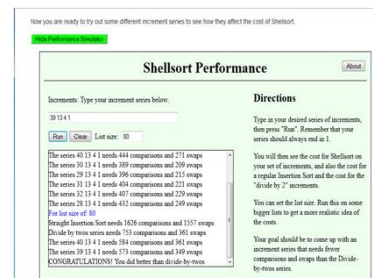
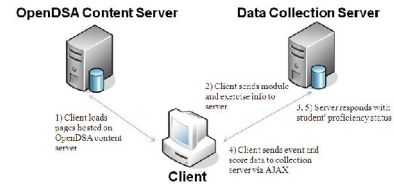


The OpenDSA System

The OpenDSA Project seeks to provide complete instructional materials for data structures and algorithms (DSA) courses. Our vision for a highly interactive eTextbook involves the use of many algorithm visualizations (AVs) and a wide range of interactive exercises with automated assessment.

OpenDSA is designed with the following educational goals in mind.

1. Leverage technology to present the material in a way that makes learning easier.
2. Include activities to engage and motivate students.
3. Include assessments to evaluate how well students learn.



Implementation & Interactive Content

OpenDSA Authoring System:

- reStructuredText (ReST) markup language
- Sphinx compiler

Book Configuration System:

- Book instance configuration (json) file: contains all book details
- easily shared among instructors

Technologies

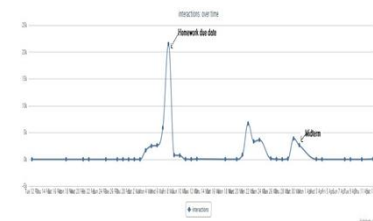
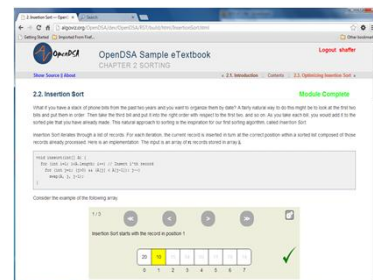
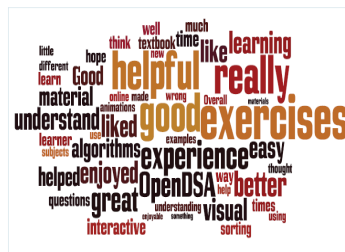
- Client: HTML5 + JavaScript
- Server: RESTful API+Django+MySQL

Interactive content:

- Slideshows
- Simple Questions (multiple choices)
- Proficiency exercises
- Programming exercises

Evaluation

- Students expressed positive attitude towards OpenDSA
- Students voluntarily repeated exercises to review for exams
- Students often skip directly to the exercises, only reading as required to get exercise credit



- Low use of learning technologies for teaching CS (other than for programming tasks)
- Low in-class use of Algorithm Visualizations (AVs) despite their educational usefulness and popularity
- Inadequate number of assessment activities with immediate feedback due to the lack of time for grading.

NABC

- Integrate text and images, dynamic presentation, rich assessment exercises with automated grading
- Display dynamic execution of algorithms.
- Assess student understanding and knowledge of the concept that is being studied
- Include "exploration" activities

- Low cost (open source, free of charge)
- Saves instructor time (automated grading)
- Personalization (of content)
- Better student understanding

- Superior to paper textbooks
- Most eTextbooks today have only static multiple choice questions
- AVs far more sophisticated than typical eTextbook displays