate `<Author>` elements in the generated title page.

**PackageDoc**

This is a record (or a list of records) which is used to tell the GAP help system about the package manual. Currently AutoDoc extracts the value of the `PackageDoc.BookName` component and then passes that on to GAPDoc when creating the HTML, PDF and text versions of the manual.

**AutoDoc**

This record controls extra settings used by AutoDoc while generating the manual. In particular, `PkgInfo.AutoDoc.TitlePage` lets you add or override title-page elements coming from package metadata.

Typical fields you may set there include `TitleComment`, `Abstract`, `Copyright`, `Acknowledgements` and `Colophon`. For example, in `PackageInfo.g`:

```
SetPackageInfo( rec(
  ...
  AutoDoc := rec(
    TitlePage := rec(
      Copyright := "(C) 2026 Jane Doe",
      Acknowledgements := "Funded by Example Grant 1234."
    )
  )
) );
```

This inserts `<Copyright>` and `<Acknowledgements>` blocks into the generated `title.xml`.

`PkgInfo.AutoDoc.TitlePage` has exactly the same meaning as `scaffold.TitlePage` in AutoDoc (4.2.1). The function documentation for `scaffold.TitlePage` points back to this subsection.

**2.5.4 Entities from PackageInfo.g and scaffold options**

Besides title-page fields, you can define custom entities in `AutoDoc.entities` inside `PackageInfo.g`. They are written to `doc/_entities.xml`, so they can be used both by generated main files and by hand-written main XML files.

In addition, AutoDoc predefines the entities `VERSION`, `RELEASEYEAR` and `RELEASEDATE`, derived from package metadata. This is useful if you keep a custom title page or custom chapters and still want release information to stay synchronized with `PackageInfo.g`.

You can specify scaffold-related settings in `PackageInfo.g` and in your `makedoc.g` call at the same time; both records are merged, and values from `makedoc.g` take precedence when both define the same key.

## 2.6 Worksheets

For stand-alone documents that are not tied to a package, use `AutoDocWorksheet` ([4.1.1](#)). Its documentation and examples are in Section [4.1](#) of chapter [4.2.1](#).

## Chapter 3

# AutoDoc documentation comments

You can document declarations of global functions and variables, operations, attributes etc. by inserting *AutoDoc* comments into your sources before these declarations. An *AutoDoc* comment always starts with `#!`. This is also the smallest possible *AutoDoc* command. If you want your declaration documented, just write `#!` at the line before the documentation. For example:

```
#!  
DeclareOperation( "AnOperation",  
                 [ IsList ] );
```

This will produce a manual entry for the operation `AnOperation`.

For declaration documentation, the associated declaration must appear immediately after the *AutoDoc* comment block. In particular, do not insert other code (such as `if false then` or assignments) between the comment block and the `Declare...` statement.

This also works for `InstallMethod` and `InstallOtherMethod`. In that case, *AutoDoc* uses the installed method's name and filter list to create a manual entry for the implemented item.

Inside of *AutoDoc* comments, *AutoDoc commands* starting with `@` can be used to control the output *AutoDoc* produces. Any comment line that does *not* start with an *AutoDoc* command is treated as regular documentation text and may contain (almost) arbitrary *GAPDoc* XML markup, such as `<Ref>`, `<A>`, `<List>`, and similar tags. This lets you use the normal *GAPDoc* formatting toolbox directly inside *AutoDoc* comments.

For example:

```
#! @Description  
#! See <Ref Chap="Chapter_Tutorials"/> for setup details.  
#! The argument <A>obj</A> must satisfy <K>IsObject</K>.
```

As explained in chapter 1, you can combine *AutoDoc* comments with hand-written XML and classic *GAPDoc* comments. For practical setup and migration workflows, see chapter 2.

### 3.1 Documenting declarations

In the bare form above, the manual entry for `AnOperation` will not contain much more than the name of the operation. In order to change this, there are several commands you can put into the *AutoDoc* comment before the declaration. Currently, the following commands are provided:



### 3.1.1 @Description *descr*

Adds the text in the following lines of the **AutoDoc** to the description of the declaration in the manual. Lines are until the next **AutoDoc** command or until the declaration is reached.

### 3.1.2 @Returns *ret val*

The string *ret\_val* is added to the documentation, with the text “Returns: ” put in front of it. This should usually give a brief hint about the type or meaning of the value returned by the documented function.

### 3.1.3 @Arguments *args*

The string *args* contains a description of the arguments the function expects, including optional parts, which are denoted by square brackets. The argument names can be separated by whitespace, commas or square brackets for the optional arguments, like “grp[, elm]” or “xx[y[z] ]”. If **GAP** options are used, this can be followed by a colon : and one or more assignments, like “n[, r]: tries := 100”.

For `DeclareGlobalName`, using `@Arguments` or `@Returns` also makes **AutoDoc** document the item as a function. This is useful because `DeclareGlobalName` itself does not reveal whether the name denotes a function or a variable.

### 3.1.4 @ItemType *kind*

Overrides the kind of manual item created for the following declaration or installed method. The supported values are `Attr`, `Cat`, `Coll`, `Constr`, `Fam`, `Filt`, `Func`, `InfoClass`, `Meth`, `Oper`, `Prop`, `Repr`, and `Var`.

The values `Cat`, `Coll`, and `Repr` are **AutoDoc**-specific aliases. They emit `Filt` entries with the corresponding **GAPDoc** filter type.

This is useful when the source code alone does not determine which manual item kind should be emitted. For many declarations such as `DeclareAttribute` or `DeclareProperty`, **AutoDoc** already knows the intended type from the declaration itself.

It is useful for `DeclareGlobalName`, because that declaration can refer to either a function or a variable. **AutoDoc** defaults such entries to `Var`, but switches to `Func` as soon as `@Arguments` or `@Returns` indicates function-style documentation. You can still use `@ItemType` to override this explicitly.

It is useful for `DeclareSynonym`, because that declaration can document a function synonym or one of several filter-like synonyms. Use `@ItemType Filt`, `Cat`, `Coll`, or `Repr` to control which kind of filter entry should be emitted.

For example:

```
#! @ItemType Repr
DeclareSynonym( "IsSomethingRep", IsComponentObjectRep );
```

This makes **AutoDoc** emit a `<Filt Type="Representation" .../>` manual entry.

### 3.1.5 @Group *grpname*

Adds the following method to a group with the given name. See section 3.5 for more information about groups.

### 3.1.6 @Label *label*

Adds label to the function as label.

If this is not specified, then for declarations that involve a list of input filters (as is the case for `DeclareOperation`, `DeclareAttribute`, etc.), a default label is generated from this filter list.

```
#! @Label testlabel
DeclareProperty( "AProperty",
                IsObject );
```

leads to this:

```
<ManSection>
  <Prop Arg="arg" Name="AProperty" Label="testlabel"/>
  <Returns> <K>true</K> or <K>>false</K>
</Returns>
  <Description>
  </Description>
</ManSection>
```

while

```
#!
DeclareProperty( "AProperty",
                IsObject );
```

leads to this:

```
<ManSection>
  <Prop Arg="arg" Name="AProperty" Label="for IsObject"/>
  <Returns> <K>true</K> or <K>>false</K>
</Returns>
  <Description>
  </Description>
</ManSection>
```

### 3.1.7 @ChapterInfo *chapter, section*

Adds the entry to the given chapter and section. Here, *chapter* and *section* are the respective titles. As an example, a full `AutoDoc` comment with all options could look like this:

```
#! @Description
#! Computes the list of lists of degrees of ordinary characters
#! associated to the $p$-blocks of the group $G$
#! with $p$-modular character table <A>modtbl</A>
#! and underlying ordinary character table 'ordtbl'.
#! @Returns a list
#! @Arguments modtbl
#! @Group CharacterDegreesOfBlocks
#! @Label chardegblocks
#! @ChapterInfo Blocks, Attributes
DeclareAttribute( "CharacterDegreesOfBlocks",
                IsBrauerTable );
```

## 3.2 Other documentation comments

There are also some commands which can be used in **AutoDoc** comments that are not associated to any declaration. This is useful for additional text in your documentation, examples, mathematical chapters, etc.

### 3.2.1 @Chapter *name*

Sets the active chapter, all subsequent functions which do not have an explicit chapter declared in their **AutoDoc** comment via `@ChapterInfo` will be added to this chapter. Also all text comments, i.e. lines that begin with `#!` without a command, and which do not follow after `@Description`, will be added to the chapter as regular text. Additionally, the chapters label will be set to `Chapter_name`.

Example:

```
#! @Chapter My chapter
#! This is my chapter.
#! I document my stuff in it.
```

The `@ChapterLabel label` command can be used to set the label of the chapter to `Chapter_label` instead of `Chapter_name`.

Additionally, the chapter will be stored as `_Chapter_label.xml`.

The `@ChapterTitle title` command can be used to set a heading for the chapter that is different from *name*. Note that the title does not affect the label.

If you use all three commands, i.e.,

```
#! @Chapter name
#! @ChapterLabel label
#! @ChapterTitle title
```

*title* is used for the headline, *label* for cross-referencing, and *name* for setting the same chapter as active chapter again.

### 3.2.2 @Appendix *name*

This is analogous to `@Chapter`, but generates **Appendix** elements instead of **Chapter** elements. When scaffolding generates the main XML file, appendices created this way are included automatically after any files listed in `scaffold.appendix`.

Example:

```
@Appendix Supplementary material

@Section Additional tables
```

### 3.2.3 @Section *name*

Sets an active section like `@Chapter` sets an active chapter. The section automatically ends with the next `@Section` or `@Chapter` command.

```

#! @Section My first manual section
#! In this section I am going to document my first method.

```

The `@SectionLabel label` command can be used to set the label of the section to `Section_label` instead of `Chapter_chaptername_Section_name`.

The `@SectionTitle title` command can be used to set a heading for the section that is different from `name`.

### 3.2.4 @Subsection name

Sets an active subsection like `@Section` sets an active section. The subsection automatically ends with the next `@Subsection`, `@Section` or `@Chapter` command. It also ends with the next documented function. Indeed, internally each function “manpage” is treated like a subsection.

```

#! @Subsection My first manual subsection
#! In this subsection I am going to document my first example.

```

The `@SubsectionLabel label` command can be used to set the label of the subsection to `Subsection_label` instead of `Chapter_chaptername_Section_sectionname_Subsection_name`.

The `@SubsectionTitle title` command can be used to set a heading for the subsection that is different from `name`.

### 3.2.5 @BeginGroup [grpname]

Starts a group. All following documented declarations without an explicit `@Group` command are grouped together in the same group with the given name. If no name is given, then a new nameless group is generated. The effect of this command is ended when an `@EndGroup` command is reached.

See section 3.5 for more information about groups.

### 3.2.6 @EndGroup

Ends the current group.

```

#! @BeginGroup MyGroup
#!
DeclareAttribute( "GroupedAttribute",
                  IsList );

DeclareOperation( "NonGroupedOperation",
                  [ IsObject ] );

#!
DeclareOperation( "GroupedOperation",
                  [ IsList, IsRubbish ] );

#! @EndGroup

```

### 3.2.7 @GroupTitle *title*

Sets the subsection heading for the current group to *title*. In the absence of any @GroupTitle command, the heading will be the name of the first entry in the group. See 3.5 for more information.

### 3.2.8 @BeginExample and @EndExample

@BeginExample marks the start of an example to be put into the manual. It differs from GAPDoc's <Example> (see (GAPDoc: Log)), in that it expects actual code (not in a comment) interspersed with comments, to allow for examples files that can be both executed by GAP, and parsed by AutoDoc. To achieve this, GAP commands are not preceded by a comment, while output has to be preceded by an AutoDoc comment. The gap> prompt for the display in the manual is added by AutoDoc. @EndExample ends the example block.

To illustrate this command, consider this input:

```
#! @BeginExample
S5 := SymmetricGroup(5);
#! Sym( [ 1 .. 5 ] )
Order(S5);
#! 120
#! @EndExample
```

This results in the following output:

```
Example
gap> S5 := SymmetricGroup(5);
Sym( [ 1 .. 5 ] )
gap> Order(S5);
120
```

The AutoDoc command @Example is an alias of @BeginExample. If you enable `extract_examples := true` when calling AutoDoc (4.2.1), these examples can also be turned into .tst files (see Section 2.4.1).

### 3.2.9 @BeginExampleSession and @EndExampleSession

@BeginExampleSession marks the start of an example to be put into the manual, while @EndExampleSession ends the example block. It is the direct analog of GAPDoc's <Example> (see (GAPDoc: Log)).

To illustrate this command, consider this input:

```
#! @BeginExampleSession
#! gap> S5 := SymmetricGroup(5);
#! Sym( [ 1 .. 5 ] )
#! gap> Order(S5);
#! 120
#! @EndExampleSession
```

This results in the following output:

## Example

```
gap> S5 := SymmetricGroup(5);
Sym( [ 1 .. 5 ] )
gap> Order(S5);
120
```

It inserts an example into the manual just as `@Example` would do, but all lines are commented and therefore not executed when the file is read. All lines that should be part of the example displayed in the manual have to start with an `AutoDoc` comment (`#!`). The comment will be removed, and, if the following character is a space, this space will also be removed. There is never more than one space removed. To ensure examples are correctly colored in the manual, there should be exactly one space between `#!` and the `gap>` prompt. The `AutoDoc` command `@ExampleSession` is an alias of `@BeginExampleSession`.

### 3.2.10 `@BeginLog` and `@EndLog`

Works just like the `@BeginExample` command, but the example will not be tested. See the `GAPDoc` manual for more information. The `AutoDoc` command `@Log` is an alias of `@BeginLog`.

### 3.2.11 `@BeginLogSession` and `@EndLogSession`

Works just like the `@BeginExampleSession` command, but the example will not be tested if manual examples are run. It is the direct analog of `GAPDoc`'s `<Log>` (see (**GAPDoc: Log**)). The `AutoDoc` command `@LogSession` is an alias of `@BeginLogSession`.

### 3.2.12 `@DoNotReadRestOfFile`

Prevents the rest of the file from being read by the parser. Useful for unfinished or temporary files.

```
#! This will appear in the manual

#! @DoNotReadRestOfFile

#! This will not appear in the manual.
```

### 3.2.13 `@BeginChunk name`, `@EndChunk`, and `@InsertChunk name`

Text inside a `@BeginChunk` / `@EndChunk` part will not be inserted into the final documentation directly. Instead, the text is stored in an internal buffer.

That chunk of text can then later on be inserted in any other place by using the `@InsertChunk name` command.

If you do not provide an `@EndChunk`, the chunk ends at the end of the file.

```
#! @BeginChunk MyChunk
#! Hello, world.
#! @EndChunk

#! @InsertChunk MyChunk
## The text "Hello, world." is inserted right before this.
```

You can use this to define an example like this in one file:

```
#! @BeginChunk Example_Symmetric_Group
#! @BeginExample
S5 := SymmetricGroup(5);
#! Sym( [ 1 .. 5 ] )
Order(S5);
#! 120
#! @EndExample
#! @EndChunk
```

And then later, insert the example in a different file, like this:

```
#! @InsertChunk Example_Symmetric_Group
```

### 3.2.14 @BeginCode *name*, @EndCode, and @InsertCode *name*

Inserts the text between @BeginCode and @EndCode verbatim at the point where @InsertCode is called. This is useful to insert code excerpts directly into the manual.

```
#! @BeginCode Increment
i := i + 1;
#! @EndCode

#! @InsertCode Increment
## Code is inserted here.
```

### 3.2.15 @LatexOnly *text*, @BeginLatexOnly, and @EndLatexOnly

Code inserted between @BeginLatexOnly and @EndLatexOnly or after @LatexOnly is only inserted in the PDF version of the manual or worksheet. It can hold arbitrary  $\LaTeX$ -commands.

```
#! @BeginLatexOnly
#! \include{picture.tex}
#! @EndLatexOnly

#! @LatexOnly \include{picture.tex}
```

### 3.2.16 @NotLatex *text*, @BeginNotLatex, and @EndNotLatex

Code inserted between @BeginNotLatex and @EndNotLatex or after @NotLatex is inserted in the HTML and text versions of the manual or worksheet, but not in the PDF version.

```
#! @BeginNotLatex
#! For further information see the PDF version of this manual.
#! @EndNotLatex

#! @NotLatex For further information see the PDF version of this manual.
```

### 3.2.17 @Index key [entry text]

Adds an index entry to the current documentation text. The command `@Index key entry text` generates `<Index Key="key">entry text</Index>`. If no entry text is provided, then the entry text is empty. To use keys containing spaces, wrap the key in double quotes, e.g. `@Index "my key" entry text`. The entry text is processed like normal documentation text, so markdown-like inline code such as `true` is supported.

## 3.3 Title page commands

The following commands can be used to add corresponding parts to the title page of a document generated by AutoDoc.

- @Title
- @Subtitle
- @Version
- @TitleComment
- @Author
- @Date
- @Address
- @Abstract
- @Copyright
- @Acknowledgements
- @Colophon

Many of these values can (and for package manuals typically should) be extracted from `PackageInfo.g`. If you set them explicitly in comments, they override extracted or scaffold-defined values. This is usually most useful for worksheets created with `AutoDocWorksheet` (4.1.1), since worksheets do not have a `PackageInfo.g` file from which this information could be extracted.

## 3.4 Plain text files

Files that have the suffix `.autodoc` and are listed in the `autodoc.files` option of AutoDoc (4.2.1), resp. are contained in one of the directories listed in `autodoc.scan_dirs` or one of their subdirectories, are treated as standalone AutoDoc input files. They are meant for manual text that does not belong next to a single declaration: chapters, sections, tutorials, worked examples, index entries, chunks, title-page metadata, and similar prose-heavy material.

Conceptually, a `.autodoc` file uses the same parser as AutoDoc comments, but without the comment marker. In a `.autodoc` file, lines do not need to start with `#!` and in fact usually should not. This makes `.autodoc` files one convenient way to replace hand-written XML chapters when you prefer



AutoDoc’s command syntax and Markdown-like text features. However, it is not the only supported style: chapter and section commands inside source comments remain fully supported, and AutoDoc itself still uses that style in files such as `gap/Magic.gd`. For the surrounding workflow, see Chapter 2.

The most important difference from declaration comments is that a plain text file does *not* document a declaration by adjacency. There is no following `Declare...` or `InstallMethod` statement for AutoDoc to inspect. So commands whose meaning depends on such a declaration only make sense in source comments immediately before that declaration.

In practice, this gives the following rule of thumb.

- Use source comments beginning with `#!` to document declarations. This is the mode for `@Description`, `@Returns`, `@Arguments`, `@Label`, `@Group`, and `@ChapterInfo`.
- Use either `.autodoc` files or source comments for standalone manual structure and prose. Commands such as `@Chapter`, `@Section`, `@Subsection`, grouping commands, examples and logs, chunks and code insertion, `@Index`, title-page commands, Markdown-style headings, fenced code blocks, and ordinary GAPDoc XML markup work in both styles.

As a concrete example, the following file can serve as a complete chapter written in `.autodoc` format.

```
@Chapter Test
@Section First Section
@Subsection First Subsection

This text belongs directly to the manual chapter.
It can use XML tags such as <A>arg</A> or <Ref .../>.

@BeginExampleSession
gap> S5 := SymmetricGroup(5);
Sym( [ 1 .. 5 ] )
gap> Size(S5);
120
@endExampleSession

@Index "Worksheet Autoplain" Plain worksheet index entry with 'true'
```

This is essentially the style used in the worksheet fixture `tst/worksheets/autoplain.sheet/plain.autodoc`.

The same structural commands can also be used inside source comments, for example:

```
#! @Chapter Reference
#! @Section The AutoDoc() function
#! Some introductory text for this section.
```

This source-comment style is still fully supported and is used in `gap/Magic.gd`.

The mixed-workflow case is equally common. Suppose an existing manual still has a hand-written main XML file and perhaps some hand-written XML chapters. Then you can keep those files, include `_AutoDocMainFile.xml` from the main XML file as described in Chapter 2, and add one or more `.autodoc` files via `autodoc.files` or `autodoc.scan_dirs`. Those files can provide

tutorial chapters or appendices, while declaration documentation continues to live in source comments and older XML chapters remain unchanged.

One caveat is worth keeping in mind. If you want a standalone `.autodoc` file to pause and resume around declaration documentation that is written in source comments, the current workaround is to use chunks. That interleaving workflow is currently limited; see issue #60 in the AutoDoc issue tracker.

So, while `.autodoc` files and source comments share most of the same text syntax, they can be combined freely. The main distinction is simply that declaration-bound commands attach metadata to a following declaration, while standalone manual text can live wherever you find it most convenient.

## 3.5 Grouping

In GAPDoc, it is possible to make groups of manual items, i.e., when documenting a function, operation, etc., it is possible to group them into suitable chunks. This can be particularly useful if there are several definitions of an operation with several different argument types, all doing more or less the same to the arguments. Then their manual items can be grouped, sharing the same description and return type information. You can give a heading to the group in the manual with the `@GroupTitle` command; if that is not supplied, then the heading of the first manual item in the group will be used as the heading.

Note that group names are globally unique throughout the whole manual. That is, groups with the same name are in fact merged into a single group, even if they were declared in different source files. Thus you can have multiple `@BeginGroup` / `@EndGroup` pairs using the same group name, in different places, and these all will refer to the same group.

Moreover, this means that you can add items to a group via the `@Group` command in the AutoDoc comment of an arbitrary declaration, at any time.

The following code

```
#! @BeginGroup Group1
#! @GroupTitle A family of operations

#! @Description
#! First sentence.
DeclareOperation( "FirstOperation", [ IsInt ] );

#! @Description
#! Second sentence.
DeclareOperation( "SecondOperation", [ IsInt, IsGroup ] );

#! @EndGroup

## .. Stuff ..

#! @Description
#! Third sentence.
#! @Group Group1
KeyDependentOperation( "ThirdOperation", IsGroup, IsInt, "prime );
```

produces the following:

```

<ManSection Label="Group1">
<Heading>A family of operations</Heading>
  <Oper Arg="arg" Name="FirstOperation" Label="for IsInt"/>
  <Oper Arg="arg1,arg2" Name="SecondOperation" Label="for IsInt, IsGroup"/>
  <Oper Arg="arg1,arg2" Name="ThirdOperation" Label="for IsGroup, IsInt"/>
  <Description>
First sentence.
Second sentence.
Third sentence.
  </Description>
</ManSection>

```

## 3.6 Markdown-like formatting of text in AutoDoc

AutoDoc has some convenient ways to insert special format into text, like math formulas and lists. The syntax for them are inspired by Markdown and  $\LaTeX$ , but do not follow them strictly. Neither are all features of the Markdown language supported. The following subsections describe what is possible.

### 3.6.1 Lists

One can create lists of items by beginning a new line with \*, +, -, followed by one space. The first item starts the list. When items are longer than one line, the following lines have to be indented by at least two spaces. The list ends when a line which does not start a new item is not indented by two spaces. Of course lists can be nested. Here is an example:

```

#! The list starts in the next line
#! * item 1
#! * item 2
#!   which is a bit longer
#!   * and also contains a nested list
#!   * with two items
#! * item 3 of the outer list
#! This does not belong to the list anymore.

```

This is the output:

The list starts in the next line

- item 1
- item 2 which is a bit longer
  - and also contains a nested list
  - with two items
- item 3 of the outer list

This does not belong to the list anymore.

The \*, -, and + are fully interchangeable and can even be used mixed, but this is not recommended.

### 3.6.2 Math modes

One can start an inline formula with a \$, and also end it with \$, just like in  $\text{\LaTeX}$ . This will translate into GAPDocs inline math environment. For display mode one can use \$\$, also like  $\text{\LaTeX}$ .

```
#! This is an inline formula: $1+1 = 2$.
#! This is a display formula:
#! $$ \sum_{i=1}^n i. $$
```

produces the following output:

This is an inline formula:  $1 + 1 = 2$ . This is a display formula:

$$\sum_{i=1}^n i.$$

### 3.6.3 Emphasize

One can emphasize text by using two asterisks (\*\*) or two underscores (\_\_) at the beginning and the end of the text which should be emphasized. Example:

```
#! **This** is very important.
#! This is __also important__.
#! **Naturally, more than one line
#! can be important.**
```

This produces the following output:

*This is very important. This is also important. Naturally, more than one line can be important.*

### 3.6.4 Inline code

One can mark inline code snippets by using backticks (`) at the beginning and the end of the text which should be marked as code. Example:

```
#! Call function `foobar()` at the start.
```

This produces the following output:

Call function `foobar()` at the start.

### 3.6.5 Fenced code blocks

One can insert verbatim code blocks by placing the code between lines containing at least three back-ticks or at least three tildes. The opening fence may optionally be followed by an info string. The values @listing, @example, and @log select the corresponding GAPDoc element; any other value is currently ignored. If nothing is specified the default is to generate <Listing>. Example:

```
#! ```@listing
#! if x = 2 then
#!   Print("1 + 1 = 2 holds, all is good\n");
```

```

#! fi;
#! '''
#! ~~~@example
#! gap> [ 1 .. 3 ] ^ 2;
#! [ 1, 4, 9 ]
#! ~~~
#! '''@log
#! #I  some log message
#! '''

```

This produces the following output:

```

if x = 2 then
  Print("1 + 1 = 2 holds, all is good\n");
fi;

```

Example

```

gap> [ 1 .. 3 ] ^ 2;
[ 1, 4, 9 ]

```

Example

```

#I  some log message

```

## 3.7 Deprecated commands

The following commands used to be supported, but are not supported anymore.

### @EndSection

You can simply remove any use of this, **AutoDoc** ends sections automatically at the start of any new section or chapter.

### @EndSubsection

You can simply remove any use of this, **AutoDoc** ends subsections automatically at the start of any new subsection, section or chapter.

### @BeginAutoDoc **and** @EndAutoDoc

It suffices to prepend each declaration that is meant to appear in the manual with a minimal **AutoDoc** comment `#!`.

### @BeginSystem *name*, @EndSystem, **and** @InsertSystem *name*

Please use the chunk commands from subsection [3.2.13](#) instead.

### @AutoDocPlainText **and** @EndAutoDocPlainText

Use `.autodoc` files or **AutoDoc** comments instead.

# Chapter 4

## Reference

### 4.1 AutoDoc worksheets

#### 4.1.1 AutoDocWorksheet

▷ `AutoDocWorksheet([filenames][,] [optrec])` (function)

The purpose of this function is to create stand-alone PDF and HTML files using **AutoDoc** without associating them with a package.

Instead of a package directory, you pass one filename or a list of filenames containing **AutoDoc** text from which the document is created. Settings are supplied via an optional record using the same entries as the *optrec* argument of **AutoDoc** (4.2.1). Alternatively, you may omit *filenames* and specify the files via `optrec.autodoc.files`.

A simple worksheet file can define title-page information and chapter content directly in the source file, including example blocks. If this is stored in `worksheet.g`, you can generate documentation via

Example

```
AutoDocWorksheet( "worksheet.g" );
```

This creates documentation in a `doc` subdirectory of the current directory.

Since worksheets do not have a `PackageInfo.g`, title-page fields are specified directly in the worksheet file.

For backwards compatibility, worksheet calls still accept GAP global options for specifying the option-record entries such as `dir`, `scaffold`, `autodoc`, `gapdoc`, and `extract_examples`. However, this feature is deprecated.

### 4.2 The AutoDoc() function

#### 4.2.1 AutoDoc

▷ `AutoDoc([pkgdir][,] [optrec])` (function)

**Returns:** nothing

This is the main function of the **AutoDoc** package. It can perform any combination of the following tasks:

1. It can (re)generate a scaffold for your package manual. That is, it can produce two XML files in GAPDoc format to be used as part of your manual: First, a file named `doc/_main.xml` which

is used as main XML file for the package manual, i.e. this file sets the XML doctype and defines various XML entities, includes other XML files (both those generated by **AutoDoc** as well as additional files created by other means), tells **GAPDoc** to generate a table of contents and an index, and more. Secondly, it creates a file `doc/title.xml` containing a title page for your documentation, with information about your package (name, description, version), its authors and more, based on the data in your `PackageInfo.g`.

2. It can scan your package for **AutoDoc** based documentation, using documentation comments and commands. This produces additional XML files to be used as part of the package manual.
3. It can use **GAPDoc** to generate PDF, text and HTML (with MathJax enabled) documentation from the **GAPDoc** XML files it generated as well as additional such files provided by you. For this, it invokes `MakeGAPDocDoc` (**GAPDoc: MakeGAPDocDoc**) to convert the XML sources, and it also instructs **GAPDoc** to copy supplementary files (such as CSS style files) into your doc directory (see `CopyHTMLStyleFiles` (**GAPDoc: CopyHTMLStyleFiles**)).

These tasks can be enabled independently, so you can use as much or as little of **AutoDoc** as your package currently needs. For more information and some examples, please refer to Chapter 2.

The parameters have the following meanings:

#### *pkgdir*

This optional parameter is used to determine the package directory in which **AutoDoc** will operate, and to find the metadata concerning the package being documented. If given, it should be an `IsDirectory` object. If the argument is omitted, then **AutoDoc** checks if it was called from a `makedoc.g` file or similar, and if so, uses the directory this is contained in. Otherwise the current directory is used. In both cases, the specified directory must contain a `PackageInfo.g` file, and **AutoDoc** extracts all needed metadata from that. The `IsDirectory` form is for example useful if you have multiple versions of the package around and want to make sure the documentation of the correct version is built.

For backwards compatibility, it is also possible to pass a package name as this argument, which then is resolved to the package directory of the first instance of this package **GAP** knows about. However, this is deprecated, as it is unreliable in the presence of multiple copies of a package.

Note that when using `AutoDocWorksheet` (see 4.1), there is no parameter corresponding to *pkgdir* and so the “package directory” is always the current directory, and there is no metadata.

#### *optrec*

*optrec* can be a record with some additional options. The following are currently supported:

*dir* This should either be a string, in which case it must be a path *relative* to the specified package directory, or a `Directory()` object. (Thus, the only way to designate an absolute directory is with a `Directory()` object.) This option specifies where the package documentation (e.g. the **GAPDoc** XML or the manual PDF, etc.) files are stored and/or will be generated.

*Default value:* `"doc/"`.

#### *scaffold*

This controls whether and how to generate scaffold XML files for the package documentation.

The value should be either `true`, `false` or a record. If it is a record or `true` (the latter is equivalent to specifying an empty record), then this feature is enabled. It is also enabled if `opt.scaffold` is missing but the package’s info record in `PackageInfo.g` has an `AutoDoc` entry. In all other cases (in particular if `opt.scaffold` is `false`), scaffolding is disabled.

If scaffolding is enabled, and `PackageInfo.AutoDoc` exists, then it is assumed to be a record, and its contents are used as default values for the scaffold settings.

If `opt.scaffold` is a record, it may contain the following entries.

#### *includes*

A list of XML files to be included in the body of the main XML file. If you specify this list and also are using `AutoDoc` to document your operations with `AutoDoc` comments, you can add `_AutoDocMainFile.xml` to this list to control at which point the documentation produced by `AutoDoc` is inserted. If you do not do this, it will be added after the last of your own XML files.

#### *index*

By default, the scaffold creates an index. If you do not want an index, set this to `false`.

#### *appendix*

This entry is similar to `opt.scaffold.includes` but is used to specify files to include after the main body of the manual, i.e. typically appendices written directly in `GAPDoc` XML. Appendices created with `@Appendix` are included automatically after these files when scaffolding generates the main XML file.

#### *bib*

The name of a bibliography file, in BibTeX or XML format. If this key is not set, but there is a file `doc/PACKAGENAME.bib` then it is assumed that you want to use this as your bibliography.

#### *bibstyle*

Overrides the bibliography style used for LaTeX output. This is written as the `Style` attribute of the generated `<Bibliography .../>` element, so valid values are the bibliography style names understood by `GAPDoc` and BibTeX, such as `alpha`, `alphaurl`, or `plain`.

#### *entities*

A record whose keys are taken as entity names, set to the corresponding (string) values. For example, if you pass the record “SomePackage”,

```
rec( SomePackage := "<Package>SomePackage</Package>",
    RELEASEYEAR := "2015" )
```

then the following entity definitions are added to the XML preamble:

```
<!ENTITY SomePackage '<Package>SomePackage</Package>''>
<!ENTITY RELEASEYEAR '2015'>
```

This allows you to write “&SomePackage;” and “&RELEASEYEAR;” in your documentation, which will be replaced by respective values specified in the entities definition.

Note that `AutoDoc` predefines several entities:



*VERSION*

Set to the `Version` field of your package info record.

*RELEASEYEAR*

Set to a string containing the release year, as derived from the `Date` field of your package info record.

*RELEASEDATE*

Derived from the `Date` field of your package info record.

*SomePackage*

The precise name of this entity is derived from the `PackageName` field of your package info record. Note that it is case sensitive. The content is defined as suggested by the example above.

*TitlePage*

A record with extra title-page fields for the generated manual. Field names are interpreted as title-page XML element names, and their values are written as element content. For example, you can set a custom acknowledgements block with

```
rec( Acknowledgements := "Many thanks to ..." )
```

If this is set in `PackageInfo.g` as `PkgInfo.AutoDoc.TitlePage`, it has the same meaning as this option; see subsection 2.5.3 in chapter 2 for details and an example. For the list of valid title-page elements, see the GAPDoc manual, specifically section (GAPDoc: TitlePage).

*MainPage*

If scaffolding is enabled, by default a main XML file is generated (this is the file which contains the XML doctype and more). If you do not want this (e.g. because you have a handwritten main XML file), but still want AutoDoc to generate a title page for you, you can set this option to `false`

*document\_class*

Sets the document class of the resulting PDF. The value can either be a string which has to be the name of the new document class, a list containing this string, or a list of two strings. Then the first one has to be the document class name, the second one the option string (contained in `[ ]`) in L<sup>A</sup>T<sub>E</sub>X.

*latex\_header\_file*

Replaces the standard header from GAPDoc completely with the header in this L<sup>A</sup>T<sub>E</sub>X file. Please be careful here, and look at GAPDoc's `latexheader.tex` file for an example.

*autodoc*

This controls whether and how to generate additional XML documentation files by scanning for AutoDoc documentation comments.

The value should be either `true`, `false` or a record. If it is a record or `true` (the latter is equivalent to specifying an empty record), then this feature is enabled. It is also enabled if `opt.autodoc` is missing but the package depends (directly) on the AutoDoc package. In all other cases (in particular if `opt.autodoc` is `false`), this feature is disabled.

If `opt.autodoc` is a record, it may contain the following entries.

*files*

A list of files (given by paths relative to the package directory) to be scanned

for **AutoDoc** documentation comments. Usually it is more convenient to use `autodoc.scan_dirs`, see below.

#### `scan_dirs`

A list of subdirectories of the package directory (given as relative paths) which **AutoDoc** then scans recursively for `.gi`, `.gd`, `.g`, and `.autodoc` files; all of these files are then scanned for **AutoDoc** documentation comments. The special entries `"."` and `""` still only scan the package root itself. This controls where **AutoDoc** looks for source comments beginning with `#!` and for standalone `.autodoc` files. It does not affect where **GAPDoc** looks for **GAPDoc** comments; that is controlled separately by `gapdoc.scan_dirs`.

*Default value:* `[ ".", "gap", "lib", "examples", "examples/doc" ]`.

#### `level`

This defines the level of the created documentation. The default value is 0. When parts of the manual are declared with a higher value they will not be printed into the manual.

#### `gapdoc`

This controls whether and how to invoke **GAPDoc** to create HTML, PDF and text files from your various XML files.

The value should be either `true`, `false` or a record. If it is a record or `true` (the latter is equivalent to specifying an empty record), then this feature is enabled. It is also enabled if `opt.gapdoc` is missing. In all other cases (in particular if `opt.gapdoc` is `false`), this feature is disabled.

If `opt.gapdoc` is a record, it may contain the following entries.

#### `main`

The name of the main XML file of the package manual. This exists primarily to support packages with existing manual which use a filename here which differs from the default. In particular, specifying this is unnecessary when using scaffolding.

*Default value:* `_main.xml` when scaffolding is enabled for package manuals, otherwise `PACKAGENAME.xml`.

#### `files`

A list of files (given by paths relative to the package directory) to be scanned for **GAPDoc** documentation comments. Usually it is more convenient to use `gapdoc.scan_dirs`, see below.

#### `scan_dirs`

A list of subdirectories of the package directory (given as relative paths) which **AutoDoc** then scans recursively for `.gi`, `.gd` and `.g` files; all of these files are then scanned for **GAPDoc** documentation comments. The special entries `"."` and `""` still only scan the package root itself. This controls only where **GAPDoc** comments are searched for. It does not affect where **AutoDoc** looks for source comments beginning with `#!` or for `.autodoc` files; use `autodoc.scan_dirs` for that.

*Default value:* `[ ".", "gap", "lib", "examples", "examples/doc" ]`.

#### `LaTeXOptions`

Must be a record with entries which can be understood by `SetGapDocLaTeXOptions` (**GAPDoc: SetGapDocLaTeXOptions**). Each entry can be a string, which will be given to **GAPDoc** directly, or a list containing of two entries: The first one must be

the string "file", the second one a filename. This file will be read and then its content is passed to **GAPDoc** as option with the name of the entry.

#### *gap\_root\_relative\_path*

Either a boolean, or a string containing a relative path. By default (if this option is not set, or is set to `false`), references in the generated documentation referring to external documentation (such as the **GAP** manual) are encoded using absolute paths. This is fine as long as the documentation stays on only a single computer, but is problematic when preparing documentation that should be used on multiple computers, e.g., when creating a distribution archive of a **GAP** package.

Thus, if a relative path is provided via this option (or if it is set to `true`, in which case the relative path `../..` is used), then **AutoDoc** and **GAPDoc** attempt to replace all absolute paths in references to **GAP** manuals by paths based on this relative path. On a technical level, **AutoDoc** passes the relative path to the *gaproot* parameter of **MakeGAPDocDoc** (**GAPDoc: MakeGAPDocDoc**).

#### *extract\_examples*

Either `true` or a record. If set to `true`, then all manual examples are extracted and placed into files `tst/PACKAGENAME01.tst`, `tst/PACKAGENAME02.tst`, ... and so on, with one file for each chapter. For chapters with no examples, no file is created.

If set to a record, it may contain the following entries:

##### **subdir**

A string or `Directory()` object selecting where the generated `.tst` files are written. The default is `tst`. If a string is given, it is interpreted relative to the package directory, so values such as `tst/generated` are supported.

##### **units**

This controls how examples are grouped into files. Recognized values are "Chapter" (default), "Section", "Subsection" or "Single". Depending on the value, one file is created for each chapter, each section, each subsection or each example. For all other values only a single file is created.

On a technical level, **AutoDoc** passes the value to the *units* parameter of **ExtractExamples** (**GAPDoc: ExtractExamples**).

##### **skip\_empty\_in\_numbering**

If set to `true` (the default), the generated files use filenames with strictly sequential numbering; that means that if chapter 1 (or whatever units are being used) contains no examples but chapter 2 does, then the examples for chapter 2 are put into the file `tst/PACKAGENAME01.tst`. If this option is set to `false`, then the chapter numbers are used to generate the filenames; so the examples for chapter 2 would be put into the file `tst/PACKAGENAME02.tst`.

The function also checks the following **GAP** global options, i.e. options supplied via **GAP**'s value-option syntax and visible through nested calls. These are not entries of *optrec*. See (**Reference: Options Stack**) for more information about **GAP**'s global options system.

#### *nopdf*

If this global option is set to `true`, then **AutoDoc** tells **GAPDoc** not to build the PDF version of the manual. HTML and text output are still generated.

This is useful on systems without a working `pdflatex` installation, or when you only need the non-PDF outputs while iterating on the manual.

For example:

```
AutoDoc( rec( autodoc := true ) : nopdf );
```

Also, if the environment variable NOPDF is set, then **AutoDoc** behaves as if the global option *nopdf* had been enabled.

#### *relativePath*

This has the same effect as *gapdoc.gap\_root\_relative\_path*, but as a GAP global option. It takes precedence over that record entry if both are specified.

If *relativePath* is true, then the default relative path *../..* is used. If it is a string, then that string is used as the relative path from the documentation directory to the GAP root.

For example:

```
AutoDoc( rec( autodoc := true ) : relativePath := "../.." );
```

In particular, a call such as

```
Read( "makedoc.g" : nopdf, relativePath );
```

sets both global options to true, and they remain visible to the **AutoDoc** call inside *makedoc.g*.

## 4.2.2 InfoAutoDoc

▷ InfoAutoDoc

(info class)

Info class for the **AutoDoc** package. Set this to 0 to suppress info messages, 1 to allow most messages, and 2 to allow all messages including those that contain file paths.

This can be set by calling, for example, `SetInfoLevel(InfoAutoDoc, 0)`. Default value is 1.

# References

- [LN24] F. Lübeck and M. Neunhoffer. *GAPDoc (Version 1.6.7)*. RWTH Aachen, 2024. GAP package, <https://www.math.rwth-aachen.de/~Frank.Luebeck/GAPDoc/index.html>. 2

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