

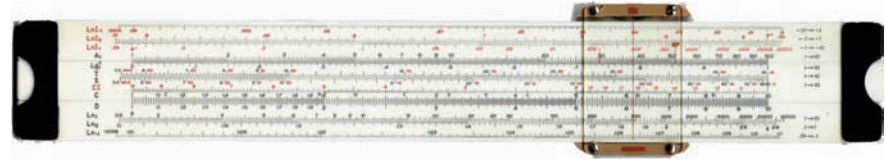
Who needs books anyway?

Interactive learning material in the digital age

IDA 30th Anniversary,
Linköping University

Linda Mannila
Åbo Akademi University
19.6.2013





“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

Analog

Tethered

Isolated

Generic

Consuming

Closed

Now

Digital

Mobile

Connected

Personal

Creating

Open

Education

Analog

Tethered

Isolated

Generic

Consuming

Closed

Everyday

Digital

Mobile

Connected

Personal

Creating

Open

Education

Analog

Tethered

Isolated

Generic

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Mobile

Connected

Personal

Creating

Open

Education

Analog

Tethered

Isolated

Generic

Consuming

Closed

Everyday

Digital

Mobile

Connected

Personal

Creating

Open

So – what kinds of material do we want?

Interactive?

Social?

Personalized?

Adaptable?

Open?

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Swipe or scroll left and right to view content, or navigate up and down.

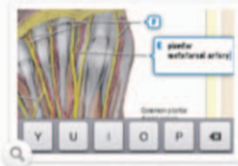
Mark Up and Search Your Title



Tap or click and hold anywhere in the text, and your favorite study tools—highlighting, notes, and copying—pop up. Also try adding notes to any card, like a quiz or video. On iPad, your notebook saves these notes, your bookmarks, and anything you've starred in one searchable study guide. On the web, it's easy to see your annotations on the right side of the browser window.

Need to find a specific page or want to learn more about something? Search your book, notes, and the web. You can even star web links.

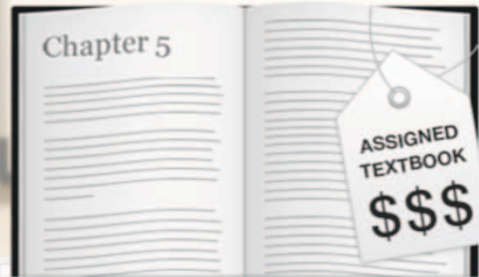
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The advertisement features a central desktop monitor displaying the iBooks Author software interface. The monitor screen shows a textbook chapter titled "Immunity" with a 3D anatomical illustration of a cell. To the left of the monitor, an iPad displays a textbook page titled "Shaping a New Nation" with a historical painting of the signing of the Constitution. To the right of the monitor, another iPad displays the same "Immunity" chapter page as the monitor. The iBooks Author window has a "Download Now" button in the top right corner. Below the devices, the text reads: "iBooks Author. Create and publish amazing Multi-Touch books for iPad."

Traditional study tools

How do cells get energy from food?

When sugar is broken down, energy is released. It is stored in a molecule called *adenosine triphosphate* (ATP). ATP powers many of the chemical reactions that enable cells to survive. The process of breaking down food to produce ATP is called **cellular respiration** (SELL•yoo•lahr ress•puh•RAY•shuhn).



Using Oxygen

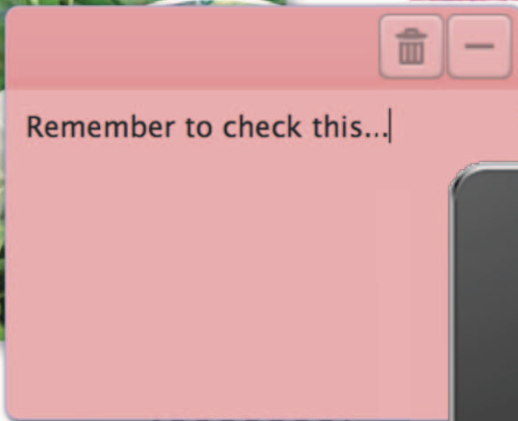
Cellular respiration takes place in the cytoplasm and cell membranes of prokaryotic cells. In eukaryotic cells, cellular respiration takes place in organelles called *mitochondria* (singular, *mitochondrion*). Mitochondria are found in both plant and animal cells. The starting materials of

Active Reading

10 Identify As you read, underline the starting materials and products of cellular respiration.

Visualize It!

Respiration During respiration, cells use oxygen to break down sugars and release energy.



Multisensory learning through different media



Students assessing themselves

Flashcards | Lesson 6

Lesson 6

Term	Definition
cytoplast	the process by which cells use oxygen to produce energy from food
photosynthesis	
chloroplast	
mitochondrion	

How Well Do You Know This?

Already Known (2) Cards

Chapter 1 Flashcards

Eukaryote

Chapter 1 Quiz

Current Score: 85%

1. Lower eukaryotes are prokaryotic organisms that lack a nucleus and other eukaryotic organelles.

2. All eukaryotes have a nucleus.

3. Eukaryotes have a nucleus and other organelles.

4. Eukaryotes have a nucleus and other organelles.

5. Eukaryotes have a nucleus and other organelles.

6. Eukaryotes have a nucleus and other organelles.

7. Eukaryotes have a nucleus and other organelles.

8. Eukaryotes have a nucleus and other organelles.

9. Eukaryotes have a nucleus and other organelles.

10. Eukaryotes have a nucleus and other organelles.

Learning analytics

The screenshot shows the SMARTBOOK interface for 'Major Themes of Anatomy and Physiology'. It features a '4 ASSIGNMENT' section with three stars. The main content is divided into three sections: 'Learn!' (green), 'Recharge!' (orange), and 'Don't Forget!' (red). The 'Learn!' section includes 'Main Idea' (Topics and main ideas, Stated and implied main ideas), 'Supporting details' (Identifying supporting details, Signal words, major and supporting details), and 'Author's purpose and intended audience' (Four purposes for writing, types of intended audience). The 'Recharge!' section includes 'Four purposes for writing, types of intended audience' and 'Identifying author's purposes and intended audience'. The 'Don't Forget!' section includes 'Start recharging' and 'Recharge your mind with this video'. A progress bar shows 'Assignment progress' and 'Time passed until due date: Fri, 10/11/13'. The interface also includes a navigation bar at the bottom with 'Home', 'Vertical split', and 'Logout' options, and the McGraw Hill Education logo.

Personalize, predict,
adapt and intervene

The screenshot shows the iPad interface for 'Kno Me' displaying learning analytics for 'Human Biology'. The interface is titled 'Kno Me' and shows 'Last updated 5m ago'. It features a 'How am I doing with Human Biology?' section with three key metrics: '14h 25m Spent Reading', '135 Pages Read', and '57 Annotations Made'. Below these metrics, it shows '55m since last access', '12 pages since last access', and '3 annotations since last access'. A 'Did you know?' section provides a tip: 'You visit your Journal in 20% of your study sessions. Try visiting your journal after every study session for a quick review! The more you study the more you learn.' A 'Friends following me' section lists users: Gail R., Air, S., Rose T., and Collin G. The 'Study Session' section shows 'Avg. 50m', 'Time in Chapter Avg. 50m', 'Annotations in Chapter 4% of pages read', and 'Flashcards 8 Flashcards answered'. A 'Study Session - Total Time' section includes a 'Set Goal' button and a bar chart showing study time in minutes over time. The chart shows a significant peak in study time around November 14th. A summary box at the bottom states: 'Summary You study an average of 55 minutes when you open this book.' An 'Explain this graph' button is also present.

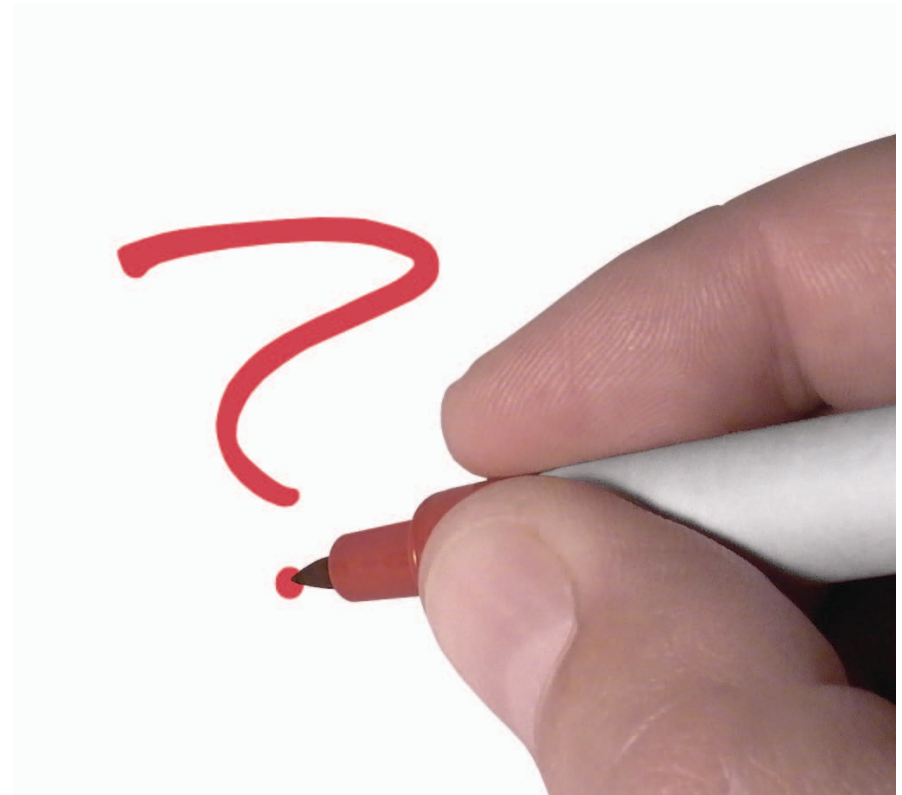
Likes, ratings and shares

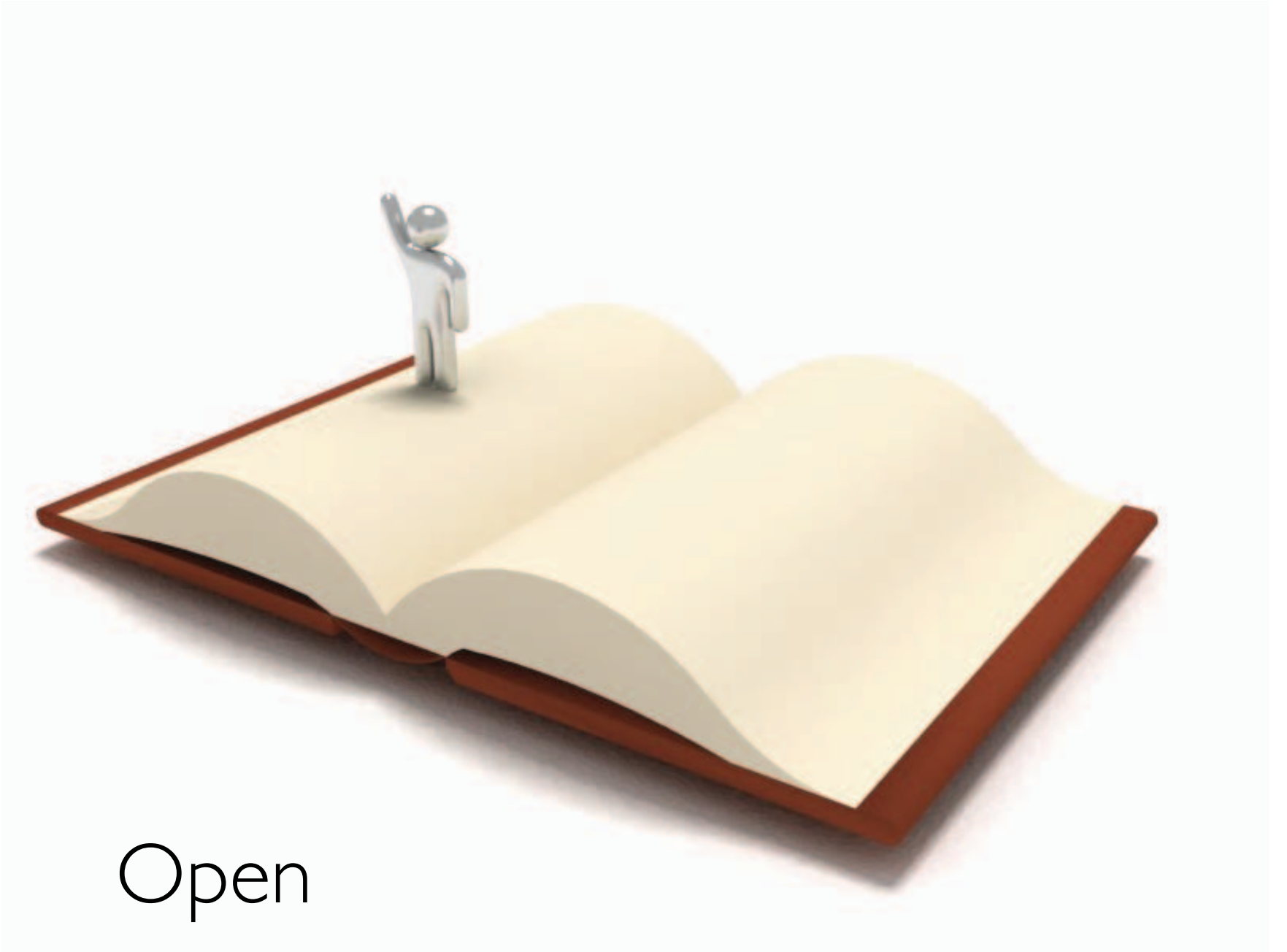


Collaboration and help

The image shows a Facebook post from the 'Astronomy Club' with the text: "Let's make our own solar system." and "Turned in (1) DUE: Jul 23, 2010". Below the post, several comments are visible, including "Anne B. - can we make things at home?", "Me - absolutely! be creative!!!", "Matthew G. - i am gonna make a spaceship", and "Zora H. - oh, i have this exercise ball that we can". In the foreground, a smartphone displays the Edmodo gradebook for the Astronomy Club, showing a list of students and their scores.

Student	Score
George Washington	0/0
Jane Addams	115/125
Ben Franklin	0/0
Matthew Gaines	5/5
Johnny Kennedy	100/100
Mary Lincoln	100/100
Jimmy Madison	0/0





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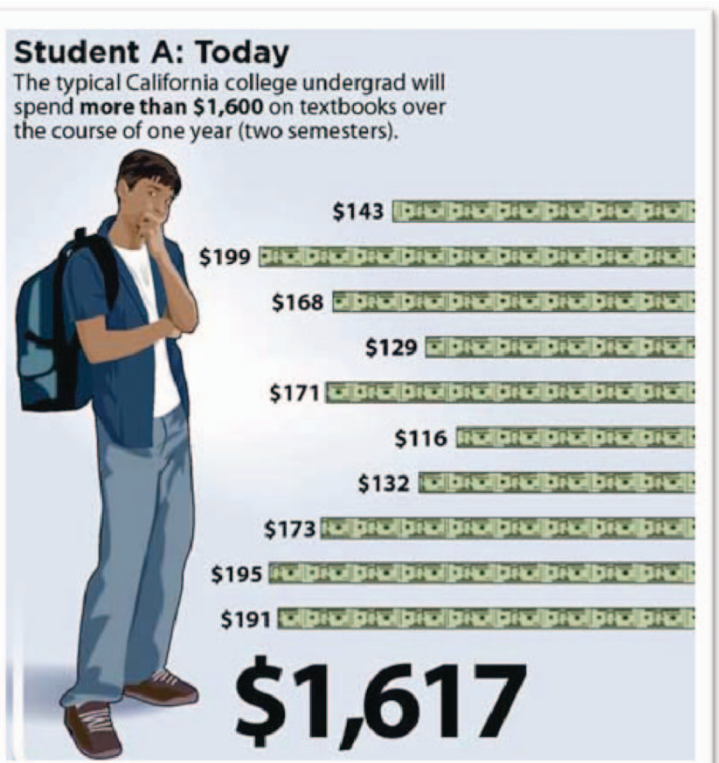
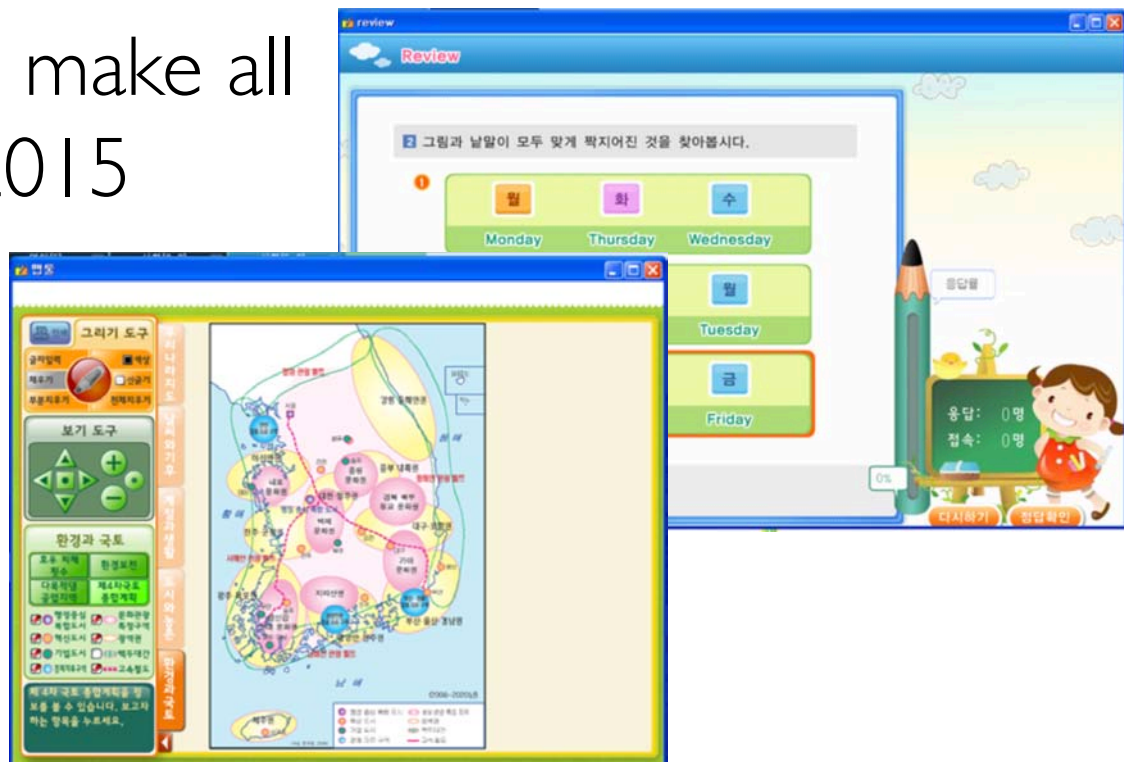
Natural Sciences and Technology Grade 4 – 6: The Thunderbolt Kids



Download PDF files of our CAPS-aligned Thunderbolt Kids series for free. Available titles include our Natural Sciences and Technology Grade 4- 6 workbooks and the digital "Science Adventures" series, which is the perfect accompaniment to the workbooks.

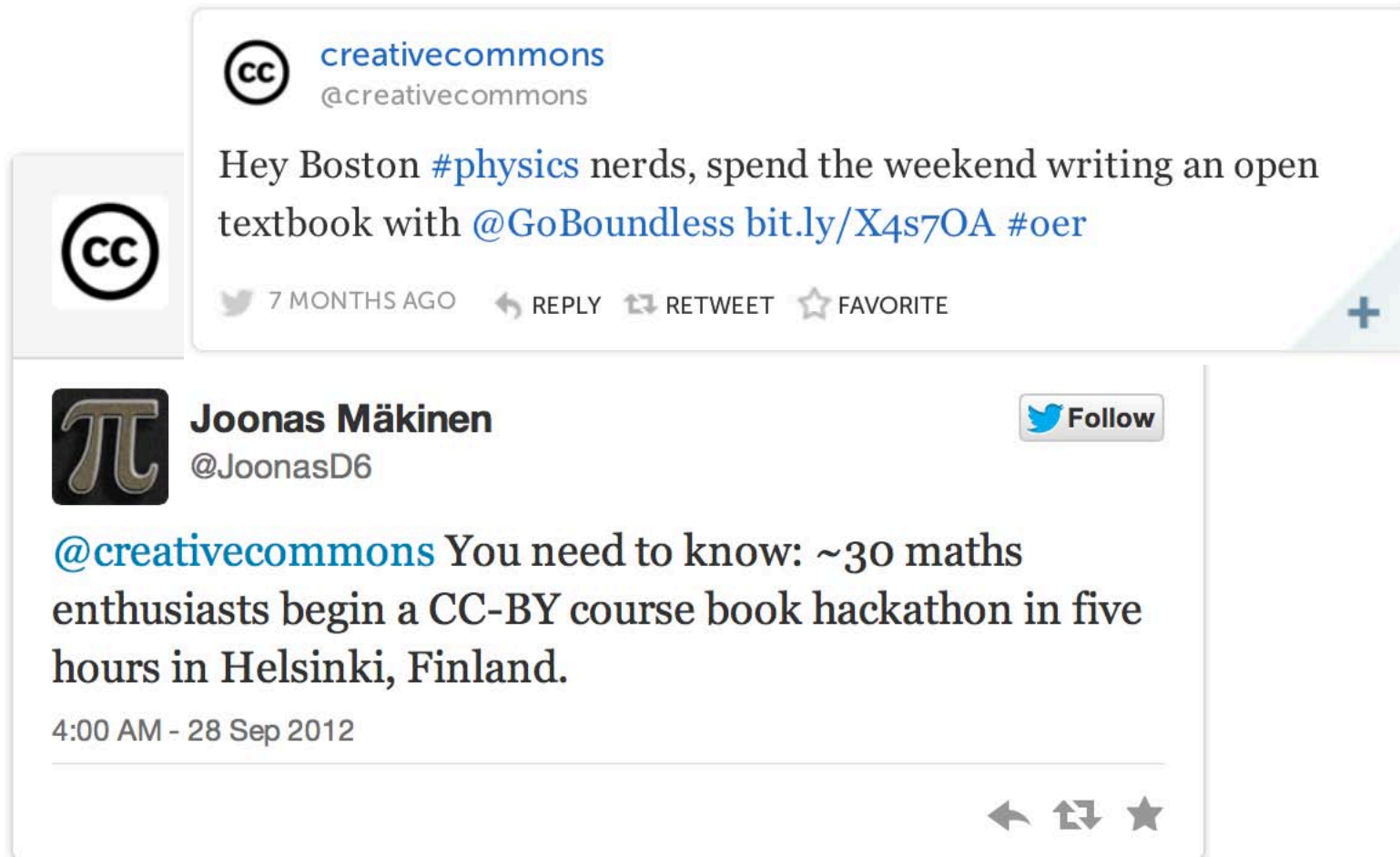
www.thunderboltkids.co.za

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





The image shows a screenshot of a Twitter thread. The top tweet is from the account 'creativecommons' (@creativecommons), which has a profile picture of the Creative Commons logo. The tweet text says: 'Hey Boston #physics nerds, spend the weekend writing an open textbook with @GoBoundless bit.ly/X4s7OA #oer'. Below the text are icons for '7 MONTHS AGO', 'REPLY', 'RETWEET', and 'FAVORITE', along with a plus sign icon in the bottom right corner. The bottom tweet is from 'Joonas Mäkinen' (@JoonasD6), with a profile picture of the Greek letter pi (π). It includes a 'Follow' button. The tweet text reads: '@creativecommons You need to know: ~30 maths enthusiasts begin a CC-BY course book hackathon in five hours in Helsinki, Finland.' Below the text is the timestamp '4:00 AM - 28 Sep 2012' and icons for 'REPLY', 'RETWEET', and 'FAVORITE'.

 **creativecommons**
@creativecommons




Hey Boston #physics nerds, spend the weekend writing an open textbook with @GoBoundless bit.ly/X4s7OA #oer

 7 MONTHS AGO  REPLY  RETWEET  FAVORITE 

 **Joonas Mäkinen** 
@JoonasD6

[@creativecommons](#) You need to know: ~30 maths enthusiasts begin a CC-BY course book hackathon in five hours in Helsinki, Finland.

4:00 AM - 28 Sep 2012

avoimet-oppimateriaalit-ry / vapaa-matikka

★ Star 6

Fork 6

Code Network Pull Requests 0 Issues 15 Wiki Graphs

Kirjojen lähdekoodi. Source code of the books. — Read more


Clone in Mac ZIP HTTP SSH Git Read-Only https://github.com/avoimet-oppimateriaalit-ry/vapaa- Read-Only access

branch: master Files Commits Branches 2 Tags

vapaa-matikka /

1000+ commits

Tiedostoja muunnettu käyttämään alakohtia

 haposade authored 7 days ago	latest commit 79406ebe92
MAA1	8 days ago korjattu bugit [NVI]
MAA11	9 days ago % FIX ME välit ja \ldots [omauno]
MAA2	7 days ago Tiedostoja muunnettu käyttämään alakohtia [haposade]
MAA3	8 days ago Lisätty pythiskuva. [ttalvitie]
MAA4	8 days ago yhtälöryhmän ratkaiseminen [jramo]
scripts	8 days ago lisätty keskeneräinen muokkau
.gitignore	2 months ago Extended .gitignore [NVI]
.gitmodules	a month ago commons as submodule: add s
README.md	2 months ago Drive-jako toimii nyt [NVI]
commons @ 2db8506	8 days ago submodule update [NVI]

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Introduction to Databases
by Jennifer Widom



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Automated Assignments

The quizzes and exercises may be attempted as many times as you like. For us we recommend you retake each one until you get a perfect score. For the quizzes of each problem on every attempt, so you may want to continue taking them to understanding, even after you've achieved a perfect score on one variant.

We've listed the assignments in their recommended order within each topic. Within "exercises" for a topic, we recommend you do the quiz first and then the exercises — you'll see why once you get going. For some topics we've created a core set of exercises that cover the topic thoroughly, along with a set of extra exercises for further reinforcement. We've put the overall topics in the same order as the videos, but you can certainly jump around and pick and choose; there are a few topic dependencies mentioned on this page.

XML Data

XML Quiz

Attempt Assignment

Due Date Mon 18 Jan 2038 7:14 PM PST (UTC -080)
We recommend submitting before the due date. However, you can submit any time before the penalty.

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INSTRUCTORS
Steve Huffman
Anthony Teate

Take the Class

Class Summary

Starting from the basics of how the web works, this class will walk you through everything you need to know to build your own blog application and scale it to support large numbers of users.

What Should I Know?

A moderate amount of programming and computer science experience is necessary for this course.

What Will I Learn?

In this project-based course your knowledge will be evaluated as you learn to build your own blog application! Learn everything Steve Huffman wished he would have known when he broke into the startup world. Read more about Huffman and the course [here](#).

Course Instructors

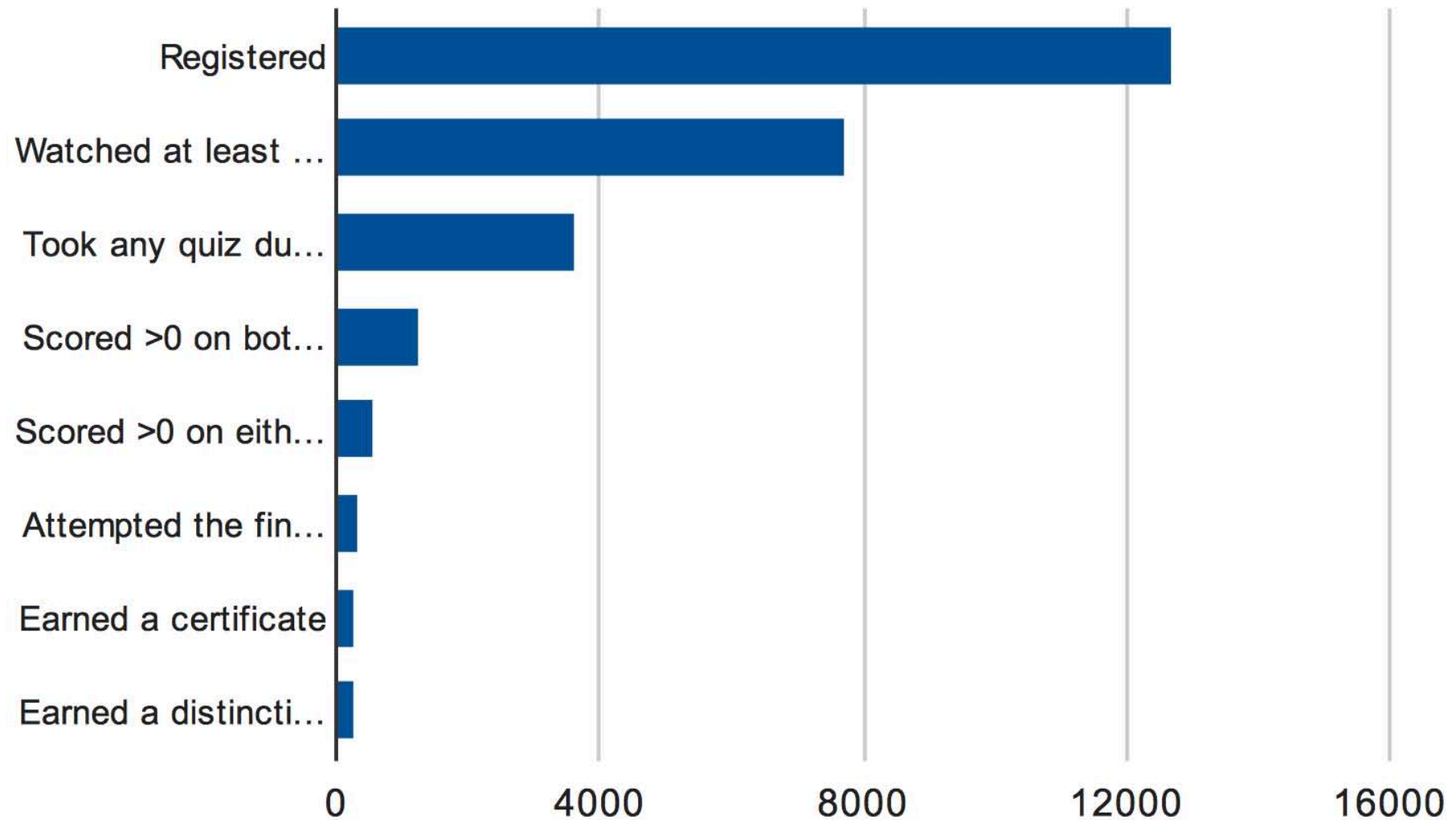
Steve Huffman
Instructor



Syllabus

2012: Year of the MOOC

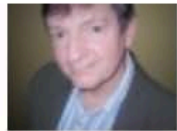
Student Persistence in One MOOC: Bioelectricity, Fall 2012



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.

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.



(Image: Joe McKendrick/ZDNet)



All in one or
pick 'n' learn?

Search for Content

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1885 results for: **"computer science"**

Limit search to: Title Author  Collections

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(What are  [modules](#) and  [collections](#)?)

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View: [Detail](#) | [Compact](#) | [Statistics](#)

[1] 2 3 4 ... 189 [Next 10](#) »

 **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



Learn

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 make a 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 function definition)?

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

Check Me

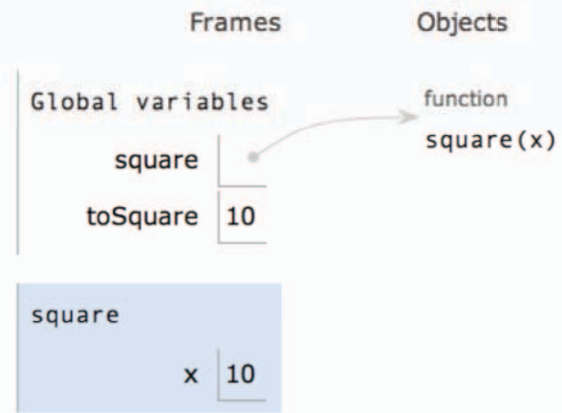
```

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")
    
```

Progress bar: Step 4 of 7

Navigation: << First < Back 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. Here

```
void insort(int[] A)
  for (int i=1; i<A.length; i++)
    for (int j=i; (j>0 && A[j]<A[j-1]); j--)
      swap(A, j, j-1)
```

(Note that to make the explanation more complex records. But you more complex records that each have an integer key value. You will see how to deal with more complex records in module 1.4.)

Consider this start to the process.

Quicksort Pivot Proficiency

Quicksort Find Pivot Element

0%

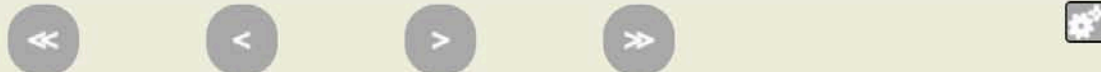
Highlight the pivot element for Quicksort in the array displayed below. The left pointer is at index 0 and the right pointer is at index 6

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](#)

1 / 3



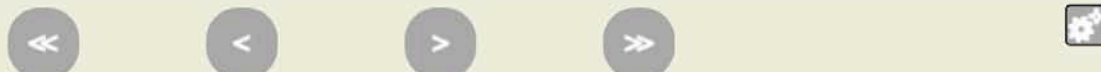
Insertion Sort starts with the record in position 1

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

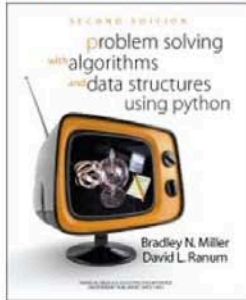


Next, process the record in position 2. Swap it to the left until it reaches a value smaller than it is.

1 / 5



Welcome to Problem Solving with Algorithms and Data Structures



By Brad Miller and David Ranum, Luther College

Introduction

- [Introduction](#)
 - [Objectives](#)
 - [Getting Started](#)
 - [What Is Computer Science?](#)
 - [Review of Basic Python](#)
 - [Summary](#)
 - [Key Terms](#)
 - [Discussion Questions](#)
 - [Programming Exercises](#)

Analysis

- [Algorithm Analysis](#)
 - [Objectives](#)
 - [What Is Algorithm Analysis?](#)
 - [Performance of Python Data Structures](#)
 - [Summary](#)
 - [Key Terms](#)
 - [Discussion Questions](#)
 - [Programming Exercises](#)

Basic Data Structures

- [Basic Data Structures](#)
 - [Objectives](#)
 - [What Are Linear Structures?](#)
- [Stacks](#)
 - [What is a Stack?](#)
 - [The Stack Abstract Data Type](#)
 - [Implementing a Stack in Python](#)

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 listSum(list):
2     theSum = 0
3     for i in list:
4         theSum = theSum + i
5     return theSum
6
7 print(listSum([1, 3, 5, 7, 9]))
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("1"), "1")
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



02/06

FILES

script.py

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 returns `True` if `x` is even and `False` otherwise.

[? Stuck? Get a hint!](#)

```
1- def is_even(x):
2-     if x%2==0:
3-         return True
4-     else:
5-         return False
```




Save & Submit Code


Reset Code

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Turing Machine

Turing Machine

/**
 * A Turing machine (TM) is a very simple kind of computer,
 * but despite its simplicity it can do anything
 * that the computer you are reading this on can
 * (it will probably be slower, but it will work).
 * A TM consists of:
 * -A tape (the thing on the top with numbers on it).
 * The tape is divided into infinitely many cells
 * (the boxes that the numbers are in).
 * Each cell contains a letter in the tape's alphabet
 * (the alphabet consists of a blank symbol--here it's
 * an empty box (" " in the source code) and any number
 * of other symbols (here, those are "1" and "0").
 * -A head (the yellow cell), which is the cell that the
 * TM is currently looking at.
 * -A list of states (the left part of the table).
 * There are a finite number of states, and the
 * TM starts in the "start" state.

21 Votes  Share... New Program

					1	1	1	0	1	1	1				
-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7

Click to run! (one click per step)

State:	Symbol:	Write:	Direction:	Next state:
start	0	0	right	start
start	1	1	right	start
add	0	1	left	done
add	1	0	left	add
add	1	1	left	done
done	0	0	left	done
done	1	1	left	done
done			right	stop
stop				

Save as a spin-off
Restart

2.2.9: Plangeometriska grundbegrepp > Vinkel > Likbelägna vinklar

5 6 7 8 9 10 11 12

Geometri

- 1 Förord
- 2 Plangeometriska grundbegrepp
- 3 Triangel
- 4 Trigonometri
- 5 Kongruens och likformighet
- 6 Månghörning
- 7 Cirkel
- 8 Rymdgeometris grundbegrepp
- 9 Polyeder
- 10 Cylinder
- 11 Kon
- 12 Sfär

Linj
vink
samt

Låt α vara någon av vinklarna mellan s och t och β någon av och β sägs vara *likbenägna* om linjen s är båda vinklarnas höger sida eller båda vinklarnas vänster sida).

Bild: Vinklarna α och β är likbenägna

Teori 10: Sats

Uppgifter

Grunduppgifter

- Uppgift 2.2.1: Vinkelproblem
- Uppgift 2.2.2: Olika vinklar
- Uppgift 2.2.3: Komplementvinklar
- Uppgift 2.2.4: Supplementvinklar

Olika vinklar

Flytta punkterna i bilden, så att du får en nollvinkel.

0/0

OK

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



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 additional questions.

Sorting exercise



In sorting exercises programs code lines (or some of them) are sorted into the correct order. We're currently working on adding elements other than numbers to the exercise as well.

Coding exercise



In coding assignments you need to write a program (or a part of it) for it to perform the given operation. We currently only support Java, but the support for other programming languages is being added. For more exercises for Python found in VILLE, but the editor is quite not ready.

Clouds & Boxes exercise



In CAB exercise student simulates the execution of program by clicking on the boxes. In several types of CAB exercises, the difference being the depth of the simulation.

Survey



Surveys consist of different kinds of questions (such as open, scaled, multiple choice) and allow students to submit any kind of files to teacher.

Construct exercise



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

3. Coding exercise

0 / 10 points, 0 submissions

In coding assignments you need to write a program (or a part of it) for it to perform the given operation. More instructions can be found [here](#). Scroll down for exercise description:

Submit Reset

```
import java.util.Random;
public class Test{
    public static void main(String[] args){
        long l = Long.parseLong(args[0]);
        Random r = new Random(1);
        int begin = r.nextInt(20)+1;
        int end = begin + r.nextInt(10)+8;
    }
}
```



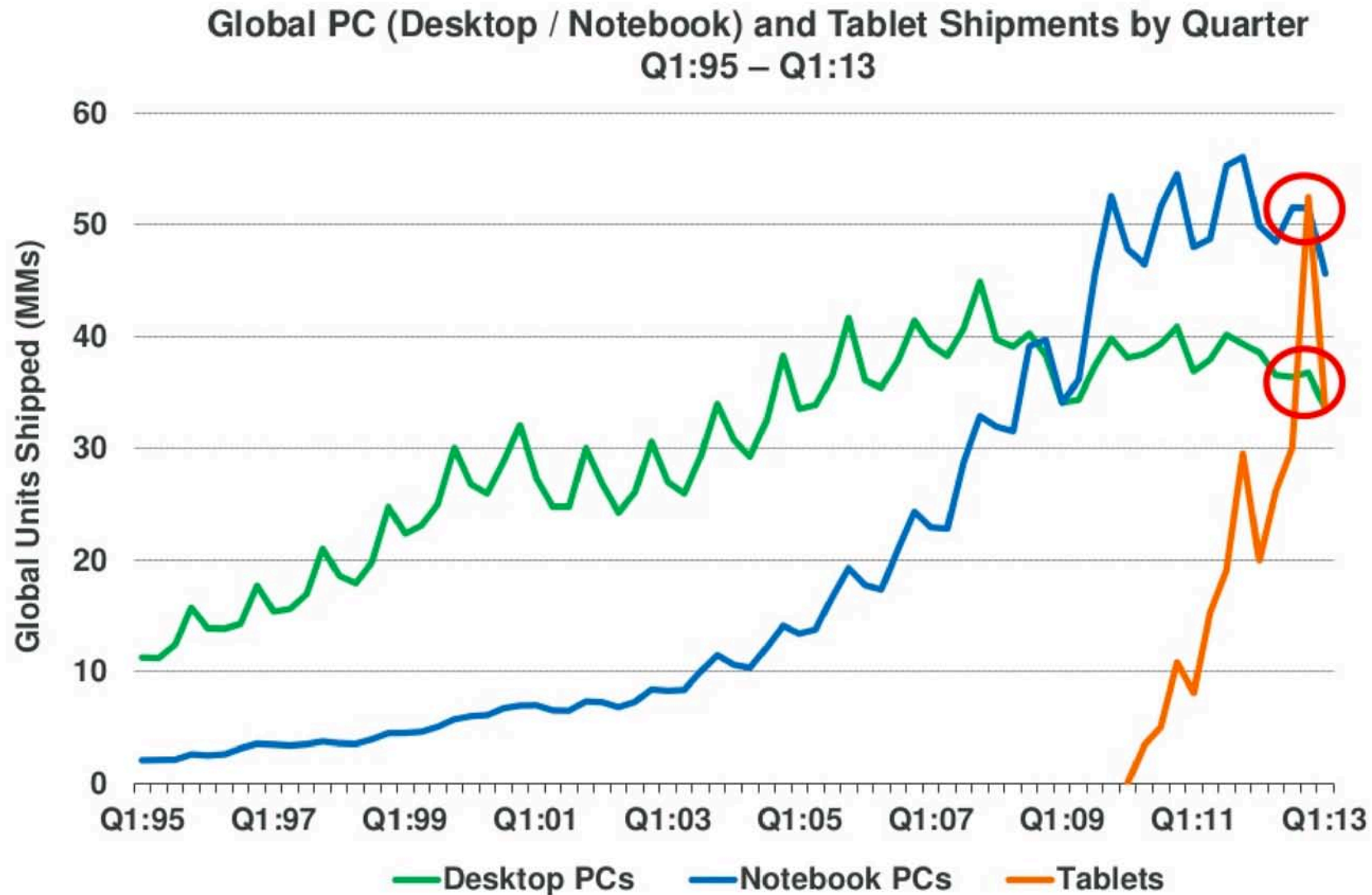
What about the future?

“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)

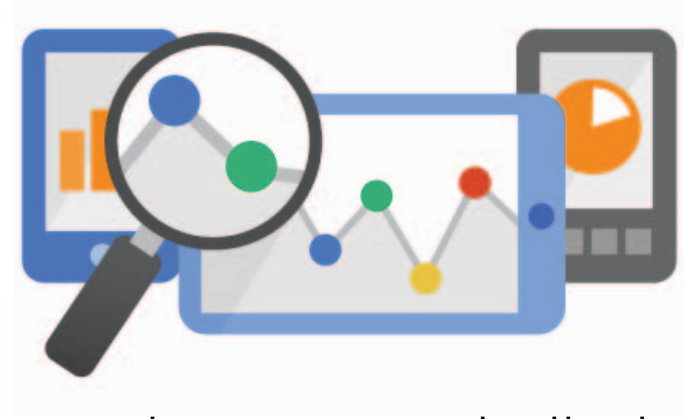
“Thinking of the problem as ‘**how do we get a textbook onto an iPhone**’ is framing it wrong.

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



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

Textbook

Analog

Tethered

Isolated

Generic

Consuming

Closed

Digital material

Digital

Mobile

Connected

Personal

Creating

Open

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?



The screenshot shows a news article snippet from The Observer. At the top, there are navigation tabs for 'News', 'Education', and 'Exams'. The main headline is 'Advent of Google means we must rethink our approach to education'. Below the headline is a sub-headline: 'We have a romantic attachment to skills from the past which are no longer relevant on a curriculum for today's children'. The author is identified as Sugata Mitra, and the publication is 'The Observer, Saturday 15 June 2013 21.00 BST'. There is a 'Jump to comments (48)' link. On the right side, there are social sharing buttons for Facebook (2750 shares), Twitter (647 tweets), Google+ (331 shares), LinkedIn (101 shares), and Email. There is also an 'Article history' link at the bottom right.

News > Education > Exams

Advent of Google means we must rethink our approach to education

We have a romantic attachment to skills from the past which are no longer relevant on a curriculum for today's children

Sugata Mitra
The Observer, Saturday 15 June 2013 21.00 BST

[Jump to comments \(48\)](#)

Facebook Share 2750
Twitter Tweet 647
Google+ +1 331
LinkedIn Share 101
Email

Article history

Thank
you!

Linda Mannila
linda.mannila@abo.fi