35. Rein Prank, Evari Koppel, Joosep Kibal, Katrin Valdson and Joosep Norma: Word Problem Solution Environment TEKSTER

TEKSTER is an environment for solution of word problems by finding at each solution step a value of some sensible quantity. Such tasks are solved in Mathematics of elementary grades but also in Geometry, Physics and Chemistry.

At each step the student performs the following substeps:

1) Using given phrases to build a question/sentence that tells what quantity will be calculated at this step;

2) Forming from initial data and results of previous steps a numeric expression that finds the desired quantity (using arithmetical operations);

3) Calculating the value of the expression.

At the first substep the program checks whether the sought quantity belongs to the 'reasonable' intermediate results specified by the author of the task and whether it can be found using the allowed number of operations. The equality between the student's and teacher's expression is checked at the second substep and the correctness of calculation at the third step.

The program uses the Maxima computer algebra system for checking equality of algebraic expressions and the automated Solver for checking the solvability of tasks, for demo solutions and generation of hints. The student program records in solution file the choices and mistakes made by the student.

In task composition environment the teacher types the text of the task, marks the numbers that can be used in solution, composes the matric(es) of phrases for questions, and inputs the formulas that express the intermediate results through initial data. The program can generate numerical values of initial data at random. The presentation demonstrates both student and teacher environments.