

When comparing part a) and b) of problem 2, matching students with boolean logic uses a significantly larger encoding and takes significantly longer time than when using integer variables and functions. This is because the number of assertions and variables needed for part a) is exponentially larger than in part b).

For each student in part a) every single possible connection with every other student must be declared as a separate boolean variable, and every single student preference must be declared as a separate assert statement. In part b) only one variable is needed to represent each student, and one assert statement represents all of the student's preferences. Also with an exponentially greater number of variables representing a student in part a), asserting that no student can be in more than one group takes many more assertions than part b). Therefore the size of the part a) encoding is much larger than the part b) encoding.

While part a) is has an exponentially larger encoding, it is also more straightforward to understand than part b) because only booleans are used in the z3 logic, while part b) uses intermediate/uninterpreted functions and variables that belong to a user declared type "A" .

When running a large preference list of 25 students, part a) used 300 boolean variables and took 2.86 seconds to calculate, while part b) used 25 variables and took 1.47 seconds. Part a) taking significantly longer than part b) to complete matches what is expected because of its significantly larger and more verbose part a) solution using boolean variables.