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----- Original Message -----

Subject: Re: Capriglione doesn't get it [Fwd: FW: [Fwd: Re: NC and the 5 page excel work around for touch screens.]]
Date: Fri, 26 Dec 2008 11:05:03 -0800
From: Philip B. Stark <stark@stat.berkeley.edu>
Reply-To: stark@stat.berkeley.edu
To: Joyce McCloy <jmc27106@earthlink.net>, Rep. Verla Insko <verlai@ncleg.net>
References: <49552090.1030004@earthlink.net>

Dear Rep. Insko and Joyce--

My previous email concerned Microsoft Excel in particular, and Mr. Capriglione's assertion that it is bug-free.

Mr. Capriglione's suggestion to use Lotus 123 would avoid Microsoft Excel's particular bugs, but those are only part of the problem.

Certainly, using *both* Excel and Lotus 123 and comparing the results would add some comfort--as would using OpenOffice Calc as a third check. (OpenOffice has the advantage that it is free, open source software.) I do not agree with Mr. Capriglione's characterization of the use of the software as simply verifying that $1+1=2$. If the result of the calculation were known, there would be no need to do the calculation.

As Joyce knows, I have serious reservations regarding using *any* spreadsheet software for complex calculations like tabulating IRV voting. Here are some of them:

- 1) The procedure proposed is very complicated, with many manual steps. Human error in such a complex task is almost inevitable. A slight slip can result in mis-copying data, overwriting data, hitting the wrong function, etc.
- 2) Spreadsheets mix data and programming. It is not possible to tell at a glance whether a cell in a spreadsheet is data or the result of a calculation. As a result, it is quite easy--deliberately or inadvertently--to corrupt a calculation or the data on which it is based. In principle that can be detected, but it requires additional scrutiny--such as clicking each cell and looking at what is displayed. And even that is not foolproof.
- 3) Because of the likelihood of error, using cut-and-paste, etc., as part of a "production" system is unheard of, in my experience.

It is far preferable to use proper scientific software for calculations like this--especially because so much rides on the results. With proper software, the data are separated from the programming commands. Somebody can double check independently that the data were entered correctly (or exported correctly from the election management software), and that the programming is correct. The raw data can be made public so that others can replicate the calculation independently as a cross check. And, once the program is written, tested, and debugged, users of the software need only say "go," not perform step after step of error-prone data entry or manipulation.

Best wishes to both of you and your families for a happy, healthy, peaceful, productive, and prosperous 2009.

Philip

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