The esg8022pset class*

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1 Introduction

The esg8022pset class provides a template for ESG class PSets.

It is set up so that there is one master file, which contains both problems and solutions. It might look something like

```
\documentclass{esg8022pset}
\begin{preamble}
\usepackage{amsmath}
\end{preamble}

\classname{\LaTeX}
\semester{Spring 2011}
\problemsetnumber{0}
\duedate{Today}
\psettitle{\LaTeX}

\begin{document}

\begin{problem}{Example Problem}
  Learn \LaTeX.
\end{problem}
\begin{solution}
  Read \emph{The Not So Short Introduction to \LaTeXe}
\end{solution}

\end{document}
```

If this file is called `example.tex`, then typesetting this file would create two new .tex files (a problems file called `example_Problems.tex`, and a solutions file called `example_Solutions.tex`), as well as a typeset version of the problems file. To get a typeset solutions file, you will need to typeset the `example_Solutions.tex`

*This document corresponds to esg8022pset ?, dated ?.

file.[1] If you pass the option `makesolutionspdf` to this document class, and run latex with `\write18` enabled, you will also get a pdf of the solutions file.

2 Usage

I give the usage and specification of every macro defined. I give bugs when I know them (please email me if you find other bugs, or have fixes for the bugs I list). I sometimes give extra description or justification.

`\AfterEnvironment` Usage: `\AfterEnvironment{`⟨*environment*⟩`}{`⟨*code*⟩`}`
Specification: Runs ⟨*code*⟩ after the end of ⟨*environment*⟩. The code is run as if it were placed after the `\end{`⟨*environment*⟩`}` statement.

`\duedate` Usage: `\duedate{`⟨*date*⟩`}`
Specification: The ⟨*date*⟩ is used as the due date.

`\problemsetnumber` Usage: `\problemsetnumber{`⟨*number*⟩`}`
Specification: The ⟨*number*⟩ is used as the problem set number.

`\semester` Usage: `\semester{`⟨*semester*⟩`}`
Specification: The ⟨*semester*⟩ is used as the semester of the class.

`\classname` Usage: `\classname{`⟨*name*⟩`}`
Specification: The ⟨*name*⟩ is used as the name of the class.

`\readingassignment` Usage: `\readingassignment{`⟨*assignment*⟩`}`
Specification: The ⟨*assignment*⟩ is used as the reading assignment. If it's empty, or if this command is not called, no reading assignment is shown.

`\problemsettitle` Usage: `\problemsettitle{`⟨*title*⟩`}`
Specification: The ⟨*title*⟩ is used as the problem set title.

`problem` Usage: `\begin{problem}[`⟨*number*⟩`]{`⟨*description*⟩`}`
Specification: The ⟨*number*⟩ is used as the problem number, and defaults to the current section number (and is automatically incremented). The ⟨*description*⟩ is used as the problem title/description. This command typesets a problem, which is written both the this file, the problems tex file, and the solutions tex file.

`solution` Usage: `\begin{solution}`
Specification: Typesets the solution to a problem in the solution tex file.

`ForProblems` Usage: `\begin{ForProblems}`
Specification: Inserts code into only the problem set file.

`ForSolutions` Usage: `\begin{ForSolutions}`
Specification: Inserts code into only the solutions file.

`ForPSet` Usage: `\begin{ForPSet}`
Specification: Inserts code into both the problems and solutions file.

3 Setup

```
1 \ifthenelse{\boolean{esg8022pset@problems} \OR \boolean{esg8022pset@solutions}}{
2 }{
```

[1] I am still trying to figure out how to get two pdfs (or dvis, etc.) out of a single .tex file. When I figure out how to do this, typesetting the solutions file separately will not be necessary.

```
\expandnext{\renewcommand{\end}[1]}{\end{#1}\ifcsname end#1@hook\endcsname\csname end#1@hook\

\newcommand{\AfterEnvironment}[2]{%
  \ifcsdef{end#1@hook}{}{%
    \csdef{end#1@hook}{}%
  }%
  \csappto{end#1@hook}{#2}%
}


\newwrite\esgpset@problemsout
\newwrite\esgpset@solutionsout
%\newwrite\esgpset@tempout
\newcommand{\esgpset@compilefile}[1]{\write18{pdflatex "#1"}}
\edef\esgpset@problemsfilename{\jobname\string_Problems.tex}
\edef\esgpset@solutionsfilename{\jobname\string_Solutions.tex}
%\edef\esgpset@tempfilename{\jobname.tmp}
\newcommand{\esgpset@writetoboth}[1]{\esgpset@writetoproblems{#1}%
  \esgpset@writetosolutions{#1}}
\newcommand{\esgpset@writetoall}[1]{\esgpset@writetoboth{#1}\esgpset@writetothis{#1}}
\newcommand{\esgpset@writetoproblems}[1]{\immediate\write\esgpset@problemsout{#1}}
\newcommand{\esgpset@writetosolutions}[1]{\immediate\write\esgpset@solutionsout{#1}}
\newcommand{\esgpset@writetothis}[1]{{\edef\temp{#1}\expandafter}\expandafter\scantokens\expa
\newcommand{\esgpset@pre@writetothis}{\gdef\esgpset@curcode{}}%\immediate\openout\esgpset@tem
\newcommand{\esgpset@do@writetothis}[1]{\gappto\esgpset@curcode{#1^^J}}%\immediate\write\esgp
\newcommand{\esgpset@post@writetothis}{\expandnext{\scantokens}{\esgpset@curcode}}%\immediate

\immediate\openout\esgpset@problemsout\esgpset@problemsfilename
\immediate\openout\esgpset@solutionsout\esgpset@solutionsfilename

\AtEndDocument{
  \esgpset@writetoboth{\string\end{document}}
  \immediate\closeout\esgpset@problemsout
  \immediate\closeout\esgpset@solutionsout
  \ifthenelse{\boolean{esg8022pset@pdfsolutions}}{\esgpset@compilefile{\esgpset@solutionsfile
  \ifthenelse{\boolean{esg8022pset@pdfproblems}}{\esgpset@compilefile{\esgpset@problemsfilena
}

\begingroup
  \esgpset@writetosolutions{%
    \string\documentclass[solutions]{esg8022pset}
  }
  \esgpset@writetoproblems{%
    \string\documentclass[problems]{esg8022pset}
  }
\endgroup

\newenvironment{preamble}{%
  \begingroup% Lets Keep the Changes Local
    \esgpset@pre@writetothis%
```

```
      \@bsphack
      \let\do\@makeother\dospecials\catcode`\^^M\active
      \def\verbatim@processline{\esgpset@writetoboth{\the\verbatim@line}\expandnext{\esgpset@do
      \verbatim@start
  }{\@esphack\endgroup\esgpset@post@writetothis}

  \AtBeginDocument{

    \begingroup
      \esgpset@writetoboth{%
        \string\classname{\expandafter\unexpanded\expandafter{\@classname}}^^M%
        \string\semester{\expandafter\unexpanded\expandafter{\@semester}}
      }
      \esgpset@writetoboth{%
        \string\problemsetnumber{\expandafter\unexpanded\expandafter{\@problemsetnumber}}%
      }
      \esgpset@writetoboth{%
        \string\date{\expandafter\unexpanded\expandafter{\@date}}%
      }
      \esgpset@writetoboth{%
        \string\duedate{\expandafter\unexpanded\expandafter{\@duedate}}%
      }
      \esgpset@writetoboth{%
        \string\readingassignment{\expandafter\unexpanded\expandafter{\@readingassignment}}%
      }
      \esgpset@writetoboth{%
        \string\problemsettitle{\expandafter\unexpanded\expandafter{\@problemsettitle}}%
      }
      \esgpset@writetoboth{\string\begin{document}}
    \endgroup
  }
}


\pagestyle{fancy}
\headheight 14.5pt
\fancyhead{}
\fancyfoot{}
\cfoot{\thepage\space of \pageref{LastPage}}

\let\@seccntformat\@gobble

\AtBeginDocument{
  \begingroup
    \def\@headerextra{%
      \xifblank{\@problemsettitle}{}{%
        (\@problemsettitle)\space
      }%
    }%
    \ifthenelse{\boolean{esg8022pset@problems}}{%
```

```
      \edef\@cheader{Problem Set \@problemsetnumber\space\@headerextra - Problems}
    }{
      \ifthenelse{\boolean{esg8022pset@solutions}}{
        \edef\@cheader{Problem Set \@problemsetnumber\space\@headerextra - Solutions}
      }{
        \edef\@cheader{Problem Set \@problemsetnumber\space\@headerextra - Problems}
      }
    }
  \expandafter\endgroup
  \expandafter\chead\expandafter{\@cheader}
  \begingroup
    \bf
    \begin{center}%
      {\noindent  \textsc{Massachusetts Institute of Technology} \par}%
      {\noindent  Experimental Study Group \par}%
    \end{center}%
    {\noindent  \@classname, \@semester \par}%
    \begin{center}%
      {\noindent \Large
        Problem Set \@problemsetnumber
        \ifthenelse{\boolean{esg8022pset@solutions}}{% \OR \NOT \boolean{esg8022pset@problems}{
          \space Solutions%
        }{}%
      \par}%
      \xifblank{\@problemsettitle}{}{%
        {\noindent \Large \@problemsettitle\par}%
      }%
    \end{center}%
    {\noindent Due: \@duedate}%
    \xifblank{\@readingassignment}{}{%
      \\\\
      {\noindent Reading: \@readingassignment \par}%
    }%
  \endgroup
  \global\let\duedate\relax
  \global\let\problemsetnumber\relax
  \global\let\semester\relax
  \global\let\classname\relax
  \global\let\readingassignment\relax
  \global\let\problemsettitle\relax
  \global\let\@duedate\relax
  \global\let\@problemsetnumber\relax
  \global\let\@semester\relax
  \global\let\@classname\relax
  \global\let\@readingassignment\relax
  \global\let\@problemsettitle\relax
}
```

`\duedate`
`\problemsetnumber`
`\semester`
`\classname`
`\readingassignment`
`\problemsettitle`

These four macros are provided by `esg8022pset.dtx` to provide information about the class assigning the pset. The information is stored away in internal control

sequences. It is the task of the \maketitle command to use the information provided. The definitions of these macros are shown here for information.

```
\newcommand*{\duedate}[1]{\gdef\@duedate{#1}}
\newcommand*{\problemsetnumber}[1]{\gdef\@problemsetnumber{#1}}
\newcommand*{\semester}[1]{\gdef\@semester{#1}}
\newcommand*{\classname}[1]{\gdef\@classname{#1}}
\newcommand*{\readingassignment}[1]{\gdef\@readingassignment{#1}}
\readingassignment{}
\newcommand*{\problemsettitle}[1]{\gdef\@problemsettitle{#1}}
```

3.1 Problem Environments

problem
solution

```
\newenvironment{problem}[2][\relax]{%
  \ifthenelse{\equal{#1}{\relax}}{%
    \esgpset@writetoall{\string\section{Problem \string\thesection: \unexpanded{#2}}}%
  }{%
    \esgpset@writetoall{\string\section*{Problem #1: \unexpanded{#2}}}%
  }%
  \esgpset@writetosolutions{\string\subsection{Problem}}%
  \begingroup% Lets Keep the Changes Local
    \esgpset@pre@writetothis
    \@bsphack
    \let\do\@makeother\dospecials\catcode`\^^M\active
    \def\verbatim@processline{\esgpset@writetoboth{\the\verbatim@line}\expandnext{\esgpset@do@w
    \verbatim@start
}{\@esphack\endgroup\esgpset@post@writetothis}
\newenvironment{solution}{%
  \esgpset@writetosolutions{\string\subsection{Solution}}%
  \begingroup% Lets Keep the Changes Local
    \@bsphack
    \let\do\@makeother\dospecials\catcode`\^^M\active
    \def\verbatim@processline{\esgpset@writetosolutions{\the\verbatim@line}}%
    \verbatim@start
}{\@esphack\endgroup}%
```

3.2 Problems/Solutions Environments

ForProblems
ForSolutions
ForPSet

```
\newenvironment{ForProblems}{%
  \begingroup% Lets Keep the Changes Local
    \esgpset@pre@writetothis
    \@bsphack
    \let\do\@makeother\dospecials\catcode`\^^M\active
    \def\verbatim@processline{\esgpset@writetoproblems{\the\verbatim@line}\expandnext{\esgpset@
    \verbatim@start
}{\@esphack\endgroup\esgpset@post@writetothis}
\newenvironment{ForPSet}{%
```

```
  \begingroup% Lets Keep the Changes Local
    \esgpset@pre@writetothis
    \@bsphack
    \let\do\@makeother\dospecials\catcode`\^^M\active
    \def\verbatim@processline{\esgpset@writetoboth{\the\verbatim@line}\expandnext{\esgpset@do@w
    \verbatim@start
}{\@esphack\endgroup\esgpset@post@writetothis}
\newenvironment{ForSolutions}{%
  \begingroup% Lets Keep the Changes Local
    \@bsphack
    \let\do\@makeother\dospecials\catcode`\^^M\active
    \def\verbatim@processline{\esgpset@writetosolutions{\the\verbatim@line}}%
    \verbatim@start
}{\@esphack\endgroup}%
```