

December 21, 2015

To: Rob Beezer (beezer@pugetsound.edu)

From: Murli M. Gupta, Professor and Chair, Department of Mathematics

Re: Open source algebra project

I am writing to support the proposal from my colleague, **Dan Ullman**, for teaching our abstract algebra course (**Math 4121**) using open source textbook and Sage software. This is a two-course sequence where Math 4121 is offered in the fall and Math 4122 is offered in spring. Dan is scheduled to teach this course in fall 2016 semester and he would be happy to teach this course sequence in the subsequent two years using the stated course materials. I am very happy that Dan is willing and eager to try this new approach and we are hopeful that we would gain new insights into the design of courses and how the students learn.

In addition, I would also like to teach our linear algebra course (**Math 2184**) using the open source textbook and sage software. I have been teaching linear algebra for many years at GW. In the 1990s, I introduced the use of MATLAB in the teaching of linear algebra and used it to teach linear algebra for several years. The experiment was quite successful though it was not continued by my colleagues when they took over the teaching of linear algebra. I do not have an experience with Sage but I believe that it is easy to learn. We teach one or more sections of linear algebra each semester, depending upon enrollments, and it is possible to have a control section of the course at the same time when I teach this course.

George Washington University is a private, urban, comprehensive university in the nation's capital, located just a few blocks from the White House. We have about 10,000 undergraduates across schools of Arts and Sciences, Engineering, Business, and International Affairs.

Please let me know if you have further questions.

Sincerely,



Murli M. Gupta
Chair, Department of Mathematics
Professor of Mathematics

To: Rob Beezer (beezer@pugetsound.edu)
From: Dan Ullman
Re: Open source algebra project
Date: Dec 3, 2015

I would be eager to participate in your UTMOST project. I am in my 31st year of teaching at the George Washington University, and I would be interested to teach undergraduate abstract algebra over the next few years in an innovative way. I have taught the course only once before, but I am on the schedule to teach it in the 2016–17 academic year. My department chair is supportive of the project and will be happy to have me teach the course in the two subsequent years as well.

I enjoyed teaching abstract algebra very much the one time I did so, because it is such a mind-blowing experience for many of the students. They've never seen anything like it before. One difficulty with learning group theory is that the traditional first examples come from such a narrow spectrum: the reals, the integers, cyclic groups, symmetric groups, dihedral groups, but not much else. The students get very little feeling through these examples of notions like cosets or conjugacy classes or commutators. If they could just compute inside of some real but really complicated example --- the Rubic's Cube group, for example --- they would likely come to understand these ideas more concretely and more immediately. For this reason, I would be eager to use more computational software in my course.

Having said that, I don't use computational machinery in my teaching very much. I use Mathematica and MatLab to make computations and occasionally to bring demonstrations to my classes. But I haven't taught any classes in which I assign problems that require extensive machine computation. I'm happy to try it, though.

My experience with Sage is limited to a couple of momentary trials some years ago when I first learned of it. I definitely have zero experience with SageMathCloud.

We teach one section of undergraduate abstract algebra each year at GW, part one (groups) in the fall and part two (rings and fields) in the spring. We have about 25 majors per year, but not all of them take the course, so one section is sufficient to meet the demand.

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Let me know if you want me to be part of your project.