Automatic generation of personalized answers to a problem set using LaTeX & Stata

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Introduction

- ▶ Econometrics or statistics course implies undertaking applied analysis of data.
- ▶ The usual approach is to offer a problem set to students based on a single database.
- ▶ The purpose is to make students practice close to reality problems, and assess their knowledge and understanding.
- ▶ Several books and websites provide databases for these purposes.

Issue: 1 problem set, 1 database, 1 answer

- ▶ On the good side.
  - ▶ Reaching the right answer is taken as a positive work and understanding.
  - ▶ Reinforces the student who did the work.
  - ▶ Thre is a sole right answer.
  - ▶ Ease of grading.
- ▶ On the bad side.
  - ▶ Copy and paste the answers an analysis.
  - ▶ One student doing the right work is enough for cheaters to take advantage (copy and paste).
  - ▶ When the database is popular (book or website), this issue takes a world wide dimension.
  - ▶ Regression analysis in books always shows positive outcomes and easy answers (a bit unrealistic).
- ▶ The whole purpose of the assessment vanishes. We end up knowing even less if the student learned or not.

Solution: 1 problem set, *n* databases, *n* answers

- ▶ Combine the use of Stata and LATEX.
- ▶ Take advantage that both sofware generate an outcome out of commands.
- ▶ Stata uses: .do.
- ▶ LATEXuses: .tex.
- ▶ Take advantage of writing a LATEXfrom Stata and the capabilities of the latter in processing an external sofware.

How?

Gini and Pasquini (2006) clearly describe how to communicate Stata and LATEX.

Automatic generation of documents

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How?

1. Write a .do solving the problem set.
2. .do includes commands to capture the outcome from Stata in local, graphs, outreg2, sutex, etc.
3. .do can write commands in a .tex file, including the results from the statistics above.
4. .do can invoque a .tex compiler and transform to .pdf.

On the good side

- ▶ The grading and assessment will evaluate the answer from a unique y correct, which is known beforehand.
- ▶ Reinformces the work done by a good student.
- ▶ Ease of grading.
- ▶ Students can not copy certain set of results.
- ▶ Students performs a piece of analysis kupon an imperfect database, allowing him to go deeper into the regression results.
- ▶ Zero mistakes in reporting result.
- ▶ Zero effort in generate 2, 20 or 200 problem set' answers.
- ▶ You only have to write the answer once.

On the bad side

- ▶ Control and care of the .do and .tex files.
- ▶ Time devoted to write program can be long, however to repeat it is a matter of minutes.

Ejemplo

```
/*DEFINE FIN DE COMANDO STATA*/
 #delimit ;
/*DEFINE SENDERO PARA STATA*/
 cd C:\rodrigo\project_lst_latex_stata_text;
/*CARGAR DATOS*/;
/*GENERACION MUESTRA 5% DE BASE DE DATOS ORIGINAL*/;
/*PARA CADA ESTUDIANTE*/;
    local estudiante "Pedro Pablo";
    foreach estudiante in `estudiante' {;
    sysuse nlsw88, clear;
    sample 5;
    save data\nlsw88_`estudiante'.dta, replace;
    };
/*INICIA DOCUMENTO LATEX*/;
local estudiante "Pedro Pablo";
foreach estudiante in `estudiante' {;
    file open reporte_`estudiante' using reporte_`estudiante'.tex, write replace;
    file write reporte_`estudiante' `"\documentclass{article}"´ _n;
    file write reporte_`estudiante' `"\usepackage{graphicx}"´ _n;
    file write reporte_`estudiante' `"\setlength{\voffset}{-1in}"´ _n;
    file write reporte_`estudiante' `"\setlength{\textheight}{24.2cm}"´ _n;
```

Ejemplo

```stata
/*ESCRIBIR DOCUMENTO LATEX*/;
    file write reporte_'estudiante' '"\begin{centering}"´ _n _n;
    file write reporte_'estudiante' '"\textbf{Nombre estudiante:}'estudiante' "´ _n _n;
    file write reporte_'estudiante' '"\textbf{Respuestas curso econometr\'ia}"´ _n _n;
    file write reporte_'estudiante' '"\end{centering}"´ _n _n;
    file write reporte_'estudiante' ' ´ _n _n;
    file write reporte_'estudiante' ' ´ _n _n;
    file write reporte_'estudiante' '"\hrulefill "´ _n _n;
/*LLAMAR BASE DE DATOS*/;
    use data\nlsw88_'estudiante'.dta, clear;
/*PREGUNTA 1*/;
/*TABLA CON ESTADISTICAS DESCRIPTIVAS*/;
sutex age wage hours ttl_exp tenure, labels
    minmax
    title(Ëstadísticas descriptivas")
    placement(h!)
    key(tab:des_'estudiante')
    file(des_'estudiante'.tex) replace;
file write reporte_'estudiante' '"\noindent \textbf{Pregunta 1.}Estadísticas desivas. "´ _n _n;
file write reporte_'estudiante' '"\input{C:/rodrigo/project_lst_latex_stata_text/des_'estudiante'.tex}"´
_n _n;
/*FINALIZA DOCUMENTO LATEX*/;
file write reporte_'estudiante' '"\end{document}"´ _n;
file close reporte_'estudiante';
```

Ejemplo

```
/*COMPILA LATEX*/;
    shell pdflatex reporte_'estudiante'.tex;
    shell bibtex reporte_'estudiante'.tex;
    shell pdflatex reporte_'estudiante'.tex;
    shell pdflatex reporte_'estudiante'.tex;
/*ABRE ARCHIVO*/;
winexec ''C:\Program Files\Adobe\Reader 10.0\Reader\AcroRd32.exe''
    ''C:\rodrigo\project_lst_latex_stata_text\reporte_'estudiante'.pdf'';
```