Streamlining Grading
Toward Better Feedback

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This is CS50.

- lectures
- sections
- walkthroughs
- shorts
This is CS50.

- 8 problem sets
- 2 quizzes
- 1 final project
This is CS50.

- 110 staff members
- 70 teaching fellows (grade problem sets)
- 40 course assistants (do not grade)
Weekly TF Responsibilities

• lead 90-minute section of 12-15 students
• hold 3 hours of office hours
• attend 90-minute staff meeting
• grade 12-15 problem sets
Staff Grading Workflow

- ssh to shared server
- copy, download submissions
- generate PDFs from source code
- annotate PDFs using Acrobat
- record grades in separate spreadsheet
- email annotated PDFs to students
Problems

• too many bottlenecks
• less time spent leaving feedback
• inability to track staff’s comments
• unclear if all students read comments
Time Spent Grading

- grading per week: **7.2 hours**
- total work per week: **17.2 hours**
- **42%** of time is spent grading
Goals

• reduce setup time for staff
• audit quality of staff feedback
• understand students’ usage
This is CS50 Submit.

- command-line and web uploads
- in-browser source code commenting
- summary comments for submissions
- centralizes submission and feedback
queue.c

```c
#include <stdbool.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#define CAPACITY 10

// the capacity of the queue

typedef struct
{
  // the index of the first element in the queue
  int head;

  // storage for the elements in the queue
  char* strings[CAPACITY];

  // the size of the queue
  int size;
} queue;

// declare a queue (as a global variable)
queue q;

/**
 * Puts a new element into the queue into the "end" of the data structure
 * so that it will be retrieved after the other elements already in the
 * queue.
 */
```
Results

- staff efficiency
- feedback quantity
- students’ usage
Staff Efficiency

• 10% fewer hours grading per week
• 13% fewer minutes grading per student
• independent of prior teaching experience
Staff Efficiency

- fewer reported grading bottlenecks
- 136% more time spent on discussion board
- locate problem set-specific bottlenecks
Feedback Quantity

- median number of comments per student remains constant
- median number of words per comment declines
Students’ Usage

- on average, 9% of students never open feedback
- mid-semester peak of 14%
- number of students who do not open feedback increases over time
Percentage of students who did not review feedback

Problem Set

0%
4%
8%
12%
16%

1  2  3  4  5  6  7
Questions