
interactiveworkbook: L^AT_EX–Based Interactive PDF on the Web

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Abstract

The package, **interactiveworkbook**, gives the user the ability to write L^AT_EX documents which, ultimately, create interactive question–and–answer Portable Document Format (PDF) tutorials meant to be used by Internet distance learning students (Kuhn, 1999).

1 Introduction

Combining interactivity with the display of mathematical notation is important for online distance learning. The interactive PDF (Adobe, 1999a) (Adobe, 1999b) tutorials created using **interactiveworkbook** are meant to mimic a classroom discussion situation. The interactive PDF tutorial program responds in either a positive or negative way to an Internet students’ answers to a variety of questions, including multiple choice (multiple and single answer), fill–in–the–blank, true/false and matching type problems. The fact that the interactive PDF tutorial is L^AT_EX–based allows both the program questions and responses to student answers to be very explanatory and, in particular, to freely use mathematical notation.

Achieving interactivity with the display of mathematical notation is difficult on the Internet. The Internet is presently based on the Hypertext Markup Language (HTML) which essentially does not allow for mathematical notation. Not surprisingly, a fair bit of effort has been devoted in the last few years to finding a solution to this problem. The World Wide Web Consortium, which manages HTML, is in the process of preparing Mathematical Markup Language (MathML) (Sutor and Dooley, 1998). The computer company IBM has produced a plug–in for Netscape Navigator and Microsoft Internet Explorer called *texexplorer Hypermedia Browser* (Sutor and Dooley, 1998). The interactive PDF approach used in this paper has been used by others, in particular, D.P. Story (1999) and T. Merz (1998). An initial version of **interactiveworkbook**, called *pdf-flash*, was written by A. Montgomery (1998).

2 Creating an interactive PDF question

A simple example of the use of **interactiveworkbook** to create an interactive PDF multiple choice question with multiple answers using check boxes, is given below.

```
\documentclass[dvips]{article}
```

```
\usepackage{interactiveworkbook}

\begin{document}

\questionandresponses{check}
{ques1.pdf}{questionindex.pdf}{ques3.pdf}
{Question 2. $\\;$ This is a multiple
check box question where more than one
answer can be correct.\\}
\begin{center}
\checkone {\boldmath $0.94$}
\answercheckone{Off} $\\;$
\checktwo {\boldmath $0.95$}
\answerchecktwo{Off}$\\;$
\checkthree {\boldmath $0.96$}
\answercheckthree{On} $\\;$
\checkfour {\boldmath $0.97$}
\answercheckfour{Off} $\\;$
\checkfive {\boldmath $0.98$}
\answercheckfive{On}
\end{center}
}
{Yes, correct.}
{No, try again.}

\end{document}
```

Using a L^AT_EX → DVI → PS → PDF process, three PDF pages (which, together, are called an interactive PDF question), are generated by this sample L^AT_EX file. These three pages include a question (first) page, correct response (second) page and incorrect response (third) page. In addition to the question text and check boxes, there are a number of navigational buttons appearing at the bottom of all of these pages. Depending on the navigational button clicked, the user is passed either between the three pages of this interactive PDF question, or outside of this interactive PDF question, to another interactive PDF question.

2.1 Questionandresponses command

The command “\questionandresponses” used in the sample L^AT_EX file above has seven arguments.

The first argument, “check”, tells **interactiveworkbook** that check boxes are used in this particular question. This first argument may take on one of four values: check, popup, field or radio

The second, third and fourth arguments name the PDF files that a user passes to when clicking on the Previous, Index and Next navigational buttons, respectively. In this case, a user passes back to the first question, ques1.pdf, when clicking on the Previous button, to the index, questionindex.pdf, when clicking on the Index button, and to the third question, ques3.pdf, when clicking on the Next button.

- Montgomery, Aaron. “pdfflash”. 1998.
software package available at
<http://mac69108.math.cwu.edu/code/latex.html>.
- Story, Donald P. 1999. interactive
PDF software available at
[http://www.math.uakron.edu/dpstory/
acrotex.html](http://www.math.uakron.edu/dpstory/acrotex.html).
- Sutor, Robert R. and S. S. Dooley. “ \TeX and \LaTeX
on the Web Via IBM techexplorer”. *TUGboat*
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