http://sproc.org/ojs/index.php/wjet

Automated problem generation in learning management systems: a tutorial

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Abstract

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1. Introduction

/EMC2./P /MCI30/ang enBBB2 B/T1 11.04 Tf 0 0 1 79.9445959.54 enBBB1 0 0 1862.6445959.54 enEduaScnatiSnal13Sestarc

3. Problem generation based on random parameters in cloze questions

Problem design.

Data generation.

Problem computations.

Design of interpretation rules.

Wording generation

Generation of cloze questions in XML format

4. Example

Problem design.

$$A_i = \sum_{k=1}^{K} w_k \times b_{ik}$$

Data generation.

Problem computations and design of interpretation rules

Wording generation.

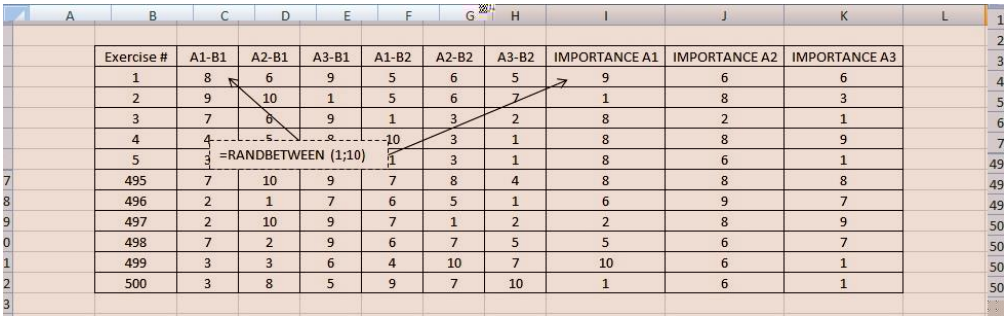
Generation of cloze questions in XML format

In order to evaluate brands in category X, consumer usually consider attributes A1, A2, and A3. Company B1 recently conducted a survey asking consumers to evaluate these attributes in its brand and its main competitor (company B2), as well as the importance of each attribute when they make a purchase in category X. The scale for evaluating attributes as well as their importance ranges from 1 to 10. The survey results are:

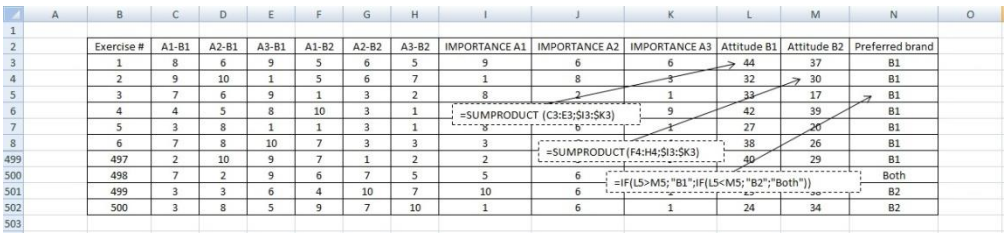
	Brand B1	Brand B2	Importance
Attribute A1	5	7	4
Attribute A2	8	4	5
Attribute A3	2	1	2

Questions:

1) Which is the attitude toward brand B1?
2) Which is the attitude toward brand B2?
3) Which brand is the most preferred by customers?



Exercise #	A1-B1	A2-B1	A3-B1	A1-B2	A2-B2	A3-B2	IMPORTANCE A1	IMPORTANCE A2	IMPORTANCE A3
1	8	6	9	5	6	5	9	6	6
2	9	10	1	5	6	7	1	8	3
3	7	6	9	1	3	2	8	2	1
4	4	5	8	10	3	1	8	8	9
5	3	8	1	1	3	1	8	6	1
495	7	10	9	7	8	4	8	8	8
496	2	1	7	6	5	1	6	9	7
497	2	10	9	7	1	2	2	8	9
498	7	2	9	6	7	5	5	6	7
499	3	3	6	4	10	7	10	6	1
500	3	8	5	9	7	10	1	6	1



Exercise #	A1-B1	A2-B1	A3-B1	A1-B2	A2-B2	A3-B2	IMPORTANCE A1	IMPORTANCE A2	IMPORTANCE A3	Attitude B1	Attitude B2	Preferred brand
1	8	6	9	5	6	5	9	6	6	44	37	B1
2	9	10	1	5	6	7	1	8	3	32	30	B1
3	7	6	9	1	3	2	8	2	1	33	17	B1
4	4	5	8	10	3	1	8	8	9	42	39	B1
5	3	8	1	1	3	1	8	6	1	27	20	B1
6	7	8	10	7	3	3	3	8	1	38	26	B1
497	2	10	9	7	1	2	2	8	9	40	29	B1
498	7	2	9	6	7	5	5	6	7	34	38	Both
499	3	3	6	4	10	7	10	6	1	23	24	B2
500	3	8	5	9	7	10	1	6	1	24	34	B2

PROBLEM: BRAND ATTITUDES

In order to evaluate brands in category X, consumer usually consider attributes A1, A2, and B3. Company B1 recently conducted a survey asking consumers to evaluate these attributes in its brand and its main competitor, as well as the importance of each attribute when they make their purchase in category X. The scale for evaluating attributes as well as their importance ranges from 1 to 10. The survey results are:

	Brand B1	Brand B2	Importance
Attribute A1	«A1B1»	«A1B2»	«IMPORTANCE_A1»
Attribute A2	«A2B1»	«A2B2»	«IMPORTANCE_A2»
Attribute A3	«A3B1»	«A3B2»	«IMPORTANCE_A3»

Questions:

1) Which is the attitude toward brand B1?
2) Which is the attitude toward brand B2?
3) Which brand is the most preferred by customers?

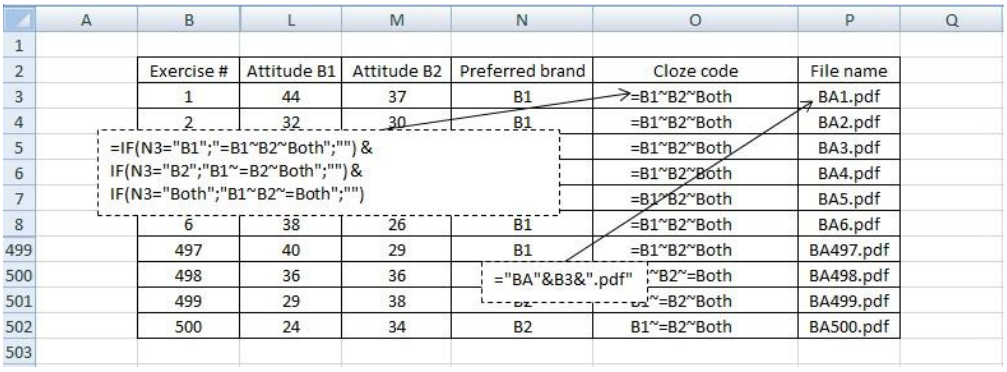
PROBLEM: BRAND ATTITUDES

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	Brand B1	Brand B2	Importance
Attribute A1	8	5	9
Attribute A2	6	6	6
Attribute A3	9	5	6

Questions:

1) Which is the attitude toward brand B1?
2) Which is the attitude toward brand B2?
3) Which brand is the most preferred by customers?



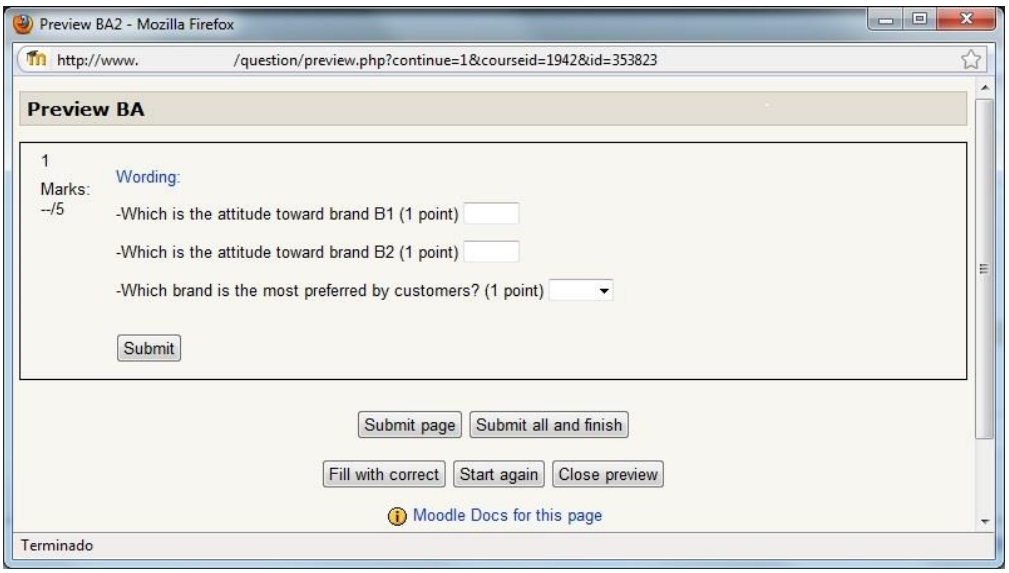
	A	B	L	M	N	O	P	Q
1								
2		Exercise #	Attitude B1	Attitude B2	Preferred brand	Cloze code	File name	
3		1	44	37	B1	=B1~B2~Both	BA1.pdf	
4		2	32	30	B1	=B1~B2~Both	BA2.pdf	
5						=B1~B2~Both	BA3.pdf	
6						=B1~B2~Both	BA4.pdf	
7						=B1~B2~Both	BA5.pdf	
8		6	38	26	B1	=B1~B2~Both	BA6.pdf	
499		497	40	29	B1	=B1~B2~Both	BA497.pdf	
500		498	36	36		B2~=Both	BA498.pdf	
501		499	29	38		=B2~Both	BA499.pdf	
502		500	24	34	B2	B1~=B2~Both	BA500.pdf	
503								

```
<question type="cloze">
 <name>
  <text>BA2</text>
 </name>
 <questiontext>
  <text>
   <![CDATA[
   <p><a href="http://www.serv_name.org/file.php/439/BA/«File_name»" target="_blank">Wording:</a></p>
   <p></p>
   <p>-Which is the attitude toward brand B1 (1 point) {1:NUMERICAL:=«Attitude_B1»:0} </p>
   <p>-Which is the attitude toward brand B2 (1 point) {1:NUMERICAL:=«Attitude_B2»:0} </p>
   <p>-Which brand is the most preferred by customers? (1 point) {3:MULTICHOICE:=«Cloze code»} </p> ]]>
  </text>
 </questiontext>
 <generalfeedback>
  <text />
 </generalfeedback>
 <shuffleanswers>0</shuffleanswers>
</question>
```

```
<?xml version="1.0" encoding="UTF-8" ?>                                                                  } Part 1: File introduction
<quiz>
 <question type="category">
  <category>
   <text>$course$/This is course name//Brand attitudes</text>
  </category>
 </question>

 <question type="cloze">                                                                                 } Part 2: Questions This must be repeated for each generated problem. Cloze question for case 1 is shown
  <name>
   <text>BA2</text>                                  Hyperlink containing the wording in pdf format
  </name>
  <questiontext>
   <text>
    <![CDATA[
    <p><a href="http://www.serv_name.es/file.php/439/BA/BA1.pdf" target="_blank">Wording:</a></p>
    <p></p>
    <p>-Which is the attitude toward brand B1 (1 point) {1:NUMERICAL:=44:0} </p>
    <p>-Which is the attitude toward brand B2 (1 point) {1:NUMERICAL:=37:0} </p>
    <p>-Which brand is the most preferred by customers? (1 point) {3:MULTICHOICE:=B1~B2~Both} </p> ]]>
   </text>
  </questiontext>
  <generalfeedback>
   <text />
  </generalfeedback>
  <shuffleanswers>0</shuffleanswers>
 </question>

</quiz>                                                                                                  } Part 3: File end
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5. Assessment and further implementations

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Acknowledgements

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