Counting

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Our next topic is counting. It includes some very simple counting approaches and builds up to challenging complex methods.

One important area where counting plays an important role is computing. In many cases, deciding whether a certian procedure is feasible we try to count the number of operations the procedure may need to execute before it terminates. To have a better feeling for this issue consider the simple arithmetic operation of factoring an integer.

Use SAGE to try and factor the following numbers: (you may have to give up after some time when SAGE might not be able to factor one or both numbers. Both numbers are not prime as SAGE can easily test.

1. $2^{256} + 1$

2. 1937450698970522912412566471986080656881832844432020811016940689608908006 1186523062534389280375148890616887852485763545277185664236906143753626392 14707 4512392990498058572341861713154169912093779285932034024647619235528384648852185966229

We shall adopt a different approach to this topic. The file Let us count contain many counting problems. We shall go over them together in class and try to solve as many as we can. Once we do it, we will idnetify some tools that help us solve many counting problems.