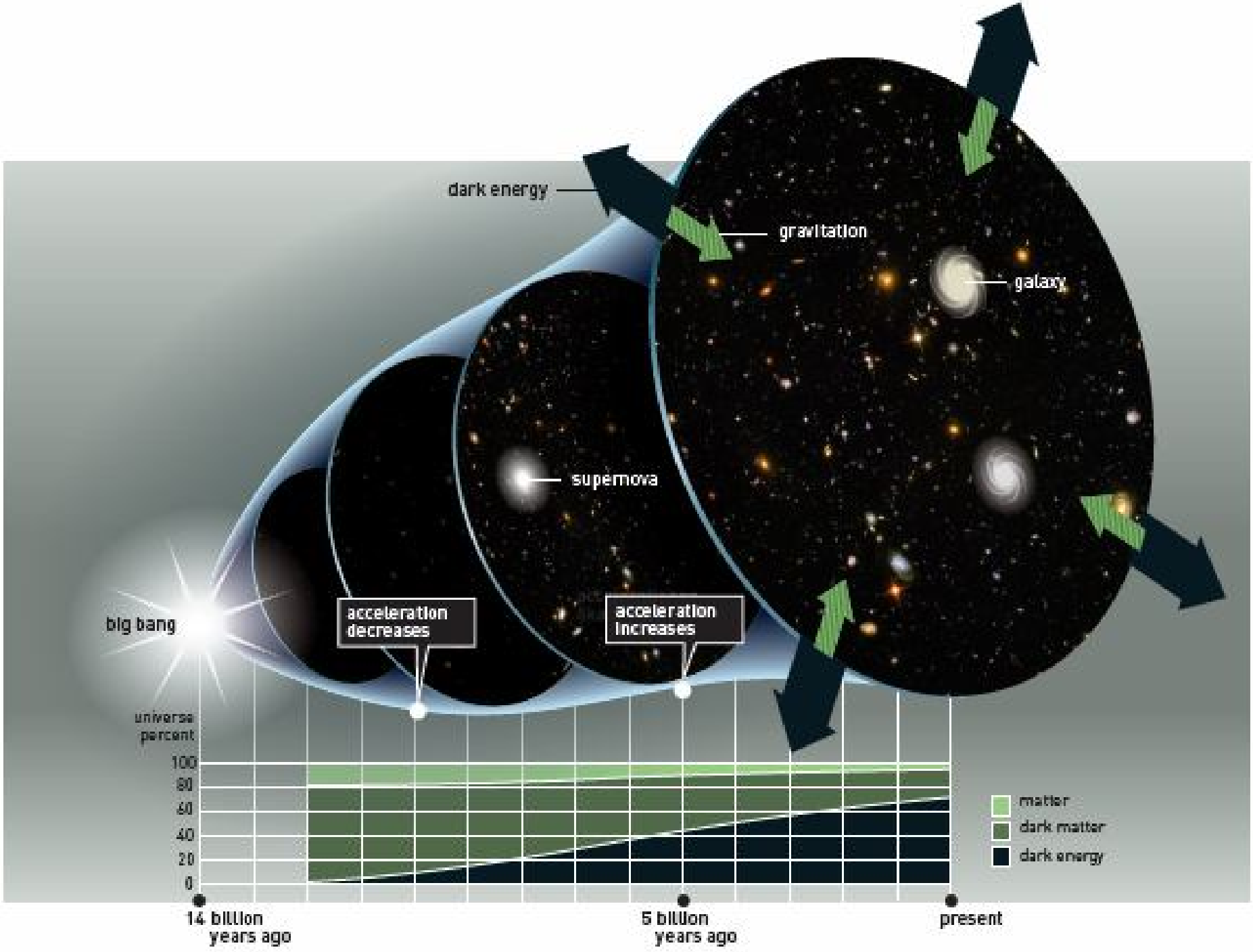
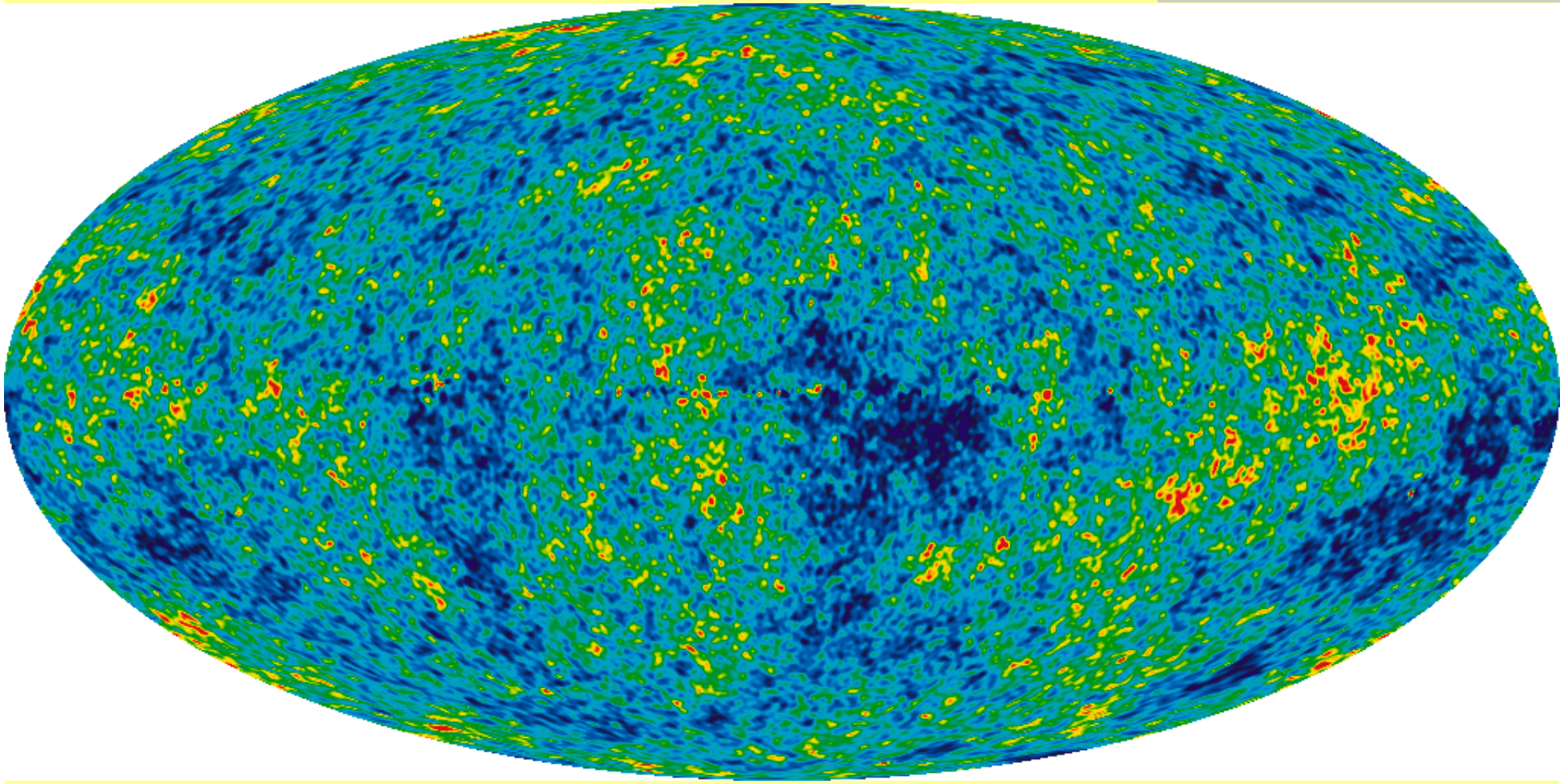
Тернопільський національний технічний університет імені Івана Пулюя
Семінар «Практичні аспекти використання елементів дистанційного навчання в рамках впровадження кредитно-модульної системи»
4 квітня 2013 року

Масові дистанційні online-курси: способи ефективного використання

Ю.Л.Скоренький
кафедра фізики ТНТУ
skorenkyy@tstu.edu.ua


dark energy
gravitation
galaxy
supernova
big bang
acceleration decreases
acceleration increases
universe percent
100
80
60
40
20
0
matter
dark matter
dark energy
14 billion years ago
5 billion years ago
present

National Aeronautics and Space Administration



Карта анізотропії мікрохвильового реліктового випромінювання
Wilkinson Microwave Anisotropy Probe, 2001-2012
http://map.gsfc.nasa.gov/

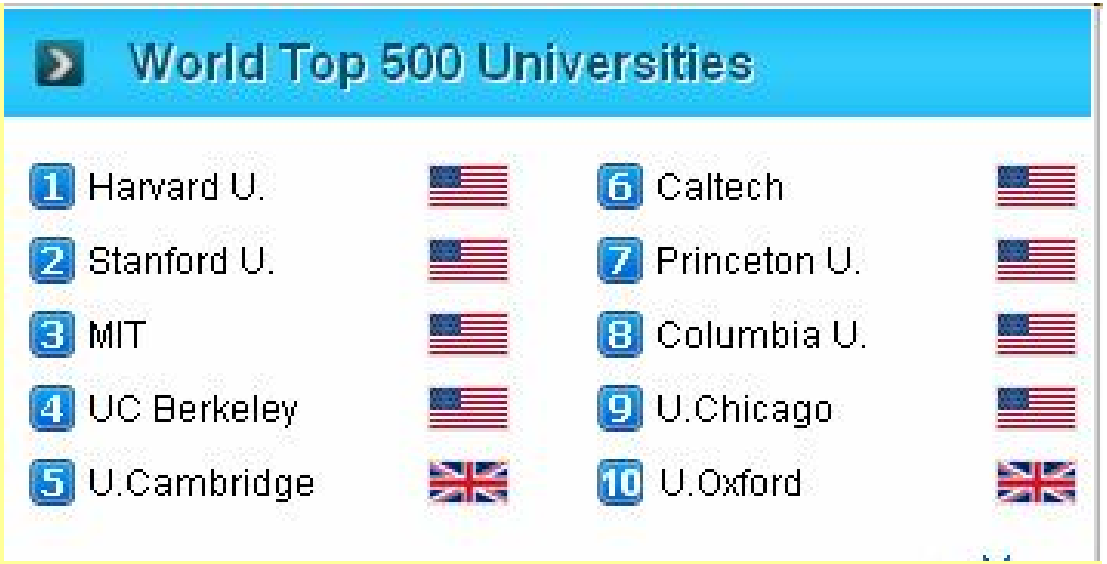
The Shawshank Redemption, 1994

FEAR CAN HOLD YOU PRISONER.
HOPE CAN SET YOU FREE.

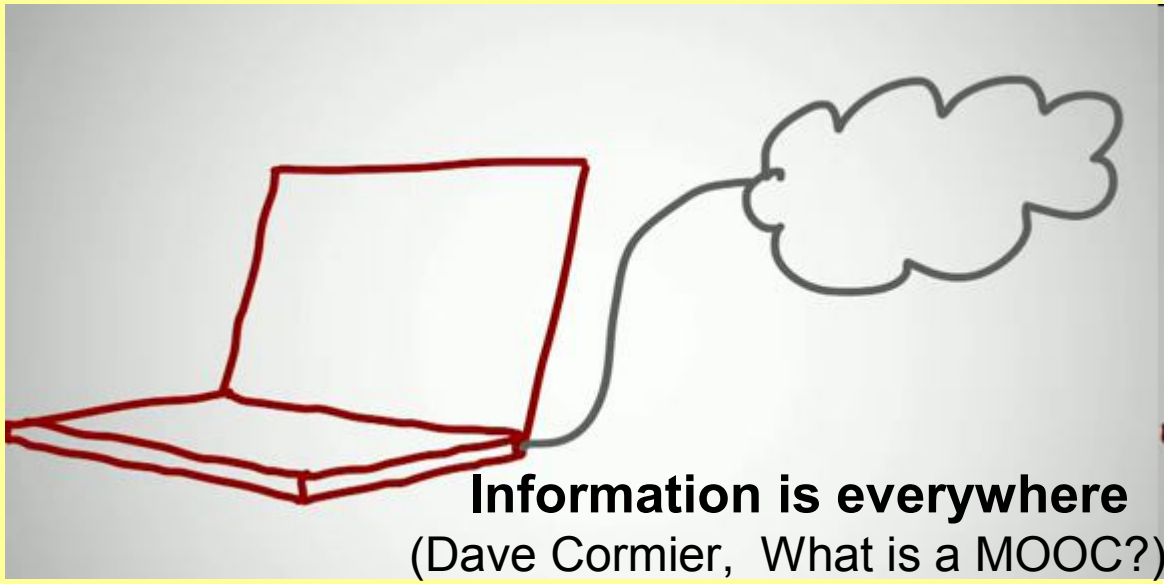
"Mr. Dekins, do you want your sons to go to Harvard... or Yale?"

THE IVY LEAGUE

Massive Online Open Course



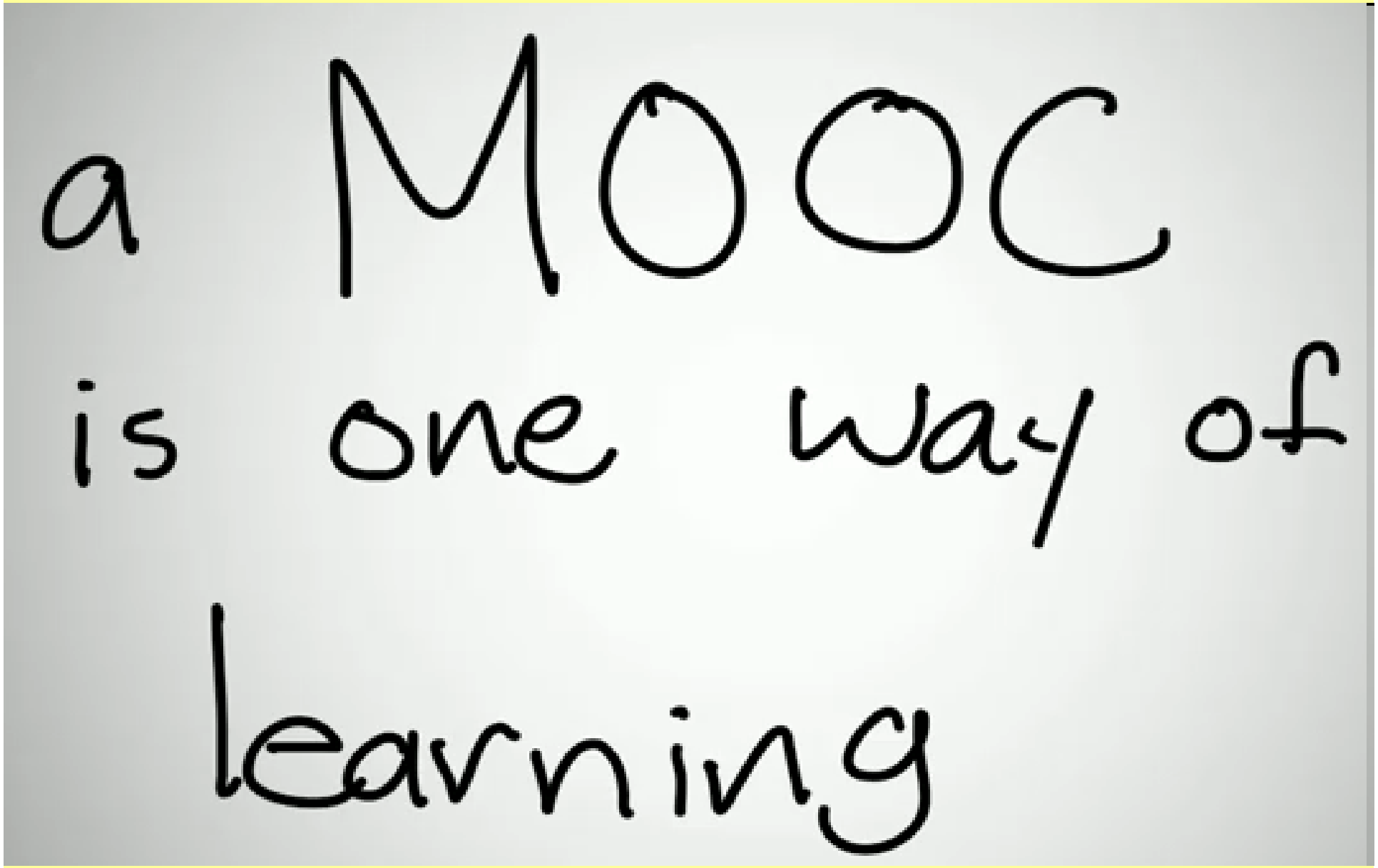
http://www.shanghairanking.com/



Information is everywhere

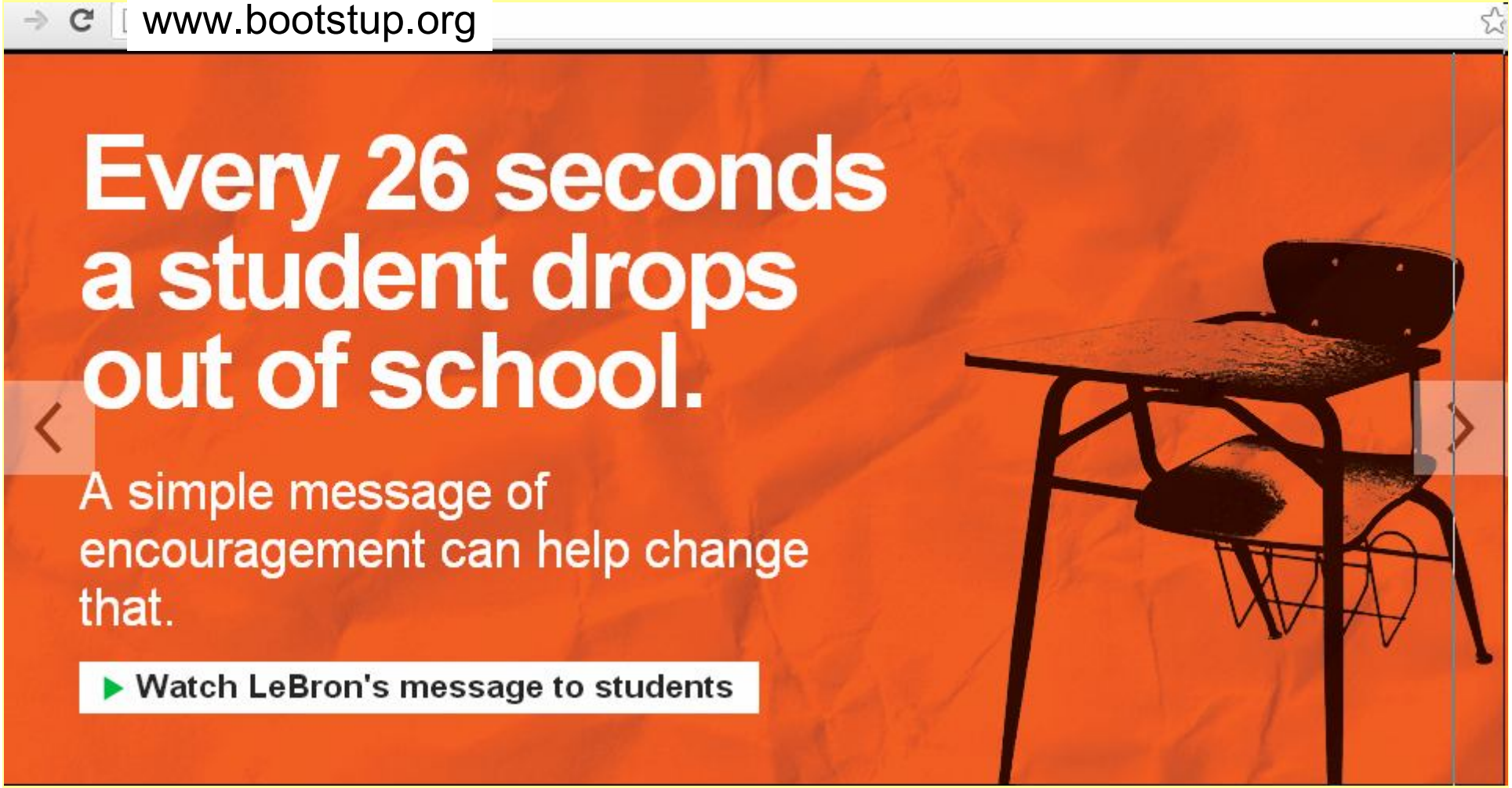
(Dave Cormier, What is a MOOC?)

http://www.youtube.com/watch?v=eW3gMGqcZQc



http://www.youtube.com/watch?v=eW3gMGqcZQc

Кому це потрібно?

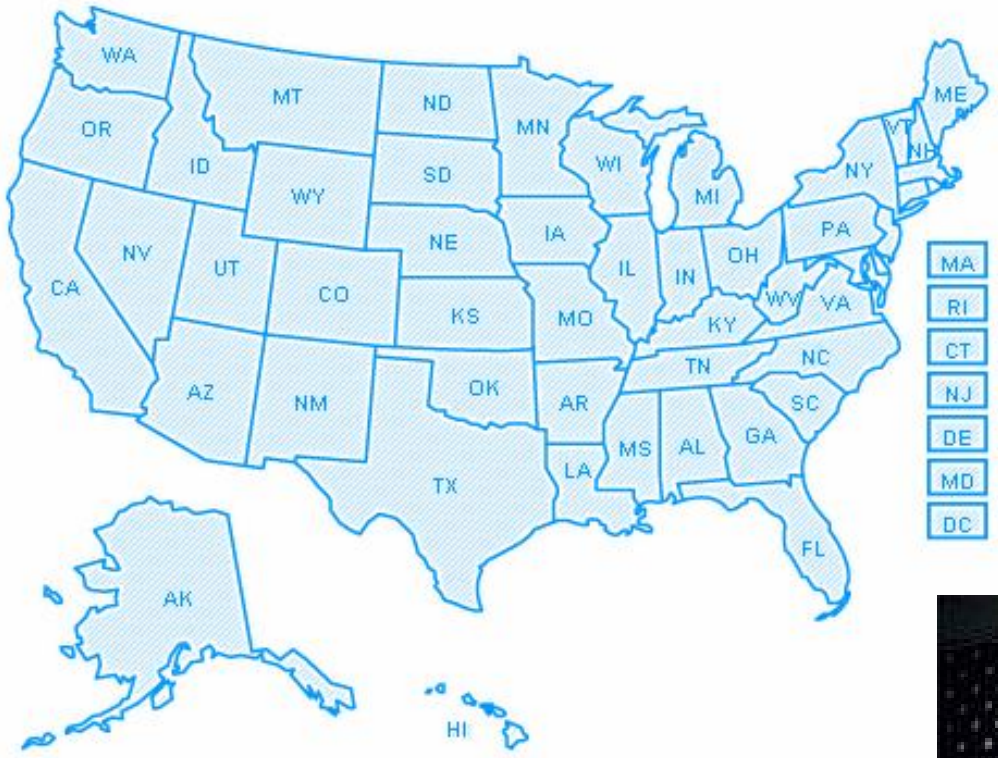


www.boostup.org/en/facts/statistics#national

Click a state to see detailed statistics.

NATIONAL STATISTICS

www.bootstup.org

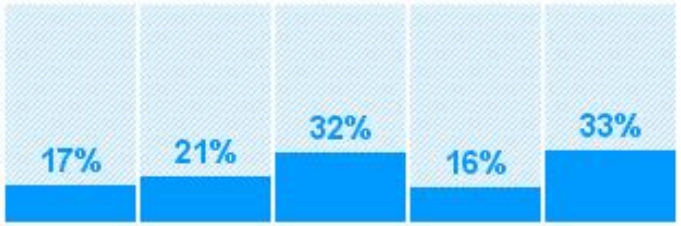


Map Data Courtesy of **Everyone Graduates Center**

Dropout Rate

22%

Dropout Statistics



No Child Left Behind Act, 2001

http://en.wikipedia.org/wiki/No_Child_Left_Behind_Act

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ocw.mit.edu/courses/find-by-t

Course Finder

Topic | MIT Course Number | Department

TOPIC	SUB-TOPIC	SPECIALTY
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Energy	Biological Engineering	Artificial Intelligence
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Fine Arts	Civil Engineering	Computer Networks
Health and Medicine	Computer Science	Cryptography
Humanities	Electrical Engineering	Data Mining
Mathematics	Environmental Engineering	Graphics and Visualization

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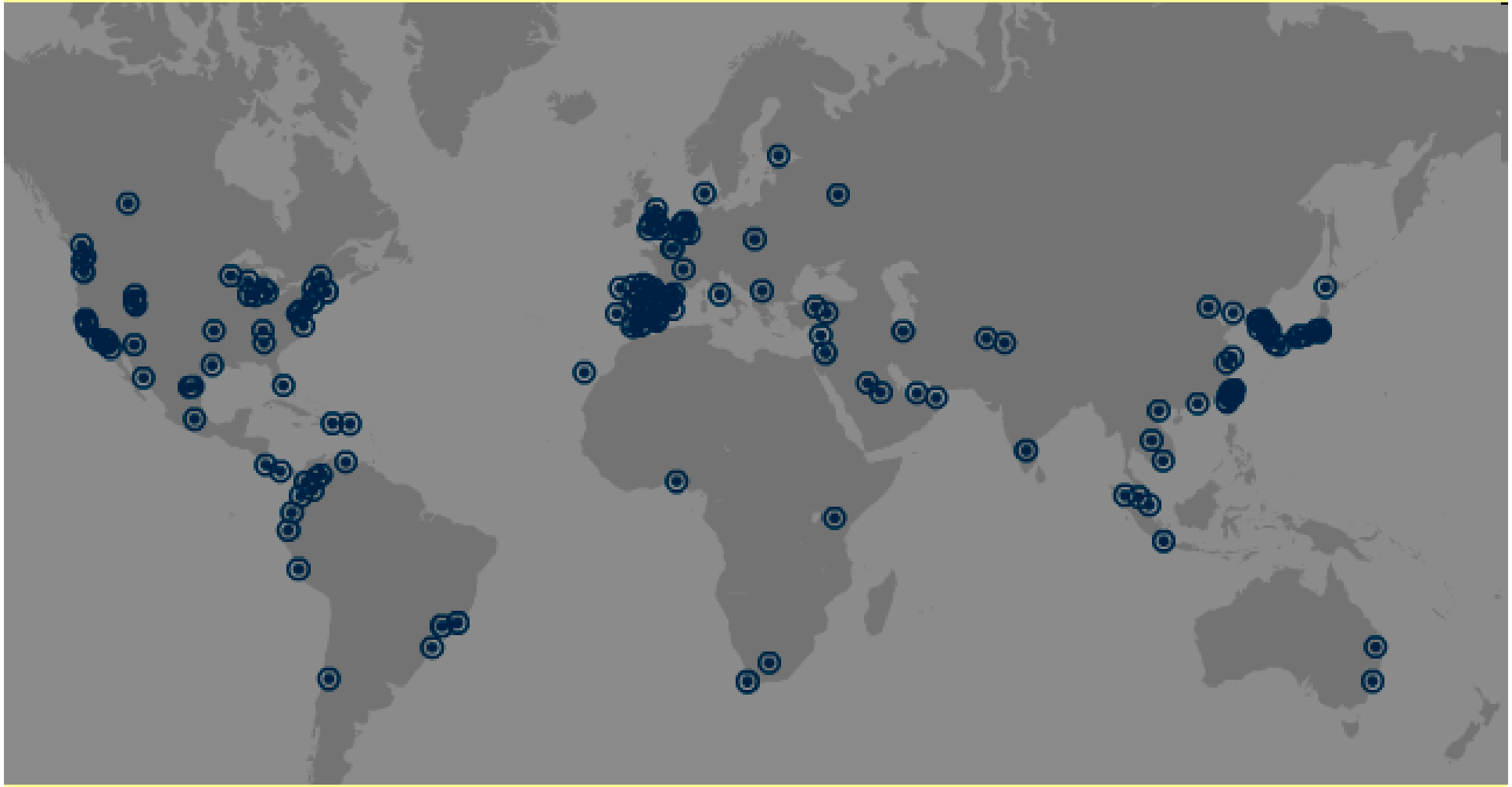
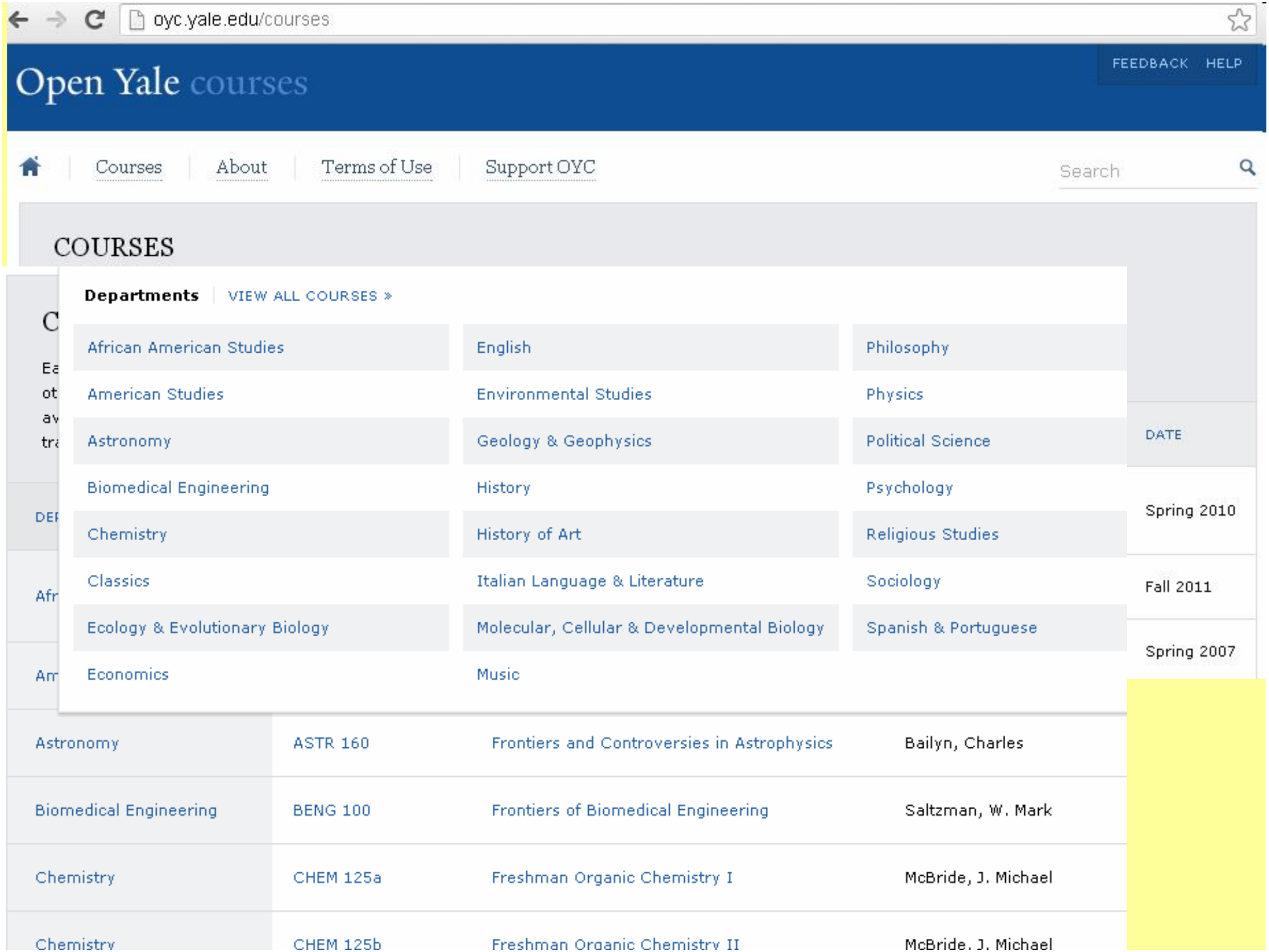


http://www.ocwconsortium.org/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Classics
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History of Art
Italian Language & Literature
Molecular, Cellular & Developmental Biology
Music
Philosophy
Physics
Political Science
Psychology
Religious Studies
Sociology
Spanish & Portuguese
DATE
Spring 2010
Fall 2011
Spring 2007
Astronomy ASTR 160 Frontiers and Controversies in Astrophysics Bailyn, Charles
Biomedical Engineering BENG 100 Frontiers of Biomedical Engineering Saltzman, W. Mark
Chemistry CHEM 125a Freshman Organic Chemistry I McBride, J. Michael
Chemistry CHEM 125b Freshman Organic Chemistry II McBride, J. Michael

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featuring entrepreneurship and innovation thought leaders.

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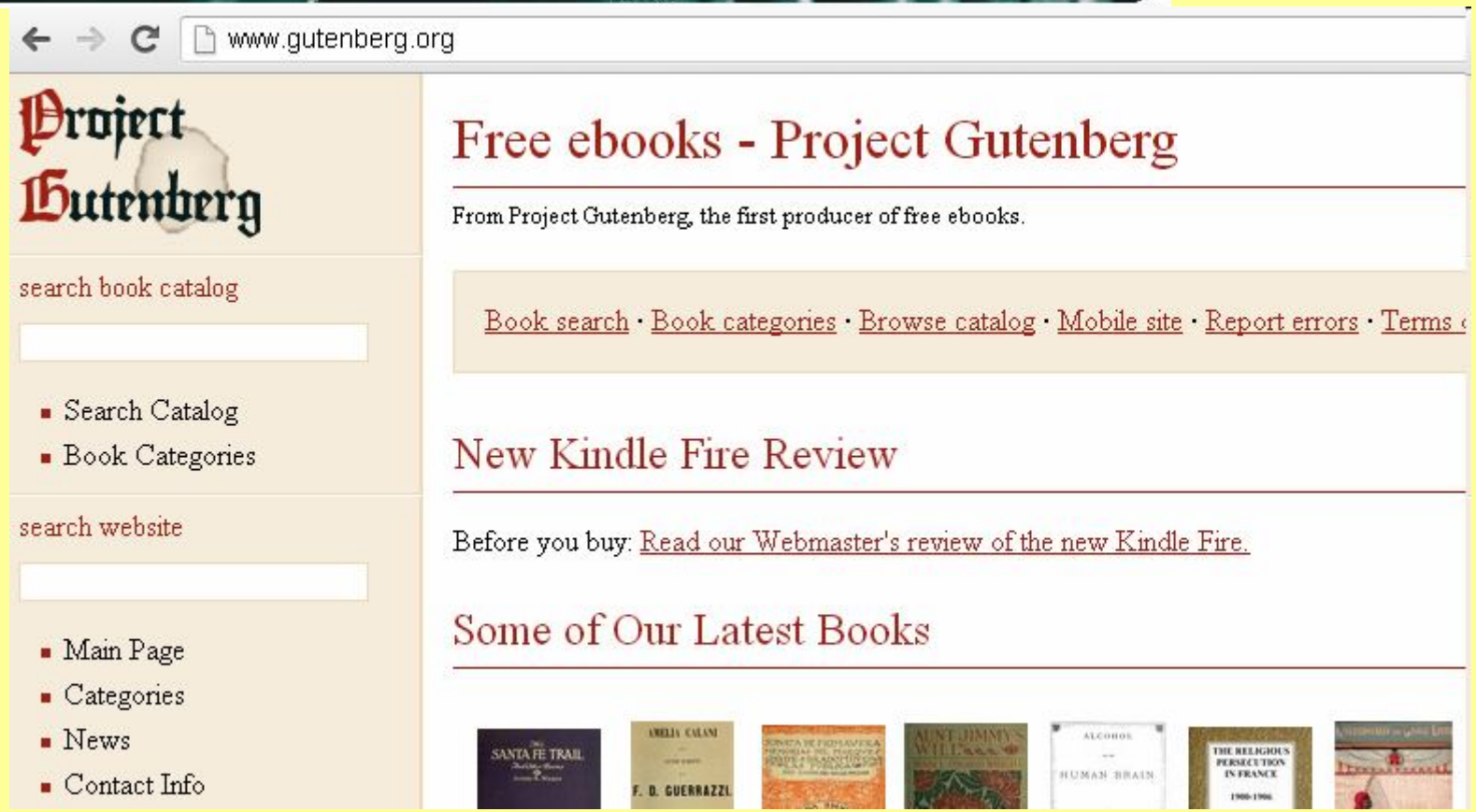
Quickstart
FAQ
RSS
Contribute
Contact
Open Stanford on iTunes U
Coding Together:
Apps for iPhone and iPad
Updated for iOS 6. Starts January 2013.

Звичайно ж, можна і самостійно



Але в товаристві – веселіше і ефективніше.

Що в цьому доброго?

Безкоштовний відкритий доступ до знань звідки завгодно

Можливість використовувати прогресивні навчальні моделі та засоби

Можливість долучитися до розробки навчального контенту (wiki)

Можливість співпрацювати/спілкуватися з представниками іншої культури/галузі знань і формувати професійну мережу

Розвиток цифрової економіки

TED
Ideas worth spreading

Salman Khan:
Let's use video to reinvent education
Березень 2011 р.

http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html

TED
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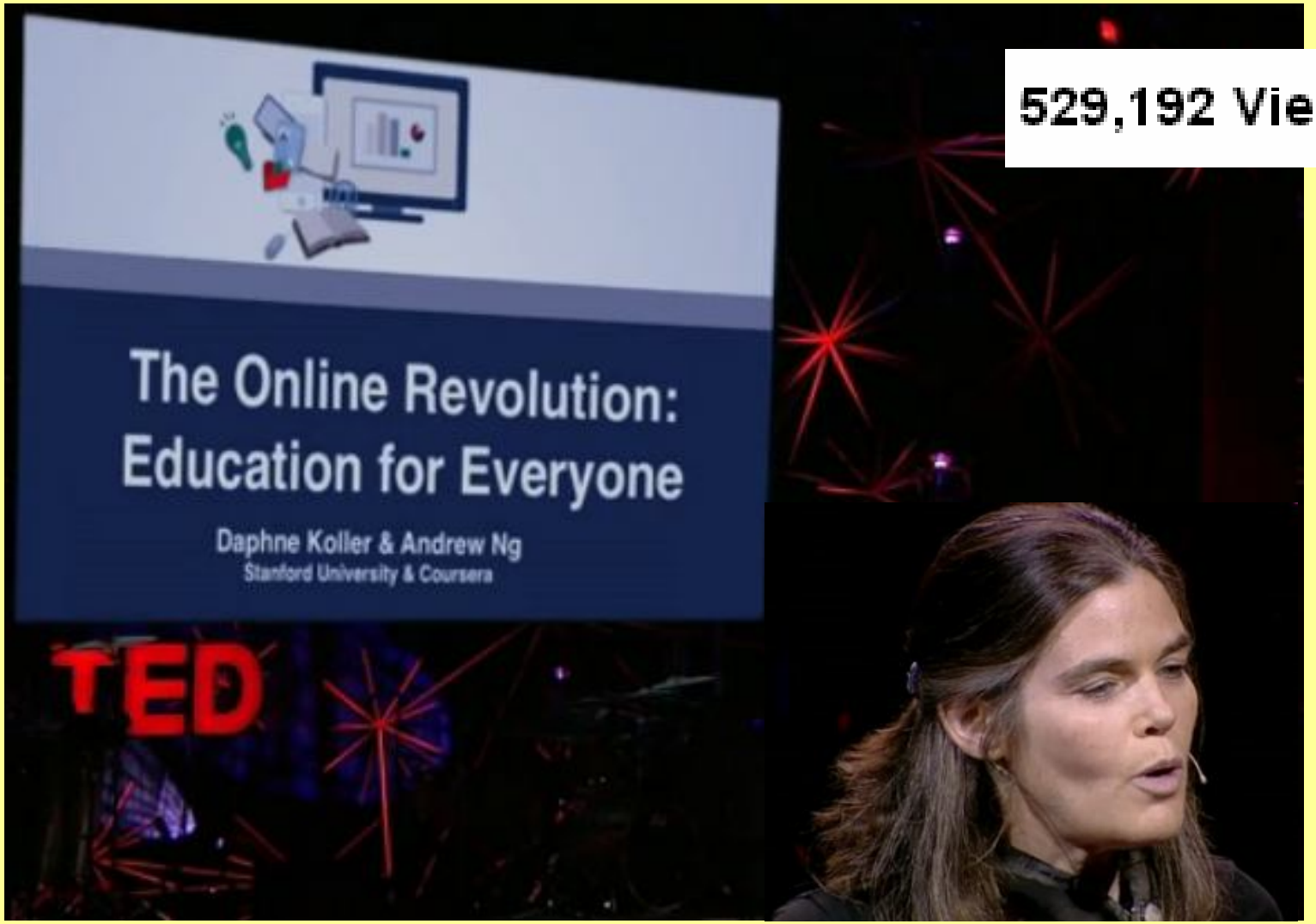
Peter Norvig:
The 100,000-student classroom
Березень 2012 р.

http://www.ted.com/talks/peter_norvig_the_100_000_student_classroom.html

TED
Ideas worth spreading

Daphne Koller:
What we're learning from online education
Червень 2012 р.



www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html

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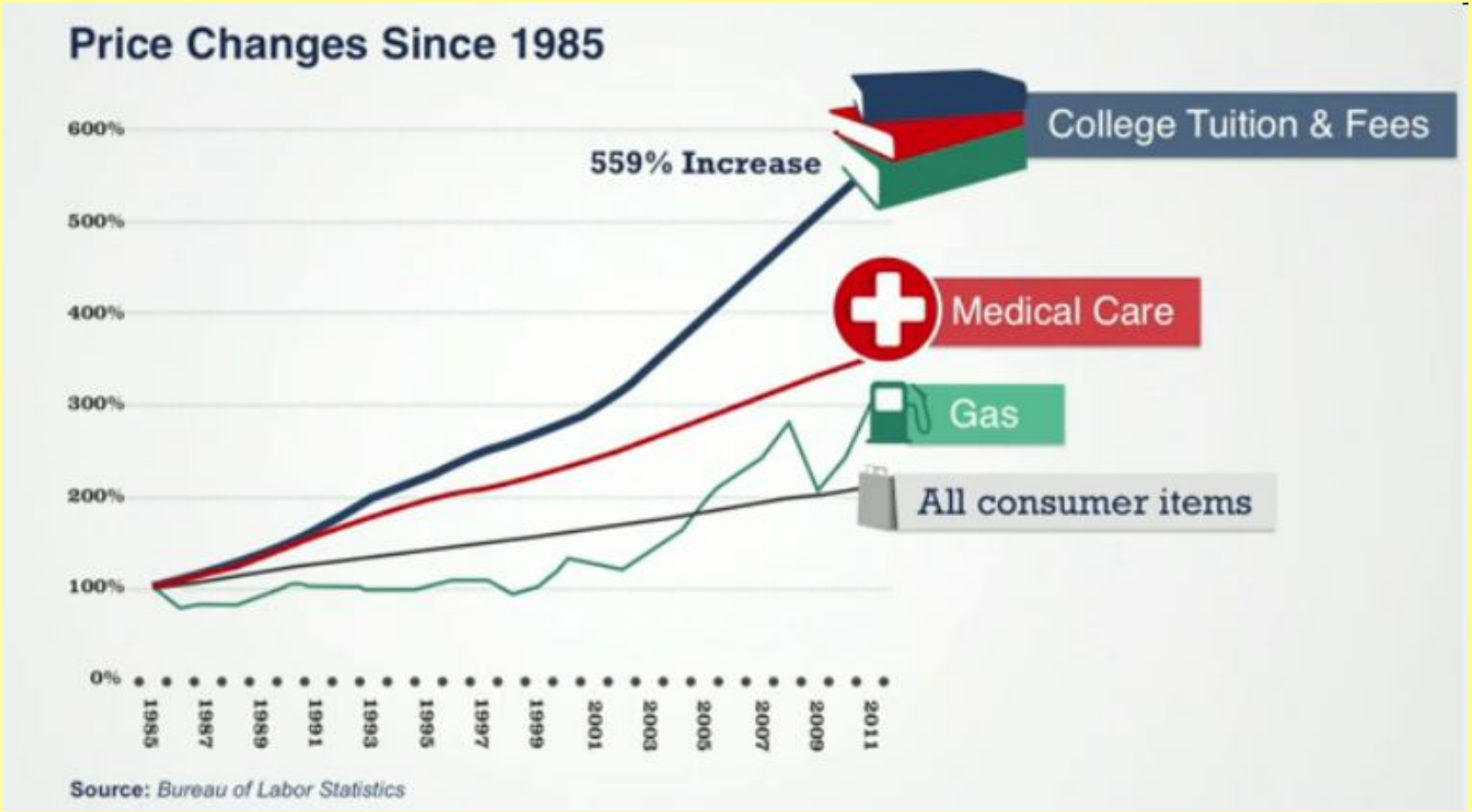

www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html

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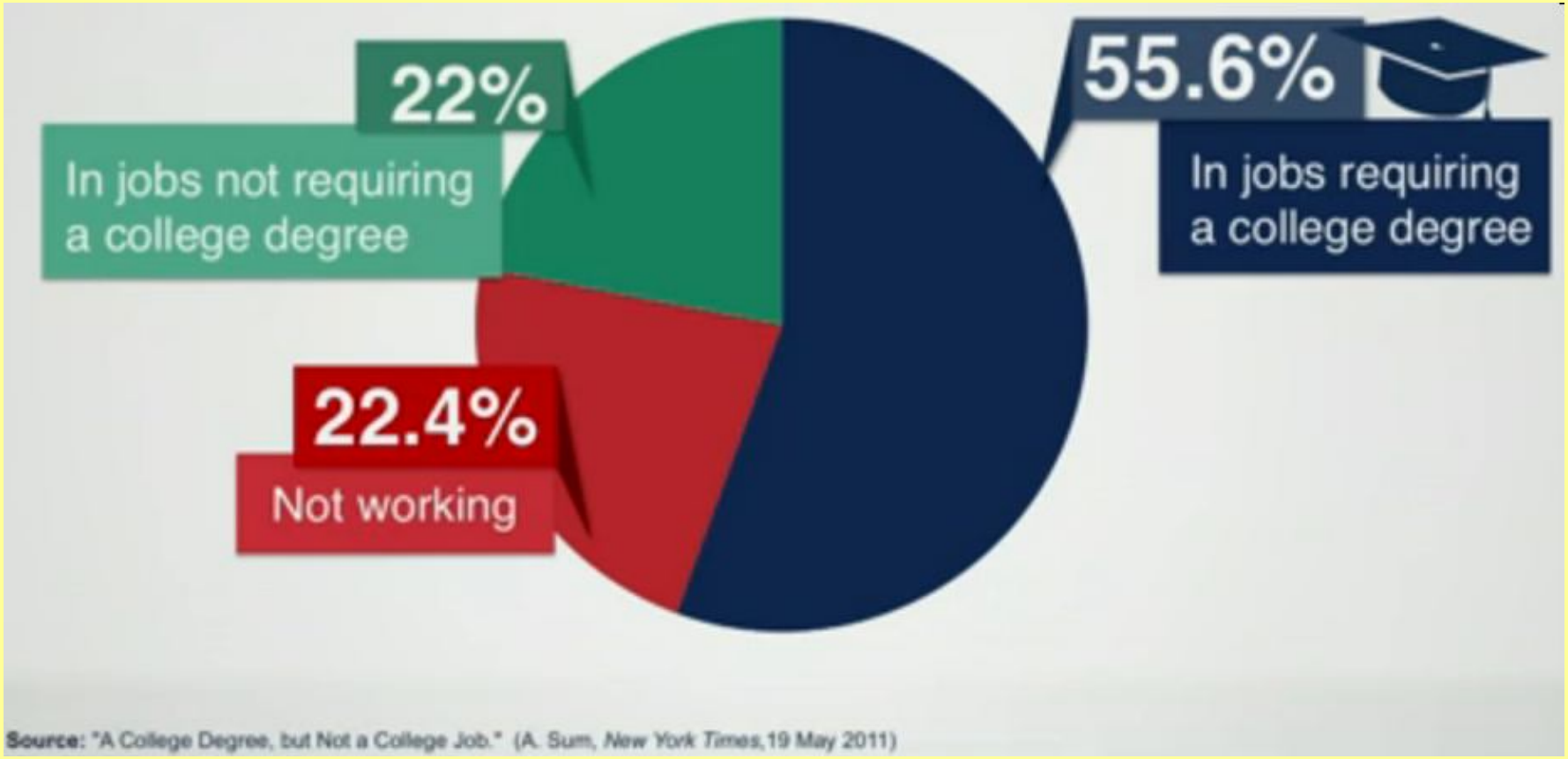
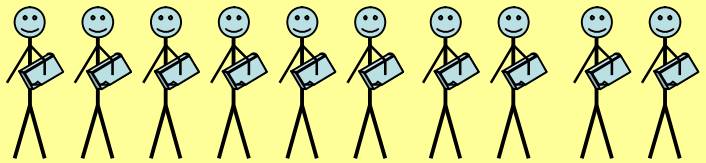
Червень 2012 р.



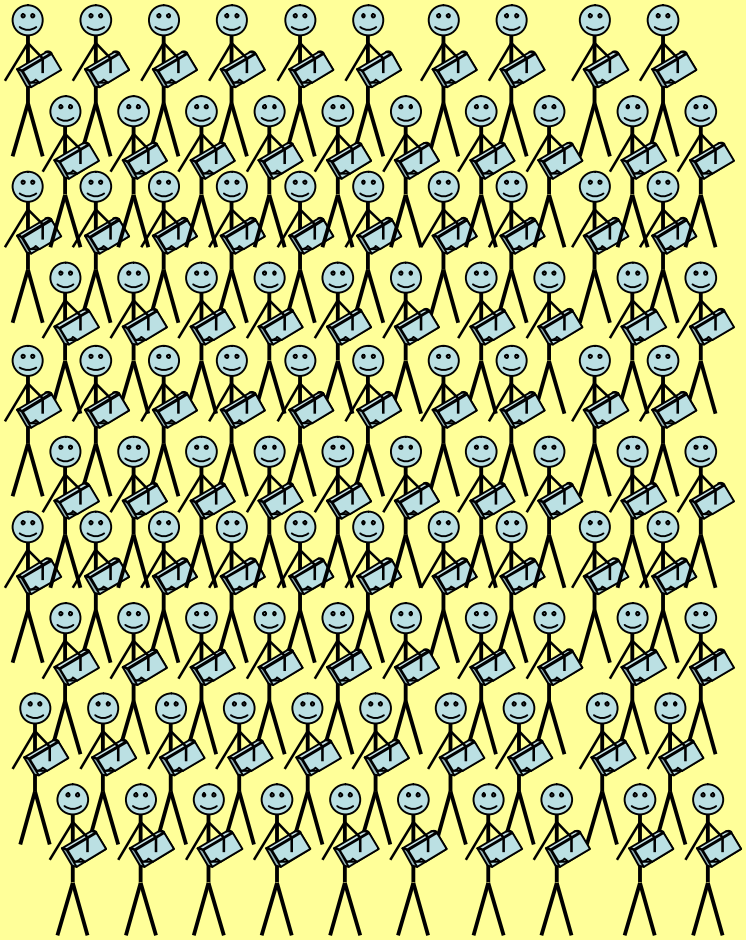
www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html

group



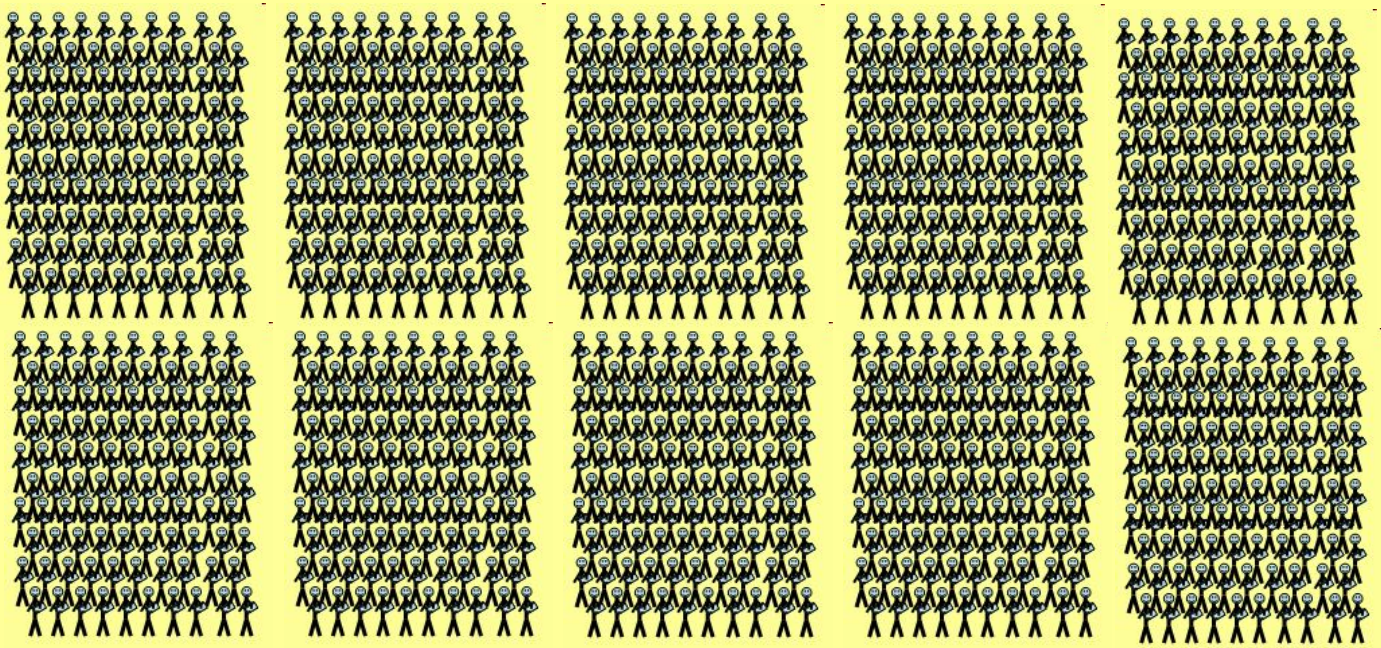
10

class

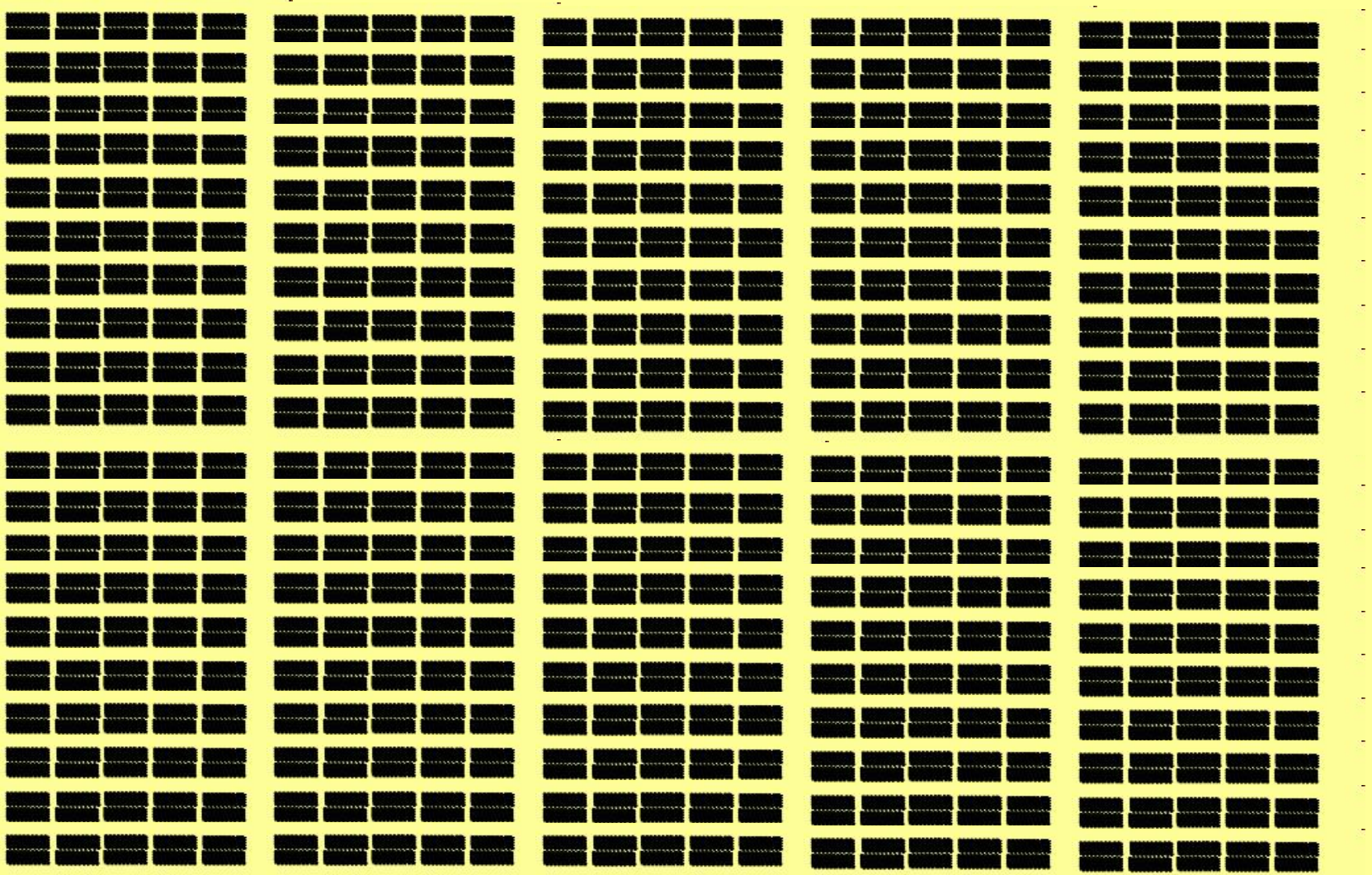


$10^{2}=100$

open online course $10^3 = 1000$



Massive open online course $10^6 = 1000000$

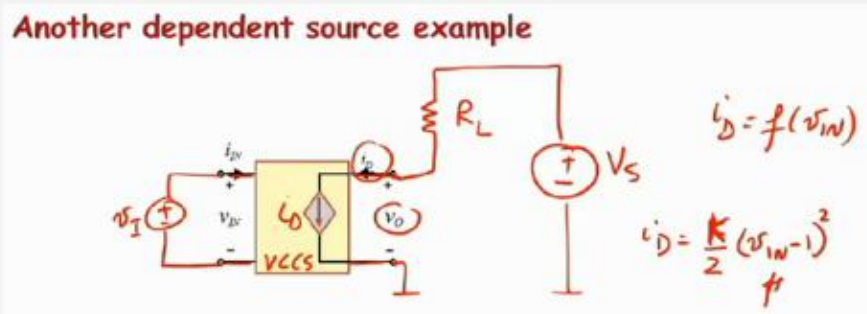


March 5th - June 14th, 2012

MITx · Circuits and Electronics

6.002x had 154,763 registrants.
Of these, 69,221 looked at the first problem set,
and 26,349 earned at least one point on it.
9,318 people got a passing score on the midterm.
5,800 people got a passing score on the final exam.
Finally, after completing 14 weeks of study,
7,157 people have earned the first certificate
awarded by MITx.

S8V5: Another Dependent Source Example



And I want to pick my current source, my controlled current source, to look as follows.

I'm going to pick this dependent source that has the following relationship to VIN.

It's a nonlinear relation.

It's iD equals K divided by 2 times

S8V12: DEMO - Amplification

SPEAKER 1: Let me show you little demo of a small device

that I built involving such a dependent source.

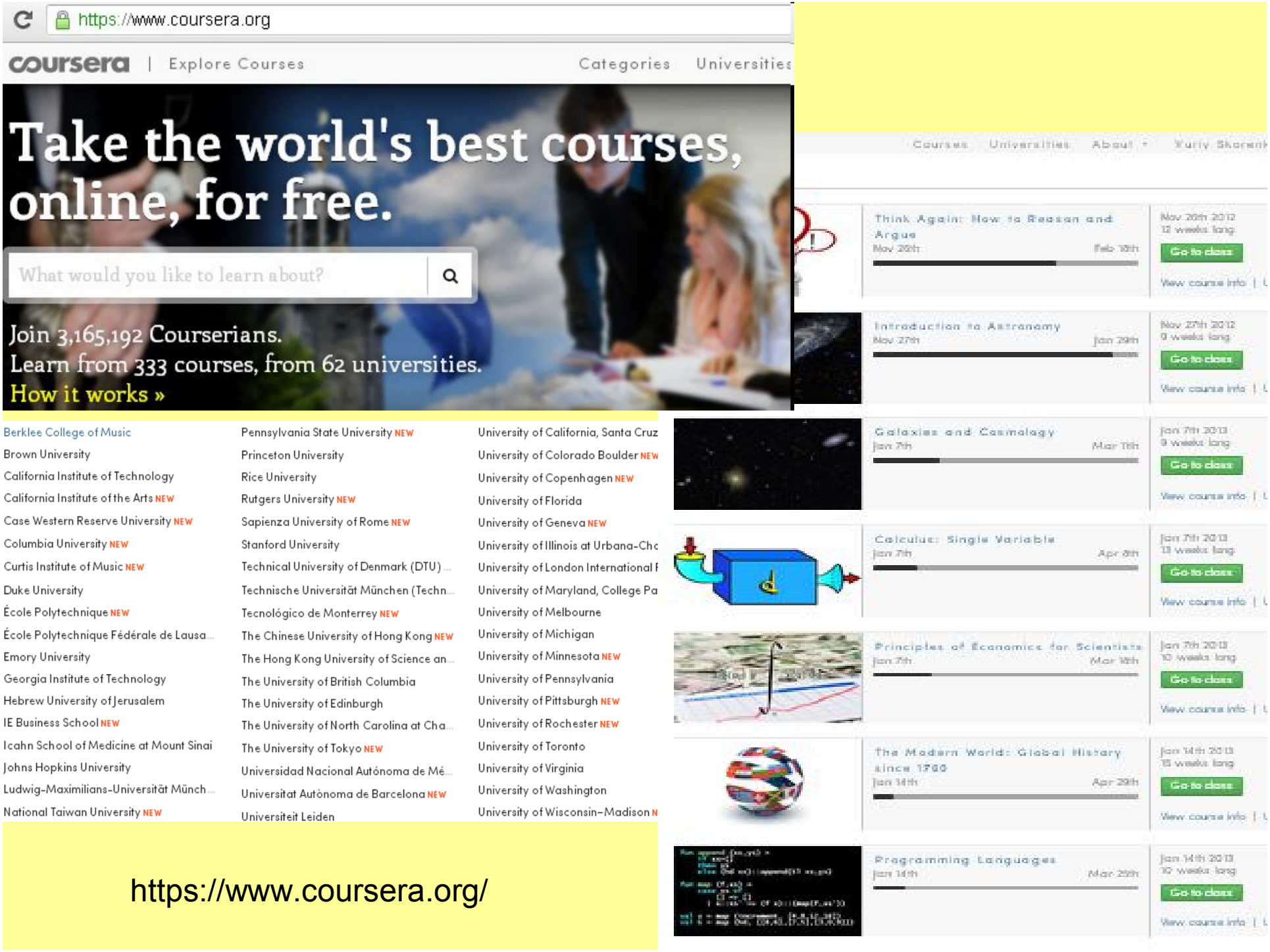
On my x-axis is vI and vO is y-axis.

And focus on this little point here.

OK?

Right now my vI is zero, and therefore that's my output.

to watch the output and see it behaves, pretty much



https://www.coursera.org/

We started with **2 founders** and now we're a team of 20+ people doing **Engineering**, **Design**, **Course Operations**, and **Business Development**.

16 of us went to Stanford University.

We speak a variety of languages, like **Chinese**, **Hebrew**, **Spanish**, and of course, **Quechua**.

2 of us went to the same high school in Texas — but didn't know it until now.

The New York Times

Education

Universities Abroad Join Partnerships on the Web

By TAMAR LEWIN
Published: February 20, 2013

Fri 13 Jan 2012 - Sun 22 Apr 2012

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Model Thinking

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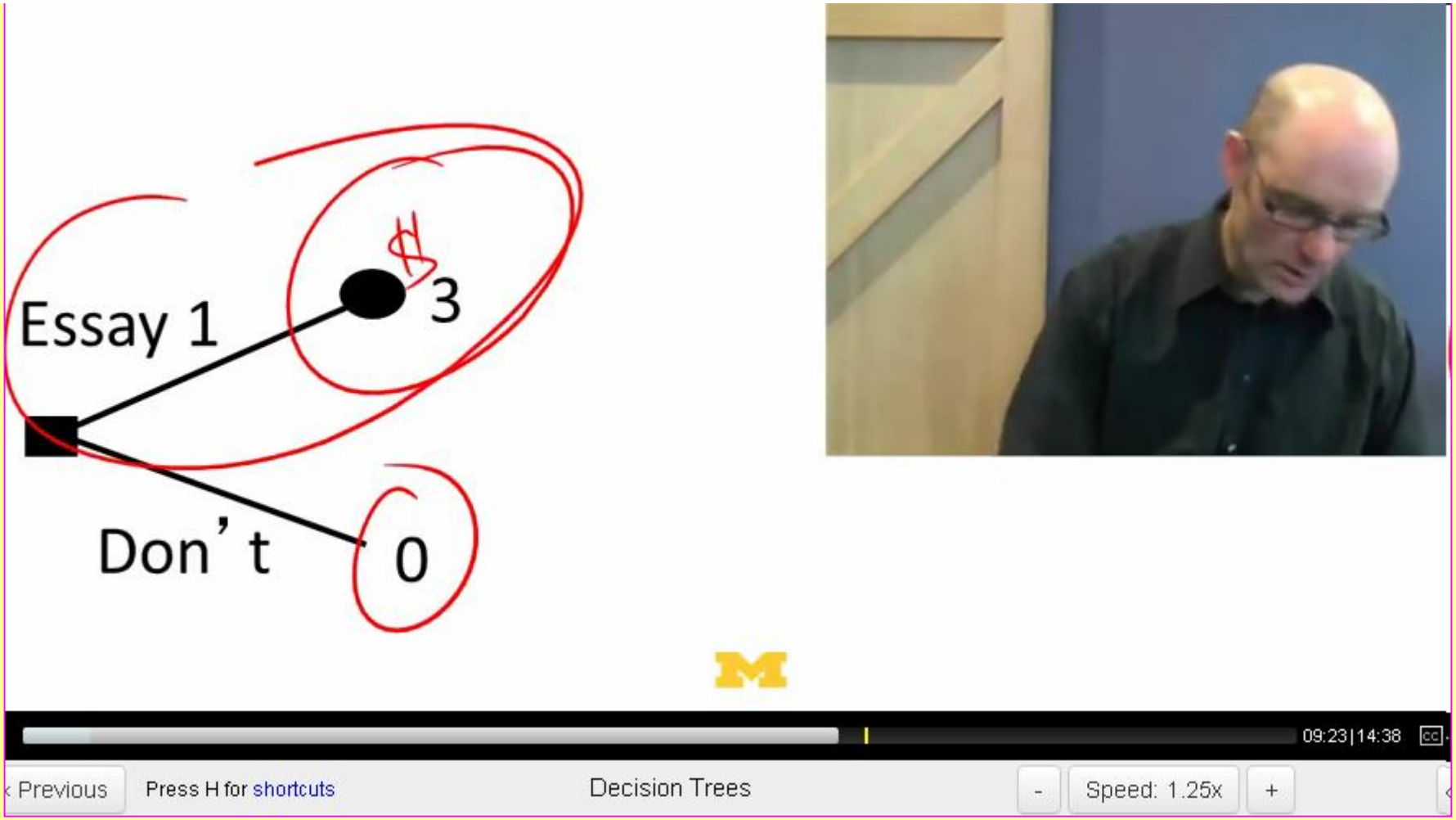
Video Lectures

Introduction: Why Model?

- ✓ Why Model?
- ✓ Intelligent Citizens of the World
- ✓ Thinking More Clearly
- ✓ Using and Understanding Data
- ✓ Using Models to Decide, Strategize, and Design

Segregation and Peer Effects



Question 6

In regards to the Rational Actor Model, which of the following would make you MORE likely to assume that individuals act rationally?

- [ ] High Stakes Choice
- [ ] Emotional Decision
- [ ] Repeated Choice

Principles of Economics for Scientists

Jan 7th — Mar 18th

California Institute of Technology

Jan 7th 2013 (10 weeks long)

Go to class

View course info | Un-enroll

Calendar & deadlines

Week	Item	Out	Due
w1	Unit 1. Principles of optimizing behavior Lectures & Practice Problems	Jan 7	
w1	Problem Set 1	Jan 7	Jan 14
w2	Unit 2. Consumer Theory Lectures & Practice Problems	Jan 14	
w2	Problem Set 2	Jan 14	Jan 21
w3	Unit 3. Producer Theory Lectures & Practice Problems	Jan 21	
w3	Problem Set 3	Jan 21	Feb 4
w4	Unit 4. Competitive markets. Lectures & Practice Problems	Jan 28	
w4	Problem Set 4	Jan 28	Feb 11
w5	Unit 5. Government intervention in competitive markets: Efficiency. Lectures & Practice Problems	Feb 4	
w5	Problem Set 5	Feb 4	Feb 18

Можливість вільно скачувати відеолекції

4 - 4 - Part IV Derivation (contd) (1558) (difficult material optional).mp4 - Media Player Classic ...

File View Play Navigate Favorites Help

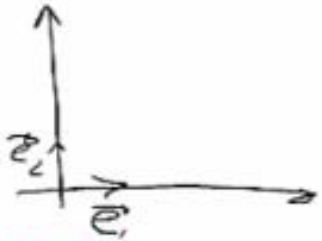
Calculating the matrix elements

$\langle x_{k+1} | x_k \rangle$

- Reminder (this issue is often a source of confusion): $|\Psi\rangle$ *vs.* $\Psi(x) = \langle x | \psi \rangle$
  - $\langle x|p\rangle = \frac{1}{\sqrt{2\pi\hbar}} e^{\frac{i}{\hbar}px}$
  - $\langle x|x'\rangle = \delta(x - x')$
- Dirac delta-function
  - Orthonormality condition for "usual" basis vectors, $\{e_i\}$:

$\sum_i \delta_{ij} = 1$

$$\vec{e}_i \cdot \vec{e}_j = \delta_{ij} = \begin{cases} 0, & \text{if } i \neq j \\ 1, & \text{if } i = j, \end{cases}$$



  - For a "continuum" basis, $\{|x\rangle\}$:

$\int_{-\infty}^{+\infty} dx\, \delta(x - x') = 1$

$$\langle x|x'\rangle = \delta(x - x') = \begin{cases} 0, & \text{if } x \neq x' \\ \infty, & \text{if } x = x', \end{cases}$$

- An important property (Fourier transform) of the δ-function:

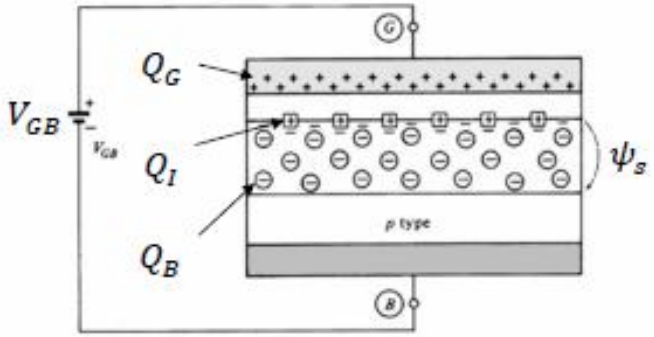
$$\delta(x) = \int_{-\infty}^{+\infty} \frac{dk}{2\pi} e^{ikx}$$

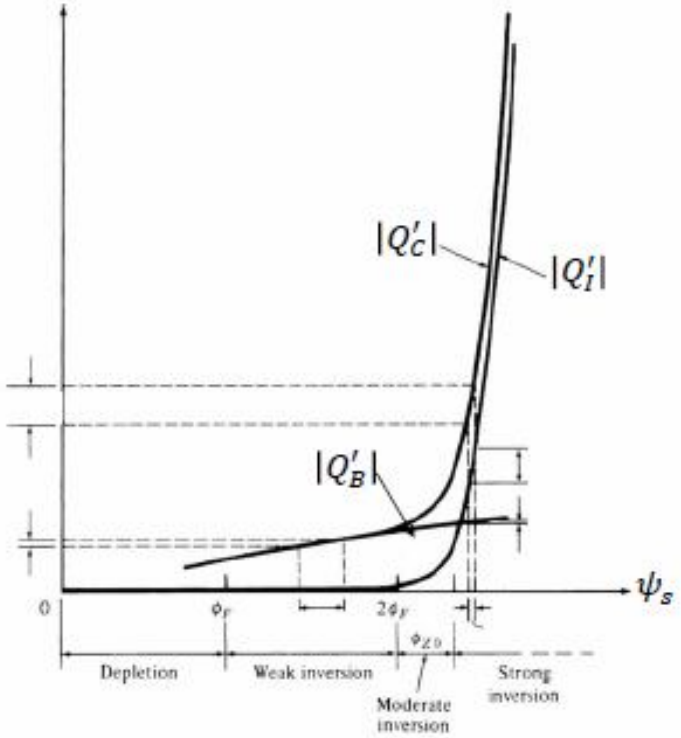
Paused 04:54 / 15:58

Можливість вільно скачувати слайди лекцій

Terminal MOS Structure - Inversion.pdf - Adobe Reader

4 / 6 56,5% Tools



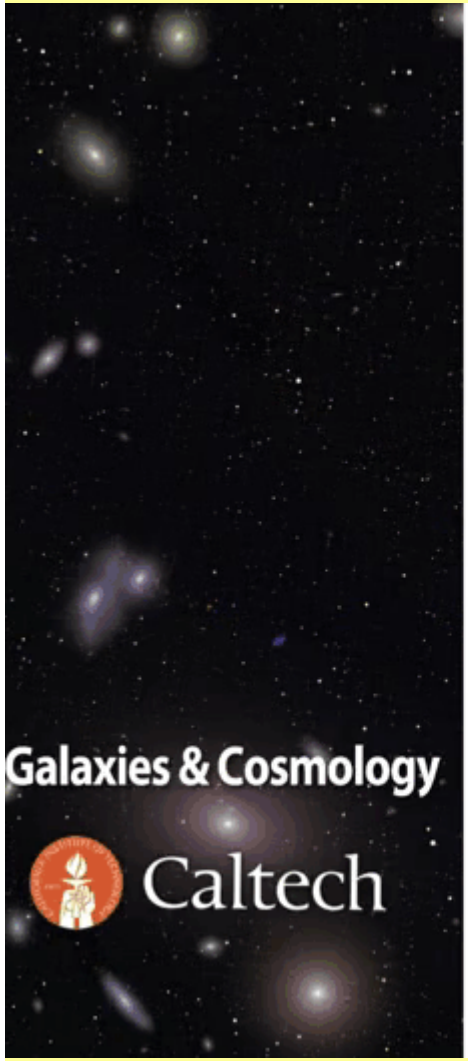


$$Q'_B = -\sqrt{2q\epsilon_s N_A}\sqrt{\psi_s}$$

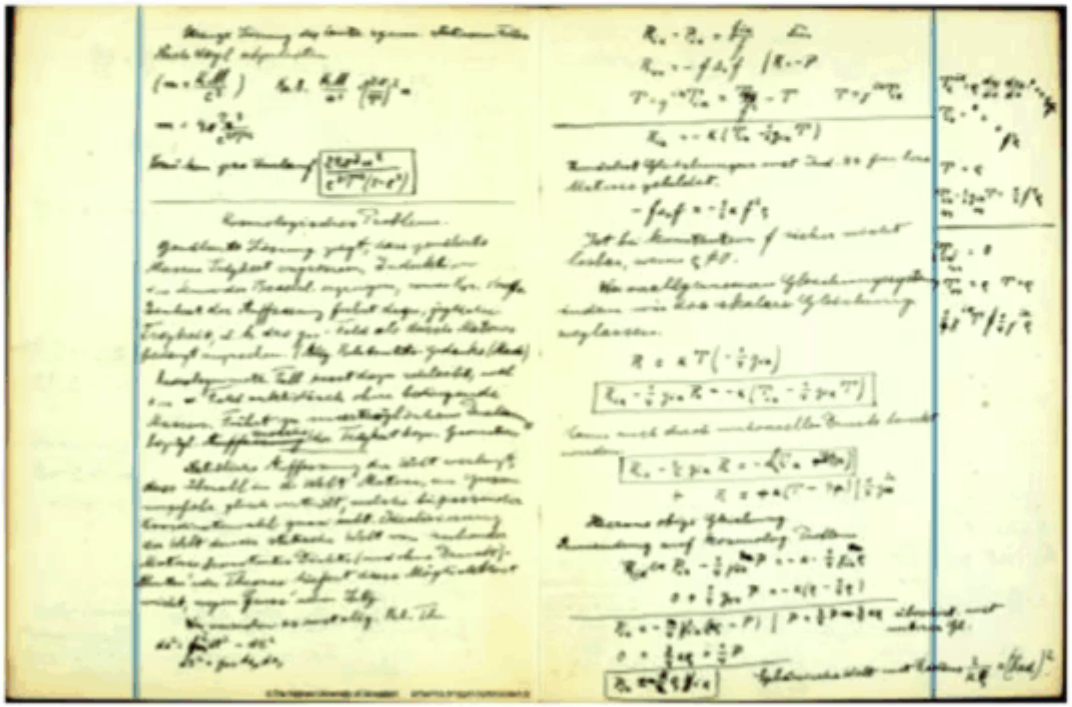
$$Q'_I = -\sqrt{2q\epsilon_s N_A}\left(\sqrt{\psi_s + \phi_t e^{(\psi_s - 2\phi_F)/\phi_t}} - \sqrt{\psi_s}\right)$$

Based on Tsividis/McAndrew; Copyright © Oxford University Press, 2011 4

Унікальні документи, експерименти та дані

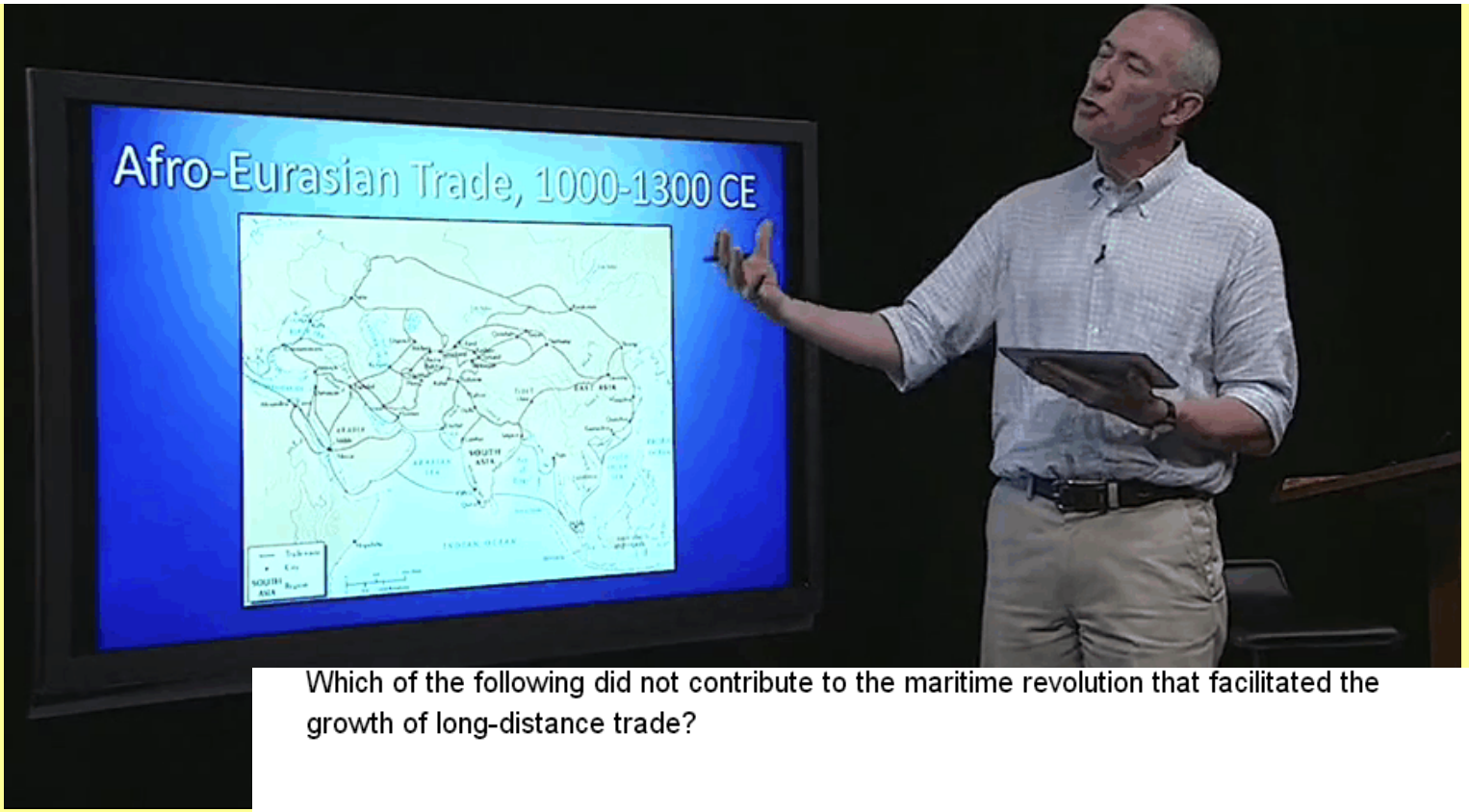


Einstein's lecture notes for a course he taught on GR in 1919. The final topic of the course was cosmology, which he had begun to investigate only two years earlier. Here he describes his methods in constructing the first mathematical model of cosmology in GR. This universe contains non-relativistic matter, stars and nebulae in agreement with the contemporary observations, but is spatially finite.



(From R. Caldwell)

Тести в лекції



Which of the following did not contribute to the maritime revolution that facilitated the growth of long-distance trade?

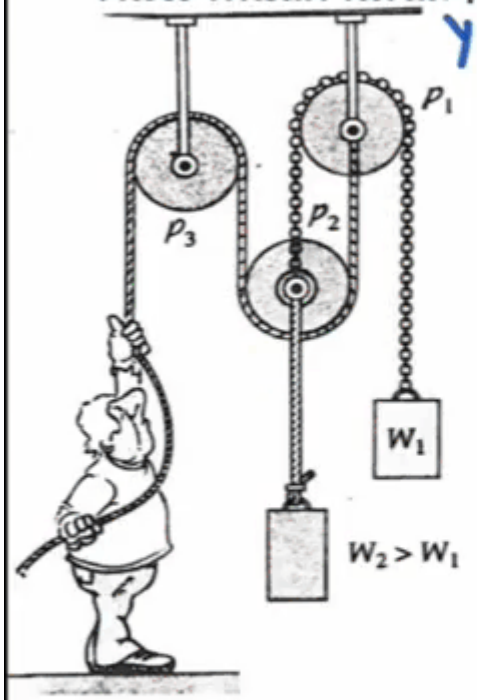
- Improved navigational technologies.
- Refinements in shipbuilding.
- Lack of protection from political authorities.
- Shift in business and accounting practices like credit.

Continue

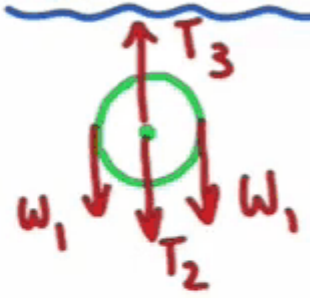
Correct!

Georgia Tech Woodruff School of Mechanical Engineering
College of Engineering

How much force must the person exert to hold the system in equilibrium?



FBD PULLEY P1



NOTE
T2 IS THE FORCE THE PERSON EXERTS

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$\uparrow \sum F_y = 0$

$T_3 - W_1 - T_2 - W_1 = 0$

$\downarrow \sum F_y = 0$

$-T_3 + W_1 + T_2 + W_1 = 0$

$T_3 = 2W_1 + T_2$

1 EQN
2 UNK

TRY

Used with permission from "Engineering Mechanics: Statics," McGill/King, 4th Ed, 2003

08:46 | 11:27

« Previous | Press H for shortcuts | Lecture Video Module 6 – Systems of ... | - | Speed: 1.50x | + | Next »

Practice problem 1.4 -- solution

1.13. Summary [6:05]

Pre-lab 1

Logistics [3:02]

Lab description [9:12]

How to trade [13:58]

Final remarks

Unit 2. Consumer theory

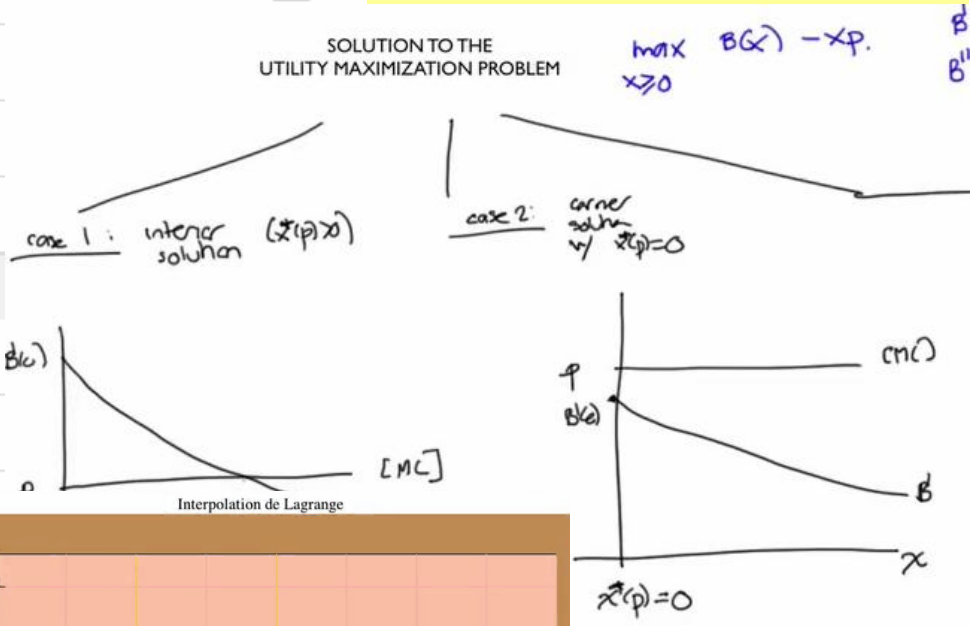
2.0. Introduction [4:20]

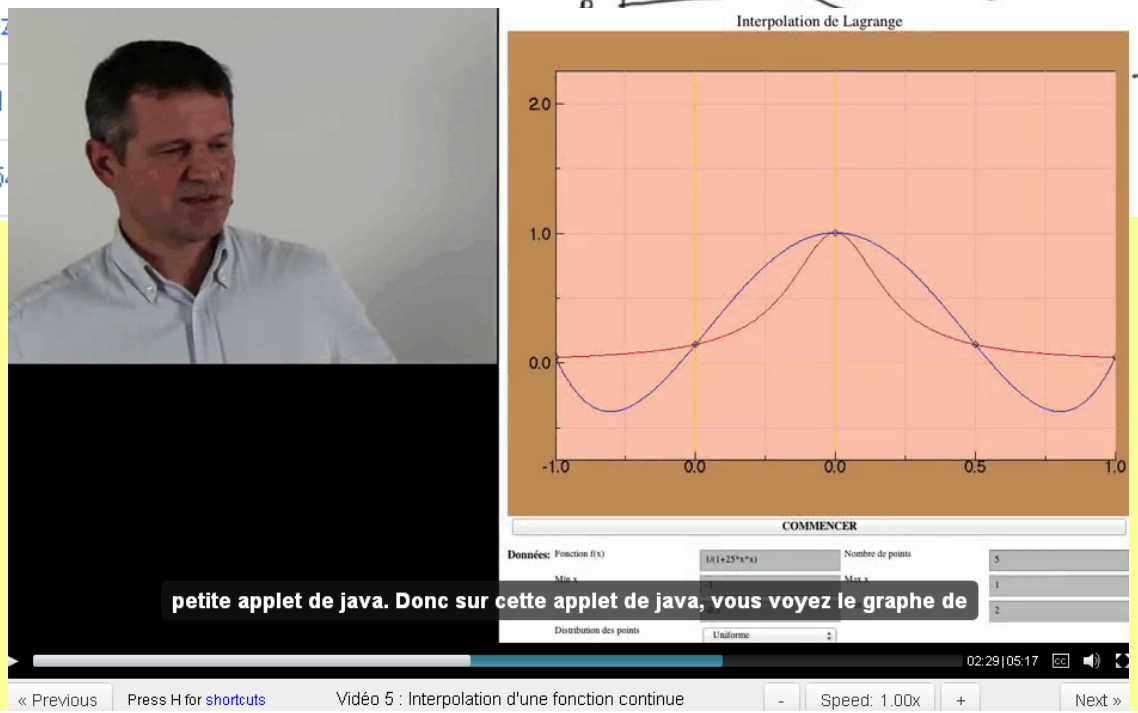
2.1. The experienced utility function [9:37]

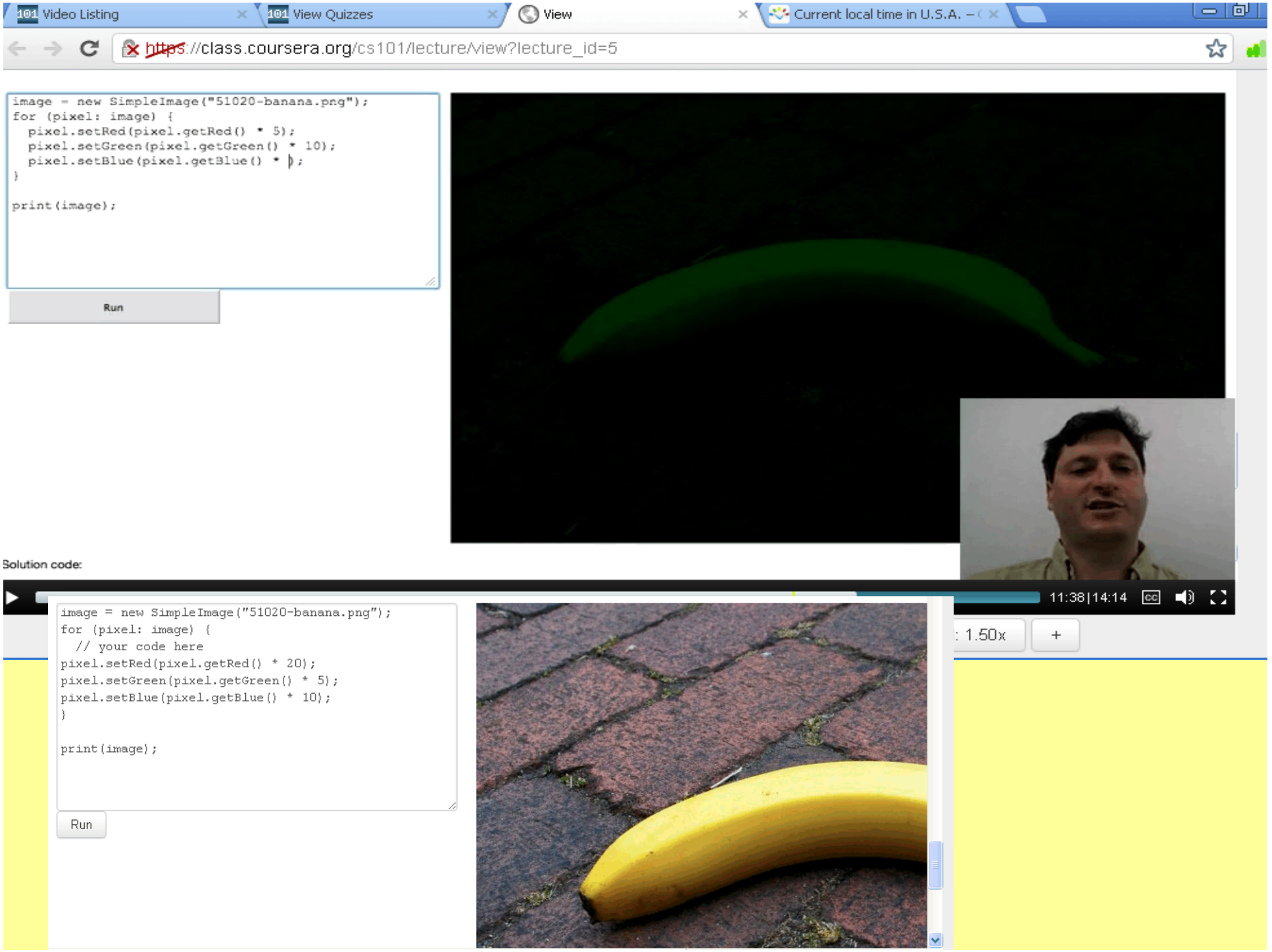
2.2. Utility maximiz

2.3. The demand

2.4. Example [2:5



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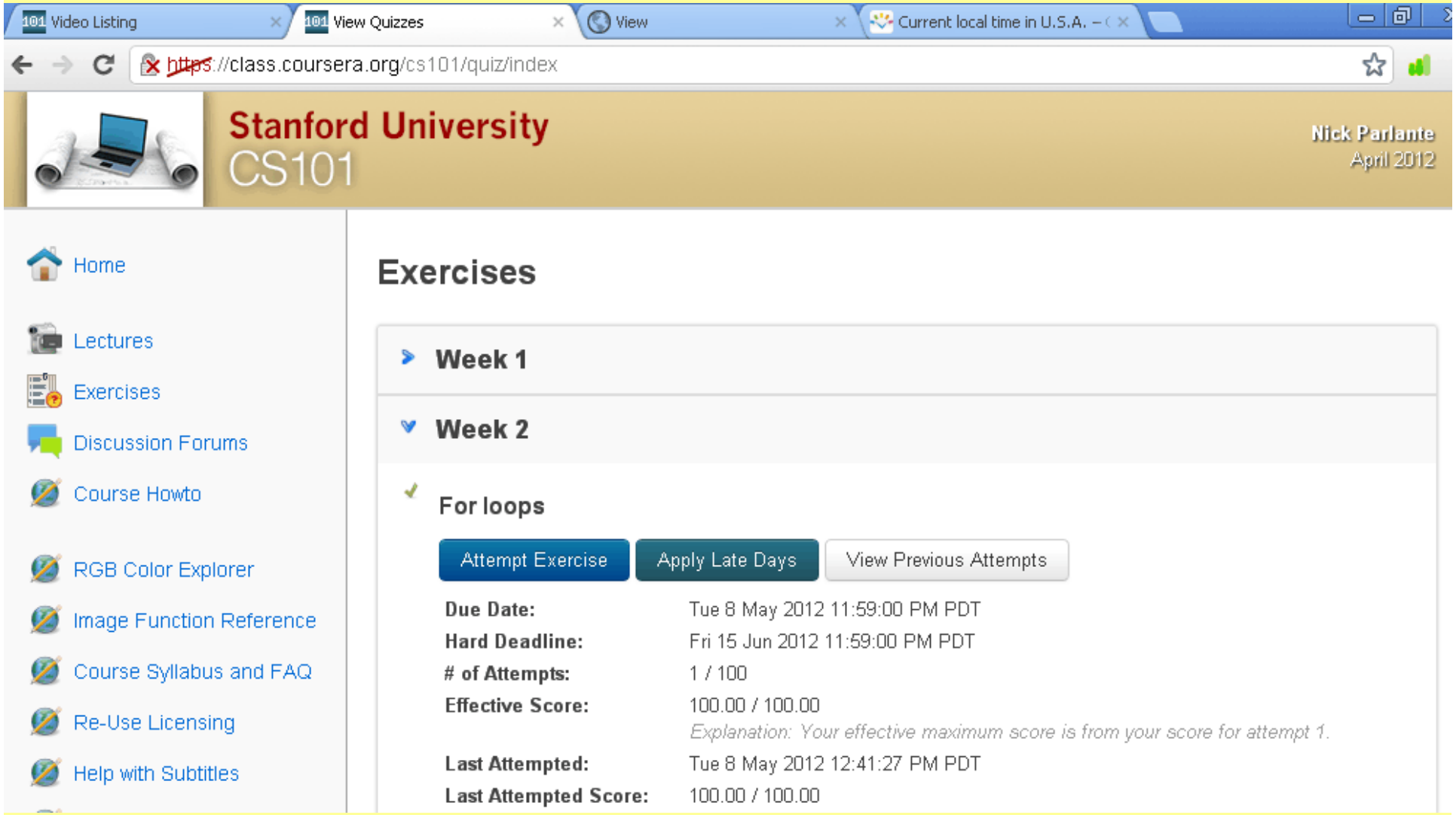
Current local time in U.S.A. –
https://class.coursera.org/cs101/lecture/view?lecture_id=5
image = new SimpleImage("51020-banana.png");
for (pixel: image) {
pixel.setRed(pixel.getRed() * 5);
pixel.setGreen(pixel.getGreen() * 10);
pixel.setBlue(pixel.getBlue() *);
}
print(image);
Run
11:38 | 14:14
1.50x
+
Solution code:
image = new SimpleImage("51020-banana.png");
for (pixel: image) {
// your code here
pixel.setRed(pixel.getRed() * 20);
pixel.setGreen(pixel.getGreen() * 5);
pixel.setBlue(pixel.getBlue() * 10);
}
print(image);
Run

Уніфікована структура (як і в будь-якій LMS)



Форум ніколи не спить

Forums / General Discussion

Question about the Polysilicon Gate

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gate × + Add Tag

Nikhil · 8 days ago

From what I know, in a N-MOS structure, we have a p-type body and n-type polysilicon gate (PSG). My question is, why do I have to use n-type polysilicon gate only? Can I not use P-type PSG? Is this because electrons have higher mobility than holes and hence offer lesser resistance and consequently lower RC delay??

1

Mark R. Gehring · 4 days ago

Look at the equation for VT0. Using P gate, with positive work function, will dramatically shift the VT to unusable values. Thus, P gates are used for p channel (nwell) MOSFETs. This is also why it took a long time to develop metal gates for low voltage MOS devices - you have to use the right metal alloy to get the VT reasonable.

Аналітичні тести

Question 1

Simplify the expression

$(-6x^2 + 9x) - (2x + 5 - 3x^2) + (7x^2 - 6x + 2)$

to the form $Ax^2 + Bx + C$.

Enter your answer as a list of the values A B C separated by spaces.

4 1 2

Question 1

Simplify $(2\sqrt{7} + 3\sqrt{2})(\sqrt{7} - 5\sqrt{2})$. For submitting an answer with symbols, please follow these instructions: "/" means division, "*" means multiplication, and "^" means exponentiation. For adding a square root symbol, use sqrt (NUMBER). Please click the "preview" button for each question prior to submitting the answer so you can check that you've entered the right math expression.

-7*sqrt(14)-16

Preview

Your submission is equivalent to: $-7\sqrt{14} - 16$

Взаємне оцінювання письмових робіт

VANDERBILT UNIVERSITY

Leading Strategic Innovation in Organizations
by David A. Owens

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Peer Assessments / 3. Concept Definition Forms

Submission Phase	Evaluation Phase	Results Phase
1. Do assignment ☑	2. Evaluate peers 🔒	3. See results ☑

Your effective grade is 32
A 20% penalty has been applied because you did not complete the entire evaluation portion of the assessment.

Your unadjusted grade is 40, which is simply the grade you received from your peers.

See below for details.

Project Assignment 3: Concept Definition Forms (Group Assignment) - The purpose of this assignment is to teach you how to synthesize, distill, and assess a large quantity of ideas into a small number of manageable

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Developing New Ideas for New Companies: Edu-Startup Focus

The Tipster
New York, NY

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Sun Feb 10
3:00 PM

RSVP →

7 Courserians attending

4 comments

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Web Based Startup | for `Developers, Innovaters, Investors, Writers'

Andheri
Mumbai, India

All Those Who Want To Start A Web Based Solution For `Education, College/Schools Events'.

Sat Feb 16
6:45 PM

RSVP 6 days left

2 Courserians attending

2 comments

#Soc101 Meet in Mumbai, India

Candies Bandra

Sat Feb 16

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ThinkAgain:Reference Card Week 4

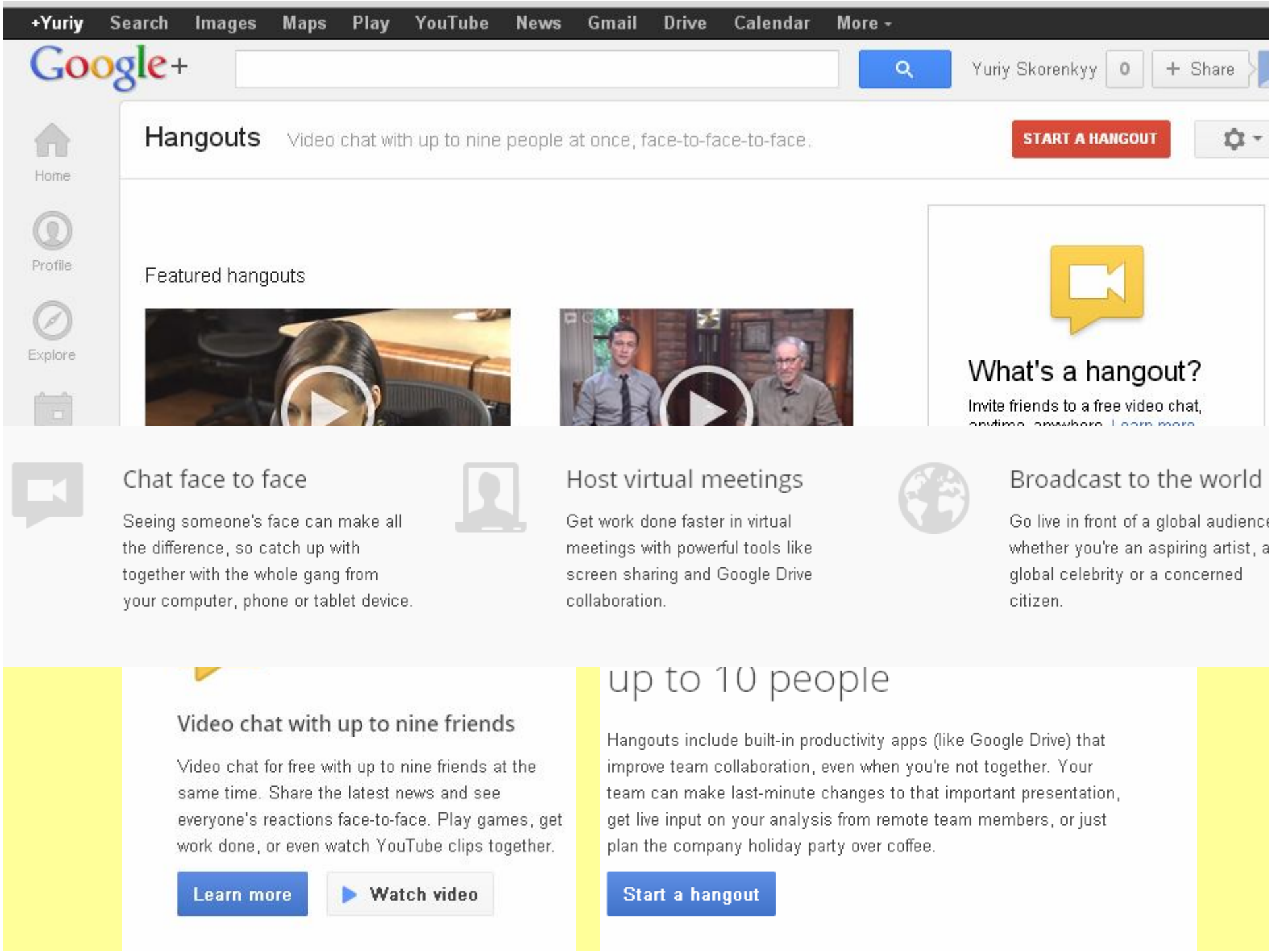
Reference Card Week 3 <---- **Reference Card Week 4** ----> Reference Card Week 5

Propositional Logic

A propositional connective is a phrase that connects to one or more propositions in order to express another proposition (a proposition is either a premise or a conclusion, and can be either true of false), e.g. "it is necessary that X", "it is true that", etc

- The final proposition may not logically depend on the original proposition(s) (whether "I hate it when [proposition]" is true is independent of whether [proposition] is true)
- When the final proposition is dependent or the original proposition(s) ("[proposition 1] and [proposition 2]"), the connective is called a truth-functional connective
  - The associated truth table stays the same even if we change the propositions
  - Conjunction: a connective that requires all original propositions to be true ("and" or "&")
    - a conjunction introduction argument is a valid argument which the conclusion conjoins two or more of the premises (e.g. A, B .: A and B)
    - a conjunction elimination argument is a valid argument which the conclusion is a conjunct of some conjuntion that appears in the premises (e.g. A and B .: A)

```
p  q  p&q
T  T  T
T  F  F
```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Video chat with up to nine people at once, face-to-face-to-face.
START A HANGOUT
Featured hangouts
What's a hangout?
Invite friends to a free video chat,
Chat face to face
Seeing someone's face can make all the difference, so catch up with together with the whole gang from your computer, phone or tablet device.
Host virtual meetings
Get work done faster in virtual meetings with powerful tools like screen sharing and Google Drive collaboration.
Broadcast to the world
Go live in front of a global audience whether you're an aspiring artist, a global celebrity or a concerned citizen.
up to 10 people
Video chat with up to nine friends
Video chat for free with up to nine friends at the same time. Share the latest news and see everyone's reactions face-to-face. Play games, get work done, or even watch YouTube clips together.
Learn more
Watch video
Hangouts include built-in productivity apps (like Google Drive) that improve team collaboration, even when you're not together. Your team can make last-minute changes to that important presentation, get live input on your analysis from remote team members, or just plan the company holiday party over coffee.
Start a hangout

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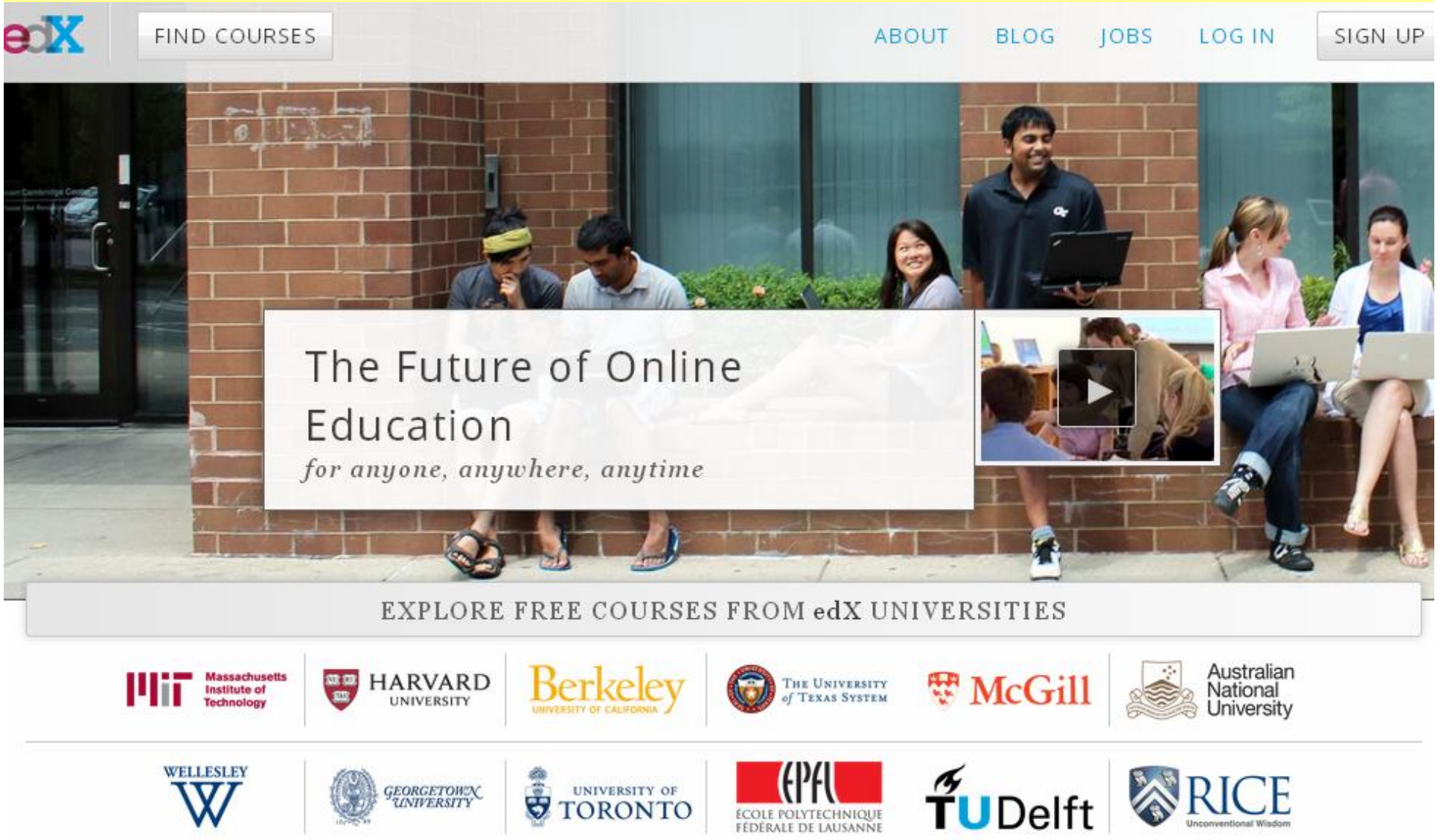

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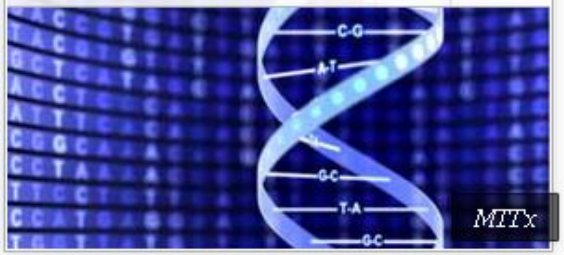
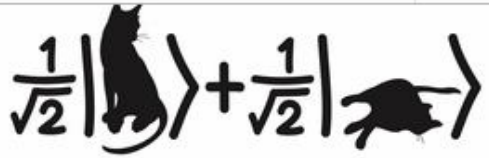
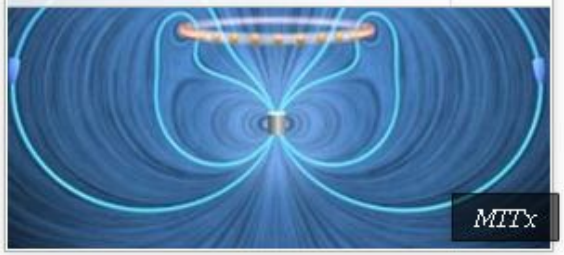
7.00x Introduction to Biology - The Secret of Life



CS191x Quantum Mechanics and Quantum Computation



8.02x Electricity and Magnetism



NEW

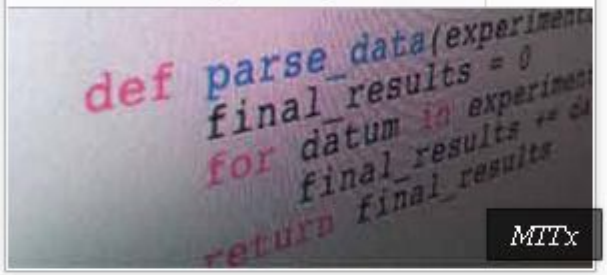
PH278x Human Health and Global Environmental Change

NEW

2.01x Elements of Structures

CS184.1x Foundations of Computer Graphics

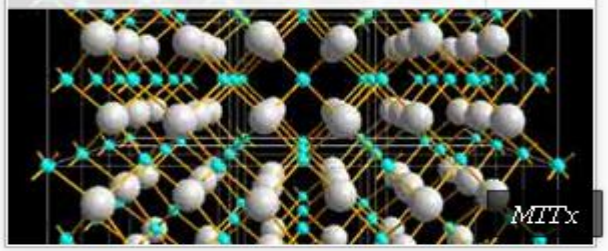
6.00x Introduction to Computer Science and Programming



HLS1x Copyright

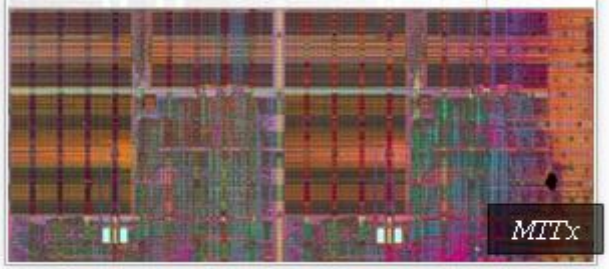
CS169.1x Software as a Service

3.091x Introduction to Solid State Chemistry



CS188.1x Artificial Intelligence

6.002x Circuits and Electronics



The Small Signal Circuit View – Foundations

- KVL, KCL applied to some circuit C yields:

$$\cdots + v_A + \cdots + v_{OUT} + \cdots + v_B + \cdots = 0 \quad (1)$$

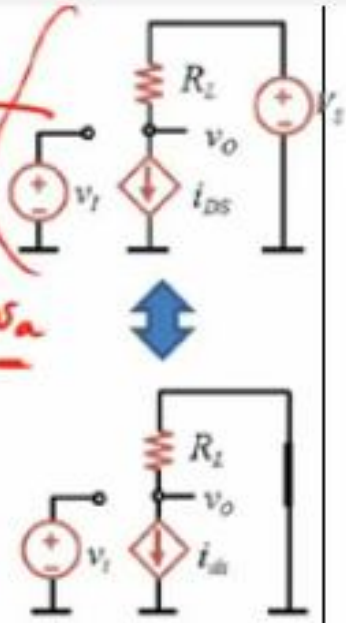
topology

- Replace total variables with operating point variables plus small signal variables

$$v_A = V_A + v_a$$

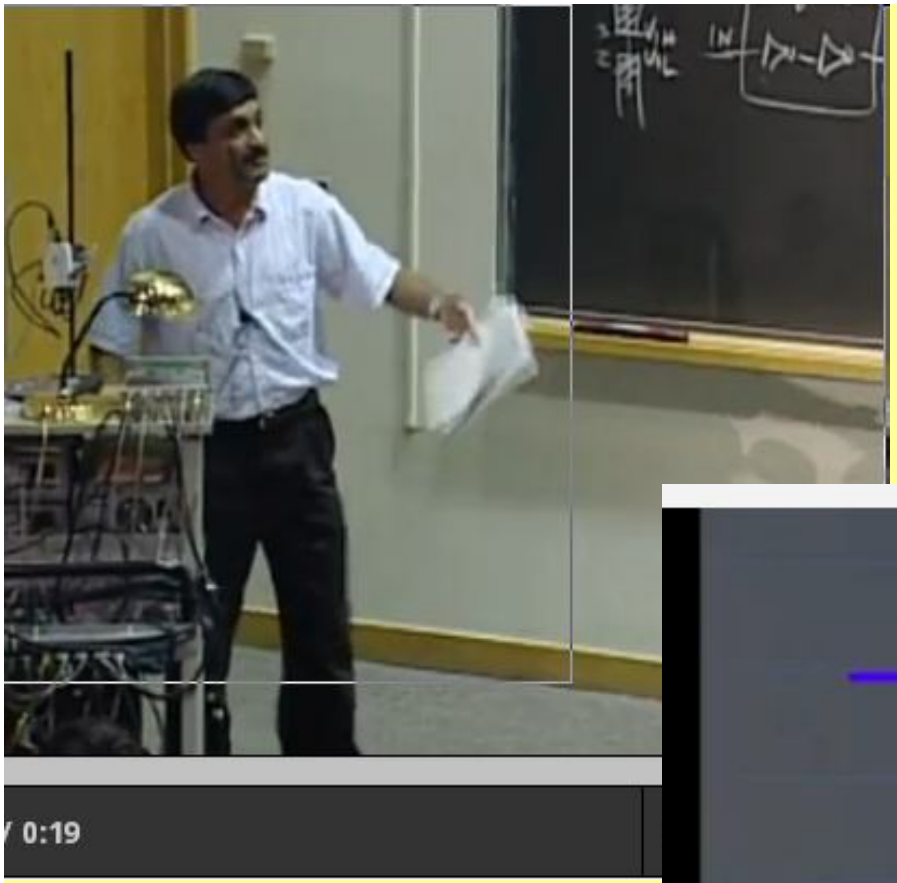
$$\cdots + V_A + v_a + \cdots + V_{OUT} + v_{out} + \cdots + V_B + v_b + \cdots = 0$$

- Operating point variables themselves satisfy the same KVL, KCL equations

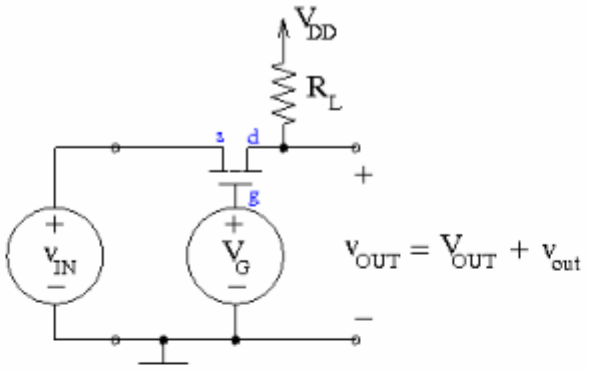


2

Лекційні демонстрації



Вбудовані інструменти аналізу електричних схем!



The MOSFET's parameters are: $V_T = 1.1$V and $K = 0.009$A/V^2. The resistance o
$R_L = 220.0\Omega$

If in the application of this circuit the input voltage v_{IN} may swing between 1.0V
the minimum value of the bias voltage V_G, in Volts, needed to keep the MOSFET

2.1 ✔

Assume $V_G = 4.0$V, and the input swing is as specified.
What is the minimum value of the power-supply voltage V_{DD}, in Volts, needed to
saturation?

2.9 ✖

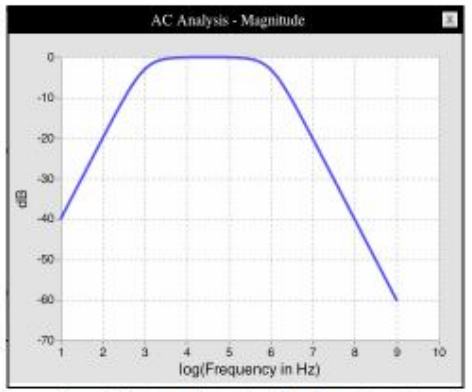
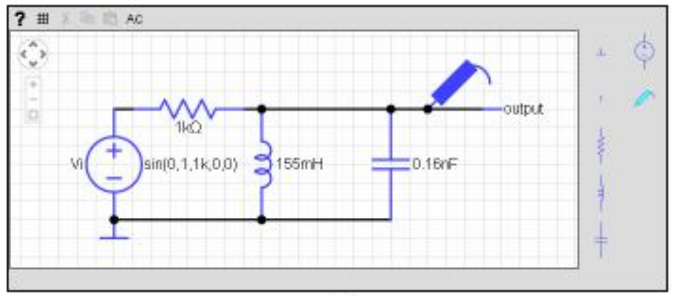


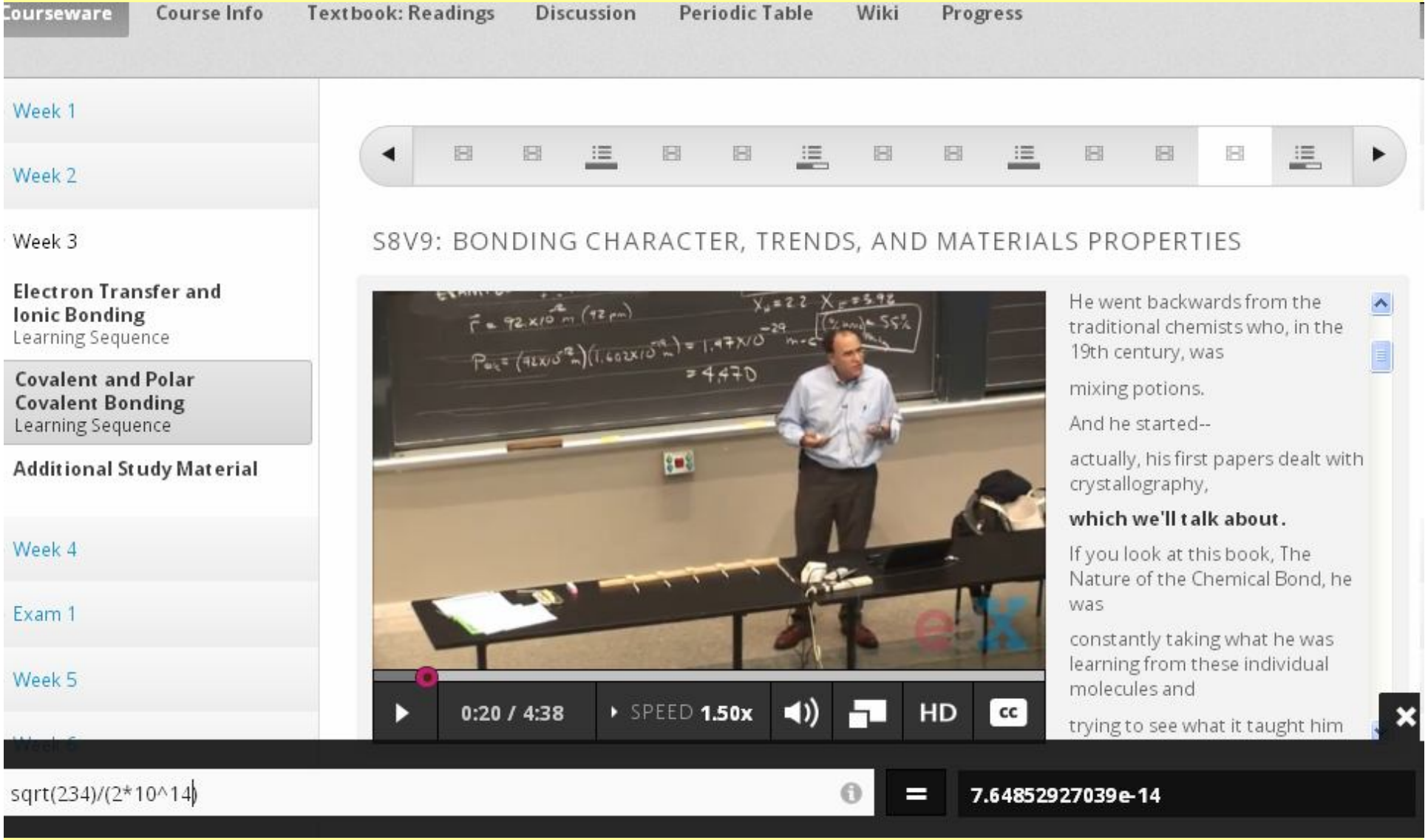
Figure 3. AC analysis of a band-pass filter (magnitude plot)

Hint: Cascade a low-pass and high-pass filter – their effects are cumulative. We've just finished analyzing one of each above! Complete the circuit below, adding the appropriate circuitry between the voltage source and V_o, the node labeled "output" in the schematic.

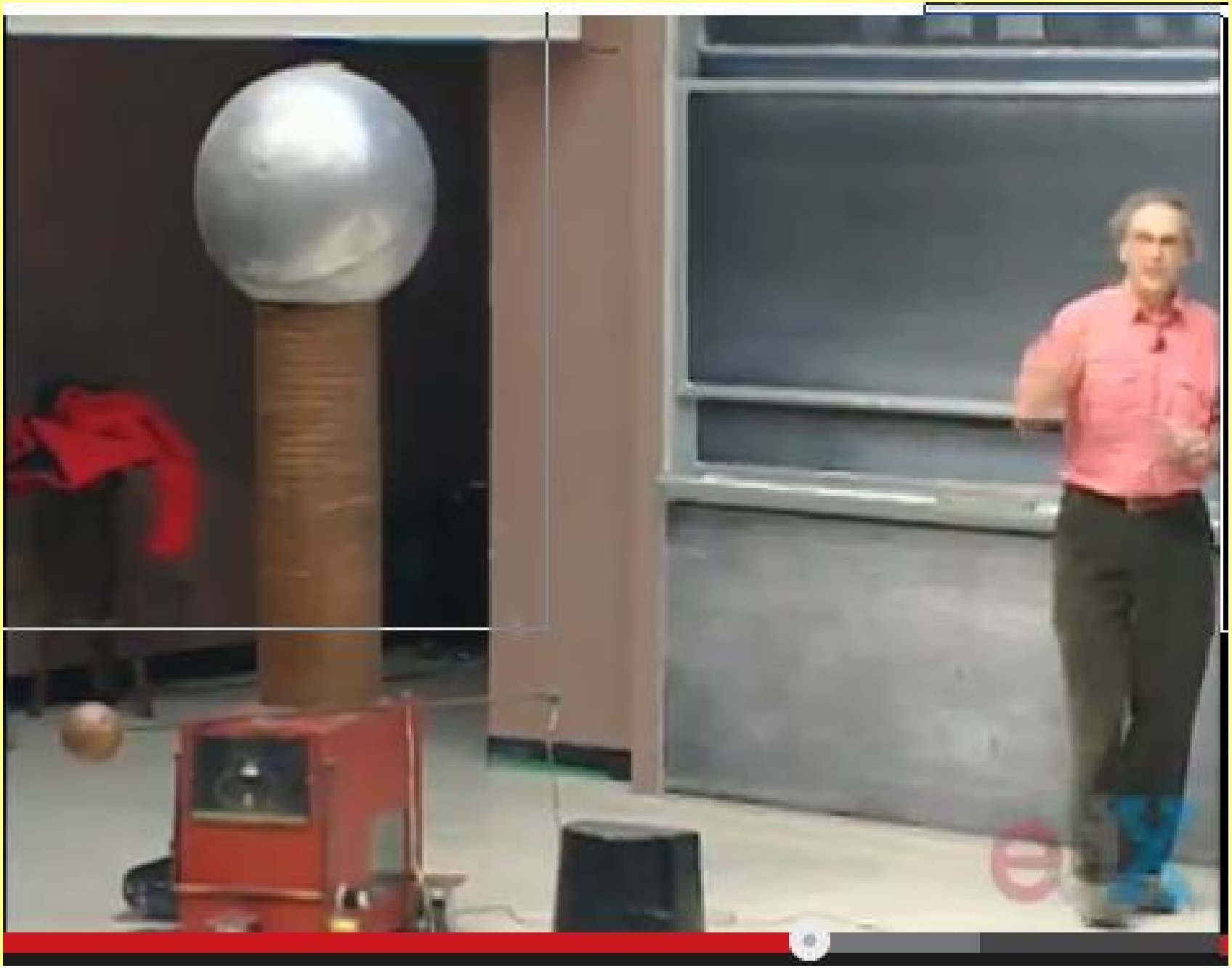


✔

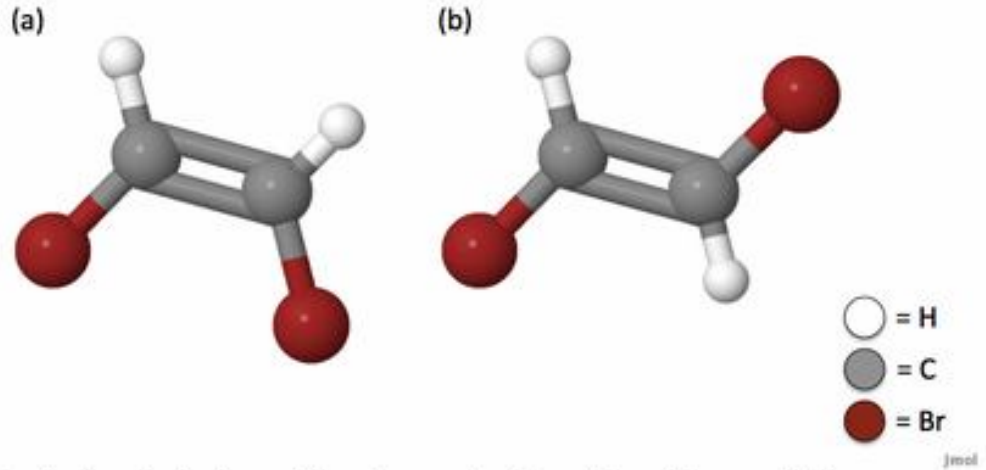
Ефект присутності в аудиторії



НЕ НАМАГАЙТЕСЯ ПОВТОРИТИ В АУДИТОРІЇ!



S8E4: POLAR MOLECULES



Consider the molecules shown, which are known as *cis*- and *trans*-dibromoethene, respectively.

(a) Which is the correct order of bond dipole moment, from weakest to strongest:

- H-C, C-C, C-Br
- C-Br, H-C, C-C
- C-C, H-C, C-Br
- C-C, C-Br, H-C ✖

(b) Which forms of dibromoethene are polar molecules?

✔
- ☑ *cis*
- ☐ *trans*

Check | Show Answer

S8E4: DETERMINING PERCENT IONIC CHARACTER

Calculate the percent ionic character of the $\mathrm{Al\text{-}F}$ bond. Recall that the $\mathrm{Al\text{-}F}$ bond is a polar covalent bond.

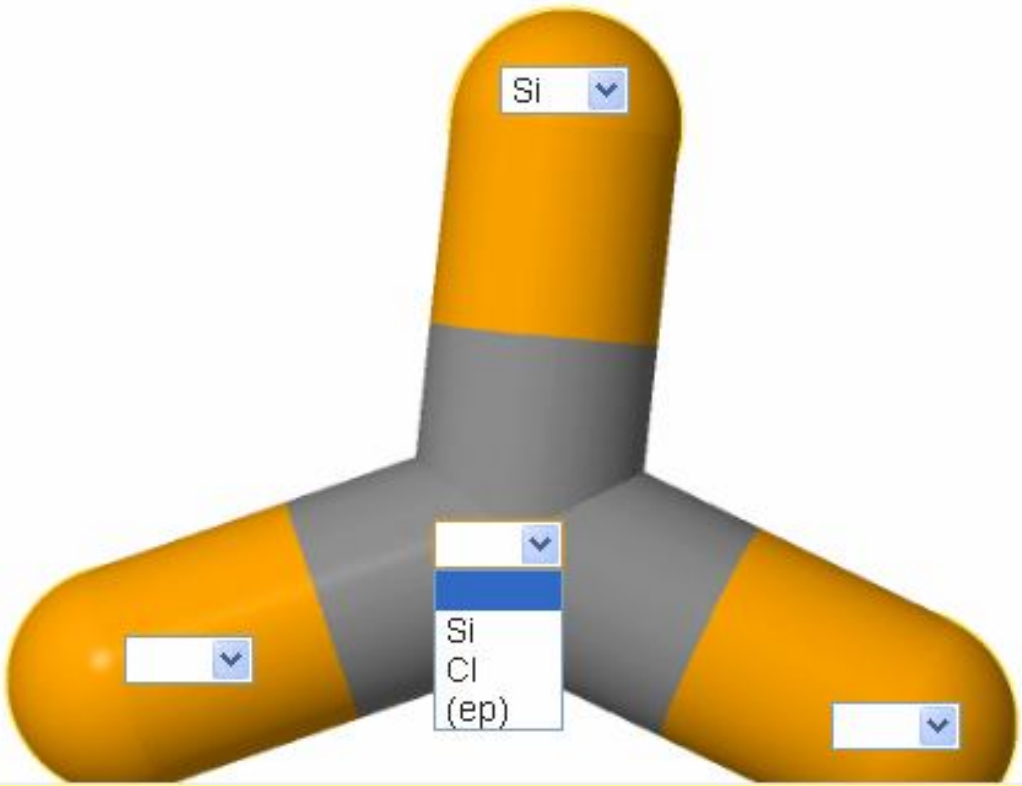
4 ✖

Конструктор молекул

S10E3: SILICON TETRACHLORIDE

Silicon (Si) reacts with chlorine (Cl), forming the compound $\mathrm{SiCl_4}$.

(a) Construct the structure of $\mathrm{SiCl_4}$.



Linear
Trigonal Planar
Tetrahedral
Trigonal Bipyramidal
Octahedral

Модульний контроль

ELECTRIC FIELD ON THE SURFACE OF A CONDUCTOR : 7.0 POINTS

Note that you get 2 attempts for this problem. Everytime you click "Check" you use one attempt, so plan wisely. We encourage you to use the "Save" button if you need to save your answers and submit them later after you have answered all parts, or checked all answers.

The electric field at point A on the surface of a conductor is 32×10^3 V/m. What is the surface charge density (C/m^2) at that point?

0.5664*10^(-6) ✗

You have used 2 of 2 submissions

(e) What is the total charge residing on the upper plate of capacitor C_2 (in Coulombs)? Make sure you have the correct sign.

14.1*10^(-6) ✓

(f) What now is the magnitude of the electric field between the plates of capacitor C_1 (in V/m)?

147.06 ✓

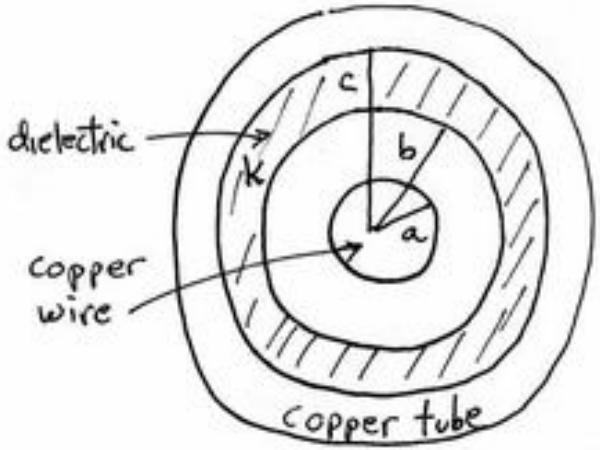
(g) What now is the magnitude of the electric field between the plates of capacitor C_2 (in V/m)?

36.765 ✗

Final Check | Save *You have used 4 of 5 submissions*

COAXIAL CABLE WITH DIELECTRIC : 14.0 POINTS

A certain coaxial cable consists of a copper wire, radius a, surrounded by a concentric copper tube of inner radius c. The space between is partially filled (from b out to c) with material of dielectric constant K. The goal of this problem is to find the capacitance per unit length of this cable. You may neglect edge effects.



Note that for technical reasons, we use the symbol l for charge per unit length, rather than the more typical λ. Do not get confused, l is not a length!

(a) Assume that the copper wire has uniform positive charge per unit length l and the copper tube has uniform negative charge per unit length on it's inner surface $-l$. Calculate the radial component of the electric field in the region $0 < r < a$. Express your answer in terms of a, b, c, K, l, r, and ϵ_0 (enter epsilon_0 for ϵ_0, pi for π and ln(x) for natural logarithm of x).

0 ✔

0

-l/(2*pi*epsilon_0)*ln(b/a) ✔

$$-\frac{l}{2\cdot\pi\cdot\varepsilon_0}\cdot\ln\left(\frac{b}{a}\right)$$

Calculate the radial component of the electric field in the region $a < r < b$. Express your answer in terms of a, b, c, K, l, r, and ϵ_0 (enter epsilon_0 for ϵ_0, pi for π and ln(x) for natural logarithm of x).

l/(2*pi*epsilon_0*r) ✔

$$\frac{l}{2\cdot\pi\cdot\varepsilon_0\cdot r}$$

Перевірка аналітичних формул!

Lecture 8: Polarization and Dielectrics
Lecture

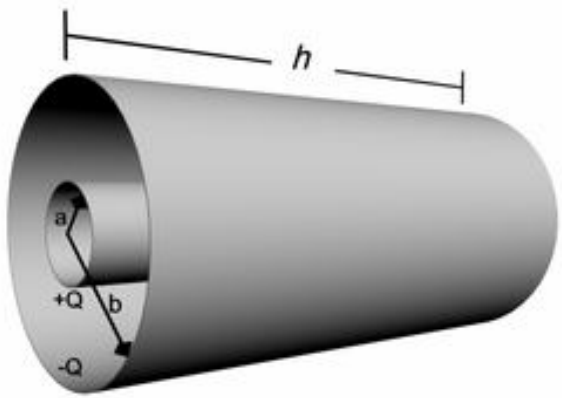
Lecture 9: Current, Resistivity and Ohm's Law
Lecture

Problem Solving
Problem Solving

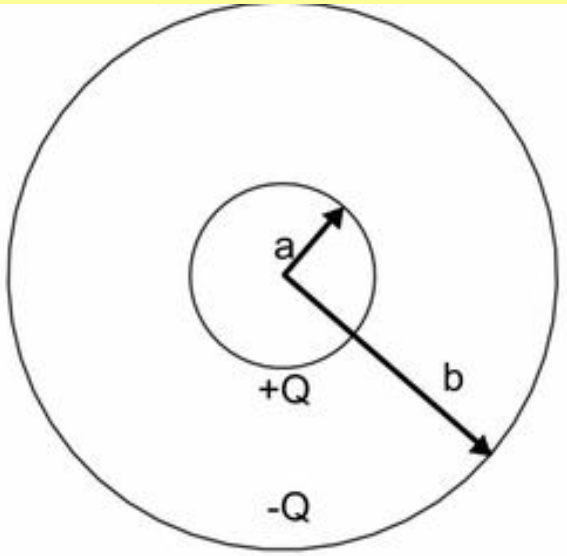
HW3
Homework due March 15, 2013

Charge by Induction Simulation
TEALsim due March 15, 2013

- Week 4
- Midterm 1
- Week 5
- Week 6
- Visualization
- TEALsim



(a) Fig. 1



(b) Fig. 2

(a) What is the capacitance per unit length? Express your answer in terms of a, b and ϵ_0 (enter epsilon_0 for ϵ_0).

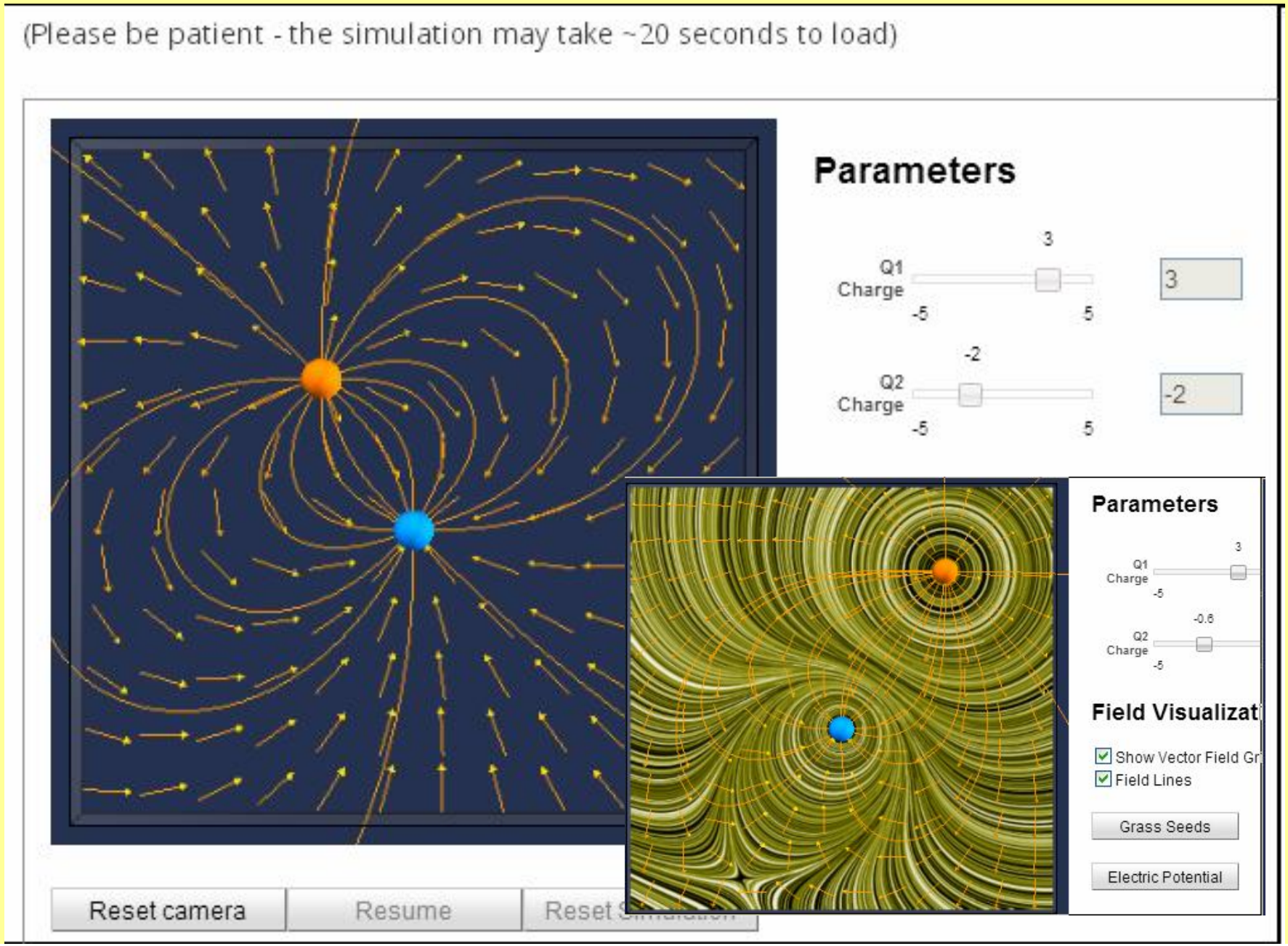
2*pi*epsilon_0/ln(b/a) ✔

$$2 \cdot \pi \cdot \frac{\varepsilon_0}{\ln\left(\frac{b}{a}\right)}$$

2*pi*epsilon_0/ln(b/a)

$$2 \cdot \pi \cdot \frac{\varepsilon_0}{\ln\left(\frac{b}{a}\right)}$$

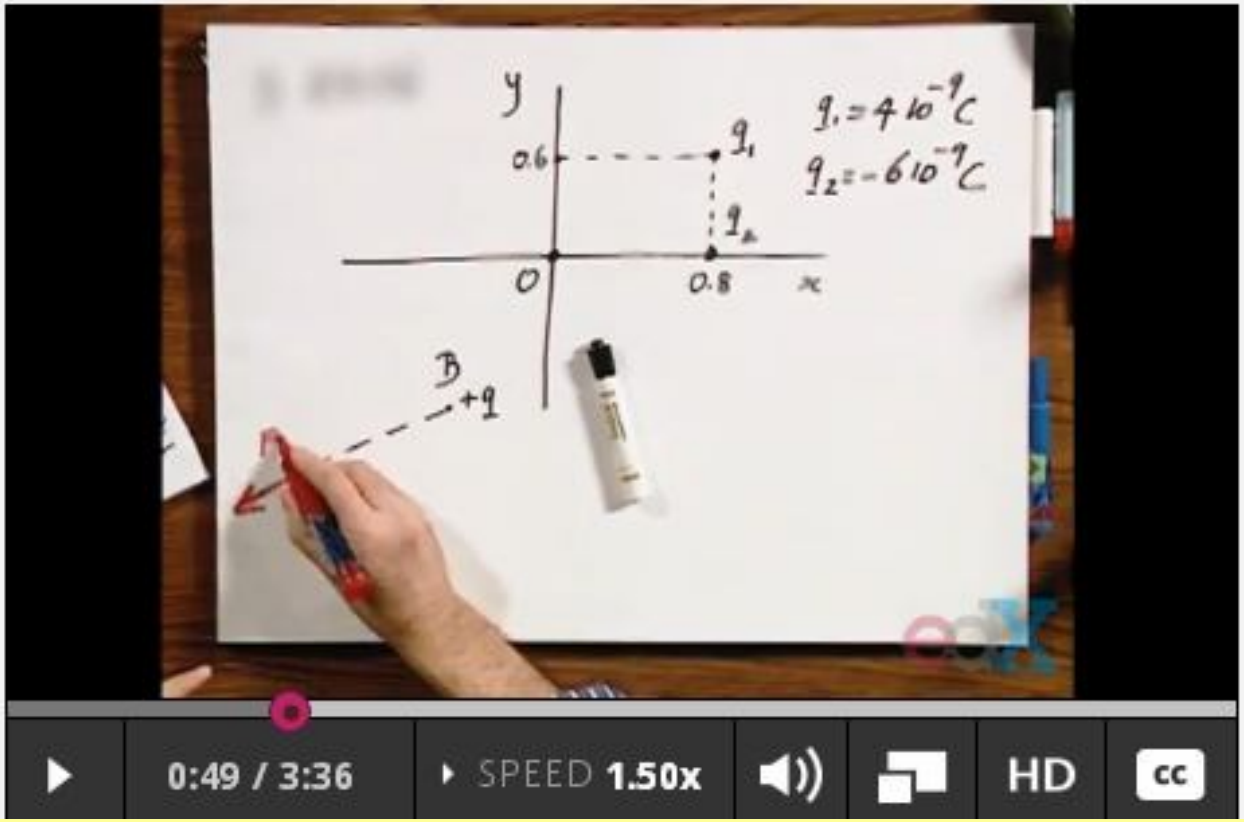
Вбудовані візуалізації!



Консультація: повторюй, скільки треба

We have two point charges, one positively charged ($q_1 = 4 \times 10^{-9}$ C located at $x = 0.8$ m and $y = 0.6$ m) and one negatively charged ($q_2 = -6 \times 10^{-9}$ C located at $x = 0.8$ m and $y = 0.0$ m). Find the electric field (magnitude and direction) at the origin due to these two charges.

HELP SESSION



here at point B, then the electric field is defined radially outwards

from B pointing in the direction of A because this is a positive charge.

If this were a negative charge, it would be reversed.

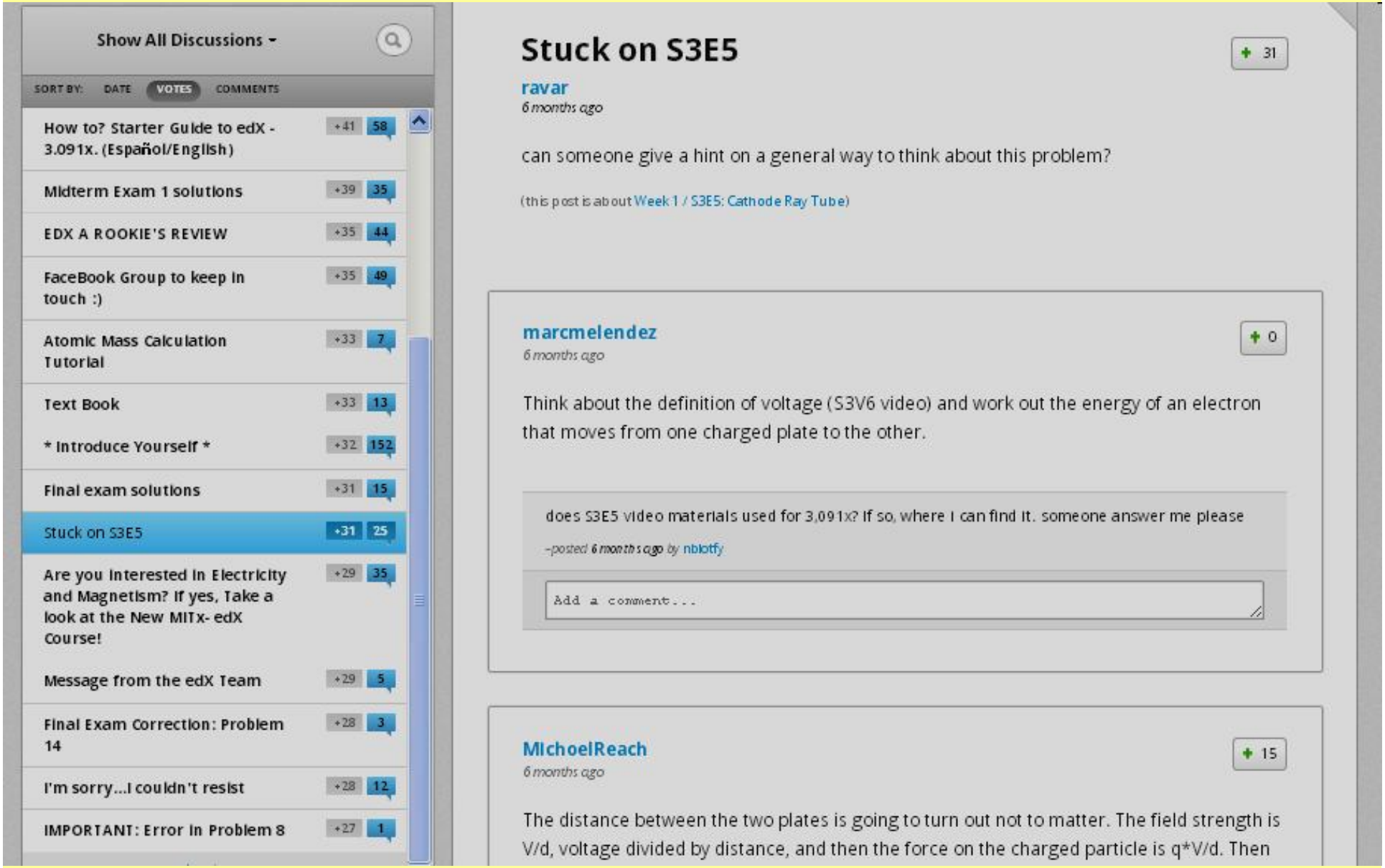
It would be pointing in the direction of B, so I call it E of A. And if the

separation between them is r, then E of A--

if I take the magnitude of it now--

is the charge at location q divided by 4 pi epsilon 0 r squared.

Форум, в якому хочуть і можуть допомогти



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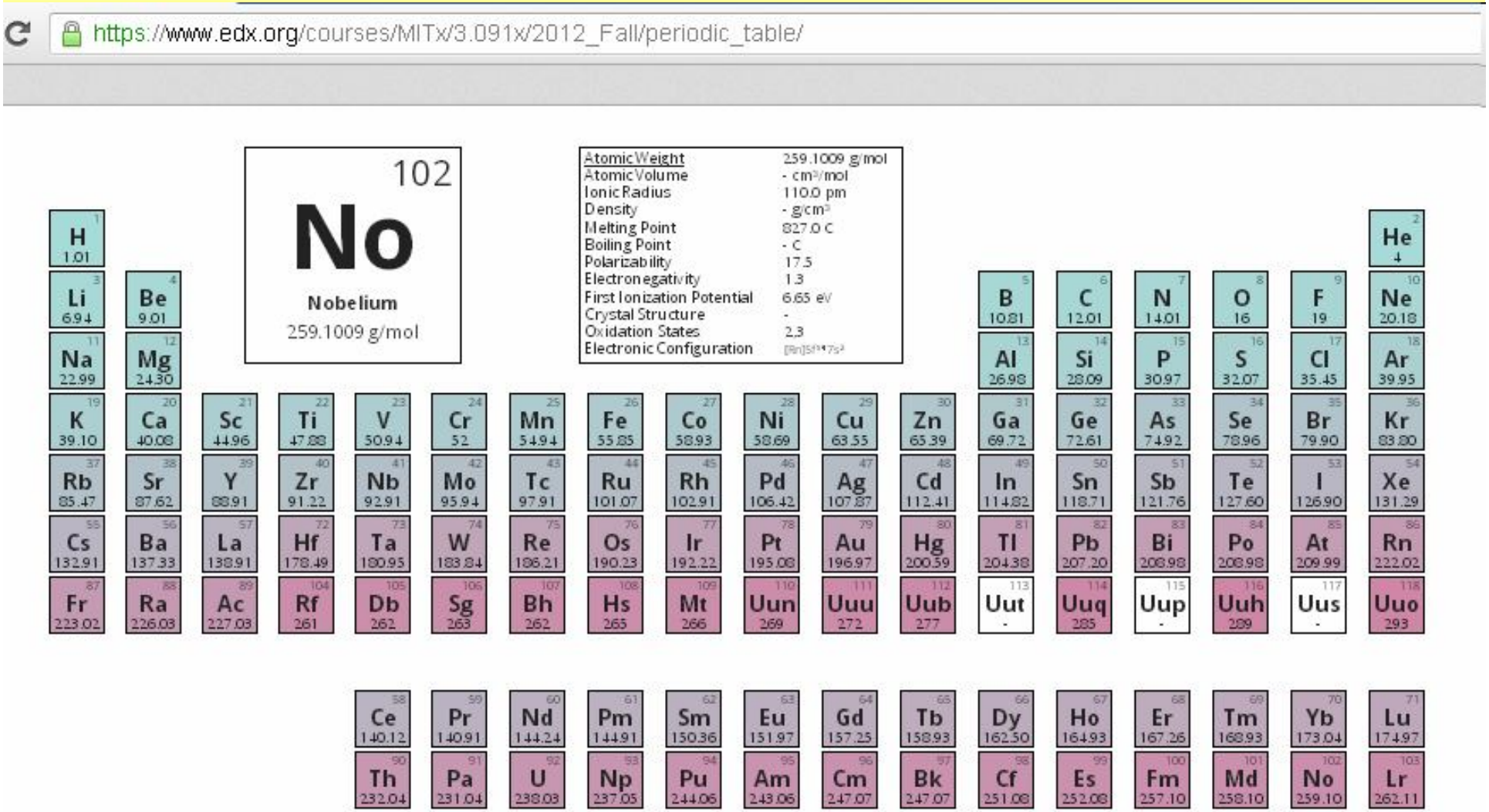


Підручники у відкритому доступі!

k = the Boltzmann constant
A = proportionality constant

B. Point Defects in "Pure" Metallic Systems

Point defects in "pure" crystalline metals are defects of atomic dimensions, such as impurity atoms, the absence of a matrix atom and/or the presence of a matrix atom in the wrong place. Some of these point defects are shown in fig. 2. An impurity atom that occupies a normal lattice site is called a *substitutional impurity atom* and an impurity atom found in the interstice between matrix atoms is called an *interstitial impurity atom*. Whether a foreign atom will occupy a substitutional or interstitial site depends largely on the size of the atom relative to the size of the site. Small atoms are usually interstitial impurities, while larger atoms are usually

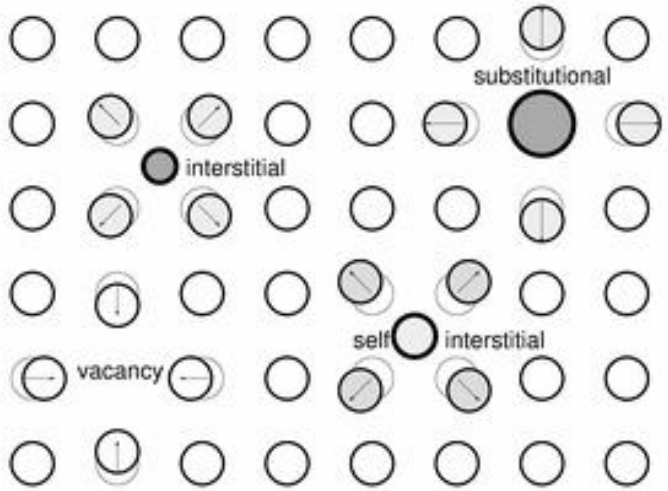
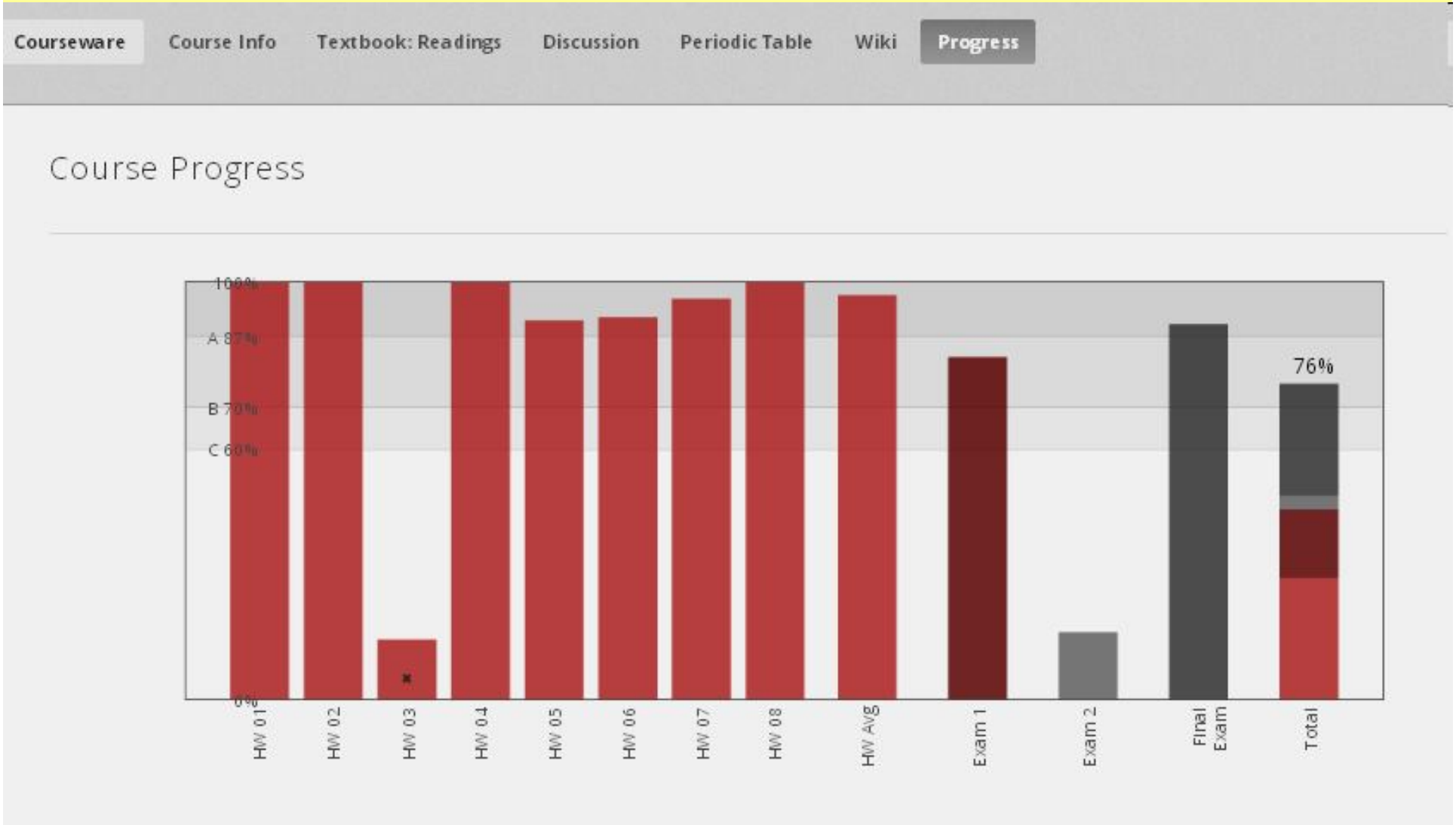


Figure 2 Point defects in crystalline solids

Можливість контролювати і прогнозувати свої досягнення



... Інші приємні дрібниці ... ☺

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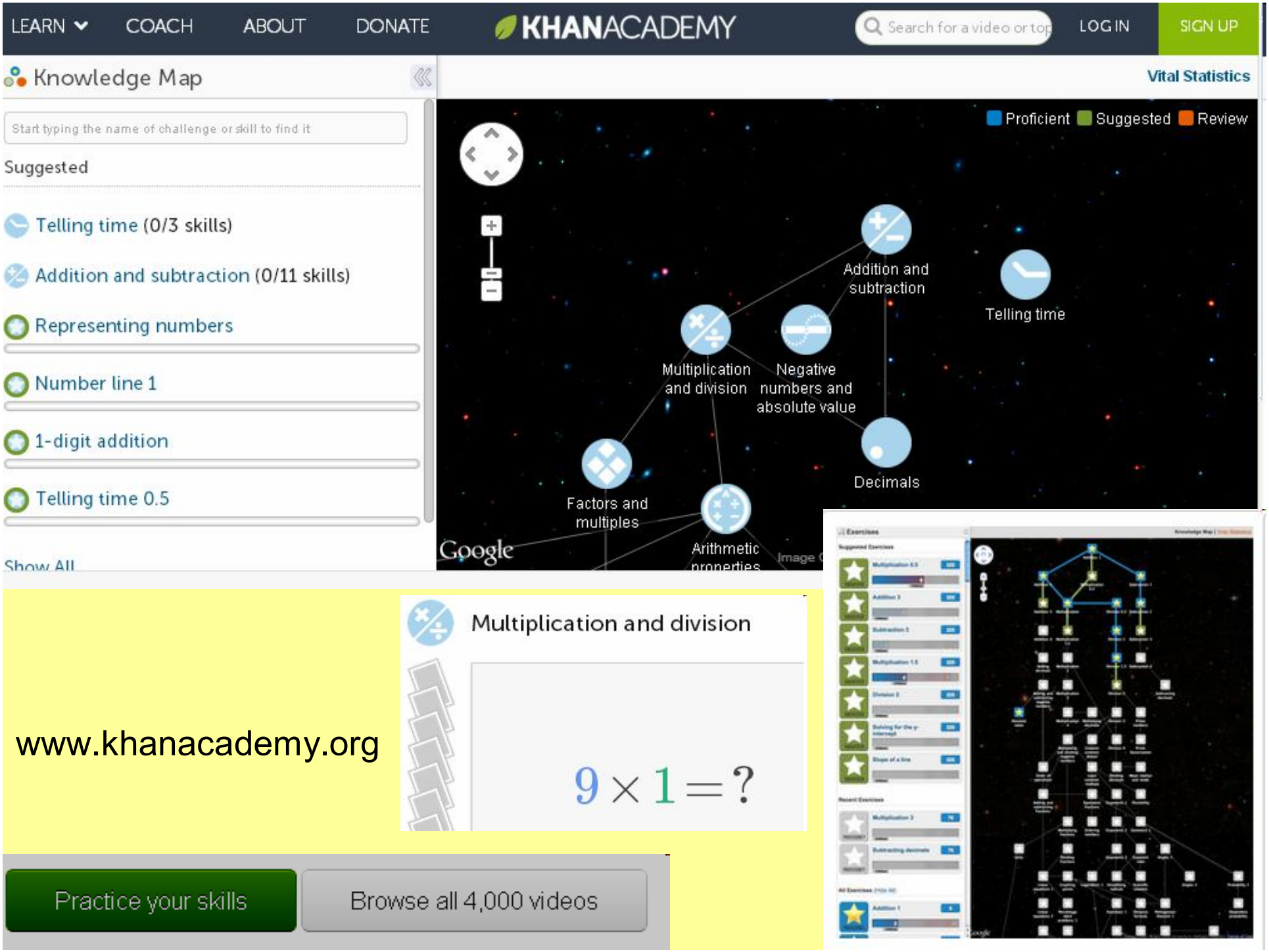
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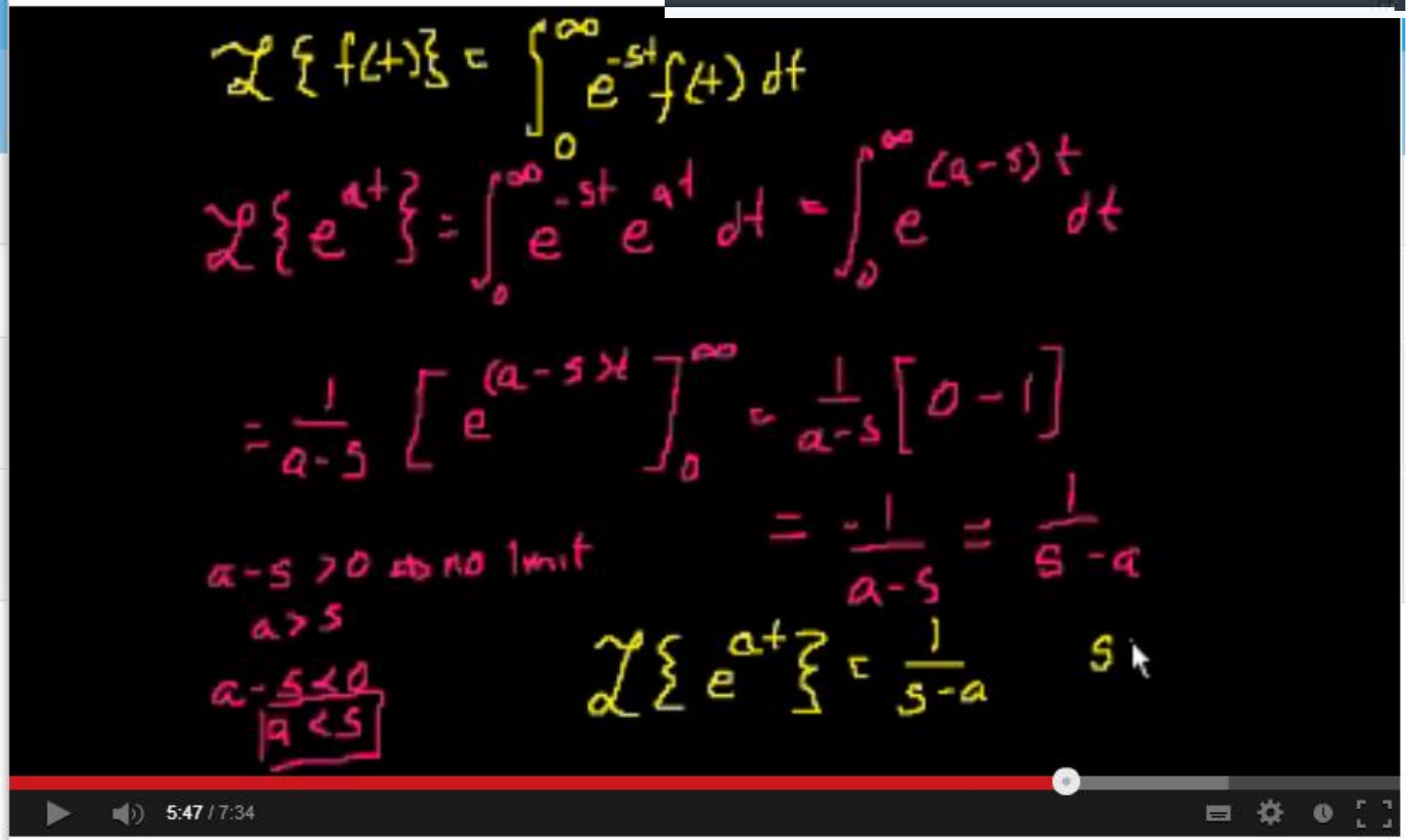
- Laplace Transform 2
- L{sin(at)} - transform of sin(at)
- Part 2 of the transform of the sin(at)



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Community Questions

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Sal works through every problem in the first edition of the College Board "Official SAT Study Guide" (ISBN Number: 0-87447-718-2 published in 2004). You should take the practice tests on your own, grade them and then use these videos to understand the problems you didn't get or to review. Have fun! If you're using the second edition of the study guide with 10 practice tests, you can still use some of these videos. Practice tests 4-10 in the newer book correspond to tests 2-8 below.

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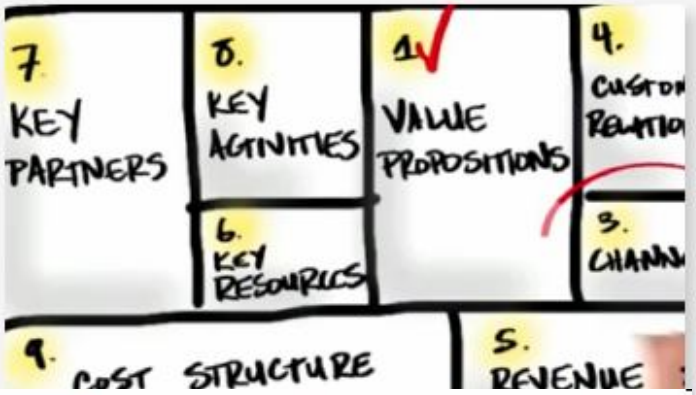

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NATURE | NEWS FEATURE

Online learning: Campus 2.0

Massive open online courses are transforming higher education — and providing fodder for scientific research.

M. Mitchell Waldrop

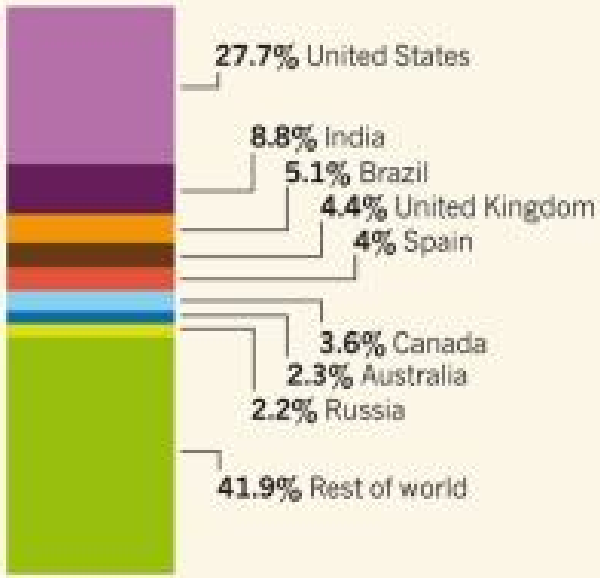
13 March 2013 | Corrected: 20 March 2013

MOOCs rising

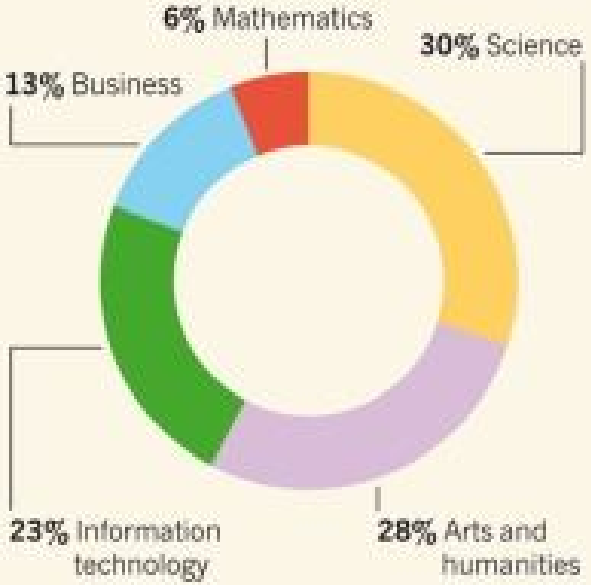
Over little more than a year, Coursera in Mountain View, California — the largest of three companies developing and hosting massive open online courses (MOOCs) — has introduced 328 different courses from 62 universities in 17 countries (left). The platform's 2.9 million registered users come from more than 220 countries (centre). And courses span subjects as diverse as pre-calculus, equine nutrition and introductory jazz improvisation (right).

Supply and demand

Student origins



Courses offered



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