Project Motivation

Today’s students rarely read textbooks on a regular basis, thus reinforcing lecture materials is a challenge; Many students never retain the knowledge of critical topics for computer science success.

Project Goals

- Create highly interactive data structure modules
- Motivate student reading
- Increase retention rates for CS students
- Allow for multiple examples and practice of work
- Create diverse examples of real CS problems
- Communicate students development and progress to the instructor in a timely manner
- Allow for student tracking throughout the whole semester

Module Structure

- Each module asks questions about a CS data structure
- The data in the module is randomized to eliminate cheating
- Each module has multiple forms of interaction
- Students can view a model solution to walk through how a problem is done
- Students are graded on their interaction with the module
- Interactions are logged to create visualizations of development to the instructor
- Instructor can view each students progress individually or as a whole class

Interactive Module Design

- Students must build a BST given the algorithm above
- Students must insert a given value into a BST according to a dynamic algorithm
- This is the model solution that walks the student through the problem step-by-step
- This is the model solution displaying the final step of the process to completion

Results

- Currently we are creating more modules based on other data structures to be implemented into this system i.e. Linked Lists and Graph Traversals.
- In addition, we are improving the instructors dashboard of student analytics to include a dynamic timeline with more in-depth and interactive views of student difficulties. This will involve comparisons across a whole class and time period.