Announcements...

FIT100

• If you were not in class Monday, find lecture slides on Web and **read 'em**

www.cs.washington.edu/100/ > Lectures > Lecture 1

Tip of the Day: Experience shows it's difficult to catch up if you fall behind in FIT100, so please keep up!

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Terms of Endearment

Using the right word speeds learning and helps getting help

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Le Mot Juste

mot juste /mō zu:st/ (Fr.) most appropriate word, expression

Learning *le mot juste*, the right word for something, aids us in two ways:

* Help Learning ... our brains seem to anchor concepts to words & phrases
* Getting Help ... asking "tech support" for help or using online **HELP** requires we describe the problem precisely

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Terms

Probably familiar terms ...

* screen saver
* monitor
* pixel
* RGB
* motherboard
* [micro]processor
* [RAM]memory

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Terms

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* screen saver
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mnemonic -- memory aid, like P.I.L.P.O.F for plug in last, pull out first

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Software/Hardware

Hardware refers to physical devices; software refers to programs, the instructions directing a computer

* The main difference is: hardware cannot be changed, while the software can be modified
* Firmware is the intermediate case -- instructions stored in hardware (ROM)

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Terms

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Definitions for "tangible" parts of IT -- RGB, pixel,... -- are found in glossaries
- A glossary is in the back of *FIT*
- Online glossaries are handy … locate one
- A useful study aid is to start a document where you store the definitions of the new words you encounter -- later in the term we will show how to set up a DB for them

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Terms

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… the "intangible" words of IT are even more important

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To Abstract

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abstract v. extract or remove

"The thief abstracted the jewels"

* In FIT100 abstracting will usually involve removing the core idea or process from a specific situation
* Humans abstract core ideas, principles, rules, themes, etc. naturally -- fables
  - The "thing removed" is an *abstraction*

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Imagine a Story ...

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"In Kim's chem class the professor assigned challenge problems worth extra credit, but each week Kim couldn't do them and asked for help. The teacher said, 'Don't give up, attempt the problem again each day.' Kim followed the advice and was able to solve the problems."

Abstracting from the situation: A good problem-solving technique is to return to problem.
- Some aspects are relevant
- Some aspects are irrelevant

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To Generalize

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generalize *v.* infer a rule

* suppose you notice that faucets turn to the left to turn the water on, and to the right to turn it off
* to infer that all faucets do so is to generalize

Are there other examples?

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To Generalize

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Are there other examples?
* Other knobs, screws, nuts/bolts, ...

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Operationally Attuned

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Noticing how devices operate simplifies
their use

Observation: Computers give feedback
when they are working for a long time

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Operationally Attuned

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Noticing how devices operate simplifies
their use

Observation: Computers give feedback
when they are working for a long time

So, if you think you're waiting for the computer
but there is no feedback, it's waiting for you

One of the most effective habits new users
can adopt is to be operationally attuned.

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The Speed of Change

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Consider running a mile ...

* How fast can anyone run a mile?
  * In 1999 Hakim El Guerrouj ran it in 3:43.13
* Compare with Roger Bannister
  * In 1954 Bannister ran a mile in 3.59.4
* Express speed
  as a rate: Bannister's rate = 15.04 mph
  El Guerrouj's rate = 16.27 mph
* In 45 years the mile run got 7% faster

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A Speed Comparison

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* Compared to normal people ...
  * How fast can you run a mile?
    * Healthy people in their twenties ... ~7:30
  * That is, El Guerrouj is twice as fast as us
  * As a rate, 7:30 is 8 mph
* El Guerrouj is about a factor-of-2
  faster than normal people ...

A factor-of-2 is a good rule for human strength

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Factors Of Flight

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Flyer 1 flew at 10 mph

SR-71 Blackbird flies at 2200 mph

* That's a factor-of-220 improvement

* A factor of improvement is the amount
  the old value must be multiplied by to
  find the new value
  Flyer1_rate x 220 = *Blackbird_rate*

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One More Factor

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How fast do computers run? Measure +

* Univac I ran 100,000 adds/sec in 1954

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One More Factor

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How fast do computers run? Measure +
- Univac I ran 100,000 adds/sec in 1954
- My IBM runs about 500,000,000 adds
  - A factor-of-5,000 improvement

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One More Factor

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One More Factor

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Can we comprehend such speeds or such factors of improvement???

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If running were like adding

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Suppose El Guerrouj had improved on Bannister like ASCI Red improved on the Univac I …
- Human perception is so slow El Guerrouj could have run 3000 miles before anyone notice that he'd moved
- The sound would still be "inside" the starting gun
- Light is only faster by a factor-of-two

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Factors Precisely

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A factor of improvement is different than a percent improvement …
- factor = new_rate/old_rate
- percent = 100 x (new_rate-old_rate)/old_rate
- Expressing an improvement by it's factor is simpler, especially for large changes
  - El Guerrouj's 7% improvement over Bannister is a 1.07 factor of improvement

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Analytical Approach

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One reason to notice the factors of improvement is to recognize scale
- The time for the mile run has improved
- Maximum adds per second has improved

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Analytical Approach

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improvement is to recognize scale
- The time for the mile run has improved
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* But the difference in scale is dramatic
  - A factor-of-1.07 for the mile run
  - A factor-of-21,000,000 for additions

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Analytical Approach

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Getting information is easy with IT, but we
need analysis to understand the significance

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Summarizing

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It is essential to learn the vocabulary
of a new field
* Words of tangible aspects of IT have
  definitions in glossaries
* Words for the intangible are key
  - Abstract
  - Generalize
  - Operationally Attuned
* Being analytical is key to understanding

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