

A Simple Strategy for Creating Web-based, Interactive, Multiple- Choice, Practice Examinations.

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INTRODUCTION

This article describes a simple, text-based HTML technique for creating multiple-choice Web examinations that allow students to review course materials interactively. Clicking on any of the answers to each examination question reveals whether that answer is right or wrong. The technique is particularly useful in converting class examinations into Web-based practice examinations.(1)

(1) Examples of examinations created through this approach are available at www.miami.edu/chm/chm201a2 (organic) and www.miami.edu/chm/chm101h (nonmajors). Look for File Examinations on the home page. These should be available through 15 December 1998.

The principal advantage of this strategy is simplicity. It requires only the ability to write HTML coding, or access to a fully featured Web page-creation program. Except for graphic, audio, or other binary files that might be included within the examination- or response-files, all files are text (ASCII) based. Other than competence with HTML, no programming skills are required.(2)

(2) Among many books available for introductions to and compendia of HTML coding, I have found Laura Lemay's HTML books especially useful, e.g. "Teach Yourself Web Publishing With HTML 4 In A Week", 4th Edition, Laura Lemay, Sams.net Publishing, 1997. See also <http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimerAll.html>

In practice, an HTML-coded file is created for the multiple-choice examination and is placed in a server directory along with a set of five HTML files (for 5-choice questions) that respond to wrong answers and a set of HTML files, one for each question in the examination, that respond to right answers.

In order of increasing complexity, the following illustrate 1) a typical wrong-response file, 2) a typical right-response file, and 3) a typical question taken from a quiz-file.

WRONG-RESPONSE FILE

Sorry, but that is the `wrong` answer. Please use your browser to move back to the quiz and try again.

That's the entire text for the wrong-response file. Except for HTML emphasis on the word "wrong" it contains nothing fancy. It seems desirable to keep the wrong-responses low key. The student now uses the browser's own capabilities to return to the the same location on the previous page, the examination page, and try the question again. There is no return-to-test link in the wrong-response file to carry the student back to the test question just attempted. The browser itself performs this function. This method of operation allows one set of five wrong-response files to be used for the entire examination.

The wrong-response files are named no1.htm through no5.htm. Alternatively they might be no_a.htm through no_e.htm, or some other variation. The file no1.htm is linked to each `*wrong* choice *a)*` in every question within the examination; file no2.htm is linked to each `*wrong* choice *b)*` in every examination question, etc. For `*right* choices *a)*, *b)*`, etc., there is a set of right-response files.

RIGHT-RESPONSE FILE

```
<font color=#6b8e23>Yes! That is the</font> <font
size=+3 color=#9400d3><blink>RIGHT</blink></
font></em> <font color=#6b8e23>answer. Now move
to the</font> <a href="quiz.htm#03">next question</
a>.
```

Here HTML coding is used for font color, font size, and to produce blinking of the word "right". Effects can easily move up or down the scale, depending on the complexity desired for right-response files, HTML competence, and/or the sophistication of a Web page-creation program.

The coding `` carries the student back to the examination, which is in a file named quiz.htm, and to the next question. This implies that the right-response file shown above must be the file for the right answer to question #2, and is used `*only*` for that particular answer of that particular question. Thus each right-response file must contain a `` where #nn refers to the next question in the examination. (The right-response file for the final question carries the student to links that permit return to question #1 for repeating the examination or

back to the home page, as described below.)

Each right-response statement is the sole occupant of a unique html file, named no01.htm, no02.htm, etc., or an appropriate variation. Notice that for the first five questions, the wrong- and right-response HTML files are distinguished from each other by a single digit (1, 2, etc.) for the wrong- and two digits (01 02, etc.) for the right-response. All additional questions continue to use two-digit right-response files, no06.htm, no07.htm, etc.

QUIZ FILE

Questions

```
<a name="06">06.</a> The energy of the sun comes from:
```

```
<ul>
```

```
<li><a href="no06.htm">a</a> fusion of H nuclei to form He nuclei
```

```
<li><a href="no2.htm">b</a> fission of He nuclei to form H nuclei
```

```
<li><a href="no3.htm">c</a> fission of U-238 nuclei
```

```
<li><a href="no4.htm">d</a> fission of U-235 nuclei
```

```
<li><a href="no5.htm">e</a> fusion of deuterium and tritium nuclei
```

```
</ul>
```

The question starts with an HTML name. In this question, Question 06, the `` is the target of the right- response file for question #05. This is what brings the browser back to question 06 of the quiz.htm file when the student clicks at the return-to-quiz link of the right-response file for Question 05.

The five choices are coded as an unnumbered list. Response *a)*, the correct response in this case, is coded to take the student to the right-response file for this question, no06.htm; all others are coded for one of the five wrong-response files.

A typical quiz footer:

```
<hr>
```

```
<a name="51">= THE END =</a><br> You now have the choice of:
```

```
<ul>
```

```
<li>returning to <a href="quiz.htm#01">Question #01</a> to repeat the quiz, or
```

```
<li>returning to the <a href="..101hfile.htm">file examination menu</a><br>
```

```
</ul>
```

```
</body>
```

```
</html>
```

Following a hard rule `<hr>`, a section named "51" (for a 50- question examination) gives students the options of returning to Question 01 of the examination or returning to a menu of file examinations. This footer must be coded `` where nn is the number of the last question on the examination.

Every quiz file is named quiz.htm. Multiple quizzes are distinguished from each other by the names of their storage directories.

Link colors:

Placing the code `<body link="#228B22" vlink="#228B22">` early in the quiz file prevents the browser from changing the colors of the links as they are clicked. Thus good choices made by the first student to take the quiz don't reveal the right answers to subsequent students (using the same computer) through color changes in links.

OTHER CONSIDERATIONS

The simplicity of HTML coding requires that every examination file, together with all its right- and wrong-response files, be placed in a unique directory on a server. The entire set of both right- and wrong-response files must be placed in every directory containing a quiz. This approach is demanding of server space, but that is a cost of its simplicity.

As with any other html document, graphics such as .gif or .jpg files can be inserted into the right- and wrong-response and quiz files. For rapid downloading via modems, I avoid graphic and other binary files except where graphics are integral parts of the questions.

Although beyond the scope of this discussion, the use of word- processor macros facilitates immensely the conversion of classroom examinations into these HTML quizzes. Anyone interested in copies of the macros I have written for use with my DOS-based, WordPerfect 5.1+ word processor may contact me. With these or other macros, the only time-consuming activity, other than proofreading, is identifying correct answers and entering the appropriate right-answer code by hand.

Finally, the HTML coding described here is effective with the currently available Netscape Communicator. While other browsers, or later versions of this browser, may require (or benefit from) different coding, the strategy described here should be generally and consistently useful.

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