

# 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

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

### 2.1 Inherited options

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

### 2.2 $\LaTeX$ Warning: Unused global option(s)

Because the Options are handled via `kvoptions` and passed directly to `article`,  $\LaTeX$ raises this warning. IMHO, the Options are used and this warning can be ignored. Nevertheless I am working on it.

## 3 Commands

### 3.1 Document Informations

<code>\subject</code> <code>\kurs</code>	Sets the subject of the document. Takes the subject as argument. Standard Value <hr/> *This document corresponds to HomeworkAssignment v1.5.2,dated 2017\04\30.
---	--

is “Kein Kurs”  
`\kurs` is deprecated.

`\tutorial` Sets the tutorial of the author. Takes it as an argument. Standard Value is empty, so that this command can be omitted.  
`\tutorium` is deprecated.

`\deadline` Sets the deadline of the document. Takes it as an argument. Standard value 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 no number, nor will they increase a counter. Nevertheless, they will be shown in the table of contents.  
`\subproblem`  
`\subsubproblem`

`\solution` They work like Paragraph, but do not take an argument, instead they print out “Lösung”, “Beweis”, “Gegeben”, and “Zu zeigen”, respectively<sup>1</sup>. They are not mentioned in the table of contents.  
`\proof`  
`\given`  
`\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 title. The optional Argument is the new value for the corresponding counter.  
`\newsproblem`  
`\newsproblem`

## 3.3 Useful Macros

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

`\EOP`  
`\eop` <sup>1</sup>As of v1.6, Translations are added, depending on the chosen Language, there may be an other Text displays.  
See 7.2 for all Translations

## 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`

## 7 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>X2e and sets the Version Loads the `article`, which is the base-class.

### 7.1 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 \fi
```

### 7.2 Translations

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

```
29 \DeclareTranslationFallback{aufgabe}{Aufgabe}
30 \DeclareTranslationFallback{loesung}{L"osung}
31 \DeclareTranslationFallback{beweis}{Beweis}
32 \DeclareTranslationFallback{uebungsgruppe}{\ "Ubungsgruppe}
33 \DeclareTranslationFallback{abgabe}{Abgabe}
34 \DeclareTranslationFallback{zuZeigen}{Zu zeigen}
35 \DeclareTranslationFallback{gegeben}{Gegeben}
```

```

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

```

### 7.3 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.

```

52
53 \fancypagestyle{firstpage}{
54   %
55   \fancyhf{}
56   % clear all six fields
57   \renewcommand{\headrulewidth}{.7pt}
58   \renewcommand{\footrulewidth}{0pt} \fancyfoot [RE,LO]{\thepage}
59   \fancyhead [L]{\hwa@tutorium} \fancyhead [R]{\@date } }
60 \fancypagestyle{followingpage}{
61   %
62   \fancyhf{}
63   % clear all six fields
64   \fancyhead [RE,LO]{\@author} \fancyhead [LE,RO]{\hwa@kurs\ \GetTranslation{abgabe}:
65     \hwa@abgabe} \fancyfoot [RE,LO]{\thepage}
66   \renewcommand{\headrulewidth}{0.7pt}
67   \renewcommand{\footrulewidth}{0pt} } \pagestyle{followingpage}
68 \AtBeginDocument{ \thispagestyle{firstpage}
69   \setlength{\headheight}{25pt} }

```

### 7.4 Internal commands

#### 7.4.1 Counter-Commands

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

```

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

```

## 7.4.2 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 7.4.3 for example usement.

```

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

## 7.4.3 Counter–Commands II

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

```

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

## 7.5 Commands

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

```

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

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

```

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

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

```

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

**\maketitle** Overrides maketitle.

```

95
96 \renewcommand{\maketitle} {
97   \begin{centering}
98     \huge{\textbf{\hwa@kurs}} {\hrule height 2pt} \vspace{.25cm}
99     \large
100     \GetTranslation{abgabe}: \hwa@abgabe\\
101     \vspace{.5cm} \hrule \vspace{.25cm}
```

```

102 \normalsize{\@author}\\
103 \vspace{.25cm} \hrule \vspace{.25cm} \normalsize
104 \end{centering}
105 }

```

Defines and initialize all counters.

```

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

```

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

```

110 \newcommand{\problem}[1]{\@startsection{problem}%Name
111 {1}%Level
112 {\z@}%indent
113 {-2em \@plus -1em \@minus -1em}%beforeskip
114 {1ex \@plus .5ex}%afterskip
115 {\normalfont\Large\bfseries}%style
116 *{#1} \addcontentsline{toc}{section}{#1} }
117
118 \newcommand{\subproblem}[1]{\@startsection{subproblem}%Name
119 {2}%Level
120 {\z@}%indent
121 {-1em \@plus -.5em \@minus -.5em}%beforeskip
122 {.5ex \@plus .5ex}%afterskip
123 {\normalfont\large\bfseries}%style
124 *{#1} \addcontentsline{toc}{subsection}{#1} }
125
126 \newcommand{\subsubproblem}[1]{\@startsection{subsubproblem}%Name
127 {3}%Level
128 {\z@}%indent
129 {-.5em}%beforeskip
130 {.5em}%afterskip
131 {\normalfont\bfseries}%style
132 *{#1} }
133
134 \newcommand{\solution}[1] []{\@startsection{solution}%Name
135 {4}%Level
136 {\parindent}%indent
137 {-.1em}%beforeskip
138 {\z@}%afterskip
139 {\normalfont\bfseries}%style
140 *{\GetTranslation{loesung}\ifthenelse{\equal{#1}{}} {} { #1:~~ } }
141
142 \newcommand{\proof}[1] []{\@startsection{proof}%Name
143 {4}%Level
144 {\parindent}%indent
145 {-.1em}%beforeskip
146 {\z@}%afterskip
147 {\normalfont\bfseries}%style

```



```

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

```

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

```

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

```

End of Proof

```

178 \newcommand{\QED}{\begin{flushright}
179   \textit{QED}
180 \end{flushright}
181 }
182 \newcommand{\EOP}{\begin{flushright}
183   $\square$
184 \end{flushright}
185 }
186 \newcommand{\eop}{\begin{flushright}
187   $\blacksquare$
188 \end{flushright}
189 }

```

*The End*

```

190 \endinput

```