Mcros to support the creation of multiple-choice questionnaires in two-column tables. Apostolos Syropoulos, and Anastasios Dimou have adapted the package to use Greek. With the help of Wolfgang Büchel I added German, Russian and Italian. Finally it was LianTze Lim and Chennan Zhang who helped me with the Chinese translation. You can use another language with “unknown” option. With some languages, you need to compile with Xe\TeX. \texttt{alterqcm} is present on the \texttt{CTAN} servers and is part of \TeX\texttt{Live} so \texttt{tlmgr} or \texttt{TeX Live Utility} will allow you to install it. You will also find \texttt{alterqcm} in \TeX\texttt{Live} under \texttt{MikTeX} under Windows XP.

I thank Jean-Côme Charpentier, Manuel Pégourié-Gonnard, Franck Pastor, Ulrike Fischer and Josselin Noirel for the different ideas and advices that allowed me to make this package. Thanks also to Wolfgang Büchel for his corrections and scripts.

You can send your remarks, and reports on errors you have found. at the following address Alain Matthes
This work may be distributed and/or modified under the conditions of the \LaTeX\ Project Public License, either version 1.3 of this license or (at your option) any later version.
This work has the LPPL maintenance status ‘maintained’.
The Current Maintainer of this work is Alain Matthes.
1 How to use: first example

You need to load the `alterqcm.sty` with \usepackage[english]{alterqcm}, if you want to use the english language. With some languages like Greek or Chinese you need to compile with Xe\LaTeX otherwise you can compile with Lua\LaTeX or PDF\LaTeX.

Just use an environment `alterqcm` and the macro `\AQquestion`, here is an example:

\begin{document}
\begin{alterqcm}
\AQquestion{Question}{
{Proposition 1},
{Proposition 2},
{Proposition 3}}
\end{alterqcm}
\end{document}

\texttt{alterqcm.sty} creates a new environment `alterqcm` which allows for a two-column table. One column on the left for the questions, the other for the different proposals. The propositions are given in a list:

\{\text{Proposition 1},
\text{Proposition 2},
\text{Proposition 3}\}\)

The number of propositions is between 2 and 5.

The result is:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Question</td>
<td>□ Proposition 1</td>
</tr>
<tr>
<td></td>
<td>□ Proposition 2</td>
</tr>
<tr>
<td></td>
<td>□ Proposition 3</td>
</tr>
</tbody>
</table>

The total width of the array is equal to \textwidth. By default the question column has the width 100mm plus a few millimeters ... introduced by the table. The width of the answers is equal to \textwidth minus the width of the first column.

The important point is that the height of the lines in the proposals is calculated automatically so that, on the one hand, the text of the proposals is placed correctly without touching the lines and, on the other hand, the text of the corresponding question can be included in its box. Precise positioning is obtained with the option \texttt{pq}.

1.1 Packages loaded by \texttt{alterqcm.sty}

The list of loaded packages is as follows:

\begin{verbatim}
\RequirePackage{xkeyval}[2005/11/25]
\RequirePackage{calc}
\RequirePackage{ifthen,forloop}
\RequirePackage{array}
\RequirePackage{multirow}
\RequirePackage{pifont}
\end{verbatim}

\* You will need to load \texttt{longtable.sty} if you wish to use the \texttt{long} option for one of your arrays.

\* You also need the macro \texttt{\square}, it is either defined in the package \texttt{fourier} or in the package.
2 Tools: The environment \texttt{alterqcm} and the macro \texttt{AQquestion}

2.1 Environment \texttt{alterqcm}

\begin{alterqcm}[(options)] \texttt{(environment contents)} \end{alterqcm}

Here is the list of available options classified by category.

<table>
<thead>
<tr>
<th>Options</th>
<th>Default</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{lq}</td>
<td>100mm</td>
<td>width of the question column</td>
</tr>
<tr>
<td>\texttt{pq}</td>
<td>0pt</td>
<td>vertical shift of the question</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numbers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{bonus}</td>
<td>0,5</td>
<td>points for a correct answer</td>
</tr>
<tr>
<td>\texttt{malus}</td>
<td>0,25</td>
<td>points for wrong answer</td>
</tr>
<tr>
<td>\texttt{numbreak}</td>
<td>0</td>
<td>to take over a split board</td>
</tr>
<tr>
<td>\texttt{points}</td>
<td>empty</td>
<td>points awarded to the qcm in the margin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macros</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{symb}</td>
<td>$\square$</td>
<td>symbol in front of the proposal</td>
</tr>
<tr>
<td>\texttt{corsymb}</td>
<td>$\blacksquare$</td>
<td>symbol in front of the proposal</td>
</tr>
<tr>
<td>\texttt{numstyle}</td>
<td>\texttt{\arabic}</td>
<td>style of question numbering</td>
</tr>
<tr>
<td>\texttt{propstyle}</td>
<td>\texttt{\alph}</td>
<td>style of proposal numbering</td>
</tr>
<tr>
<td>\texttt{size}</td>
<td>\texttt{\normalsize}</td>
<td>font size</td>
</tr>
<tr>
<td>\texttt{afterpreskip}</td>
<td>\texttt{\medskip}</td>
<td>skip after the presentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Booleans</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{long}</td>
<td>true</td>
<td>longtable instead of tabular</td>
</tr>
<tr>
<td>\texttt{sep}</td>
<td>true</td>
<td>proposal separator</td>
</tr>
<tr>
<td>\texttt{pre}</td>
<td>false</td>
<td>MCQ presentation</td>
</tr>
<tr>
<td>\texttt{VF}</td>
<td>false</td>
<td>MCQ in the form True or False</td>
</tr>
<tr>
<td>\texttt{numprop}</td>
<td>false</td>
<td>proposal numbering</td>
</tr>
<tr>
<td>\texttt{num}</td>
<td>true</td>
<td>style of question numbering</td>
</tr>
<tr>
<td>\texttt{nosquare}</td>
<td>false</td>
<td>removing the square of proposals</td>
</tr>
<tr>
<td>\texttt{title}</td>
<td>false</td>
<td>title suppression</td>
</tr>
<tr>
<td>\texttt{correction}</td>
<td>false</td>
<td>allows you to create an answer sheet</td>
</tr>
<tr>
<td>\texttt{alea}</td>
<td>false</td>
<td>randomly place proposals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Texts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{tone}</td>
<td>Questions</td>
<td>column title 1</td>
</tr>
<tr>
<td>\texttt{ttwo}</td>
<td>Réponses</td>
<td>column title 2</td>
</tr>
<tr>
<td>\texttt{language}</td>
<td>french</td>
<td>french, english, german, greek, russian, italian, chinese, unknown</td>
</tr>
</tbody>
</table>

To create a MCQ use a \texttt{alterqcm} environment as well as the \texttt{AQquestion} macro defined in the next section.

2.2 The macro \texttt{AQquestion}

\texttt{AQquestion[(local options)]{(quest)}{(prop)\ldots,(prop)\)}}

This macro uses two arguments, the first defines the question, the second is a list that defines the propositions.
2 Tools: The environment `alterqcm` and the macro `\AQquestion`

<table>
<thead>
<tr>
<th>arguments</th>
<th>default definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>quest</td>
<td>issue definition</td>
</tr>
<tr>
<td>prop, i</td>
<td>proposition</td>
</tr>
</tbody>
</table>

Here is the list of options related to this macro.

<table>
<thead>
<tr>
<th>options</th>
<th>default definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>pq</td>
<td>0pt</td>
</tr>
<tr>
<td>br</td>
<td>1</td>
</tr>
</tbody>
</table>

### 2.3 Using the `minipage` environment to change the width of the table

\begin{center}
\begin{minipage}{9cm}
\begin{alterqcm}[lq=5cm]
...
\end{alterqcm}
\end{minipage}
\end{center}

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Among the following proposals, which of the following allows for</td>
<td>□ ( \lim_{x \to +\infty} e^x = +\infty )</td>
</tr>
<tr>
<td>to affirm that the exponential function admits for asymptote the right</td>
<td>□ ( \lim_{x \to -\infty} e^x = 0 )</td>
</tr>
<tr>
<td>from the equation ( y = 0 )?</td>
<td>□ ( \lim_{x \to +\infty} \frac{e^x}{x} = +\infty )</td>
</tr>
<tr>
<td>2. ( \exp(\ln x) = x ) for any ( x ) belonging to</td>
<td>□ ( \mathbb{R} )</td>
</tr>
<tr>
<td>□ ( 0 ; + \infty )</td>
<td>□ ( 0 ; + \infty )</td>
</tr>
</tbody>
</table>

### 2.4 Temporary modification of \textwidth

It is possible to use tables and other structures in the question code or proposals. An example is shown below:

\begin{center}
\newlength{\oldtextwidth}
\end{center}

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. the matrix ( M = \begin{pmatrix} 0 &amp; 1 \ 1 &amp; 1 \end{pmatrix} ) has</td>
<td>□ ( \begin{pmatrix} 0 &amp; 1 \ 1 &amp; 4 \end{pmatrix} )</td>
</tr>
<tr>
<td>for square</td>
<td>□ ( \begin{pmatrix} 1 &amp; 2 \ 2 &amp; 5 \end{pmatrix} )</td>
</tr>
</tbody>
</table>
2 Tools: The environment \texttt{alterqcm} and the macro \texttt{AQquestion}

```latex
\begin{alterqcm}[language=english,lq=88mm,symb=$\Box$]
\AQquestion{la matrice \( M=\begin{pmatrix}
0 & 1 \\
1 & 1 \\
\end{pmatrix} \) a pour carré}\%

{%
\begin{pmatrix}
0 & 1 \\
1 & 4 \\
\end{pmatrix}%,
\begin{pmatrix}
1 & 2 \\
2 & 5 \\
\end{pmatrix}
%
\end{alterqcm}
```

\setlength{\textwidth}{\oldtextwidth}
### 3 Global Environment Options \texttt{alterqcm}

#### 3.1 \texttt{lq} : changing the width of the first column

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Of the following proposals, which one allows of to assert that the exponential function admits for asymptote the equation line ( y = 0 ) ?</td>
<td>( \lim_{x \to +\infty} e^x = +\infty ) ( \lim_{x \to -\infty} e^x = 0 ) ( \lim_{x \to +\infty} \frac{e^x}{x} = +\infty )</td>
</tr>
<tr>
<td>2. ( \exp(\ln x) = x ) for any ( x ) belonging to</td>
<td>( \mathbb{R} ) ( \left] 0 ; + \infty \right[ ) ( \left[ 0 ; + \infty \right] )</td>
</tr>
</tbody>
</table>

Let’s look at the code needed to get this table. We need to place \texttt{\usepackage[alterqcm]} in the preamble. Note that only the width of the question column is provided \texttt{lq=100mm} and that this is optional. The number of propositions is here 3 but it can vary from one question to another.

```latex
\begin{alterqcm}[long,lq=110mm]
\AQquestion{Of the following proposals, which one allows of to assert that the exponential function admits for asymptote the equation line \( y = 0 \) ?}
\{\( \lim_{x \to +\infty} e^x = +\infty \), \( \lim_{x \to -\infty} e^x = 0 \), \( \lim_{x \to +\infty} \frac{e^x}{x} = +\infty \)}
\AQquestion{\( \exp(\ln x) = x \) for any \( x \) belonging to}
\{\( \mathbb{R} \), \( \left] 0 ; + \infty \right[ \), \( \left[ 0 ; + \infty \right] \)}
\end{alterqcm}
```

### 3.2 \texttt{pq} : global use

This time, it is necessary to move several questions, I placed a \texttt{pq=2mm} globally, that is to say like this:

```latex
\begin{alterqcm}[lq=85mm,pq=2mm]
\end{alterqcm}
```

All questions are affected by this option but some questions were well placed and should remain so, so locally I give them back a \texttt{pq=0mm}.
1. A bivariate statistical series. The values of $x$ are 1, 2, 5, 7, 11, 13 and a least squares regression line equation of $y$ to $x$ is $y = 1.35x + 22.8$. The coordinates of the mean point are:

- (6,5,30,575)
- (32,575;6,5)
- (6,5,31,575)

2. For any real $x$, the number $\frac{\text{e}^x - 1}{\text{e}^x + 2}$ equal to:

- $\frac{-1}{2}$
- $\frac{\text{e}^{-x} - 1}{\text{e}^{-x} + 2}$
- $\frac{1 - \text{e}^{-x}}{1 + 2\text{e}^{-x}}$

3. With $I = \int_{\ln 2}^{\ln 3} \frac{1}{\text{e}^x - 1} \, dx$ and $J = \int_{\ln 2}^{\ln 3} \frac{\text{e}^x}{\text{e}^x - 1} \, dx$ then the number $I - J$ equals

- $\ln \frac{2}{3}$
- $\ln \frac{3}{2}$
- $\frac{3}{2}$

3.3 TF : True or False

V or F in french vrai ou faux ! There are only two proposals and the candidate must choose between True or False ou bien si vous préférez Correct and Wrong. This time the syntax has been streamlined. It is no longer necessary to write the list of proposals and it is enough to position VF by placing in the options VF.

Let $f$ be a function defined and derivable on the interval $[-3; +\infty[$, increasing over the intervals $[-3; -1]$ et $[2; +\infty[$ and decreasing over the interval $[-1; 2]$. We note $f'$ its derivative function over the interval $[-3; +\infty[$. The $\Gamma$ curve representative of the $f$ function is plotted below in an orthogonal coordinate system $(O, \overrightarrow{i}, \overrightarrow{j})$. It passes through point $A(-3 ; 0)$ and admits for asymptote the $\Delta$ line of equation $y = 2x - 5$.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For all $x \in [-3; 2]$, $f'(x) \geq 0$.</td>
<td>□ T □ F</td>
</tr>
<tr>
<td>2. The $F$ function has a maximum in 2</td>
<td>□ T □ F</td>
</tr>
<tr>
<td>3. $\int_0^2 f'(x) , dx = -2$</td>
<td>□ T □ F</td>
</tr>
</tbody>
</table>
Let $f$ be a function defined and derivable on the interval $\big[-3;+\infty\big[$, increasing over the interval $\big[-3;+\infty\big[$ and $\big[-2;+\infty\big[$ and decreasing over the interval $\big[-1;+\infty\big[$.

We note $f'$ its derivative function over the interval $[-3;+\infty[$.

The $\Gamma$ curve representative of the $f$ function is plotted below in an orthogonal system $(O,\with{\imath},\jmath)$.

It passes through the point $A(-3;0)$ and admits for asymptote the line $\Delta$ of equation $y = 2x - 5$.

\begin{alterqcm}[VF, lq=125mm]
\AQquestion{For all $x \in \]–\infty;2\], $f'(x) \geq 0$.}
\AQquestion{The $F$ function has a maximum in 2}
\AQquestion{$\displaystyle\int_{0}^{2} f'(x) \,dx = -2$}
\end{alterqcm}

\section{3.4 symb : symbol change}

If your fonts don’t have the symbol $\square$ or $\blacksquare$ you can use the one provided by the package or create one yourself. $\altersquare$, $\dingsquare$ and $\dingchecksquare$ are provided by alterqcm. Here is how these macros are defined.

\newcommand*{\altersquare}{\mbox{\vbox\hrule\hbox to 6pt{\vrule height 5.2pt \hfil\vrule}}} you either get □ or...

\newcommand*{\dingsquare}{\ding{114}}

which results in □ and finally to replace $\blacksquare$

\newcommand*{\dingchecksquare}{\mbox{\ding{114}\hspace{-.7em}\raisebox{.2ex}[1ex]{\ding{51}}}}

Let it be ✓ as a result.

\begin{tikzpicture}[scale=0.5, >=latex]
\draw[very thin, color=gray] (–3,–2) grid (10,8);
\draw[–>] (–3,0) – (10,0) node[above left] {small $x$};
\foreach \x in {–3,–2,–1,1,2,...,9}
\draw[shift={\x,0}] (0pt,1pt) – (0pt,–1pt) node[below] {$\x$};
\draw[–>] (0,–2) – (0,8) node[below right] {small $y$};
\foreach \y in {–2,–1,1,2,...,8}
\draw[shift={(0,\y)}] (1pt,0pt) – (–1pt,0pt) node[left] {$\y$};
\draw (–0.5,–2) – (10,8);
\node[above right] at (–3,0) {\textbf{A}};
\node[above right] at (0,0) {\textbf{O}};
\node[below right] at (4,3) {$\mathbf{\Delta}$};
\node[above right] at (4,5) {$\mathbf{\Gamma}$};
\draw plot[smooth] coordinates{\textbf{\textbullet}(–3,0)(–2,4.5)(–1,6.5)(0,5.5)(1,3.5)(2,3)(3,3.4)(4,4.5)(5,6)(6,7.75)};
\end{tikzpicture}
\begin{alterqcm}[lq=90mm,symb=\altersquare]
... \end{alterqcm}

Full example:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For all $x \in ]-3; 2]$, $f'(x) \geq 0$.</td>
<td>□ T</td>
</tr>
<tr>
<td></td>
<td>□ F</td>
</tr>
<tr>
<td>2. The $F$ function has a maximum in 2</td>
<td>□ T</td>
</tr>
<tr>
<td></td>
<td>□ F</td>
</tr>
<tr>
<td>3. $\int_{0}^{2} f'(x) , \text{d}x = -2$</td>
<td>□ T</td>
</tr>
<tr>
<td></td>
<td>□ F</td>
</tr>
</tbody>
</table>

\begin{alterqcm}[lq=125mm,symb = \dingsquare]
\AQquestion{For all $x \in ]-3; -2]$, $-f'(x) \geq_\text{slant} 0$.}
\AQquestion{The $F$ function has a maximum in $2$.}
\AQquestion{$\displaystyle\int_{0}^{2} f'(x)\,\text{d}x = -2$.}
\end{alterqcm}

3.5 \textit{pre, bonus, malus : automatic presentation}

As you can see below, a presentation is given of the exercise with the grading.

\begin{alterqcm}[lq=6cm,pre=true,bonus=1,malus={0,5}]
\AQquestion{Question}
\{\textit{Proposition 1}, \textit{Proposition 2}\}
\end{alterqcm}

For each of the questions below, only one of the proposed answers is true. You must choose the right answer without justification.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Question</td>
<td>□ Proposition 1</td>
</tr>
<tr>
<td></td>
<td>□ Proposition 2</td>
</tr>
</tbody>
</table>

3.6 \textit{sep : rule between proposals}

\texttt{sep=true} creates a rule between the proposals.

\begin{alterqcm}[lq=3cm,sep=true]
\AQquestion{Question}
\text{etc}...
\end{alterqcm}

3.7 \textit{num, numstyle : deletion and style of numbering}

3.7.1 \texttt{num=false}

\texttt{num=false} makes the numbering of the questions disappear.

\begin{alterqcm}[lq=3cm,num=false]
\AQquestion{Question}
\text{etc}...
\end{alterqcm}
3.7.2 numstyle

`numstyle=\alph` changes the style of question numbering. The usual styles are valid here.

\begin{alterqcm}[lq=3cm,numstyle=\alph]
  \AQquestion{Question}
  etc...
\end{alterqcm}

3.8 title, tone, ttwo : deletion and modification of the title line

title=false deletes the column headings.

\begin{alterqcm}[lq=3cm,title=false]
  \AQquestion{Question}
  etc...
\end{alterqcm}

tone=titre n°1 and ttwo=titre n°2 change the table headers

\begin{alterqcm}[lq=3cm,tone=titre n°1,ttwo=titre n°2]
  \AQquestion{Question}
  etc...
\end{alterqcm}

3.9 noquare : square suppression

nosquare=true fait disparaître le carré ou encore la numérotation des propositions.

\begin{alterqcm}[lq=3cm,nosquare=true]
  \AQquestion{Question}
  etc...
\end{alterqcm}

numprop=true number the proposals and propstyle= ... changes the numbering style.

Default, propstyle=\alph

\begin{alterqcm}[lq=3cm,numprop = true,propstyle = \Roman]
  \AQquestion{Question}
  etc...
\end{alterqcm}

3.10 alea : random positioning of proposals

It is preferable between two compilations to delete the auxiliary files.

Be careful, in random mode, it is not possible to obtain an answer corresponding to the initial assignment.

\begin{center}
<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If the $f$ function is strictly increasing on $\mathbb{R}$ then the equation $f(x) = 0$ admits</td>
<td>□ At most one solution</td>
</tr>
<tr>
<td></td>
<td>□ Exactly one solution</td>
</tr>
<tr>
<td></td>
<td>□ At least one solution</td>
</tr>
</tbody>
</table>
\end{center}
If the $f$ function is strictly increasing on $\mathbf{R}$ then the equation $f(x) = 0$ admits:

- At least one solution,
- Exactly one solution,
- At most one solution.

The order given above is that of creation. Thanks to Apostolos Syropoulos and Anastasios Dimou for enabling the use of Greek language.

For the Greek language option:

1. Wenn die Funktion $f$ auf $\mathbf{R}$ streng monoton wächst, dann hat die Gleichung $f(x) = 0$:
   - genau eine Lösung
   - höchstens eine Lösung
   - mindestens ein Lösung

For the French language option:

1. If the $f$ function is strictly increasing on $\mathbf{R}$ then the equation $f(x) = 0$ admits:
   - At least one solution
   - Exactly one solution
   - At most one solution

There’s a section devoted solely to the “greek” option.

How to use unknown: You need to call the package with the option “unknown” then you need to redefine some macros.
For each of the following questions, only one of the proposed responses is true. You must select the correct answer without justification.

\begin{alterqcm}[language=unknown]
\AQquestion{Question}{{Proposition 1}, {Proposition 2}, {Proposition 3}}
\end{alterqcm}

<table>
<thead>
<tr>
<th>Preguntas</th>
<th>Respuestas</th>
</tr>
</thead>
</table>
| 1. Question | □ Proposition 1  
               □ Proposition 2  
               □ Proposition 3 |
3.12 long : use of longtable

A table can arrive at the end of the page and be cut or simply be very long. This option allows you to use instead of a \texttt{tabular} an environnement \texttt{longtable}.

Here is an example from Pascal Bertolino.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What was the precursor language of the C language?</td>
<td>□ Fortran</td>
</tr>
<tr>
<td></td>
<td>□ language B</td>
</tr>
<tr>
<td></td>
<td>□ Basic</td>
</tr>
<tr>
<td>2. \texttt{int a = 3 ^ 4 ;}</td>
<td>□ raises 3 to the power of 4</td>
</tr>
<tr>
<td></td>
<td>□ makes an exclusive OR between 3 and 4</td>
</tr>
<tr>
<td></td>
<td>□ is not a C</td>
</tr>
<tr>
<td>3. What is the correct syntax to shift the integer 8 bits to the left? (a)?</td>
<td>□ \texttt{b = lshift(a, 8) ;}</td>
</tr>
<tr>
<td></td>
<td>□ \texttt{b = 8 &lt;&lt; a ;}</td>
</tr>
<tr>
<td></td>
<td>□ \texttt{b = a &lt;&lt; 8 ;}</td>
</tr>
<tr>
<td>4. The complete program :</td>
<td>□ display hello</td>
</tr>
<tr>
<td>\begin{verbatim}int main()\end{verbatim}</td>
<td>□ gives an error to the compilation</td>
</tr>
<tr>
<td></td>
<td>□ gives an error in execution</td>
</tr>
<tr>
<td>5. Let's say the statement \texttt{float tab[10];}</td>
<td>□ &amp;tab</td>
</tr>
<tr>
<td>The first real in the table is ...</td>
<td>□ &amp;\texttt{tab}</td>
</tr>
<tr>
<td></td>
<td>□ \texttt{tab}</td>
</tr>
<tr>
<td>6. The line \texttt{printf(&quot;%c&quot;, argv[2][0]) ;} of main of \texttt{monProg} \texttt{run like this : monProg parametre}</td>
<td>□ displays (p)</td>
</tr>
<tr>
<td></td>
<td>□ displays nothing</td>
</tr>
<tr>
<td></td>
<td>□ can cause a crash</td>
</tr>
<tr>
<td>7. What is the memory size of a \texttt{long int} ?</td>
<td>□ 4 octets</td>
</tr>
<tr>
<td></td>
<td>□ 8 octets</td>
</tr>
<tr>
<td></td>
<td>□ it depends ...</td>
</tr>
<tr>
<td>8. Following the declaration \texttt{int * i ;}</td>
<td>□ (\ast i) is an address</td>
</tr>
<tr>
<td></td>
<td>□ (\ast i) is an integer</td>
</tr>
<tr>
<td></td>
<td>□ (\ast i) is a pointer</td>
</tr>
<tr>
<td>9. One of the following choices is not a standard library of the C</td>
<td>□ stdlib</td>
</tr>
<tr>
<td></td>
<td>□ stdin</td>
</tr>
<tr>
<td></td>
<td>□ math</td>
</tr>
</tbody>
</table>

The beginning of the code is simply

\begin{verbatim}
\begin{alterqcm}[lq=80mm,long]
\AQquestion{What was the precursor language of the C language?}
\{\{Fortran\},
\{language B\},
\{Basic\}\}
\end{alterqcm}
\end{verbatim}

It is possible to modify the text that is placed at the end of the table. Just modify the command \texttt{\aqfoottext}.
3 Global Environment Options \texttt{alterqcm}

\def\aqfoottext{continued on next page\ldots}

3.13 \texttt{numbreak} : split a \texttt{mcq}

This option allows either to continue the numbering of the previous table. This option was necessary before the use of the \texttt{long} option. for tables split by a page break. It can now be used for a series of tables grouped together to obtain a single MCQ.

\begin{alterqcm}[lq=80mm,title=false,num=false,long]
\AQquestion{What was the precursor language of the C language?}
{{Fortran},
 {language B},
 {Basic}}
\verbdef\argprop|int a = 3 ^ 4 ;|
\AQquestion{\argprop}
{{raises 3 to the power of 4},
 {makes an exclusive OR between 3 and 4},
 {is not a C-instruction}}
\end{alterqcm}

For the second part, we set \texttt{numbreak} to 2 because the first board had 2 questions. In a future version, we will not have to count the questions anymore.

\begin{alterqcm}[lq=80mm,title=false,num=false,numbreak=2,long]
\AQquestion{Following the declaration \texttt{int * i} ;}
{{\texttt{*i} is an address},
 {\texttt{*i} is an integer},
 {\texttt{*i} is a pointer}}
\AQquestion{One of the following choices is not a standard C library}
{{\texttt{stdlib}},
 {\texttt{stdin}},
 {\texttt{math}}}
\end{alterqcm}
3.14 correction : Correction of a mcq

It is possible to create an answer key by using the \texttt{correction} option and indicating the correct answer(s) using a local parameter \texttt{br}. Here is an example:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For all $x \in ] -3 ; 2], $f'(x) \geq 0$</td>
<td>☑ T</td>
</tr>
<tr>
<td></td>
<td>☐ F</td>
</tr>
<tr>
<td>2. The $F$ function has a maximum in 2</td>
<td>☐ T</td>
</tr>
<tr>
<td></td>
<td>☑ F</td>
</tr>
<tr>
<td>3. $\int_{0}^{2} f'(x),dx = -2$</td>
<td>☐ T</td>
</tr>
<tr>
<td></td>
<td>☑ F</td>
</tr>
</tbody>
</table>

\begin{alterqcm}[lq=125mm,correction,\texttt{symb = \dingsquare,}
\texttt{corsymb = \dingchecksquare}]
\AQquestion[br=1]{For any $x \in \] -3 ; 2\], $f'(x) \geqslant 0$.}
\AQquestion[br=2]{The $F$ function has a maximum in $2$}
\AQquestion[br=2]{$\displaystyle\int_{0}^{2} f'(x)\,dx = - 2$}
\end{alterqcm}

3.15 Modification du symbole corsymb

\texttt{\dingchecksquare} is provided by alterqcm. Here is how this macro is defined.

\newcommand*{\dingchecksquare}{\mbox{\ding{114}\hspace{-.7em}\raisebox{.2ex}[1ex]{\ding{51}}}}

Let’s consider checksquare as a result.

\begin{alterqcm}[lq=90mm,symb=\altersquare,corsymb=\dingchecksquare] ...
\end{alterqcm}

Full example :

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For all $x \in ] -3 ; 2], $f'(x) \geq 0$</td>
<td>☑ T</td>
</tr>
<tr>
<td></td>
<td>☐ F</td>
</tr>
<tr>
<td>2. The $F$ function has a maximum in 2</td>
<td>☐ T</td>
</tr>
<tr>
<td></td>
<td>☑ F</td>
</tr>
<tr>
<td>3. $\int_{0}^{2} f'(x),dx = -2$</td>
<td>☐ T</td>
</tr>
<tr>
<td></td>
<td>☑ F</td>
</tr>
</tbody>
</table>

\begin{alterqcm}[VF,lq=125mm,correction,\texttt{symb = \dingsquare,}
\texttt{corsymb = \dingchecksquare}]
\AQquestion[br=1]{For any $x \in \] -3 ; 2\], $f'(x) \geqslant 0$.}
\AQquestion[br=2]{The $F$ function has a maximum in $2$}
\AQquestion[br=2]{$\displaystyle\int_{0}^{2} f'(x)\,dx = - 2$}
\end{alterqcm}
3.16 br=\{…\} : corrected with several correct answers

A list of correct answers is given

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
</table>
| 1. Question | ■ Proposition 1  
              | □ Proposition 2  
              | ■ Proposition 3 |

\begin{alterqcm}[correction]
\begin{QQquestion[br={1,3}][question]
\%
\{Proposition 1\},
\{Proposition 2\},
\{Proposition 3\}
\%
\end{QQquestion}
\end{alterqcm}

3.17 transparent : creation of a transparent slide showing the answers.

This macro makes it possible to create a document identical to the original but without the questions and with a circle indicating the good proposals.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>○</td>
</tr>
<tr>
<td>2.</td>
<td>○</td>
</tr>
<tr>
<td>3.</td>
<td>○</td>
</tr>
<tr>
<td>4.</td>
<td>○</td>
</tr>
</tbody>
</table>
\begin{alterqcm}[transparent,correction,corsymb=\dingchecksquare,lq=100mm]
\AQquestion\[br=2,pq=3mm\]{Which of the following proposals is that which allows us to affirm that the exponential function admits for asymptote the equation line $y = 0$ ?}
{$\displaystyle\lim_{x \to +\infty} \frac{\text{e}^x}{x} = + \infty$},
{$\displaystyle\lim_{x \to -\infty} \text{e}^x = 0$}
\end{alterqcm}

\begin{alterqcm}[br=2,pq=3mm]\AQquestion\{1,3\}{\exp(\ln x) = x$ for any $x$ belonging to }
{$\mathbf{R}$},
{$\big[0~;~+ \infty\big[$},
{$\big[0~;~+ \infty\big[$}
\end{alterqcm}

\begin{alterqcm}[br=2,p=3mm]\AQquestion\{1,2\}{\exp(\ln x) = x$ for any $x$ belonging to }
{$\mathbf{R}$},
{$\big[0~;~+ \infty\big[$},
{$\big[0~;~+ \infty\big[$}
\end{alterqcm}

\begin{alterqcm}[br=2,pq=3mm]\AQquestion\{br={1,3}\}{Which of the following proposals is that which allows us to affirm that the exponential function admits for asymptote the equation line $y = 0$ ?}
{$\displaystyle\lim_{x \to +\infty} \frac{\text{e}^x}{x} = + \infty$},
{$\displaystyle\lim_{x \to -\infty} \text{e}^x = 0$}
\end{alterqcm}
4 Local options of the macro \texttt{AQquestion}

4.1 Local use of \texttt{pq}

The following table is obtained with the options \texttt{lq=85mm} and \texttt{size=\large}. The questions are misplaced. The local option \texttt{pq} solves this problem, the text can be moved 1mm upwards with \texttt{AQquestion[pq=1mm]}, and by 6mm for the second.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
</table>
| 1. If the function $f$ is strictly increasing on $\mathbf{R}$ then the equation $f(x) = 0$ admits: | □ At least one solution  
□ [At most one solution]  
□ Exactly one solution |
| 2. If the $f$ function is continuous and positive on $[a; b]$ and $\mathcal{C}_f$ its representative curve in an orthogonal system. In units of area, the area $\mathcal{A}$ of the domain delimited by $\mathcal{C}_f$, the abscissa axis and the lines of equations $x = a$ and $x = b$ is given by the formula: | □ $\mathcal{A} = \int_b^a f(x) \, dx$  
□ $\mathcal{A} = \int_a^b f(x) \, dx$  
□ $\mathcal{A} = f(b) - f(a)$ |

Here is the corrected version

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
</table>
| 1. If the $f$ function is strictly increasing on $\mathbf{R}$ then the equation $f(x) = 0$ admits... | □ At least one solution  
□ At most one solution  
□ Exactly one solution |
| 2. If the $f$ function is continuous and positive on $[a; b]$ and $\mathcal{C}_f$ its representative curve in an orthogonal system. In area units, the $\mathcal{A}$ area of the domain delimited by $\mathcal{C}_f$, the abscissa axis and the lines of equations $x = a$ and $x = b$ is given by the formula: | □ $\mathcal{A} = \int_b^a f(x) \, dx$  
□ $\mathcal{A} = \int_a^b f(x) \, dx$  
□ $\mathcal{A} = f(b) - f(a)$ |

\texttt{alterqcm}[lq=55mm, size=\large]  
\texttt{AQquestion[pq=1mm]}(If the $f$ function is strictly increasing on $\mathbf{R}$ then the equation $f(x) = 0$ admits...  
\{[At least one solution],  
[At most one solution],  
{Exactly one solution}\)}
4 Local options of the macro \AQuestion

\AQuestion[pq=6mm]{If the $f$ function is continuous and positive on $[a~;~b]$ and $\mathcal{C}_{f}$ its representative curve in an orthogonal system.}

In units of area, the area $\mathcal{A}$ of the domain delimited by $\mathcal{C}_{f}$, the abscissa axis and the lines of equations $x = a$ and $x = b$ is given by the formula:

$$\mathcal{A}= \displaystyle \int_{b}^{a} f(x) \, dx,$$

$$\mathcal{A}= \displaystyle \int_{a}^{b} f(x) \, dx,$$

$$\mathcal{A} = f(b) - f(a).$$

\end{alterqcm}

4.2 Global and local use of \underline{pq}

This time, it is necessary to move several questions. I placed a $pq=2mm$ globally, that is to say like this:\begin{alterqcm} \[lq=85mm,pq=2mm\]

All questions are affected by this option but some questions were well placed and should remain so, so locally I give them back a $pq=0mm$.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A bivariate statistical series. The values of $x$ are 1, 2, 5, 7,</td>
<td>□ (6,5;30,575)</td>
</tr>
<tr>
<td>11, 13 and a least squares regression line equation of $y$ to $x$</td>
<td>□ (32,575;6,5)</td>
</tr>
<tr>
<td>is $y = 1.35x + 22.8$. The coordinates of the mean point are :</td>
<td>□ (6,5;31,575)</td>
</tr>
<tr>
<td>2. $(u_n)$ is an arithmetic sequence of reason $-5$. Which of these</td>
<td>□ For all $n$, $u_{n+1} - u_n = 5$</td>
</tr>
<tr>
<td>statements is true?</td>
<td>□ $u_{10} = u_2 + 40$</td>
</tr>
<tr>
<td>□ $u_3 = u_2 + 20$</td>
<td></td>
</tr>
<tr>
<td>3. Equality $\ln(x^2 - 1) = \ln(x-1) + \ln(x+1)$ is true</td>
<td>□ For all $x$ in $]-\infty; -1[ \cup [1 ; + \infty[$</td>
</tr>
<tr>
<td>□ For all $x$ in $\mathcal{R} - {-1, 1}$.</td>
<td>□ For all $x$ in $]-1 ; 1[$.</td>
</tr>
<tr>
<td>□ For all $x$ in $]1 ; +\infty[$.</td>
<td></td>
</tr>
<tr>
<td>4. For all $x$, the number $e^x - 1$ equal to :</td>
<td>□ $-\dfrac{1}{2}$</td>
</tr>
<tr>
<td>□ $\dfrac{e^{-x} - 1}{e^{-x} + 2}$</td>
<td>□ $\dfrac{1-e^{-x}}{1+2e^{-x}}$</td>
</tr>
<tr>
<td>5. Let $I = \int_{\ln2}^{\ln3} \dfrac{1}{e^x - 1} , dx$ and $J = \int_{\ln2}^{\ln3} \dfrac{e^x}{e^x - 1} , dx$</td>
<td>□ $\ln \dfrac{3}{2}$</td>
</tr>
<tr>
<td>then the number $I - J$ is equal to</td>
<td>□ $\ln \dfrac{3}{2}$</td>
</tr>
<tr>
<td>□ $\dfrac{3}{2}$</td>
<td>□ $\dfrac{3}{2}$</td>
</tr>
</tbody>
</table>

\begin{alterqcm} \[lq=85mm,pq=2mm\]

\AQuestion[pq=8mm,\underline{pq}=2mm]{Equality $\ln(x^2 - 1) = \ln(x-1) + \ln(x+1)$ is true}

\AQuestion[pq=\underline{0mm}]{Equality $\ln(x^2 - 1) = \ln(x-1) + \ln(x+1)$ is true}

\AQuestion{For any real $x$, the number $\dfrac{e^x - 1}{e^x + 2}$ equal to :}

\AQuestion{Equality $\ln(x^2 - 1) = \ln(x-1) + \ln(x+1)$ is true}
4 Local options of the macro \texttt{AQquestion}

\end{alterqcm}

\subsection*{4.3 \texttt{correction} and \texttt{br} : rank of good answer}

First of all, it is necessary to ask for an answer key. To do this, just include the option \texttt{correction} which is a boolean, thus set to \texttt{true}. Then in each question, it is necessary to give the list of correct answers. For example, with \texttt{br=1} or \texttt{br=\{1,3\}}.

Here is the previous year’s correction:

\begin{center}
\begin{tabular}{|l|c|}
\hline
\textbf{Questions} & \textbf{Answers} \\
\hline
1. For all $x \in ]-3;2]$, $f'(x)\geq 0$. & $\blacksquare$ T $\square$ F \\
\hline
2. The $F$ function has a maximum in 2 & $\square$ T $\blacksquare$ F \\
\hline
3. $\int_0^2 f'(x) \, dx = -2$ & $\square$ T $\blacksquare$ F \\
\hline
\end{tabular}
\end{center}

\begin{verbatim}
\begin{alterqcm}[VF, correction, lq=125mm]
  \AQquestion[br=1]{For all $x \in ]-3;2]$, $f'(x)\geq 0$.}
  \AQquestion[br=2]{The $F$ function has a maximum in 2}
  \AQquestion[br=2]{$\displaystyle\int_{0}^{2} f'(x)\, dx = -2$}
\end{alterqcm}
\end{verbatim}
5 Complementary macros

5.1 \texttt{AQmessage} : two-column message

It allows to insert in the table on the two columns, additional information for the candidate.

In the following table, it is necessary to give indications and clarifications on the statement. This is done using the command \texttt{AQmessage}. I have used the package \texttt{tkz-tab.sty} for this message as well as \texttt{AQmessage} for some proposals, in order to make the proposal fit on several lines. This is necessary if one does not want to leave the table or if one does not want to restrict the space given to the questions. This shows that many environments can be used in questions, messages and proposals at the same time.

\begin{tabular}{l}
\texttt{\textbackslash AQmessage}\{\textbackslash \textbackslash \textbackslash texte\}
\end{tabular}

<table>
<thead>
<tr>
<th>argument</th>
<th>default</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>texte</td>
<td></td>
<td>corps du message</td>
</tr>
</tbody>
</table>

This macro uses only one argument : the text of the message. It can contain any kind of environment except, unfortunately, an array designed with \texttt{tablor}. However, it is possible to import an array designed with \texttt{tablor} with the macro \texttt{\textbackslash includegraphics}.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
\textbf{Questions} & \textbf{Answers} \\
\hline
Let \( f \) be a function defined and derivable over the interval \([-5 ; +\infty[\) whose table of variations is given below:
\end{tabular}
\end{table}

\begin{center}
\begin{tikzpicture}
\tkzTabInit{$x$/1,$f(x)$/3} {$-5$,$-1$,$0$,$2$,$+\infty$}
\tkzTabVar{\-/$-\infty$ ,\+/$-3$,\-/$-5$,\+/$4$,\-/${4,5}$}
\end{tikzpicture}
\end{center}

We designate by \textcircled{C} the curve representative of \( f \).

1. In the interval \([-5 ; +\infty[\), the equation \( f(x) = -2 \) admits \( \square \) only one solution \( \square \) two solutions \( \square \) four solutions

\begin{tabular}{l}
\begin{alterqcm}[lq=95mm,pre=false]
\AQmessage{ Let $f$ be a function defined and derivable on the interval $]-5,-\infty[$.\hspace{1cm}
whose table of variations is given below:\hspace{1cm}
\begin{center}
\begin{tikzpicture}
\tkzTabInit{$x$/1,$f(x)$/3} {$-5$,$-1$,$0$,$2$,$+\infty$}
\tkzTabVar{\-/$-\infty$ ,\+/$-3$,\-/$-5$,\+/$4$,\-/${4,5}$}
\end{tikzpicture}
\end{center}
It is designated by $\mathcal{C}$ the curve representative of $f$.}
\AQquestion{Over the interval $]-5,-\infty[$, the equation $f(x) = -2$ admits}
\end{alterqcm}
\end{tabular}

1 package macro graphicx
\{only one solution\},
\{two solutions\},
\{four solutions\}
\end{alterqcm}

5.2 $\texttt{\textbackslash AQms}$ : use of invisible line

\[\texttt{\textbackslash AQms} (\textit{height}, \textit{depth})\]

\begin{center}
\begin{tabular}{ll}
\textbf{argument} & \textbf{default definition} \\
height & line height \\
depth & line depth \\
\end{tabular}
\end{center}

\textit{It's an invisible line useful if it is necessary to make more space around a proposal.}

\textit{It should not be used!}

\begin{verbatim}
def AQms(#1,#2){\vrule height #1pt depth #2pt width 0pt}
\end{verbatim}

5.3 $\texttt{\textbackslash InputQuestionList}$ : Multiple choice from a list of files

$\texttt{\textbackslash InputQuestionList}\{\textit{path}\}\{\textit{prefix}\}\{\textit{list of integers}\}$

\begin{center}
\begin{tabular}{|l|l|}
\hline
\textbf{Questions} & \textbf{Answers} \\
\hline
1. Question & \textsquare Proposition 1 \\
& \textsquare Proposition 2 \\
& \textsquare Proposition 3 \\
\hline
\end{tabular}
\end{center}

Let's say the file \texttt{qcm-1.tex}
**5 Complementary macros**

\AQquestion{What was the precursor language of the C language?}

\{Fortran\},
\{Language B\},
\{Basic\}

Either the file qcm-2.tex

\verbdef\argprop|int a = 3 ^ 4 ;|
\AQquestion{\argprop}

\{raises 3 to the power of 4\},
\{makes an exclusive OR between 3 and 4\},
\{is not a C\}

Suppose we create a series of files in a folder iut with the following names
qcm-1.tex, qcm-2.tex, ..., qcm-n.tex. The prefix to name these files is qcm-

The path to this folder is for example /examples/latex/iut/.

The result is:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. int a = 3 ^ 4 ;</td>
<td>□ raises 3 to the power of 4 □ makes an exclusive OR between 3 and 4 □ is not a C</td>
</tr>
<tr>
<td>2. What was the precursor language C ?</td>
<td>□ Fortran □ Language B □ Basic</td>
</tr>
</tbody>
</table>

\newcommand*{\listpath}{/Users/ego/Desktop/waiting/alterqcm_new/examples/iut/}
\begin{alterqcm}[lq=80mm]
\InputQuestionList{\listpath}{qcm-}{2,1}
\end{alterqcm}

5.4 The command \AQannexe

\AQannexe[\{local options\}]{\{start\}}{\{end\}}{\{col\}}

<table>
<thead>
<tr>
<th>arguments</th>
<th>default</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>start</td>
<td></td>
<td>first row number</td>
</tr>
<tr>
<td>end</td>
<td></td>
<td>last row number</td>
</tr>
<tr>
<td>col</td>
<td></td>
<td>number of proposals</td>
</tr>
</tbody>
</table>

This macro uses three arguments. These are three integers. start is the row of the first row, end is the final row and col is the number of propositions.

<table>
<thead>
<tr>
<th>Options</th>
<th>default</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF</td>
<td>false</td>
<td>true or false; displays T and F</td>
</tr>
<tr>
<td>propstyle</td>
<td>\arabic</td>
<td>proposal numbering style</td>
</tr>
</tbody>
</table>

VF allows to display V and F to identify the proposals but it is necessary that col is equal to two
5 Complementary macros

\documentclass{article}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{lmodern}
\usepackage{alterqcm,fullpage}
\thispagestyle{empty}
\begin{document}
NAME:

FIRST NAME:

\vspace{1cm} \Large
\AQannexe{1}{10}{2}\hspace{2cm}
\AQannexe[propstyle=\alph]{11}{20}{3}
\end{document}

\begin{tabular}{|c|c|c|}
\hline
N & 1 & 2 \\
1 & & \\
2 & & \\
3 & & \\
4 & & \\
5 & & \\
6 & & \\
7 & & \\
8 & & \\
9 & & \\
10 & & \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|}
\hline
N & a & b & c \\
11 & & & \\
12 & & & \\
13 & & & \\
14 & & & \\
15 & & & \\
16 & & & \\
17 & & & \\
18 & & & \\
19 & & & \\
20 & & & \\
\hline
\end{tabular}
### 6.1 The symbolists: use of the macro $\texttt{\includegraphics}$

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Among the three paintings opposite, which is the one painted by Gustave Moreau?</td>
<td><img src="image" alt="Image of painting by Gustave Moreau" /></td>
</tr>
<tr>
<td></td>
<td>(a)</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Image of painting" /></td>
</tr>
<tr>
<td></td>
<td>(b)</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Image of painting" /></td>
</tr>
<tr>
<td></td>
<td>(c)</td>
</tr>
<tr>
<td>2. The following picture was painted by which of these three painters?</td>
<td>(a)Gustav Klimt</td>
</tr>
<tr>
<td></td>
<td>(b)Carlos Schwabe</td>
</tr>
<tr>
<td></td>
<td>(c)Odilon Redon</td>
</tr>
</tbody>
</table>

*Questions and Answers adapted from [alterqcm](http://alterqcm.com) and [AlterMundus](http://altermundus.com).*
6.2 Using a `tikzpicture` environment in a question

For each of the questions below, only one of the proposed answers is true. You must choose the right answer without justification.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The three trees given below represent probabilistic situations. The numbers shown on the various arrows are probabilities, and, in the second level, conditional probabilities. Thus for the given tree in question 1: $0.35 = P(A)$ and $0.1 = P_A(E)$.</td>
<td>□ 0.5</td>
</tr>
<tr>
<td>1. The probability of event $E$ is equal to:</td>
<td>□ 0.1</td>
</tr>
<tr>
<td>□ 0.6</td>
<td></td>
</tr>
<tr>
<td>□ 0.36</td>
<td></td>
</tr>
</tbody>
</table>

\begin{alterqcm}[lq=120mm,pre=true,pq=3mm]
\AQmessage{The three trees given below represent probabilistic situations. The numbers shown on the different arrows are probabilities, and, in the second level, conditional probabilities. Thus for the given tree in question 1: $0.35 = P(A)$ and $0.1 = P_A(E)$.}
\AQquestion{The probability of event $E$ is equal to:} \begin{tikzpicture}...
\end{tikzpicture}
\end{alterqcm}
6.3 Use of a `array` environment in the proposals

It is possible to use tables and other structures in the question code or proposals. An example is shown below:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
</table>
| 1. The couple $(1 ; -1)$ is a solution of | □ $\left\{ \begin{array}{ll}
0,75a + 0,5b &= 0,25 \\
0,25a + 0,5b &= -0,25
\end{array}\right.$ |
| | □ $\left\{ \begin{array}{ll}
a &= 0,75a + 0,5b \\
b &= 0,25a + 0,5b
\end{array}\right.$ |
| | □ $\left\{ \begin{array}{ll}
0,75a - 0,5b &= 0,25 \\
0,5a + 0,25b &= -0,25
\end{array}\right.$ |
### 6.4 Use of code verbatim in questions and proposals

Here is an example from Pascal Bertolino. It is preferable to use as Pascal did the macro `\verbatim`, otherwise avoid the use of the mode `verbatim`. We will see on the next page how to proceed if this mode is really necessary.

1. What was the precursor language of the C language? □ Fortran □ Language B □ Basic

2. `int a = 3 ^ 4 ;` □ raises 3 to the power of 4 □ makes an exclusive OR between 3 and 4 □ is not a C

3. What is the correct syntax to shift the integer 8 bits to the left? `a`? □ `b = lshift(a, 8) ;` □ `b = 8 << a ;` □ `b = a << 8 ;`

4. The complete program:
   ```c
   int main()
   { printf ("hello") ; return 0 ; }
   ``` □ displays hello □ gives an error to the compilation □ gives an error in execution

5. Let’s say the declaration `float tab[10];` □ `*tab` □ `&tab` □ `tab`

6. The line `printf(\"%c", argv[2][0]) ;` of `main` of `monProg` run like this: `monProg parametre` □ displays `p` □ displays nothing □ can cause a crash

7. What is the memory size of a `long int`? □ 4 octets □ 8 octets □ ça dépend …

8. Following the declaration `int * i ;` □ `*i` is an address □ `*i` is an integer □ `*i` is a pointer

9. One of the following choices is not a standard C library □ `stdlib` □ `stdin` □ `math`

Let’s look at the source code
the simplest way is often to use the command `\verbatim`

```c
\verbatim
int main()
{ printf ("hello") ; return 0 ; }
```

```c
\verbatim
printf("%c", argv[2][0]) ;
```

### Alterqcm AlterMundus
Alternatively, we can load the \verb\def{} package: \verb\def{}

\begin{verbatim}
\verb\def\argprop|\int a = 3 ^ 4 ;|
\end{verbatim}

\verb\question{\argprop}
\begin{itemize}
\item raises 3 to the power of 4,
\item does an exclusive OR between 3 and 4,
\item is not a \texttt{C}-instruction
\end{itemize}

More than one variable may be required:

\begin{verbatim}
\verb\def\arg|\float tab[10]| \\
\verb\def\propa|\*tab|\global\let\propa\propa \\
\verb\def\propb|\&tab|\global\let\propb\propb \\
\verb\def\propc|\tab|\global\let\propc\propc \\
\end{verbatim}

\verb\question{Either the declaration \arg ; \\
The first real in the table is \ldots}
\begin{itemize}
\item \propa,
\item \propb,
\item \propc
\end{itemize}
7 Points assigned to an MCQ

It is possible to assign points to an MCQ using the rudimentary macro \texttt{AQpoints}.

7.1 Example

\begin{verbatim}
\AQpoints{10}
\begin{alterqcm}[symb = \dingof{219}, lq=7cm]
  \AQquestion{If $3.24$ is the truncation of \(x\) to the hundredth..., then we're sure that :}
  \{\begin{minipage}[t]{\linewidth-1cm}
    \text{$3.235 \leq x < 3.245$}\\
    \end{minipage},
  \{\begin{minipage}[t]{\linewidth-1cm}
    \text{$3.24 \leq x < 3.25$}\\
    \end{minipage},
  \{\begin{minipage}[t]{\linewidth-1cm}
    \text{$x$ is closer to $3.24$ than $3.25$}\\
    \end{minipage}}
\end{alterqcm}
\end{verbatim}

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Si $3.24$ is the truncation of $x$ to the</td>
<td>☐ $3.235 \leq x &lt; 3.245$</td>
</tr>
<tr>
<td>hundredth..., then we're sure that :</td>
<td>☐ $3.24 \leq x &lt; 3.25$</td>
</tr>
<tr>
<td></td>
<td>☐ $x$ is closer to $3.24$ than $3.25$</td>
</tr>
</tbody>
</table>
8 Known issues and FAQs

8.1 Incompatibility with colortbl.sty

The problem is that colortbl.sty is sometimes incompatible with the command \texttt{multicolumn}. The text used in the \texttt{multicolumn} command should contain only one paragraph. Simply do not use the \texttt{AQmessage} command. One solution is to interrupt the quiz to display what you want and then resume the table.

8.2 FAQ

8.2.1 Translation of commands

Some commands can be translated or modified such as: \texttt{\aq@pre} and \texttt{\aq@preVF}, all you have to do is use \texttt{\renewcommand}.

\makeatletter
\renewcommand{\aq@pre}{Pour chacune des questions ci-dessous, une seule des r\'eponses propos\'ees est exacte. Vous devez cocher la r\'eponse exacte sans justification. Une bonne r\'eponse rapporte \textbf{\cmdAQ@global@bonus\ point}. Une mauvaise r\'eponse enl\`eve \textbf{\cmdAQ@global@malus\ point}. L'absence de r\'eponse ne rapporte ni n'enl\`eve aucun point. Si le total des points est n\'egatif, la note globale attribu\'ee \`a l'exercice est \textbf{0}.}
\makeatother
9 Greek version [Apostolos Syropoulos & Anastasios Dimou]

9.1 Εισαγωγή

Ο Alain Matthes μας έχει συνήθισε σε ενδιαφέροντα πακέτα για το ΛάΤΕΧ, που είναι μάλιστα πολύ σχετικά με τα δικά μας προγράμματα, το στυλ και το ύφος τους. Ένα τέτοιο παράδειγμα είναι και το tkz-tab, που παρουσιάστηκε πέρυσι στο https://tassosdimou.gr/variation-table.

Το πακέτο alterqcm είναι ακόμη ένα πακέτο του Alain Matthes για το ΛάΤΕΧ που θα μας βοηθήσει στη κατασκευή καλαίσθητων διαγωνισμάτων με ερωτήσεις πολλαπλής επιλογής και σωστο-λάθους.

Το alterqcm τροποποιήθηκε από τους Απόστολο Συρόπουλο και Τάσσο Δήμου έτσι, ώστε να προσαρμοστεί στα δεδομένα του ελληνικού εκπαιδευτικού συστήματος.

Το άρθρο αναπτύσσει με λεπτομέρειες και πολλά παραδείγματα τις δυνατότητες του alterqcm. Δίνει οδηγίες για τη χρήση του και στο τέλος θα δοθούν μερικά παραδείγματα διαγωνισμάτων.

9.2 Εγκατάσταση του πακέτου

Θα υποδειχτούμε έναν απλό τρόπο εγκατάστασης του πακέτου. Δημιουργούμε ένα φάκελο, στον οποίο θα αποθηκευτούν όλα τα αρχεία, που θα επεξεργαστούμε, μελετώντας το alterqcm. Με άλλα λόγια, στο φάκελο αυτόν αποθηκεύουμε τα αρχεία .tex, τις εικόνες που θα χρησιμοποιηθούν και το αρχείο alterqcm.sty, που θα κατεβάσουμε από τη διεύθυνση https://ctan.org/pkg/alterqcm?lang=en. Το πακέτο θα φορτωθεί με την επιλογή greek, δηλαδή θα δώσουμε την εντολή:

\usepackage[greek]{alterqcm}

Όλα τα αρχεία θα έχουν την κλασσική δομή των αρχείων .tex.

Στο πρώτο μέρος, το προοίμιο, θα τοποθετήσουμε τα:

\documentclass[11pt,a4paper]{article}
\usepackage{xltxtra}
\usepackage{xgreek}
\usepackage{mathtools}
\usepackage{amsthm}
\usepackage{amssymb}
\usepackage{unicode-math}
\usepackage{xkeyval}
\usepackage{multirow,longtable}
\usepackage[greek]{alterqcm}
\usepackage{tkz-tab}
\parindent=0pt
\setmainfont[Mapping=text-text,Ligatures=Common]{Minion Pro}
\setmathfont[Scale=MatchUppercase]{Asana Math}

Apostolos Syropoulos, and Anastasios Dimou

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
</table>
| 1. Ερώτηση | □ Επίλογη 1  
□ Επίλογη 2  
□ Επίλογη 3 |
<table>
<thead>
<tr>
<th>Ερωτήσεις</th>
<th>Απαντήσεις</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ισχύει ότι ((α + β)^2 = α^2 + β^2)</td>
<td>□ Σ</td>
</tr>
<tr>
<td></td>
<td>□ Λ</td>
</tr>
<tr>
<td>2. Αν (α · β ≥ 0), τότε (\sqrt{α · β} = \sqrt{α} · \sqrt{β})</td>
<td>□ Σ</td>
</tr>
<tr>
<td></td>
<td>□ Λ</td>
</tr>
<tr>
<td>3. Είναι (α = α), για κάθε (x ∈ \mathbb{R})</td>
<td>□ Σ</td>
</tr>
<tr>
<td></td>
<td>□ Λ</td>
</tr>
</tbody>
</table>