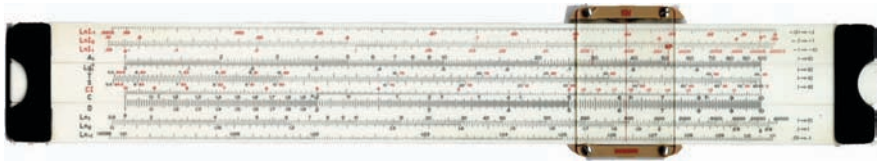
Who needs books anyway?

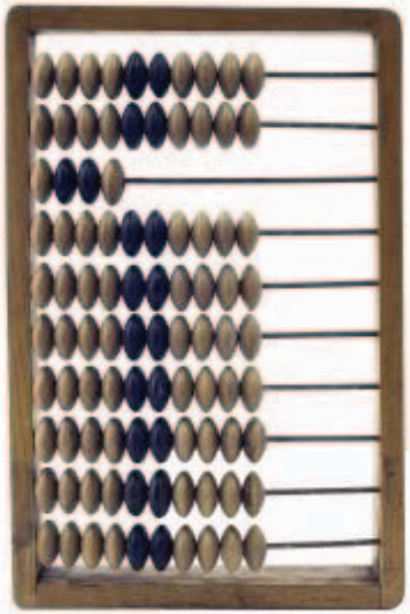
Interactive learning material in the digital age

IDA 30th Anniversiry,
Linköping University

Linda Mannila
Åbo Akademi University
19.6.2013


Hammacher Schlemmer





"The ebook revolution is just around the corner"

"The end of the textbook as we know it"

"iPads signal beginning of end for textbooks"

"No more textbooks"

"In a digital future, textbooks are history"

"Who needs textbooks, anyway?"

Why now and what
do we want instead?

Then	Now
Analog	Digital
Tethered	Mobile
Isolated	Connected
Generic	Personal
Consuming	Creating
Closed	Open

David Wiley: Openness and the Disaggregated Future of Higher Education

Education	Everyday
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So – what kinds of material do we want?

Interactive?

Social?

Personalized?

Adaptable?

Open?

inkling

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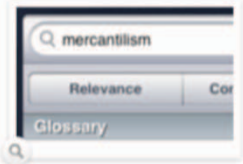

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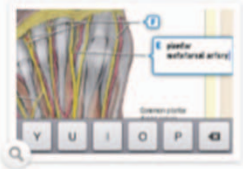

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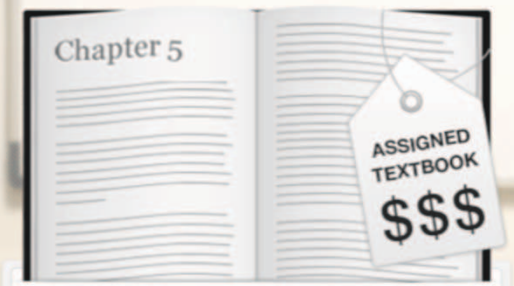

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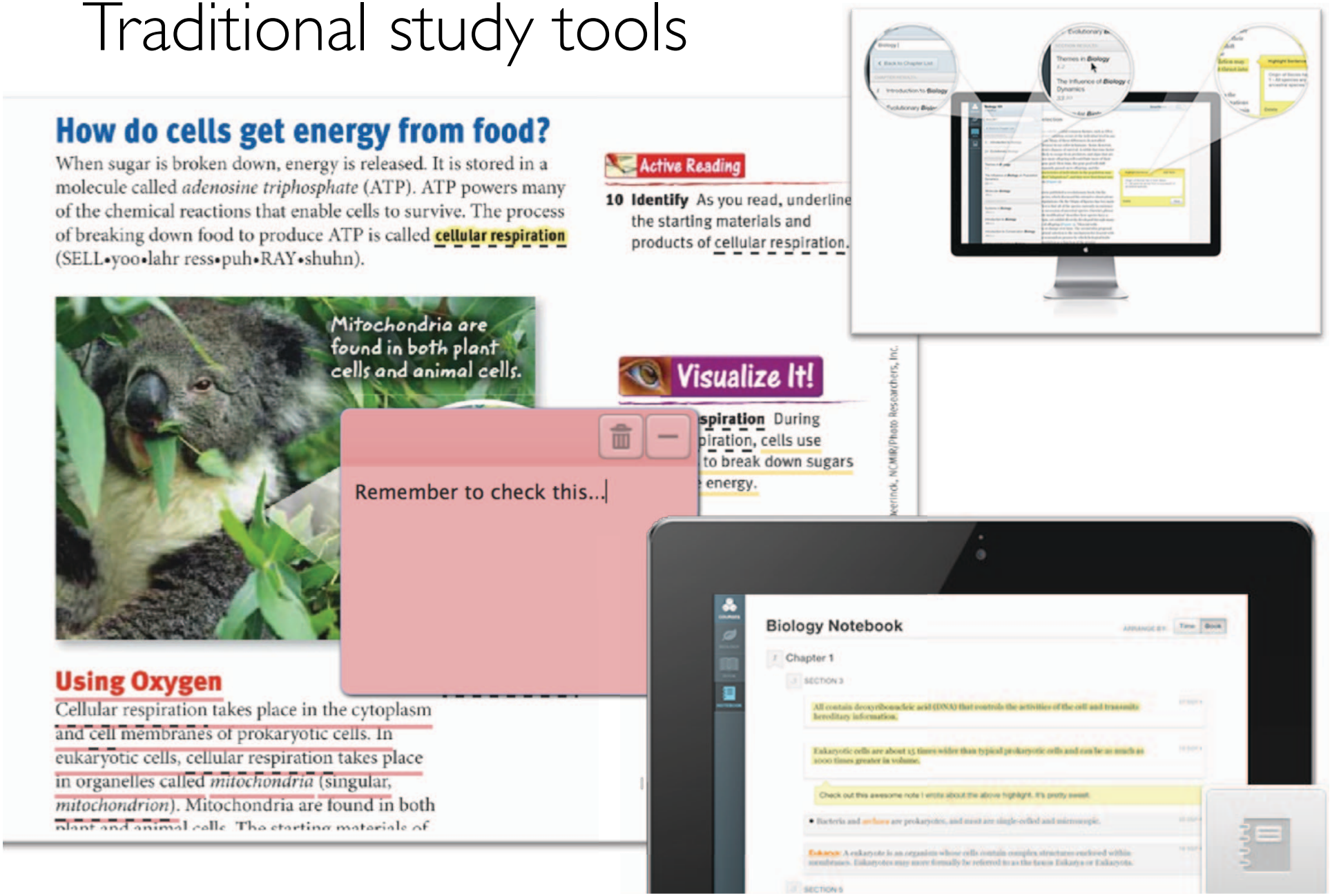
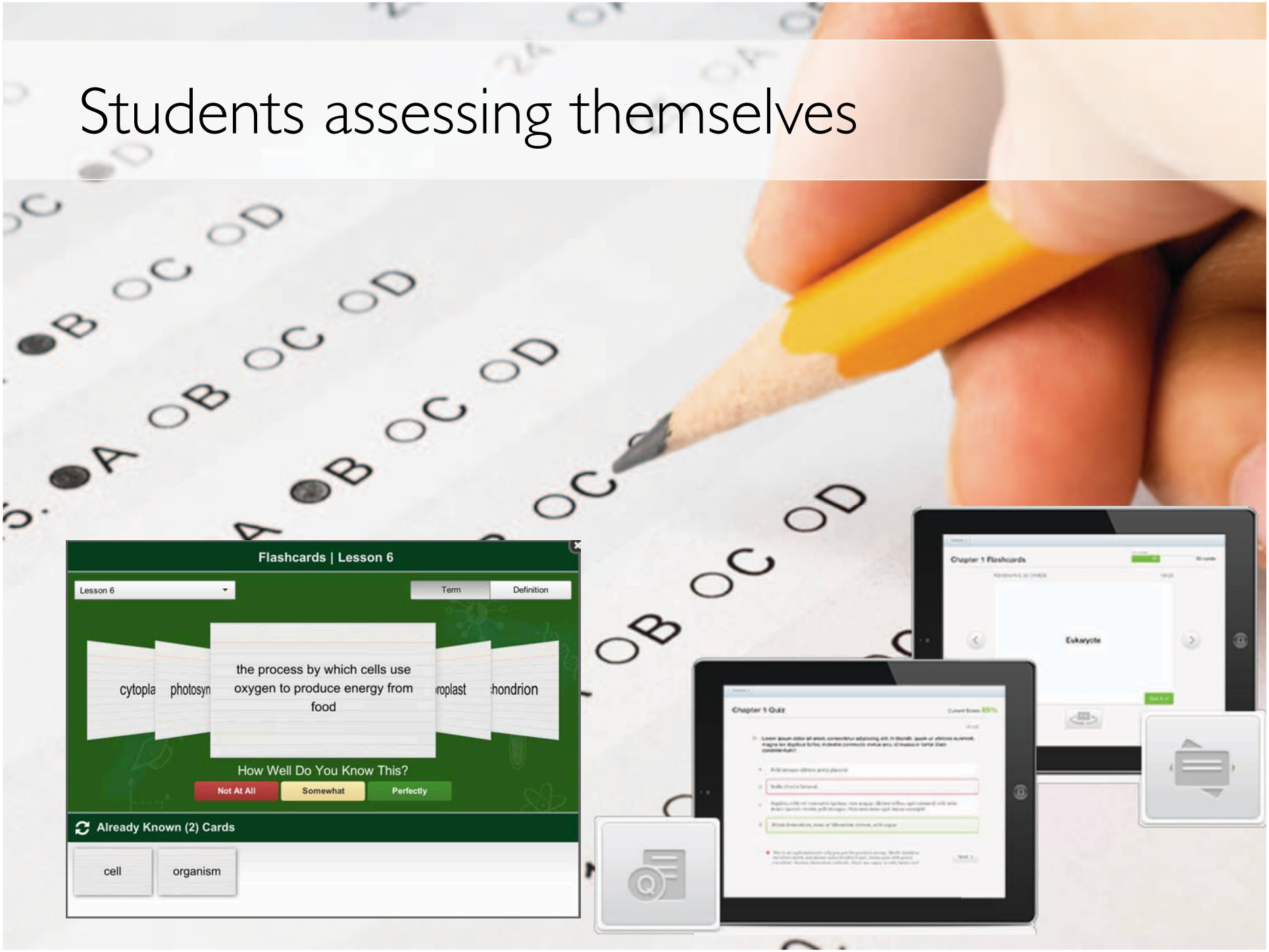
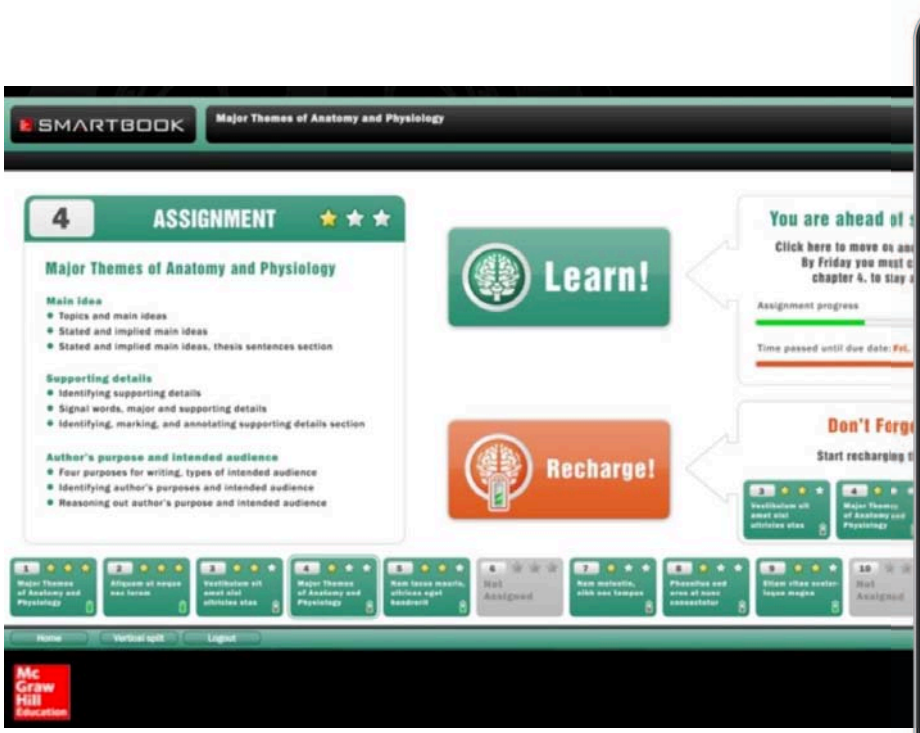


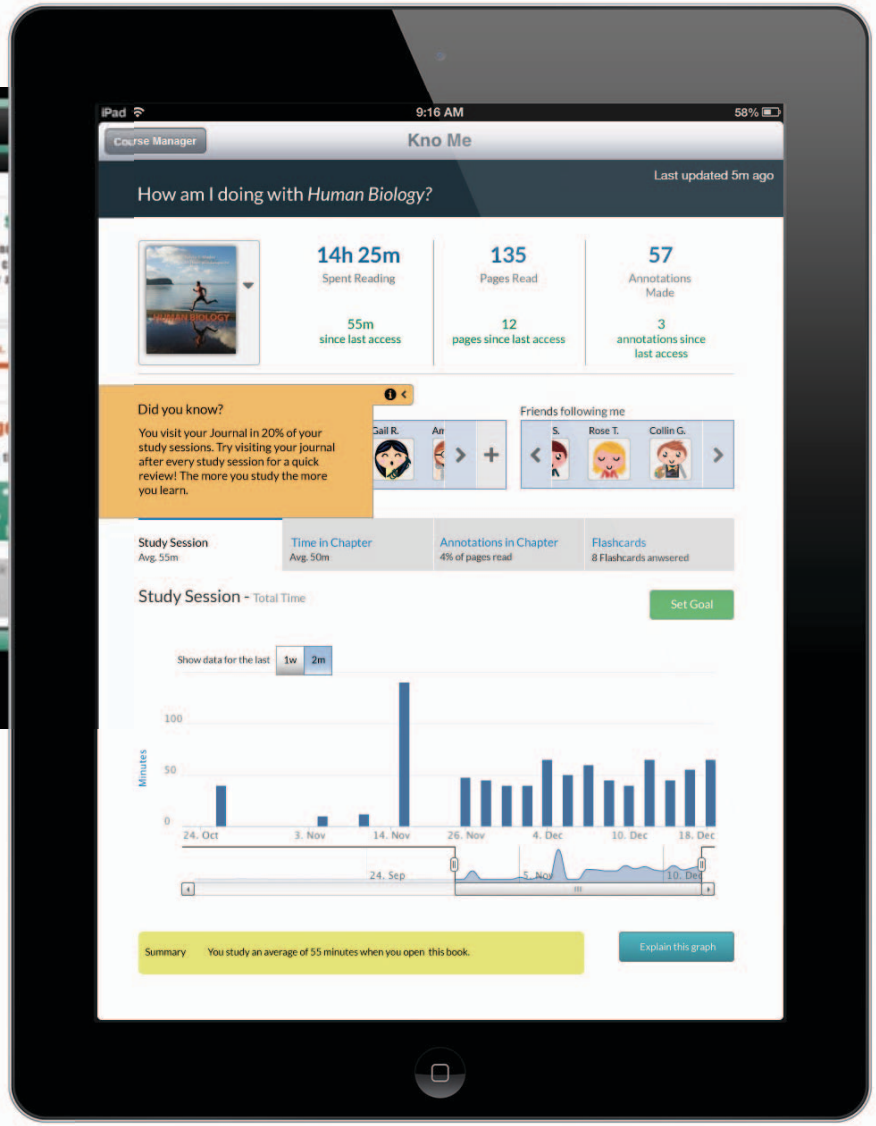
Multisensory learning through different media

Students assessing themselves



Learning analytics

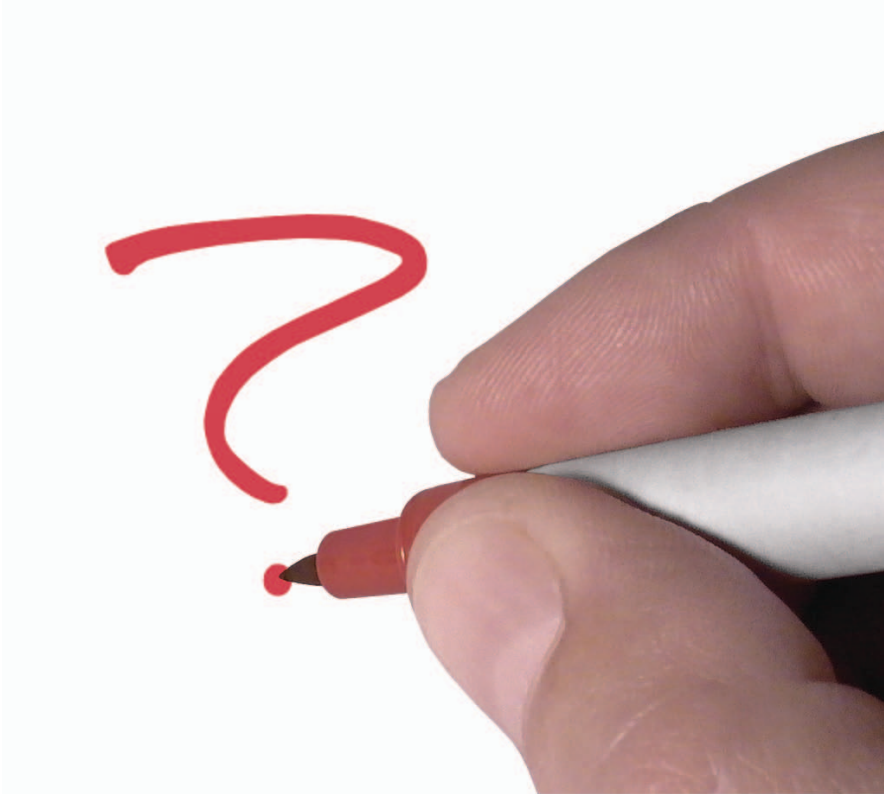


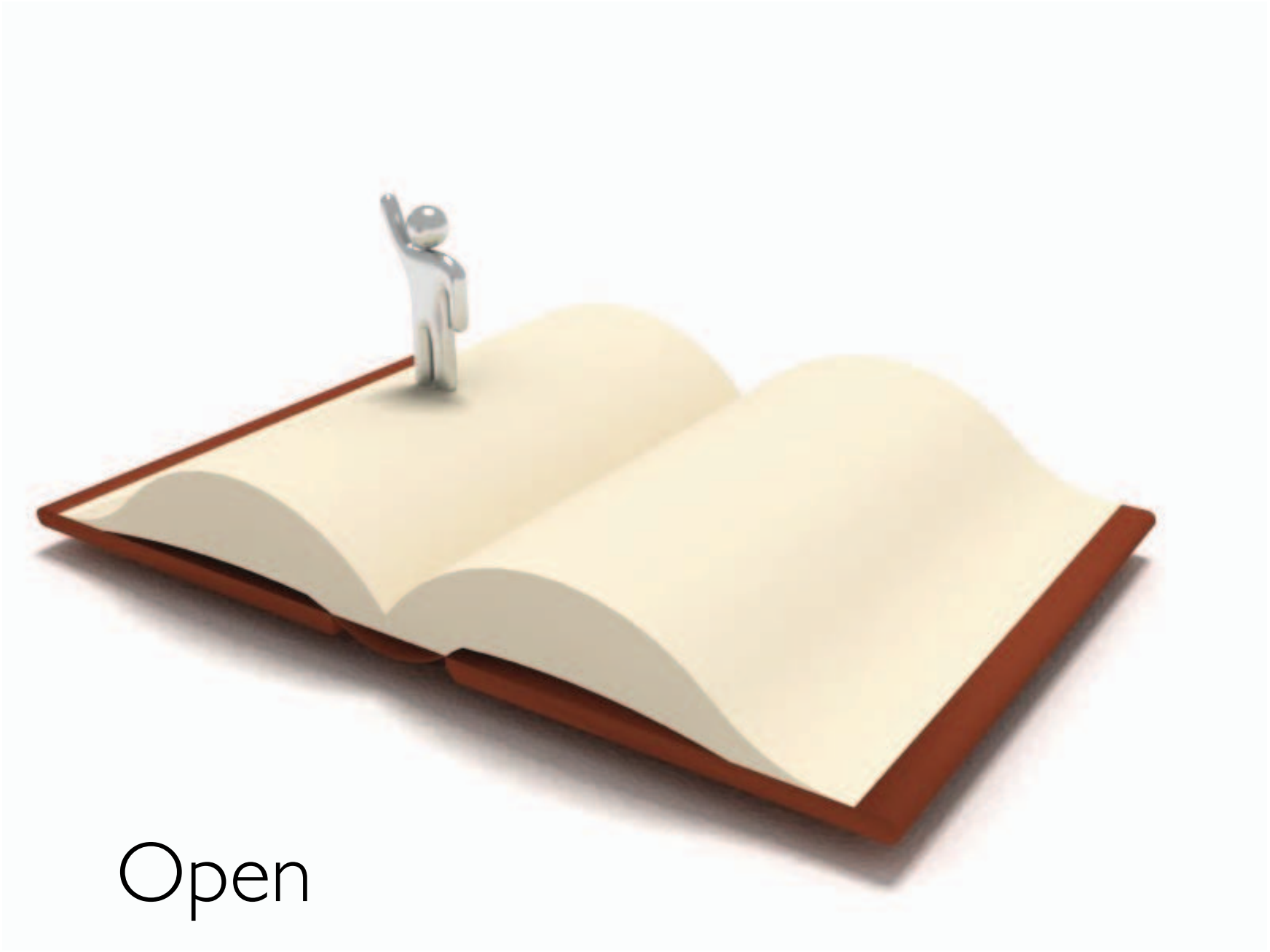


Personalize, predict,
adapt and intervene

Likes, ratings and shares

Collaboration and help





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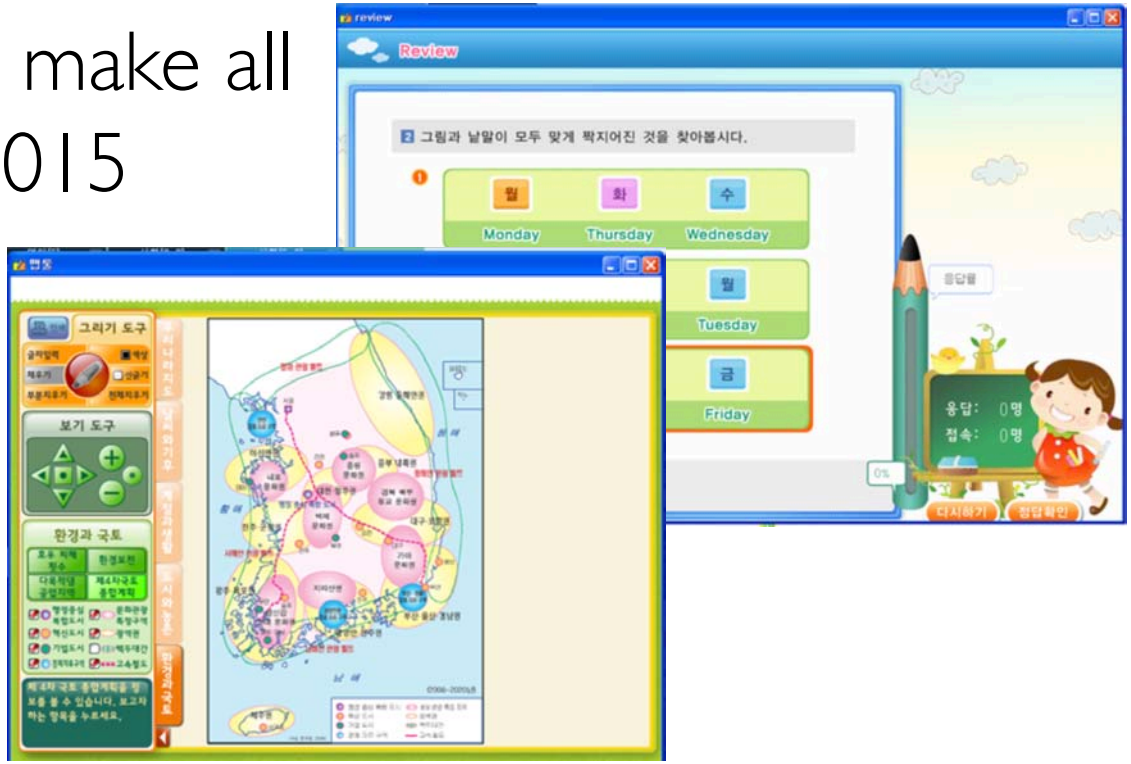
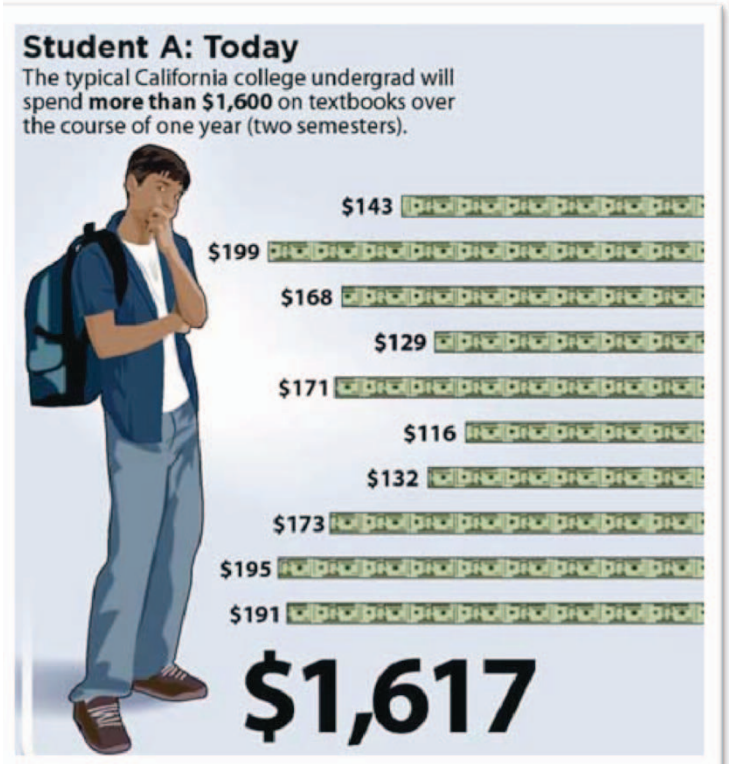
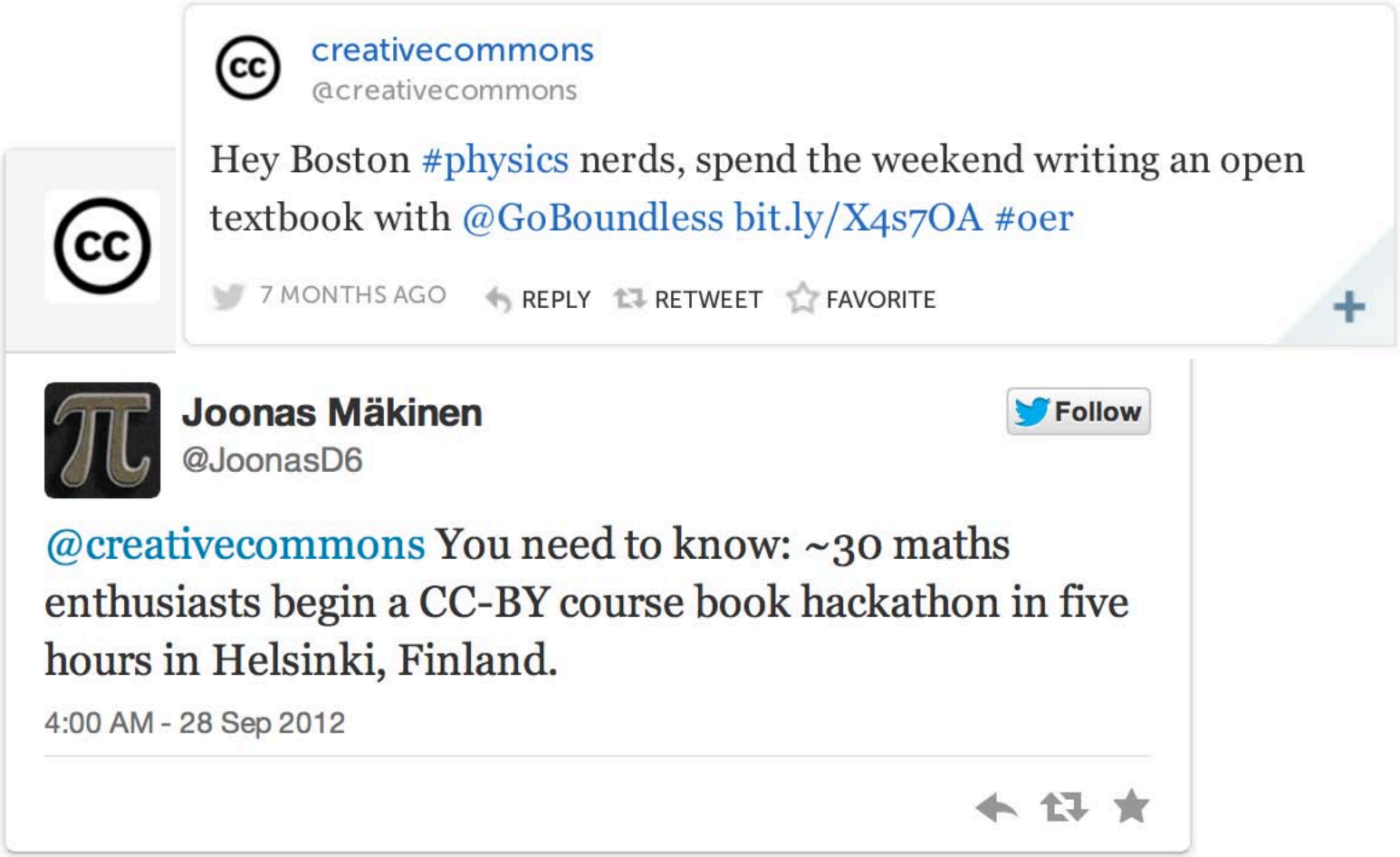
2007: South Korea to make all textbooks digital by 2015

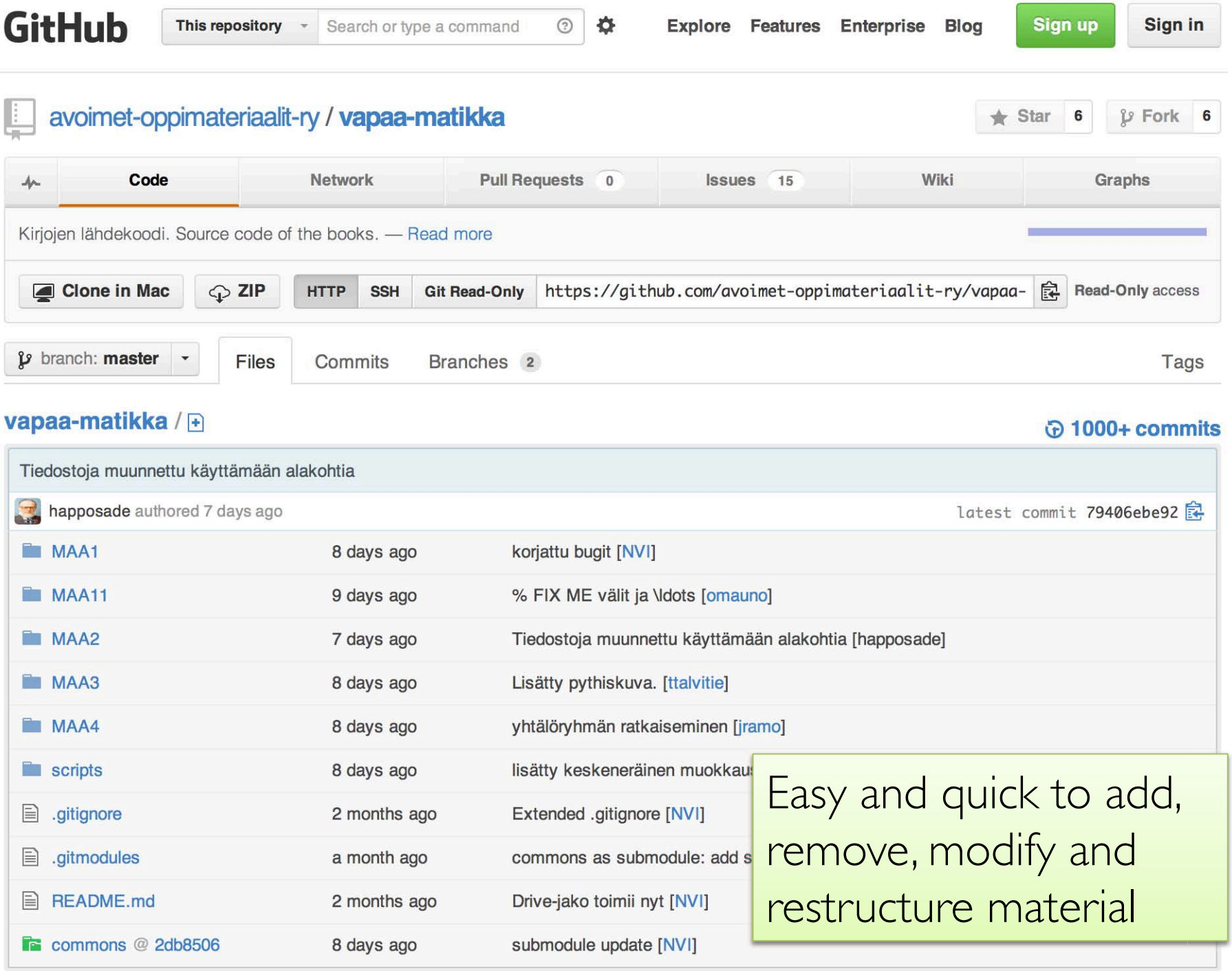




2012: California gets first Open-Source Textbook legislation

From long and well planned projects to content-hackathons

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1000+ commits
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latest commit 79406ebe92
MAA1 8 days ago korjattu bugit [NVI]
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MAA2 7 days ago Tiedostoja muunnettu käyttämään alakohtia [happosade]
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MAA4 8 days ago yhtälöryhmän ratkaiseminen [jramo]
scripts 8 days ago lisätty keskeneräinen muokkaus
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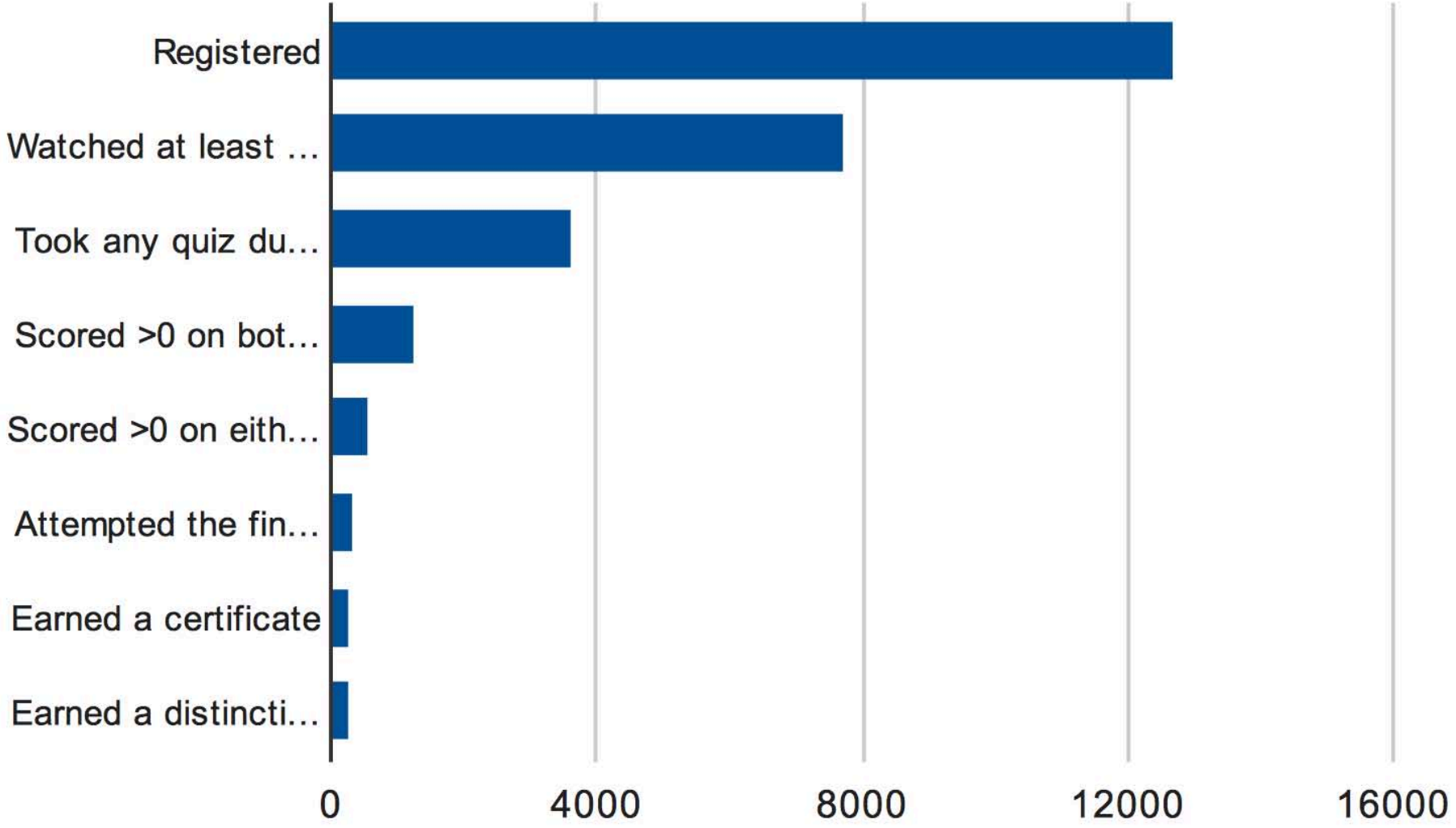
Easy and quick to add, remove, modify and restructure material

2012: Year of the MOOC

Student Persistence in One MOOC: Bioelectricity, Fall 2012



Source: Duke Center for Instructional Technology

A master's-level computer science degree, delivered via MOOCs

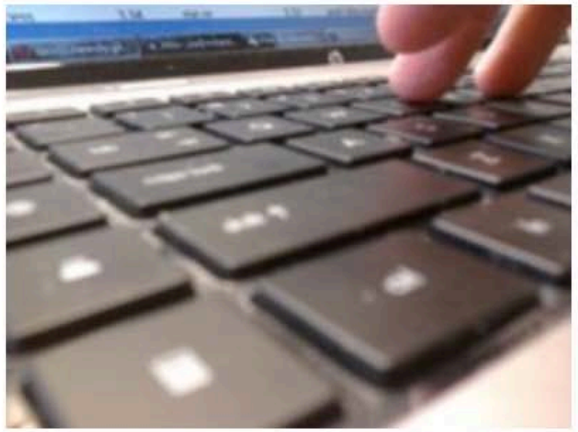
Summary: *Massive open online courses will soon deliver an advanced comp-sci degree at a very, very low price, courtesy of Georgia Tech, Udacity and AT&T.*

By Joe McKendrick for Service Oriented | May 15, 2013 -- 22:30 GMT (15:30 PDT)

Follow @joemckendrick

The disruption of the economics of higher education is providing new opportunities to refresh and expand IT skills at little or no cost. It couldn't come at a better time for professionals worried about falling behind, or for organizations scrambling to find skills for a deeper move into the digital realm.

The Georgia Institute of Technology, College of Computing, has said that it will be offering the first Online Master of Science degree in computer science (OMS CS) that can be earned completely through the massive open online course (MOOC) format. The degree will be provided via the Udacity MOOC platform, with support from AT&T.



(Image: Joe McKendrick/ZDNet)

Students enrolled in the program will pay a fraction of the cost of traditional on-campus master's programs; total tuition for the program is initially expected to be below $7,000.

All in one or
pick ‘n’ learn?

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(What are modules and collections?)

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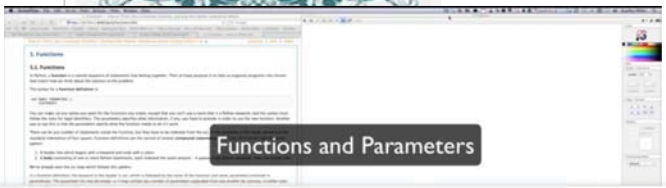
Java OOP: Controlling Opacity with a Slider (m44912)

Author: Richard Baldwin
Keywords: abstract class, abstract method, assignment compability, behavior, casting, class, class method, class variable, constructor, encapsulation, extends, final, implements, inheritance, inner class, instance, instance method, instance variable, instantiate, interface, Java, method, method overloading, method overriding, object, object-oriented programming, OOP, polymorphism, primitive type, public, reference, reference type, signature, state, static initializer block, subclass, superclass, toString method, variable, void
Summary: Learn how to use a slider to continuously change the opacity of an image and to draw that image onto a background image.
There was a match in fulltext.

Subject: Science and Technology
Language: English
Popularity: 64.04%
Revised: 2013-06-12
Revisions: 4

How to Think Like a Computer Scientist

RUNESTONE INTERACTIVE



Lear

by Bra

Gene

- •

Check your understanding

5.1.1: What is a function in Python?

- a) A named sequence of statements.
- b) Any sequence of statements.
- c) A mathematical expression that calculates a value.
- d) A statement of the form x = 5 + 4.

Check Me

5.1.2: What is one main purpose of a function?

- a) To improve the speed of execution
- b) To help the programmer organize programs into chunks that ma

problem.

- c) All Python programs must be written using functions
- d) To calculate values.

Check Me

5.1.3: Which of the following is a valid function header (first line of a f

- a) def drawCircle(t):
- b) def drawCircle:
- c) drawCircle(t, sz):
- d) def drawCircle(t, sz)

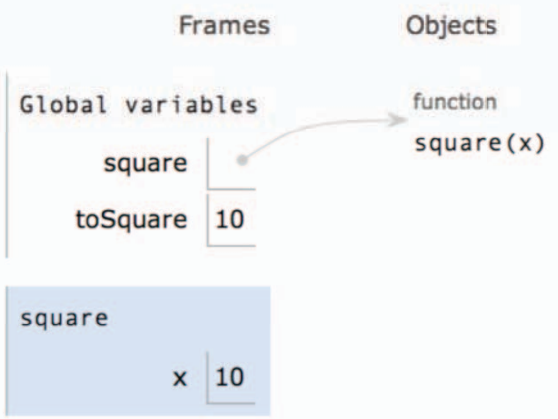
Check Me

```
1 def square(x):
2     y = x * x
3     return y
4
5 toSquare = 10
6 squareResult = square(toSquare)
7 print("The result of ", toSquare, " squared
```

<< First | < Back | Step 4 of 7 | Forward > | Last >>

line that has just executed

next line to execute



1.3. Insertion Sort

What would you do if you have
two bills and put them in order.
to the sorted pile that you have

Insertion Sort iterates through a
records already processed. Her

```
void inssort(int[] A)
  for (int i=1; i<A.l
    for (int j=i; (j>
      swap(A, j, j-1)
}
```

(Note that to make the explanati
more complex records. But you
more complex records that each

Consider this start to the process.

1 / 3

Insertion Sort starts with the record in position 1

20	10	15	54	55	11	78	14
0	1	2	3	4	5	6	7

Next, process the record in position 2. Swap it to the left until it reaches a value smaller than it is.

1 / 5

Quicksort Pivot Proficiency

Quicksort Find Pivot Element

0%

Hightlight the pivot element for Quicksort in the array displayed below.The left pointer is at index 0 and the right pointer is at index 6

125	171	313	315	975	709	735
0	1	2	3	4	5	6

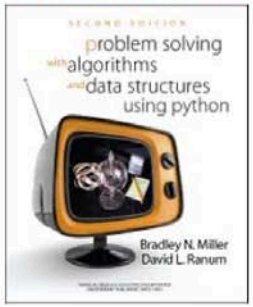
Answer

Check Answer

Need help? Get a hint.

I'd like a hint

Welcome to Problem Solving with Algorithms and Data Structures



By Brad Miller and David Ranum, Luther College

Introduction

Analysis

Basic Data Structures

What Is Recursion?

Recursion is a method of solving problems that involves breaking a problem down into smaller and smaller subproblems until you get to a small enough problem that it can be solved trivially. Usually recursion involves a function calling itself. While it may not seem like much on the surface, recursion allows us to write elegant solutions to problems that may otherwise be very difficult to program.

Calculating the Sum of a List of Numbers

We will begin our investigation with a simple problem that you already know how to solve without using recursion. Suppose that you want to calculate the sum of a list of numbers such as: $[1, 3, 5, 7, 9]$. An iterative function that computes the sum is shown in *Listing 1*. The function uses an accumulator variable (`theSum`) to compute a running total of all the numbers in the list by starting with 0 and adding each number in the list.

```
1 def lis
2     the
3     for
4
5     ret
6
7 print(l
8
```

Run

Self Check

Write a function that takes a string as a parameter and returns a new string that is the reverse of the old string.

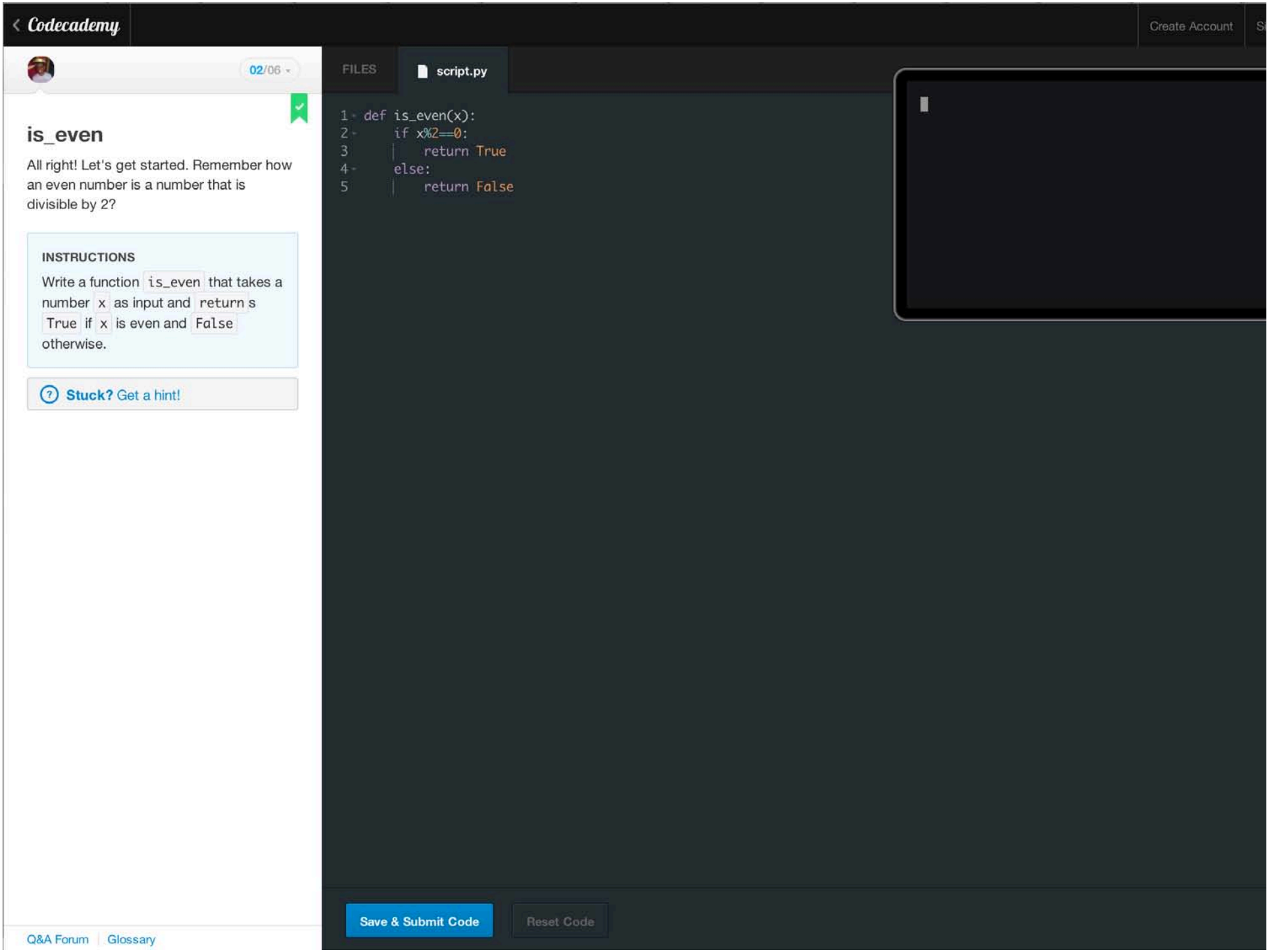
```
1 from test import testEqual
2 def reverse(s):
3     return s
4
5 testEqual(reverse("hello"),"olleh")
6 testEqual(reverse("l"),"l")
7 testEqual(reverse("follow"),"wollof")
8 testEqual(reverse(""),"")
```

run

Write a function that takes a string as a parameter and returns True if the string is a palindrome, False otherwise. Remember that a string is a palindrome if it is spelled the same both forward and backward. for example: radar is a palindrome. for bonus points palindromes can also be phrases, but you need to remove the spaces and punctuation before checking. for example: madam i'm adam is a palindrome. Other fun palindromes include:

- kayak
- aibohphobia
- Live not on evil
- Reviled did I live, said I, as evil I did deliver
- Go hang a salami; I'm a lasagna hog.
- Able was I ere I saw Elba
- Kanakanak – a town in Alaska
- Wassamassaw – a town in South Dakota

Open Editor


Codecademy
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02/06
FILES
script.py
1 def is_even(x):
2 if x%2==0:
3 return True
4 else:
5 return False
is_even
All right! Let's get started. Remember how an even number is a number that is divisible by 2?
INSTRUCTIONS
Write a function is_even that takes a number x as input and return s True if x is even and False otherwise.
Stuck? Get a hint!
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Reset Code
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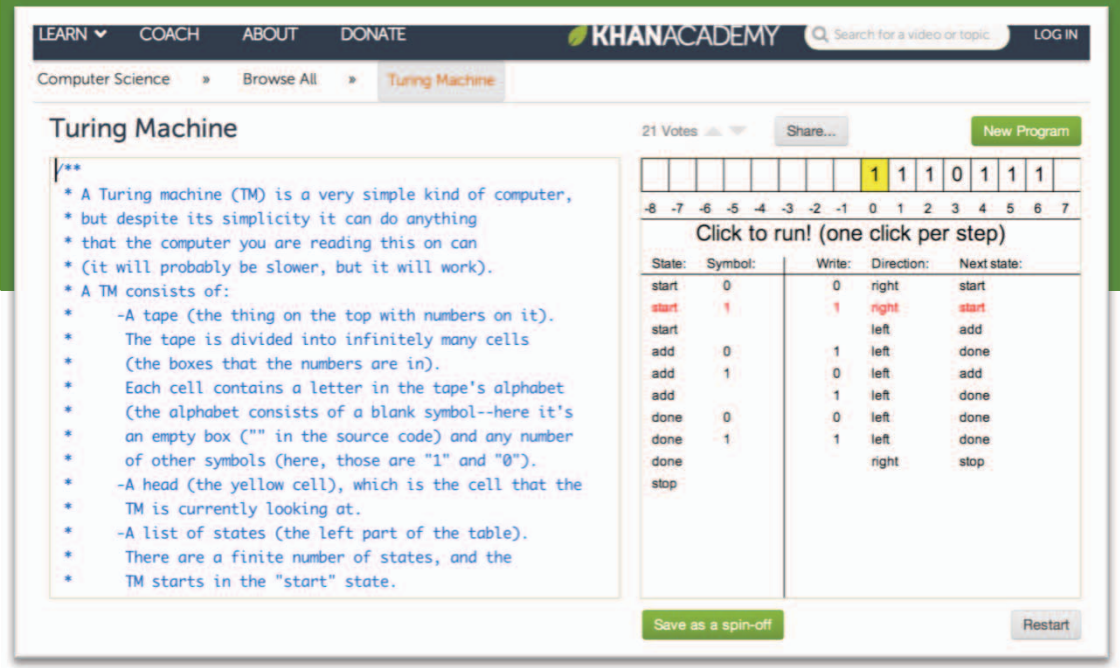
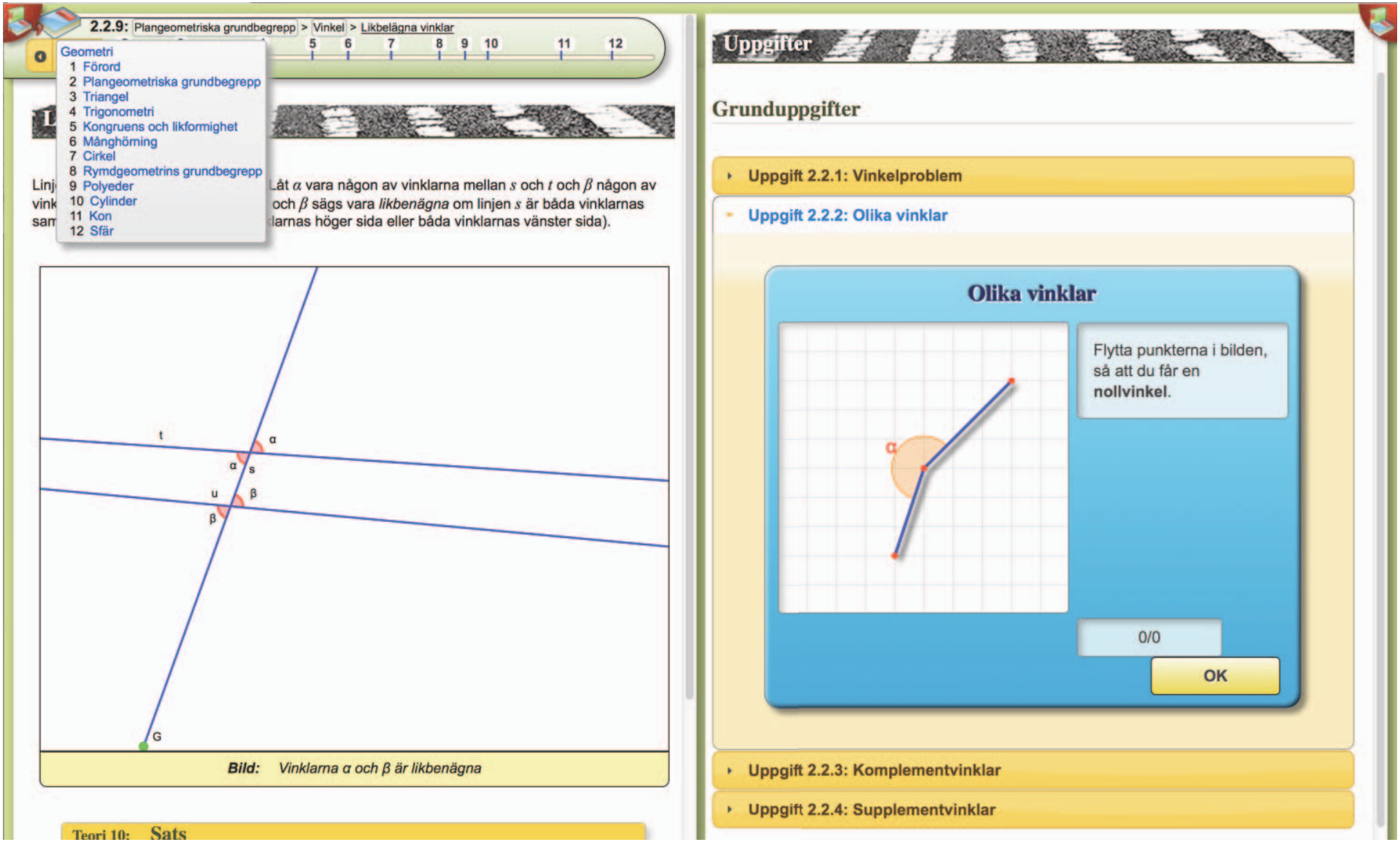




Example of all-in-one-solution
EU-project E-Math

ViLLE

Visualization exercise
Visualization exercises combine graphical execution of programs with multiple choice and array questions.

Quiz
Quizzes consist of multiple choice questions. There may be addit

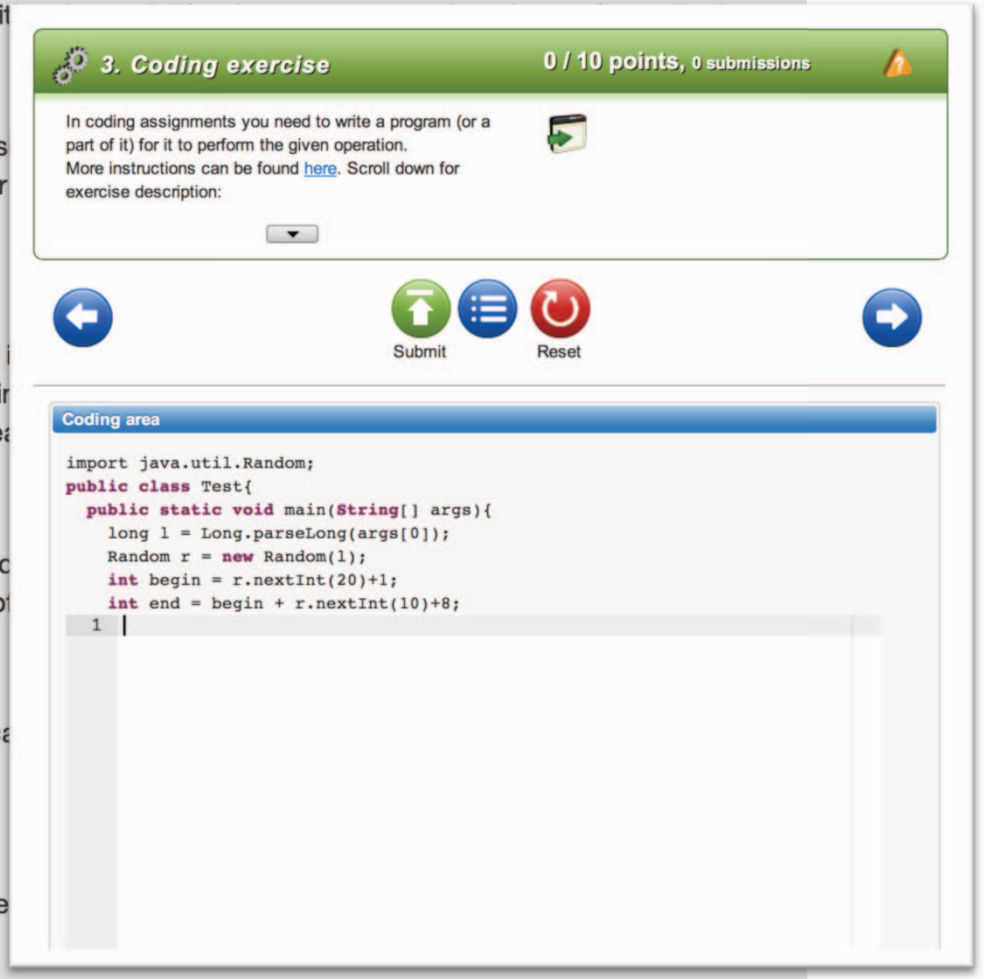
Sorting exercise
In sorting exercises programs code lines (or some of them) are s
correct order. We're currently working on adding elements other
exercise as well.

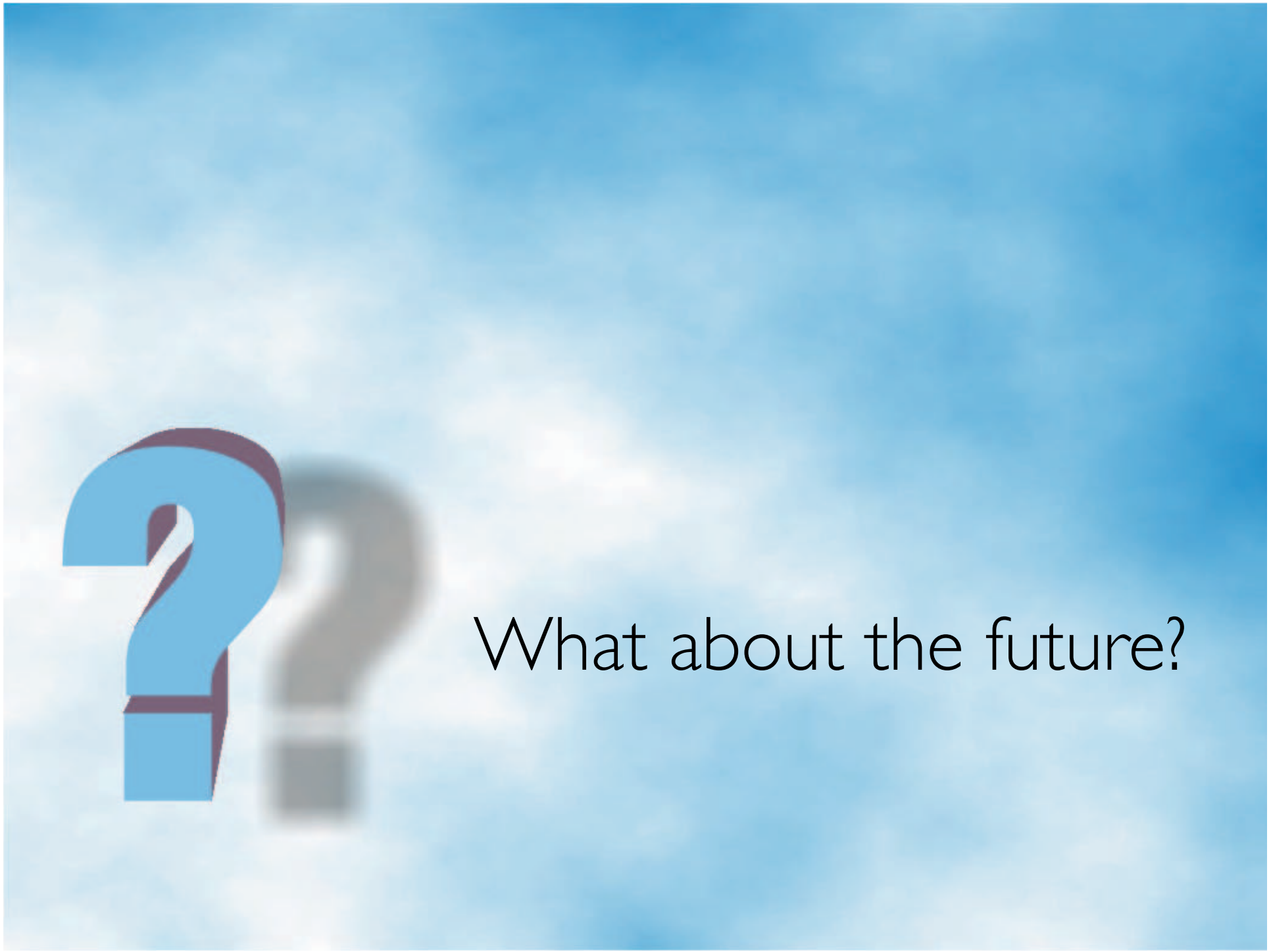
Coding exercise
In coding assignments you need to write a program (or a part of i
currently only support Java, but the support for other programmir
exercises for Python found in ViLLE, but the editor is quite not rea

Clouds & Boxes exercise
In CAB exercise student simulates the execution of program by c
several types of CAB exercises, the difference being the depth o

Survey
Surveys consist of different kinds of questions (such as open, sca
components to submit any kind of files to teacher.

Construct exercise
In construction exercise, the students need to create their own e
specify the type(s) of exercises created.



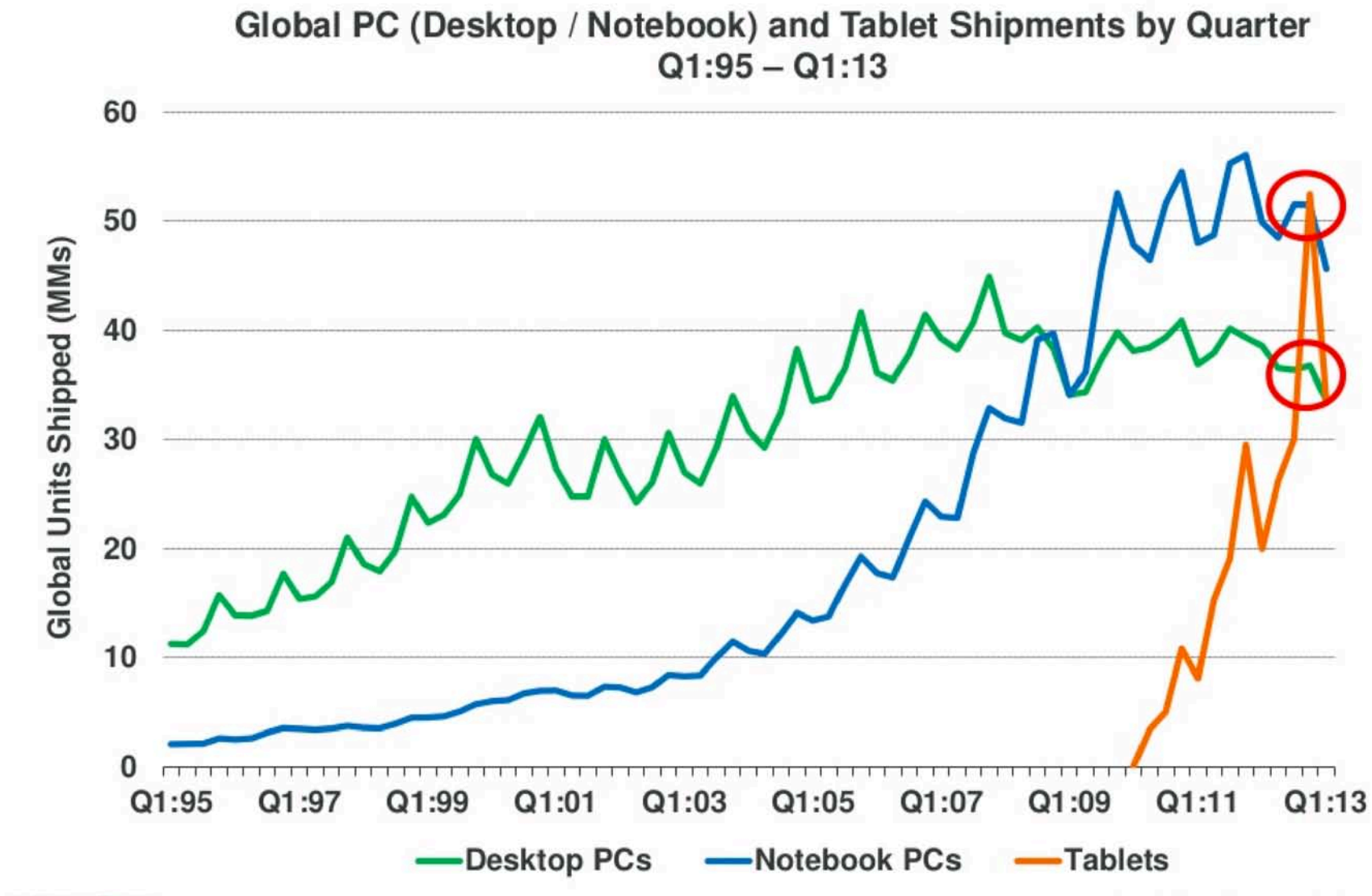

What about the future?

"Technology has become not just a tool, but a standard and matter of credibility. While learning by no means requires technology, to design learning without technology is an exercise in spite – proving a point at the cost of potential." (Terry Heick, TeachThought)

"Thinking of the problem as 'how do we get a textbook onto an iPhone' is framing it wrong.

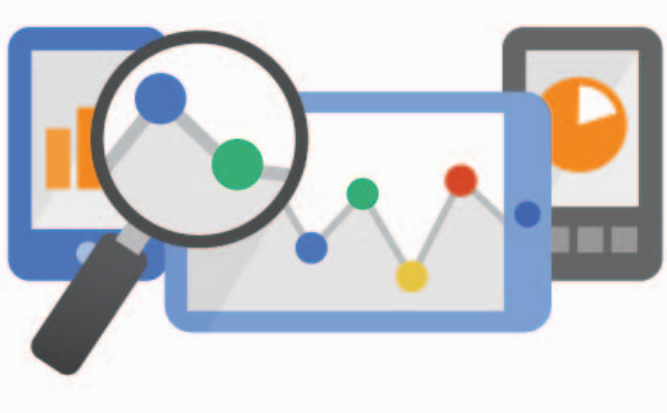
The challenge is how to make the best use of a medium that already shares three of our five senses – sight, speech, and hearing – along with geolocation, color video, and a nearly always on Web connection, to accomplish the 'job' of educating a student." (Andrew Savikas, VP, Digital Initiatives, O'Reilly Media)

Tablet Shipments =
Surpassed Desktop PCs & Notebooks in Q4:12, < 3 Years from Intro



KPCB Kleiner Perkins Caufield Byers – 2013 Internet Trends

Learning analytics



All students do not start at equal levels and progress similarly
Data driven understanding of learning
Aid in giving "good" feedback

Game-based learning

Motivating and engaging
31% of gamers 18-35 years

Open source texts hotbed for innovation in learning

But if content is free – how make money?

Then	Now
Analog	Digital
Tethered	Mobile
Isolated	Connected
Generic	Personal
Consuming	Creating
Closed	Open

David Wiley: Openness and the Disaggregated Future of Higher Education

Textbook	Digital material
Analog	Digital
Tethered	Mobile
Isolated	Connected
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David Wiley: Openness and the Disaggregated Future of Higher Education

What should our learning material look like if we want to help students learn how to

…find suitable content?

…analyze content critically?

…know if it is accurate?

…create content?

…reuse/repurpose content?

…categorize content?

…self-direct?

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