



# APCS FRQ Test Prep Tidbits

Ria Galanos



CS Teacher, Thomas Jefferson HS for Sci & Tech  
Reader, AP Computer Science, 2007-13  
Board Member, Computer Science Teachers Association

June 2013 ❖ JMU CS Content Teacher Academy

# Agenda

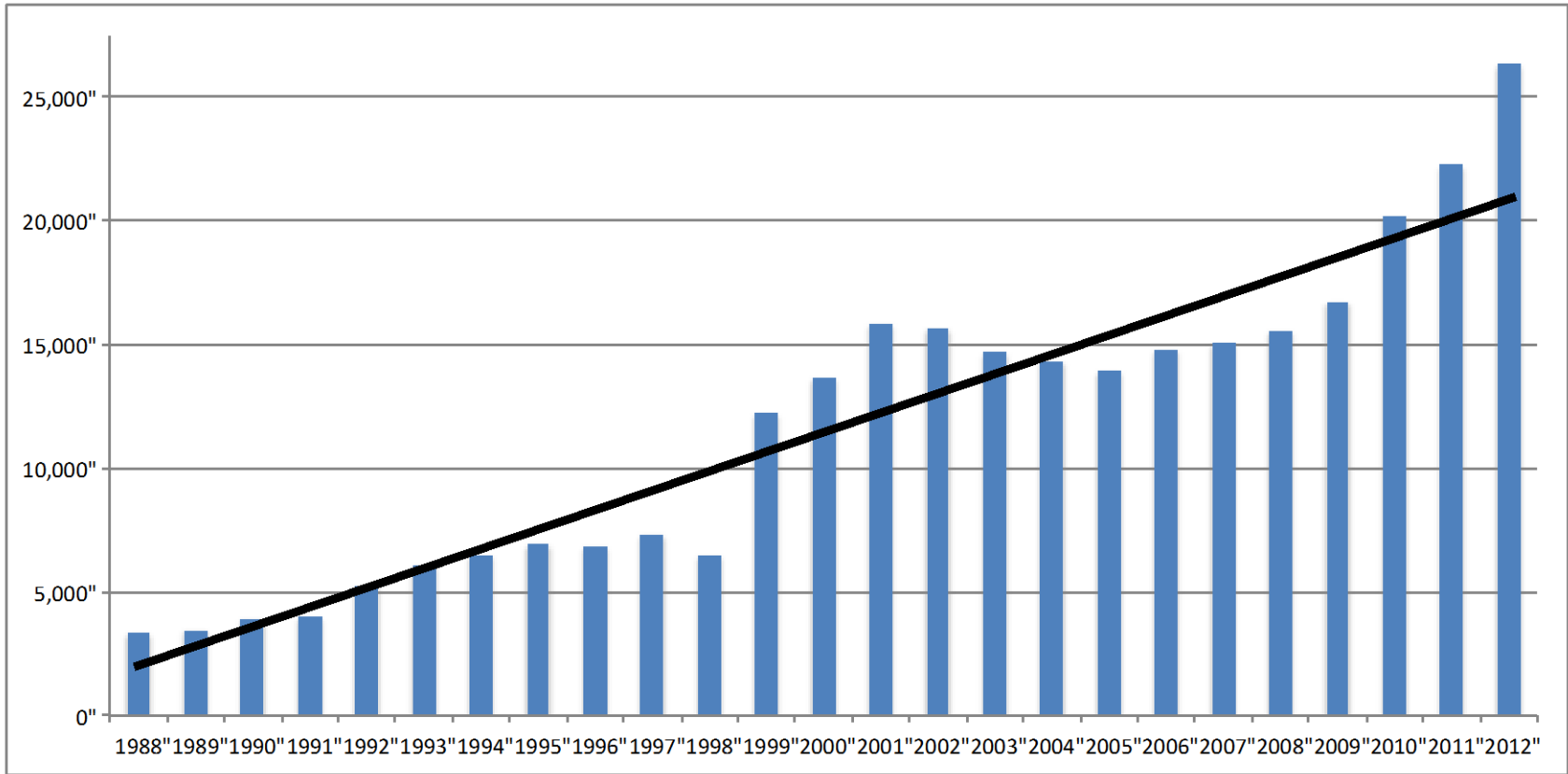
- About the Free Response Questions
- Topics – What’s Hot, What’s Not
- Where to Find Practice Questions
- My Approach to Solving the Problems
- Let’s Practice – Sing Us a Song, You’re the Piano Man
- How to Score a Problem
- Why You Should Sign Up to Score 1000+ Exams

# Introductions

Overheard: “All of my students get 4’s or 5’s on the exam.”  
Me: “Eeek! This doesn’t happen at my school.”

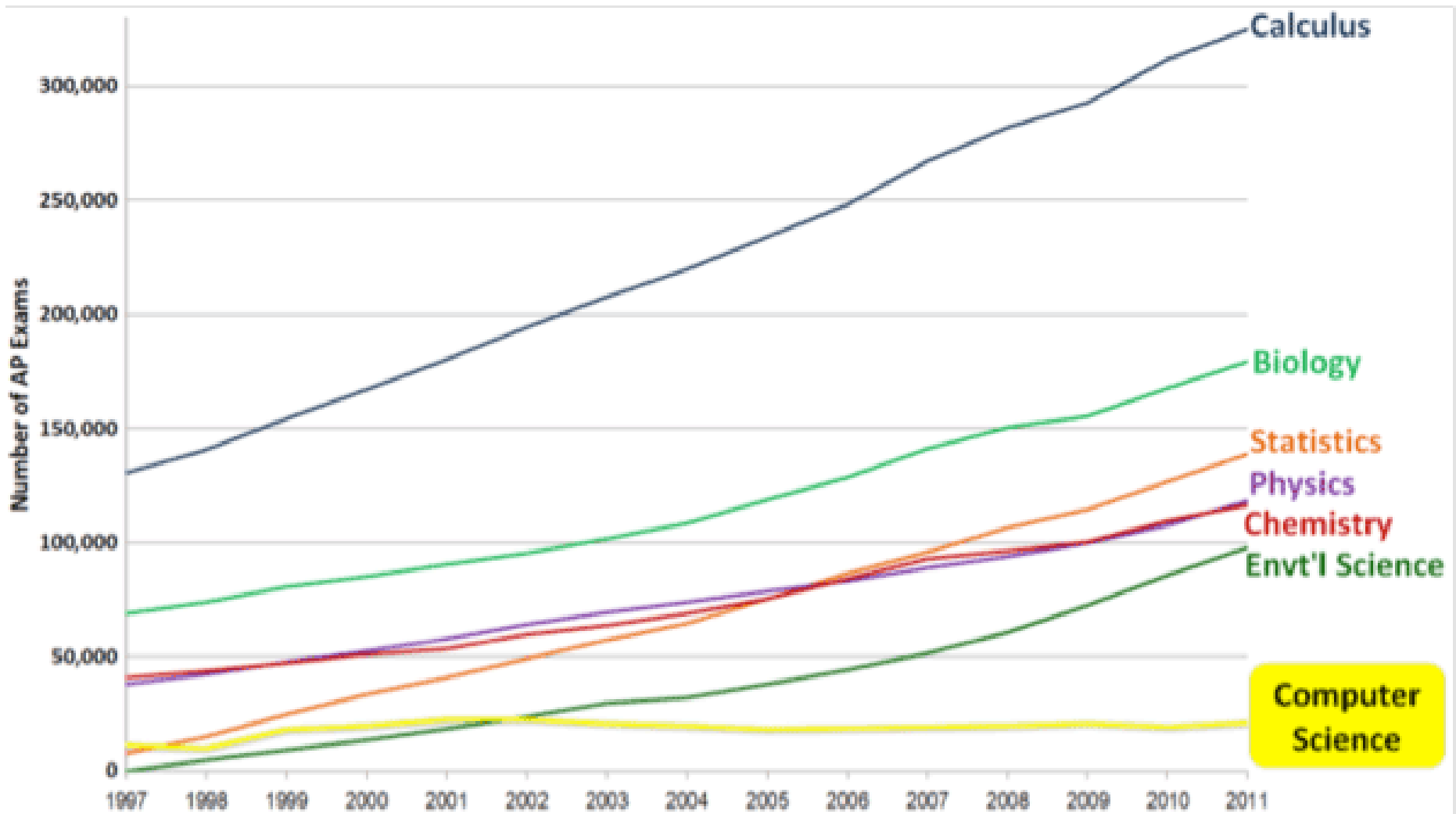
- Name
- School
- How long you’ve been teaching APCS (include this year)
- # of Sections, # of Students, % of Honors Students
- Diversity (gender, ethnic, racial, and/or socioeconomic)
- % of students who take the exam

# AP Computer Science A 26,350 Exams



**+18% from 2011    22,250**

**+30% from 2010    20,200**



# About the Free Response Questions

- Four free-response questions
- Duration: one hour and 45 minutes (follows MC after about a 10-15 break). That's just about 26 minutes per question.
- Students can/should use the [Quick Reference Guide](#)
- Worth 50% of the total points of the test
- Questions scored on a 9-point scale (may include half points)
- Each question's total score is rounded up (if half points exist)
- Count on one question being about Grid World (or Grid World-like)
- Most typical question requires students to write a method for part A and another for part B. (Exceptions – write a full class, part C)

# Things Students Should Know

- **Extract digits** from an integer
- Check consecutive elements in an array/ArrayList
- Accumulate values in an array/ArrayList
- Average elements in an array/ArrayList
- Find the max/min of an array/ArrayList
- Find the **index** of the max/min of an array/ArrayList
- Swapping elements of an array

# Things Students Should Know

- How to expand an array
- Reverse items in an array
- **Remove items** from an ArrayList
- Search for an element in an array/ArrayList using linear (sequential) search
- Sort an array using selection sort
- How to traverse a 2-D array **from multiple directions**



# What You Should Know

- Free Response Question Map
- All legal Java is acceptable (no additional output)
- No reimplementations of code without penalty

# What's Not Tested by the FRQs

- Recursion
- Sorting (but some students choose to implement a sorting algorithm, not well, I might add)
- For-each (enhanced) for loops
- The primitive character data type
- The switch statement, the do-while loop, continue in loops
- The prefix form of ++ and -- operators (++k, --k)
- Library classes (such as StringBuffer, Arrays, DecimalFormat, etc.), unless specifically listed in the subset
- Checked exceptions and try-catch-finally statements
- System.in and Scanner; any input and output other than System.out.print and System.out.println
- enum data types

# Where to Find Practice Questions

- Live Questions
- AP Audit Test
- Teacher Created Questions – Brandon Horn, and others
- JavaBat (aka Coding Bat) / Practice-It / CodeLab
  - good for direction following, method writing
- Caution: solutions posted online

# My Approach

- Teach them how to READ
- Quickly review story
- Examine question in part A first
- Make note of class, method, and collection names
- Underline what you are being asked to do
- Note what the questions is asking you to return (if anything)

# My Approach Continued

- Look at preconditions and postconditions carefully
- Check all code paths to make sure you return in all cases (if method is a non-void method)

# Let's Practice

- First, individually
- Second, talk with table partner
- Third, group discussion

# How to Score

- Get to know the rubric
- When in doubt, hose 'em
- Usage sheet
- Scoring spreadsheet
- Penalty for extraneous code with a side effect (including printing)

# Grid World

- Scavenger hunt
- Use the reference guide for EVERYTHING
- Get the grid!!!
- Note the return types on the methods you use
  - `gr.get (some location)` returns the actor at that location
  - `this.getLocation()` returns a `Location`
- You can override `act` in `Bug`, but NOT in `Critter`
- Have students understand the difference between the `processActors`, `getMoveLocations`, `selectMoveLocations`, and `makeMove` methods



# The APCS Exam Reading

- Question: Why would I want to spend a week grading 1000+ exams?
- Answer: Because grading is fun! (If you do it with your favorite adult beverage, ice cream, and 150 of your closest friends!)

# All About the Reading

- It is where the FRQs are graded each June.
- Held in downtown Cincinnati since 2009. And the waterfront area just got a much needed facelift!
- Usually held first week in June. Next up: June 2-8, 2014.
- Participants read for 7 consecutive days. Two additional days are designated for travel.
- In 2014, you would miss six days of school, 1 ½ weekends
- 150 of your closest CS friends engage in camaraderie, collegiality, and professional development.

# How Reading is Organized

- Readers: 50% current APCS teachers with at least three years of experience, 50% college CS faculty
- First timers: (We ♥ acorns!) provided extra support
- Tables: typically contain 3 pairs of Readers with 1 table leader
- Each FRQ has its own room. Each room has multiple table leaders and four question leaders. Supervising the QLs is an Exam Leader. The big cheese is the Chief Reader (CR).
- Readers are assigned to one of the four free-response questions.

# Rubrics and Training

Prior to the pre-Reading:

- The Chief Reader develops the rubrics and canonical solutions

At the pre-Reading:

- Question leaders (QLs) vet the rubrics and develop reader training
- Table leaders vet the training

# Rubrics and Training Cont'd

Reader training:

- Takes almost the whole first day
- Be one with the rubric!
- Group reading of the training pack
- Split packs with table partner

Now on to the Reading:

- Table leaders mentor readers
- Consistency checks designed to support readers

# After the Bell Rings

- Walking/running groups, golf, museum tours
- Designated social lounge at hotel open from 7-11pm
- Planned evening events include:
  - Professional Night
  - Toy Night
  - Puzzle Night
  - Reds Game
  - Closing Ceremonies

# How Do I Sign Up?

- Applications taken on a rolling basis.
- Want to participate in 2014? Apply early (Oct/Nov)!
- First-round invitations go out in early January.
- Must have taught AP CS for three years (ok to be in third year).
- Stipend is about \$1700 (before taxes).
- All travel, meals, and lodging are covered (bring \$\$\$ for optional Starbucks, Graeters ice cream, and Cubs games).

# The Disappearing Bug Case Study

- Grid World is going away – last tested in 2014
- 2015 will likely see a replacement of the Case Study
- Current proposal: The Why & The Labs
  - Magpie – Natural Language Processing
    - Conditionals, Loops, String Class
  - Picture Lab – Pixel Manipulation
    - Two-dimensional arrays
  - Game of Elevens
    - Interacting objects
- Labs will NOT be tested on exam (What?!?!)