

Understanding Computational Thinking

Practice Scenario

Problem Statement:

As a teacher, you send out a newsletter to students' parents each week with class updates—goals, challenges, successes, homework, etc. You love to personalize these letters so that parents can see what how their own child is doing in the classroom, and so that you can issue a personal challenge based on each student's individual weekly goals. Parents love it, too, and have expressed how much they appreciate the personal touch and feedback. The problem is that it takes so much time to create a personalized letter for 30 students each week. If you don't find a better solution, you may have to start sending out a more generic letter.

Questions:

Decomposition

1. What are the components of this problem?

Pattern Recognition

2. What repeating patterns do you see in the information provided or the data gathered?

Abstraction

3. Write, draw, or otherwise represent an abstraction of this problem.

Algorithm Design

4. What automated systems might be useful in solving this problem? (If you have no idea, Google “mail merge”)
5. Write ordered steps that would enable a human, a computer, or (more likely) some combination of the two to carry out the solution. Indicate the agent (who or what) that will carry out each step.

Evaluation

6. List each problem component you identified in step 1 and evaluate whether your solution addresses that problem or not. Also, identify any future issues (bugs) you foresee that may need be resolved in the algorithm to make it better.
7. How does the algorithm above leverage the power of computers and automation? In what ways might it leverage these capacities more?