

AcroTeX.Net

On using `\saveDest` and `\useDest`

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1. Introduction

This is a rather technical blog on how exerquiz creates named destinations that link the question to a solution within the `shortquiz` and `quiz` environments.

When a named destination is explicitly inserted into the syntax of a question (multiple choice, multiple selection, math fill-in, text fill-in), or is automatically generated, signaled by the `*`, the text macro `\@qzsolndest` is globally defined to be that named destination. For example, if we create a math fill-in like so,

$$\backslash\text{RespBoxMath}\{\sin(x)\}[\text{myDest1}]\{3\}\{.0001\}\{[0,1]\}$$

Just after this declaration is made `\@qzsolndest` would expand to `myDest1`. If a question has no named destination declaration

$$\backslash\text{RespBoxMath}\{\sin(x)\}\{3\}\{.0001\}\{[0,1]\}$$

`\@qzsolndest` expands to the empty string.

There is only one text macro `\@qzsolndest`, it gets defined, and re-defined with each question, whether it has a destination defined or not. This is an important point.

There are two quiz components that use `\@qzsolndest`, these are the correct answer buttons (`\CorrAnsButton` and `\CorrAnsButtonGrp`), and the solution environment.

- The correct answer buttons check `\@qzsolndest`, if this macro is non-

empty the border of the button is highlighted, and a Shift-Click JavaScript event is created to jump to the solution.

- The `solution` environment checks the macro `\@qzsolndest`, if this macro is empty, `exerquiz` places the solution following the question; otherwise, it places the solution at the end of the document and sets a destination target (for the correct answer buttons to jump to) at the beginning of the solution using `\@qzsolndest`.

Naturally, the value of `\@qzsolndest` read by `\CorrAnsButton`, for example, must be the same as that read by the `solution` environment. Normally, this is not a problem, but in the case of having grouped questions, the destinations may not match up. This situation is discussed in the next section.

2. Grouped Questions

The environment `mathGrp` can be used to group together many questions, which are graded as a group. It was a poor choice of names, perhaps I should have named the environment `quesGrp` (question group), for the grouping applies text as well as math questions; we are stuck with `mathGrp`. See the demo file `grp_test.tex` that is distributed with `AeB` for detailed examples of the grouped questions.

Let's illustrate the problem, and its solution through examples.

Example 1. Enter the first nine natural numbers in the 3×3 table below. Enter them row-wise.

Solution: The solution to Example 1. ■

Notice that this `shortquiz`—created using the `oQuestion` environment—has several problems: (1) Even though there is a solution, it does not appear at the end of the document; (2) the **Ans** button has a green border, indicating that there is a solution, shift-clicking the button goes nowhere.

So, what's the problem? The verbatim listing of this quiz is

```
\begin{oQuestion}{example1}
\noindent\textbf{Example~1.} Enter the first nine...
\begin{center}\setlength{\tabcolsep}{2mm}
\def\Nij#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}{1}{.0001}{[0,1]}}
\def\NijSoln#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}*{1}{.0001}{[0,1]}}
\begin{mathGrp}
\begin{tabular}{ccc}
```

```

\Nij{1}&\Nij{2}&\Nij{3}\\
\Nij{4}&\Nij{5}&\NijSoln{6}\makebox[0pt][l]{\quad
\CorrAnsButtonGrp{1,2,3,4,5,6,7,8,9}\kern2bp\sqrClearButton}\\
\Nij{7}&\Nij{8}&\Nij{9}
\end{tabular}
\end{mathGrp}
\end{center}
\begin{solution}The solution to Example~1.\end{solution}
\end{oQuestion}

```

We define macros `\Nij` and `\NijSoln` to make the entry of the table simple and clean. I place the `\CorrAnsButtonGrp` in line with the second row (to get that centered look). Just to the left of `\CorrAnsButtonGrp`, I use `\NijSoln` to generate a non-empty value for `\@qzsolndest`. Yet, the solution appears after the question and the button doesn't work! The reason for the first problem is that other `\RespBoxMath` declarations follow in the third row, there do not have a named destination, hence, they define and re-define the macro `\@qzsolndest` to be empty. When we get to the solution environment, the current value of `\@qzsolndest` is empty, hence, the solution is displayed after the question. The reason the shift-click button does not work, it that the destination was never created by the solution environment.

If I had aligned the correct answer button in the third row, things would have worked.

Example 2. Enter the first nine natural numbers in the 3×3 table below. Enter them row-wise.

That works, but does not supply the “look” we want. We want the freedom to place the correct answer button where ever we wish! The verbatim listing follows:

```
\begin{oQuestion}{example2}
\noindent\textbf{Example~2.} Enter the first nine...
\begin{center}\setlength{\tabcolsep}{2mm}
\def\Nij#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}{1}{.0001}{{[0,1]}}
\def\NijSoln#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}*{1}{.0001}{{[0,1]}}
\begin{mathGrp}
  \begin{tabular}{ccc}
    \Nij{1}&\Nij{2}&\Nij{3}\\\
    \Nij{4}&\Nij{5}&\Nij{6}\\\
    \Nij{7}&\Nij{8}&\NijSoln{9}\makebox[Opt][l]{\quad
      \CorrAnsButtonGrp{1,2,3,4,5,6,7,8,9}\kern2bp\sqClearButton}\\\
  \end{tabular}
\end{mathGrp}
```

```

\end{mathGrp}
\end{center}
\begin{solution}The solution to Example~2.\end{solution}
\end{oQuestion}

```

Now, the value of `\@qzsolndest` define by `\NijSoln` and picked up by `\CorrAnsButtonGrp` is the same as that picked up by the solution environment.

The next example is the solution to the problem of placing the correct answer button where we want, so that everything works.

Example 3. Enter the first nine natural numbers in the 3×3 table below. Enter them row-wise.

```

\begin{oQuestion}{example3}
\noindent\textbf{Example~3.} Enter the first nine...
\begin{center}\setlength{\tabcolsep}{2mm}
\def\Nij#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}{1}{.0001}]{[0,1]}}

```

```

\def\NijSoln#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}*{1}{.0001}{[0,1]}}
\begin{mathGrp}
  \begin{tabular}{ccc}
    \Nij{1}&&\Nij{2}&&\Nij{3}\\\
    \Nij{4}&&\Nij{5}&&\NijSoln{6}\saveDest\makebox[0pt][1]{\quad}
      \CorrAnsButtonGrp{1,2,3,4,5,6,7,8,9}\kern2bp\sqClearButton\\\
    \Nij{7}&&\Nij{8}&&\Nij{9}
  \end{tabular}
\end{mathGrp}
\end{center}
\useDest
\begin{solution}The solution to Example~3.\end{solution}
\end{oQuestion}

```

The solution is to use the command pair `\saveDest` and `\useDest`. I've placed `\saveDest` just after the `\NijSoln`. `\saveDest` picks up on the current value of `\@qzsolndest` and saves it in the text macro `\holdDest`. The command `\useDest` expands the current value of `\holdDest`, it is placed before the beginning of the solution environment.

The definition of `\saveDest` is as follows:

```

\newcommand{\saveDest}[1][ ]{%
  \def\sd@arg{#1}\ifx\sd@arg\@empty
  \xdef\holdDest{\@qzsolndest}\else

```

```
\xdef\@qzsolndest{#1}\xdef\holdDest{#1}\fi}
```

Note that there is an optional parameter as well. This allows you to insert your own named destination. This optional parameter comes in handy in the following example:

The last example illustrates `\saveDest` with its optional argument.

Example 4. Enter the first nine natural numbers in the 3×3 table below. Enter them row-wise.

```
\begin{oQuestion}{example4}
\noindent\textbf{Example 4.} Enter the first nine...
\begin{center}\setlength{\tabcolsep}{2mm}
\def\Nij#1{\RespBoxMath[\rectW{.25in}\Q{1}]{#1}{1}{.0001}{[0,1]}}
\begin{mathGrp}
\begin{tabular}{ccc}
\Nij{1}&\Nij{2}&\Nij{3}\\\
\Nij{4}&\Nij{5}&\Nij{6}\saveDest[myDest]\makebox[0pt][l]{\quad
\CorrAnsButtonGrp{1,2,3,4,5,6,7,8,9}\kern2bp\sqClearButton}}\end{tabular}
\end{mathGrp}
\end{center}
\end{oQuestion}
```

```

\Nij{7}&\Nij{8}&\Nij{9}
\end{tabular}
\end{mathGrp}
\end{center}
\useDest
\begin{solution}The solution to Example~4.\end{solution}
\end{oQuestion}

```

Notice the use of `\saveDest` with the optional argument `\saveDest [myDest]`. Notice too that I've eliminated the definition for `\NijSoln`. When a named destination is provided in `\RespBoxMath`, for example, all that is done is to define the `\@qzsolndest` macro. We can do that separately using `\saveDest`, no need for a special definition. The `\useDest` macro has definition,

```
\def\useDest{\def\@qzsolndest{\holdDest}}
```

`\useDest` should not be used unless there is a matching `\saveDest`.

Solutions to Quizzes

Solution to Quiz: The solution to Example 2.



Solution to Quiz: The solution to Example 3.



Solution to Quiz: The solution to Example 4.

