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}\ifcsdef{end#1@hook}{\csname end#1@hook\endcsn

\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\e
\newcommand{\esgpset@pre@writetothis}{\gdef\esgpset@curcode{}}%\immediate\openout\esgpset@
\newcommand{\esgpset@do@writetothis}[1]{\expandnext{\gappto\esgpset@curcode}{#1^^J}}%\imme
\newcommand{\esgpset@post@writetothis}{\expandnext{\scantokens}{\esgpset@curcode}}%\immedi

\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@solutionsf
  \ifthenelse{\boolean{esg8022pset@pdfproblems}}{\esgpset@compilefile{\esgpset@problemsfil
}

\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}\esgpset@do@writetot
      \verbatim@start
  }{\@esphack\endgroup\aftergroup\esgpset@post@writetothis\relax}

  \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@problem
          \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}\esgpset@do@writetothi
    \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}\esgpset@do@writet
    \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}\esgpset@do@writetothi
    \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}%
```