Preparing Teachers To Teach Computer Science

Education & Business Summit 2017

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Blake Vaught, Academy for the Arts, Science, and Technology

- Get started with Python
  - *How to Think Like a Computer Scientist*

    http://interactivepython.org
  - *Problem Solving with Algorithms and Data Structures using Python*

    http://interactivepython.org
- Web Page Programming
  - HTML, CSS, and JavaScript

    http://w3schools.com

New to CS?

- Python is simple, but powerful
- Python is a "real" language

  http://interactivepython.org is FREE
- Start with *How to Think Like a Computer Scientist*
- Follow up with *Problem Solving with Algorithms and Data Structures using Python*
- Also some Java resources

Interactive Python

- Easy to begin programming web pages
- Web programming, a critical programming skill
- http://w3schools.com is FREE
- Start with HTML
- Continue with CSS
- Add JavaScript
- Two specific SC courses

HTML, CSS, and JavaScript
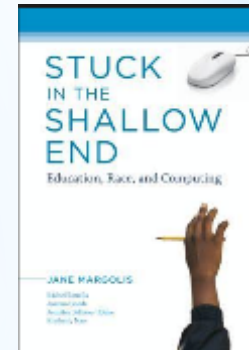
Exploring Computer Science

Overview:

- ECS curriculum initially funded by the National Science Foundation
- Curriculum is FREE and includes:
  - lesson plans
  - assessments
  - units – human-computer interaction, problem solving, web design, programming, computing and data analysis, and robotics
- http://exploringcs.org

Exploring Computer Science

http://exploringcs.org

Mission:

- ECS was developed, in part, to encourage and recruit those students not currently inclined to take a computer science course – namely women and minorities.

- Based in part on *Stuck in the Shallow End*

Exploring Computer Science

http://exploringcs.org

Mission:

Science Nation Video

https://www.youtube.com/watch?v=NsxXMOpoEYc

Exploring Computer Science

Teacher Training:

- Available in various locations

- Sometimes free, sometimes not

- Michael and/or Blake are available to provide professional development, but we are not free

Exploring Computer Science

http://exploringcs.org

Results:

- ECS is, indeed, for everyone

- ECS is foundational

- ECS aimed at 10th graders, but curriculum can be used in 8th through 12th grades

- ECS correlates well with the new SC K-8 Computer Science standards

Exploring Computer Science

http://exploringcs.org

Largest Course Launch in AP History

AP Computer Science Principles

Training

- UTeach Institute
    - http://cs.uteach.utexas.edu/

- Workshop (Myrtle Beach July 31-August 4)

AP – Computer Science Principles

Training

- Beauty and Joy of Computing

  http://bjc.edc.org/

- Free at The Citadel (this week)

  http://www.citadel.edu/root/stemcenter-teachers/professional-development

- Unit on Social Implications of Computers uses the book *Blown to Bits* (www.bitsbook.com)

AP – Computer Science Principles

Introduction

- New course – first test May 5, 2017

- 2,700 schools, 45,000 students took the test

- Some see as a logical extension of Exploring Computer Science

- Innovative testing using both "Performance Tasks" and end-of-course testing

- Can be taught without taking the AP exam

AP – Computer Science Principles

Curriculum

- Incorporates Computational Thinking Practices
- Offers "Big Ideas"
- Uses an AP Digital Portfolio
- Promotes collaboration

AP – Computer Science Principles

Computational Thinking Practices

- Connecting Computing

- Creating Computational Artifacts

- Abstracting

- Analyzing Problems and Artifacts

- Communicating

- Collaborating
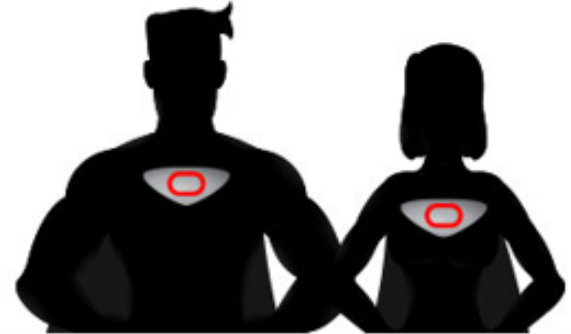
AP – Computer Science Principles

Big Ideas

- Creativity

- Abstraction

- Data and Information

- Algorithms

- Programming

- The Internet

AP – Computer Science Principles

Today's students need computer science classes as part of their educational pathways.

Oracle Academy

Java and Database Programming

- Three Java programming courses
- Three database programming courses
- One internet app programming course
- Curriculum and required software are FREE
- Teacher training is FREE and flexible
- FREE Workshops in a Box to get started
- Works with SC programming courses

Oracle Academy
http://academy.oracle.com

Workshops in a Box

- Getting Started with Java Using Alice
- Creating Java Programs with Greenfoot
- Programming the Finch Robot in Greenfoot
- Programming the Finch Robot in Java
- Solve It With SQL
- Curriculum and required software are FREE

Oracle Academy
http://academy.oracle.com

Java Programming

- Three Courses (can be used for AP CSA)
  - Java Foundations
  - Java Fundamentals (1st part of SC5058)
  - Java Programming (2nd part of SC5058)
- Curriculum and required software are FREE
- Teacher training is FREE
- Discounted certification exam
- Junior certification exam appropriate for high schools

Oracle Academy
http://academy.oracle.com

Database Programming

- Three Courses
  - Database Foundations
  - Database Design and Programming with SQL (SC5324)
  - Database Programming with PL/SQL (SC5326)
- Curriculum and required software are FREE
- Teacher training is FREE
- Discounted certification exam
- Junior certification exam appropriate for high schools

Oracle Academy
http://academy.oracle.com

Internet App Programming

- APEX Application Development Foundations
- Curriculum and required software are FREE
- Teacher training is FREE
- Merges application, web, and database programming

Oracle Academy
http://academy.oracle.com

Scratch - http://scratch.mit.edu

PencilCode - http://pencilcode.net/

AppInventor - http://appinventor.mit.edu/

Ruby – https://www.ruby-lang.org/en/

Sphero – http://www.sphero.com/education

SAS Academic Programs -

http://www.sas.com/en_us/learn/academic-programs.html

Links to Programs and Training

Project Lead the Way – https://www.pltw.org/

Legos – https://education.lego.com/en-us

PHP – http://php.net/downloads.php

Raspberries - https://www.raspberrypi.org/

Finches - http://www.finchrobot.com/

BlueJs - https://www.bluej.org/

Links to Programs and Training

Other Resources

- Code Academy
    - https://www.codecademy.com/

- Kahn Academy
    - https://www.khanacademy.org/

- Lynda (subscription based)
    – https://www.lynda.com/

- Code.org
    - http://code.org/

Programming Academies

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Blake Vaught

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Computer Science Teachers Association

- https://www.csteachers.org

CS Education in SC Steering Committee

- http://www.csedsc.org

We Can Help

Lions

Tigers

and Bears!

CS4ALL!