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# The HomeworkAssignment class\*

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## 1 Abstract

This class provides a relative simple docuemnt-type for homework, mainly created for assignments at the University This class is inherited from `article`, it is not perfect, but I am trying my very best.

## 2 Options

<code>problemstyle=&lt;1&gt;</code>	These options allow the customizatuion of the displayed numbers. For Example, if
<code>subproblemstyle=&lt;1&gt;</code>	<code>problemstyle=Roman</code> , <code>subproblemstyle=arabic</code> , <code>subsubproblemstyle=roman</code>
<code>subsubproblemstyle=&lt;1&gt;</code>	is passed, The first subsubproblem of the first subproblem of the first problem
	would be labled as <b>i</b> ) of <b>Problem I.1</b> .
	Available options are <code>arabic</code> , <code>Alph</code> , <code>alph</code> , <code>Roman</code> , and <code>roman</code> . Standard values are:
	<code>problemstyle=arabic</code> , <code>subproblemstyle=alph</code> , <code>subsubproblemstyle=roman</code> .

### 2.1 Inherited options

Because the class is inherited by Abstract, every Option that can be passed to `article`, will be passed to `article`.

## 3 Commands

### 3.1 Document Informations

<code>\subject</code>	Sets the subject of the document. Takes the subject as argument. Standard Value
<code>\kurs</code>	is “Kein Kurs”
	<code>\kurs</code> is deprecated.
<code>\tutorial</code>	Sets the tutorial of the author. Takes it as an argument. Stamdard Value is
<code>\tutorium</code>	empty, so that this command can be omitted.

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\*This document corresponds to HomeworkAssignment v1.6.4,dated 2017\05\12.

`\tutorium` is deprecated.

`\deadline` Sets the deadline of the document. Takes it as an argument. Standard value  
`\abgabe` is `\today`.  
`\abgabe` is deprecated

### 3.1.1 Inherited from article

`\author` Sets the author of the document.  
`\date` Sets the date of the document.

## 3.2 Sectioning

Because the class is designed for Assignments, the sectioning-commands are different from Article

### 3.2.1 ‘plain’ Sectioning

`\problem` These commands work like their counterpart in article, except that there will be  
`\subproblem` no number, nor will they increase a counter. Nevertheless, they will be shown in  
`\subsubproblem` the table of contents.

`\solution` They work like Paragraph, but do not take an argument, instead they print  
`\proof` out “Lösung”, “Beweis” “Gegeben”, and “Zu zeigen”, respectively<sup>1</sup>. They are not  
`\given` mentioned in the table of contents.  
`\toShow`

### 3.2.2 ‘better’ Sectioning

The following commands are an augmented version of the “plain” commands.

`\newproblem` These commands require no argument, and automatically create a numbered  
`\newsproblem` title. The optional Argument is the new value for the corresponding counter.  
`\newsproblem`

## 3.3 Useful Macros

### 3.3.1 Quod Erat Demunstarndum, End of Proof

`\QED` Display a flushed-right *QED*,  $\square$ , or  $\blacksquare$ , respectively. `\qed` is not implemented, to  
`\EOP` keep compatibility to several Math-packages, which define the later.  
`\eop`

### 3.3.2 Quod Non Erat Demunstarndum at iucundum est

`\QNEd` Display a flushed-right  $\triangle$ . `\QNEd` displays it in a new line, `\qned` at the end of  
`\qned`

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<sup>1</sup>As of v1.6, Translations are added, depending on the chosen Language, there may be an other Text displayed.  
See 8.2 for all Translations

the same line.

In Mathematical proofs this symbol is used to mark things, which we did not intend to proof, but are interesting anyway.

## **4   Pagestyle**

### **4.1   Headers**

## 5 Development and support

The package is developed at *github*:

<https://github.com/ACHinrichs/LaTeX-templates>

Please refer to that site for any bug report or development information.

## 6 Changelog

**v1.0 - 2016/10/23** Intial

**v1.1 - 2016/11/02** ...

**v1.2 - 2016/11/03** ...

**v1.3 - 2016/12/01** Provide the Class as .dtx file and more

**v1.4 - 2017/04/29** “Minor” bugfixes

**v1.5 - 2017/04/29** Problems are displayed in the table of contents. Type of  
numeration is now configurable.

**v1.5.1 - 2017/04/29** Bugfix

**v1.5.2 - 2017/04/29** Add version-number

**v1.6 - 2017/05/02** Add Translations (German and English)  
Add `\given` and `\toShow`  
Add `\QED`, `\EOP`, and `\eop`

**v1.6.3 - 2017/05/05** Bugfixes

**v1.6.4 - 2017/05/09** Change `\eop` to be in the same line  
Add `\QNEd`

## 7 Examples

For examples, please see the Git-Repo at <https://github.com/ACHinrichs/LaTeX-templates>

## 8 Implementation

The following part is very boring, but I have not found a solution to create a .cls-file without including the implementation into the document. Loads L<sup>A</sup>T<sub>E</sub>X2<sub>ε</sub> and sets the Version Loads the `article`, which is the base-class.

### 8.1 Packages & Options

```
1 \RequirePackage{kvoptions}
2 \SetupKeyvalOptions{ family=hwa,
3   prefix=hwa@ }
4 \DeclareStringOption[arabic]{problemsty}
5 \DeclareStringOption[alph]{subproblemsty}
6 \DeclareStringOption[roman]{subsubproblemsty}
7 \DeclareBoolOption[false]{listings}
8 % Redefine the article-options
9 %   \begin{macrocode}
10 \DeclareDefaultOption{\PassOptionsToClass{\CurrentOptionKey}{article}}

    Processes the Options and loads article
11 \ProcessKeyvalOptions*
12 \LoadClass{article}

    Loads required Packages
13 \RequirePackage{suffix}
14 \RequirePackage{fancyhdr}
15 \RequirePackage{ifthen}
16 \RequirePackage{translations}
17 \RequirePackage{amssymb}
18
19 \ifhwa@listings
20   \RequirePackage{listings}
21   \lstset{
22     frame = single,
23     breaklines = true,
24     postbreak=\raisebox{0ex}[0ex][0ex]{\ensuremath{\hookrightarrow}\space}},
25     basicstyle=\scriptsize
26   }
27 \else
28   \empty
29 \fi
```

### 8.2 Translations

Load translations, currently supports English and German, Fallback is German

```

30 \DeclareTranslationFallback{aufgabe}{Aufgabe}
31 \DeclareTranslationFallback{loesung}{L\ "osung}
32 \DeclareTranslationFallback{beweis}{Beweis}
33 \DeclareTranslationFallback{uebungsgruppe}{\ "Ubungsgruppe}
34 \DeclareTranslationFallback{abgabe}{Abgabe}
35 \DeclareTranslationFallback{zuZeigen}{Zu zeigen}
36 \DeclareTranslationFallback{gegeben}{Gegeben}
37
38 \DeclareTranslation{German}{aufgabe}{Aufgabe}
39 \DeclareTranslation{German}{loesung}{L\ "osung}
40 \DeclareTranslation{German}{beweis}{Beweis}
41 \DeclareTranslation{German}{uebungsgruppe}{\ "Ubungsgruppe}
42 \DeclareTranslation{German}{abgabe}{Abgabe}
43 \DeclareTranslation{German}{zuZeigen}{Zu zeigen}
44 \DeclareTranslation{German}{gegeben}{Gegeben}
45
46 \DeclareTranslation{English}{aufgabe}{Problem}
47 \DeclareTranslation{English}{loesung}{Solution}
48 \DeclareTranslation{English}{beweis}{Proof}
49 \DeclareTranslation{English}{uebungsgruppe}{Tutorial}
50 \DeclareTranslation{English}{abgabe}{Deadline}
51 \DeclareTranslation{English}{zuZeigen}{To show}
52 \DeclareTranslation{English}{gegeben}{Given}

```

### 8.3 Headers & Footers

Sets the page-headers.

All headers are cleread before they get any Text — just to be sure.

The headers look like specified above (4.1). Also inserts the Titlepage.

```

53
54 \fancypagestyle{firstpage}{
55   %
56   \fancyhf{}
57   % clear all six fields
58   \renewcommand{\headrulewidth}{.7pt}
59   \renewcommand{\footrulewidth}{0pt} \fancyfoot[RE,LO]{\thepage}
60   \fancyhead[L]{\hwa@tutorium} \fancyhead[R]{\@date } }
61 \fancypagestyle{followingpage}{
62   %
63   \fancyhf{}
64   % clear all six fields
65   \fancyhead[RE,LO]{\@author} \fancyhead[LE,RO]{\hwa@kurs\ \GetTranslation{abgabe}:
66   \hwa@abgabe} \fancyfoot[RE,LO]{\thepage}
67   \renewcommand{\headrulewidth}{0.7pt}
68   \renewcommand{\footrulewidth}{0pt} } \pagestyle{followingpage}
69 \AtBeginDocument{ \thispagestyle{firstpage}
70   \setlength{\headheight}{25pt} }

```

## 8.4 Internal commands

### 8.4.1 Counter-Commands

**Counter--Commands** These are used to output the Exercise numbers in the desired style

```
71 \newcommand{\hwa@problemno}{\arabic{problem}}
72 \newcommand{\hwa@subproblemno}{\alph{subproblem}}
73 \newcommand{\hwa@subsubproblemno}{\roman{subsubproblem}}
```

### 8.4.2 Counter-Style Parser

**Counter--Style Parser** This takes a style-input (#1), one of the three previous defined commands (#2) and the corresponding counter (#3) to redefine #1, so that it corresponds to #2. See 8.4.3 for example usement.

```
74 \newcommand{\hwa@parseCounterStyle}[3]{
75   \ifthenelse{\equal{#1}{arabic}}{ \renewcommand{#2}{\arabic{#3}} }{
76     \ifthenelse{\equal{#1}{roman}}{ \renewcommand{#2}{\roman{#3}} }{
77       \ifthenelse{\equal{#1}{alph}}{ \renewcommand{#2}{\alph{#3}} }{
78         \ifthenelse{\equal{#1}{Alph}}{ \renewcommand{#2}{\Alph{#3}} }{
79           \ifthenelse{\equal{#1}{Roman}}{
80             \renewcommand{#2}{\Roman{#3}} }{
81             \ClassError{HomeworkAssignment}{Invalid Value #1 for
82               option Counter-Styling}{Possible Values are alph,
83               arabic, Arabic, roman or Roman.} } } } } }
```

### 8.4.3 Counter-Commands II

**Counter--Style ParserCommands II** Redefines the three counter-commands

```
84 \hwa@parseCounterStyle{\hwa@problemsty}{\hwa@problemno}{problem}
85 \hwa@parseCounterStyle{\hwa@subproblemsty}{\hwa@subproblemno}{subproblem}
86 \hwa@parseCounterStyle{\hwa@subsubproblemsty}{\hwa@subsubproblemno}{subsubproblem}
```

## 8.5 Commands

**\subject** Defines \kurs. \subject equals \kurs

```
87 \newcommand{\hwa@kurs}{?\GetTranslation{subject}??}
88 \newcommand{\subject}[1]{\renewcommand{\hwa@kurs}{#1}}
89 \newcommand{\kurs}[1]{\subject{#1}}
```

**\tutorial** Defines \tutorial. \tutorium equals \tutorial

```
90 \newcommand{\hwa@tutorium}{?\GetTranslation{uebungsgruppe}??}
91 \newcommand{\tutorial}[1]{\renewcommand{\hwa@tutorium}{#1}}
92 \newcommand{\tutorium}[1]{\tutorial{#1}}
```

**\deadline** Defines \deadline. \abgabe equals \deadline

```
93 \newcommand{\hwa@abgabe}{\today}
94 \newcommand{\deadline}[1]{\def\hwa@abgabe{#1}}
95 \newcommand{\abgabe}[1]{\deadline{#1}}
```



`\maketitle` Overrides maketitle.

```
96
97 \renewcommand{\maketitle} {
98   \begin{centering}
99     \huge{\textbf{\hwa@kurs}} \vspace{.25cm} {\hrule height 2pt} \vspace{.25cm}
100    \large
101    \GetTranslation{abgabe}: \hwa@abgabe\\
102    \vspace{.5cm} \hrule \vspace{.25cm}
103    \normalsize{\@author}\\
104    \vspace{.25cm} \hrule \vspace{.25cm} \normalsize
105  \end{centering}
106 }
```

Defines and initialize all counters.

```
107 \newcounter{problem} \setcounter{problem}{0}
108 \newcounter{subproblem}[problem] \setcounter{subproblem}{0}
109 \newcounter{subsubproblem}[subproblem] \setcounter{subsubproblem}{0}
110
```

Defines ‘plain’ sectioning-commands. See 3.2 for more informations.

```
111 \newcommand{\problem}[1]{\@startsection{problem}%Name
112   {1}%Level
113   {\z@}%indent
114   {-2em \@plus -1em \@minus -1em}%beforeskip
115   {1ex \@plus .5ex}%afterskip
116   {\normalfont\Large\bfseries}%style
117   *{#1} \addcontentsline{toc}{section}{#1} }
118
119 \newcommand{\subproblem}[1]{\@startsection{subproblem}%Name
120   {2}%Level
121   {\z@}%indent
122   {-1em \@plus -.5em \@minus -.5em}%beforeskip
123   {.5ex \@plus .5ex}%afterskip
124   {\normalfont\large\bfseries}%style
125   *{#1} \addcontentsline{toc}{subsection}{#1} }
126
127 \newcommand{\subsubproblem}[1]{\@startsection{subsubproblem}%Name
128   {3}%Level
129   {\z@}%indent
130   {-.5em}%beforeskip
131   {.5em}%afterskip
132   {\normalfont\bfseries}%style
133   *{#1} }
134
135 \newcommand{\solution}[1][\ ]{\@startsection{solution}%Name
136   {4}%Level
137   {\parindent}%indent
138   {-.1em}%beforeskip
139   {\z@}%afterskip
140   {\normalfont\bfseries}%style
```

```

141 *{\GetTranslation{loesung}\ifthenelse{\equal{#1}{}} {} { #1}:~~ } }
142
143 \newcommand{\proof}[1] [] {\@startsection{proof}%Name
144   {4}%Level
145   {\parindent}%indent
146   {- .1em}%beforeskip
147   {\z@}%afterskip
148   {\normalfont\bfseries}%style
149   *{\GetTranslation{beweis}\ifthenelse{\equal{#1} {} } {} { #1}:~~ } }
150
151 \newcommand{\toShow}[1] [] {\@startsection{to show}%Name
152   {4}%Level
153   {\parindent}%indent
154   {- .1em}%beforeskip
155   {\z@}%afterskip
156   {\normalfont\bfseries}%style
157   *{\GetTranslation{zuZeigen}\ifthenelse{\equal{#1} {} } {} { #1}:~~ } }
158
159 \newcommand{\given}[1] [] {\@startsection{given}%Name
160   {4}%Level
161   {\parindent}%indent
162   {- .1em}%beforeskip
163   {\z@}%afterskip
164   {\normalfont\bfseries}%style
165   *{\GetTranslation{gegeben}\ifthenelse{\equal{#1} {} } {} { #1}:~~ } }
166

```

Defines ‘better’ sectioning commands. See 3.2 and 3.2.2 for more informations.

```

167 \newcommand{\newproblem}[1] [] {\stepcounter{problem}
168   \ifthenelse{\equal{#1}{}} {} {} {\setcounter{problem}{#1}}
169   \problem{\GetTranslation{aufgabe} \hwa@problemno } }
170
171 \newcommand{\newsubproblem}[1] [] {\stepcounter{subproblem}
172   \ifthenelse{\equal{#1}{}} {} {} {\setcounter{subproblem}{#1}}
173   \subproblem{\GetTranslation{aufgabe} \hwa@problemno}.\hwa@subproblemno } }
174
175 \newcommand{\newsbsubproblem}[1] [] {\stepcounter{subsubproblem}
176   \ifthenelse{\equal{#1}{}} {} {} {\setcounter{subsubproblem}{#1}}
177   \subsubproblem{\hwa@subsubproblemno)} } }
178

```

End of Proof

```

179 \newcommand{\QED}{\begin{flushright}
180   \textit{QED}
181 \end{flushright}}
182 }
183 \newcommand{\EOP}{\begin{flushright}
184   $\square$
185 \end{flushright}}
186 }

```

```

187 \newcommand{\eop}{\hfill$\blacksquare$}

c demonstrandum at iucundum est

188 \newcommand{\QED}{\begin{flushright}
189   $\triangle$
190   \end{flushright}
191 }
192 \newcommand{\qed}{\hfill$\triangle$}

The End
193 \endinput

```