

GAP in algebra class

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Abstract

In autumn 1997 at the computer centre of the Yamagata University.

"Hey, Hanako! Is this number 1234567891 a prime or not?"

"Who knows, I bet it's a prime."

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gap> IsPrime(1234567891);
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true
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"You win!"

This light-hearted but "*academic*" conversation occurred shortly after I explained how to use

GAP (Groups, Algorithms and Programming) 3.4.4

in the first class of Information Science for the 4th year students of the Department of Mathematical Sciences. I have never heard of such an enjoyable conversation in a math class since I began my career at university.

In this paper the author explains the effects of the usage of such a computer algebra package in class. This is a result of his two-years long project of improvement of teaching methods of algebra. In 1996 he gave the students a course of cryptography including its mathematical background. Especially

- Elementary number theory.
- Group theory.
- Finite fields.

As a result of recent dramatic expansion of graduate schools of mathematical sciences, mathematical departments of universities are not only a place for educating researchers of mathematics, but also for training engineers of mathematical sciences. Classes aided by computer are necessary for the both types of students. For students who want to be researchers it is very helpful to have a skill of calculating examples, and for students who are interested in applications of mathematics it is very useful to get used to such a math soft wear like GAP, because they can learn mathematics through examples and also learn computer systems at the same time. Though most of my 46 students have already joined computer classes including C-programming for 3 semesters, they were all keen and gave positive answers in the questionnaires after the class.

The server was S-4/1000E 3 CPU(384MB). Sometimes it was slow, but in most cases it was enough for 46 users just to learn how to use GAP.