Terms of Endearment

FIT 100, Spring 2006

Fluency in Information Technology

http://www.cs.washington.edu/education/courses/100/06sp/

Readings and References

- Reading
  - Fluency with Information Technology
    - » Chapter 1, Terms of Endearment

Le Mot Juste

- Learning *le mot juste*, the right word for something, aids us in two ways:
  - Helps our learning … our brains like to connect concepts to words and phrases
  - Helps us to communicate with others … asking "tech support" for help or using online HELP requires us to describe the problem precisely

Not Another Term?!?

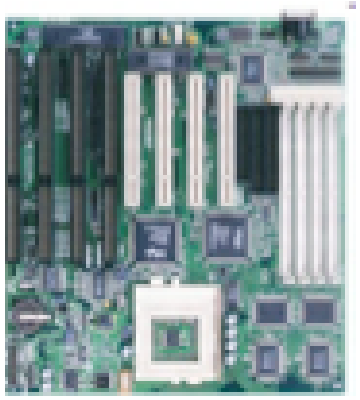
- Blog (from weblog)
  - Online journal
- Geocaching
  - GPS scavenger hunt type of game
- Pod-casting
  - Program broadcasting from your iPod

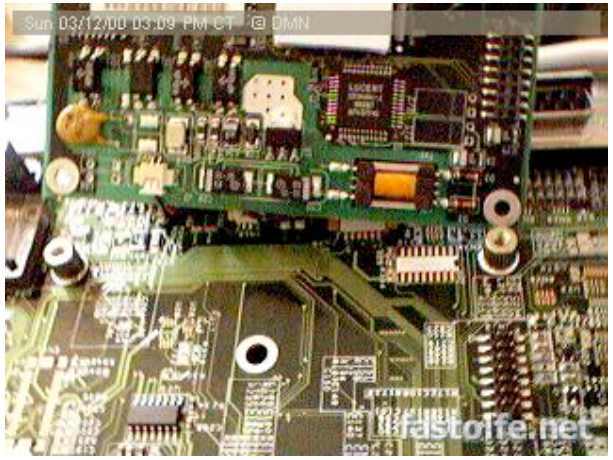
Computer Terms

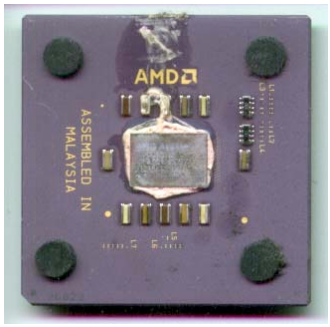
- Possibly familiar terms….
  - monitor
  - screen saver
  - CRT vs LCD vs plasma
  - pixel (1024 X 768)
  - RGB

Computer Terms con'd

- motherboard
- daughterboards / cards
  - » Video card
  - » Modem
- CPU (central processing unit)
- [micro] processor







Computer Memory

- Types of memory
  - » ROM (read-only memory)
  - » RAM (random access memory)
  - » hard disk / hard drive
- sequential access vs. random access
- persistent vs. volatile

Hardware/Software

- Hardware refers to the physical devices
- Software refers to the programs
  - The *instructions* for directing a computer
- The main difference is that hardware cannot be changed, while software can be modified
  - The same computer hardware often runs many different software applications
  - The same software application can often run on several different (but similar) computers

Encountering New Terms

- Definitions for information technology terms like byte, pixel, etc.. Are found in glossaries
  - There is a glossary in the back of the text book
  - Online glossaries are also handy …
  - A useful study aid is to start your own glossary, write down the definitions of the new words that you encounter
  - Use Google with define: <term>
  - Use Wikipedia: http://en.wikipedia.org

Invisible Terms

- Understanding the “tangible” parts of IT is important
  - system board, CPU, memory, disk, etc…
- Understanding the “intangible” parts of IT is important too!
  - algorithm, abstraction, generalization, interface, user model (eg. deadbolt example in the book)

An Algorithm

- algorithm = is a precise and system method for solving a problem
  - Writing out the steps of an algorithm is *programming*
    - » We write instructions to build a *program*
    - » We ask a computer to *run* a program
    - » A computer *executes* a program when it performs instructions

To Abstract

- abstract = to extract or remove something
  - In FIT100 abstracting will usually involve removing the core idea or process from a specific situation (eg. A fable with a moral)
    - » The “thing removed” is an abstraction
    - » What do we take away?
  - Humans abstract core ideas, principles, rules, themes, etc… naturally

Imagine A Story…

- The fable of the boy who cried wolf…
  - Shepherd boy was tending his flock of sheep
  - He was lonely, so decided to cry out to the villagers, “wolf, wolf”
  - The villagers came running to his aid, and were very disappointed when they discovered no wolf!
  - Then one day a wolf did actually come and when the boy called out to the villagers, no one came
    - » Moral: no one believes a liar, even one who speaks the truth

To Generalize

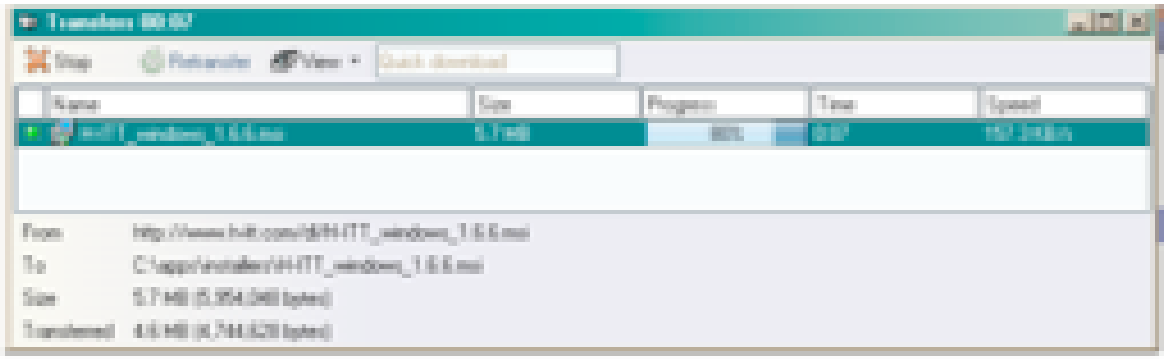
- generalize = infer a rule that applies in many situations
  - Suppose you notice that a faucet works like this:
    - » Turn counter-clockwise (left) to turn the water on
    - » Turn clockwise (right) to turn the water off
  - To infer that all faucets work the same way is to generalize

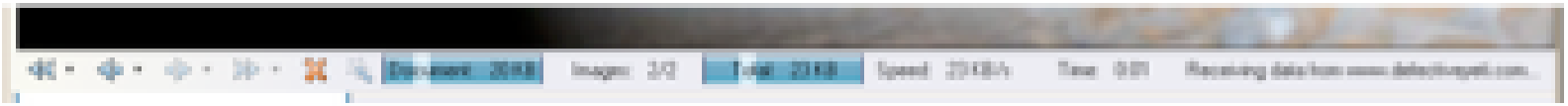
To Generalize con'd

- Can we generalize further?
  - Twisting lids, caps and screws counter-clockwise usually opens or loosens them
  - Volume knobs usually work the other way
- Can we create an abstraction from this?
  - A twisting motion is often used as an "on or an off", more or less, a control gesture, but the correct direction is not always obvious unless there are other clues

Operationally Attuned

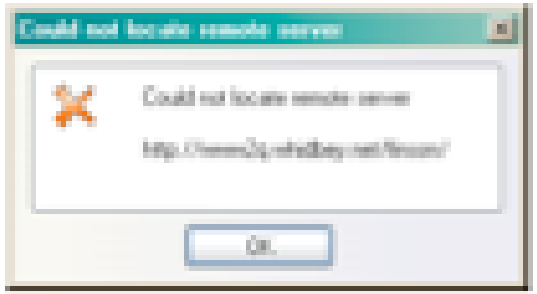
- Noticing how devices operate simplifies their use
  - Observation: computer programs often give feedback when they are working





Operationally Attuned con'd

- Noticing how devices operate simplifies their use
  - Observation: computer programs often give feedback when they are not working
  - So, if you think you're waiting for the computer but there is no indication that its working, its probably waiting for you!
- Look around the screen
  - Is there an input dialog box?
  - Is there an error message that you need to ok?



Analytical Thinking

- Allows us to talk about changes in a meaningful way
  - By giving facts as a measure of performance
- We can compare changes to other changes

The Speed of Change

- Consider running a mile …
  - How fast can anyone run a mile?
    - » In 1999 Hicham El Guerrouj ran it in 3.43.13
    - » A rate of 16.134 mph
  - Compare that with Roger Bannister
    - » In 1954 Bannister ran a mile in 3.59.4
    - » A rate of 15.038 mph
  - In 45 years the top runners got 7% faster

New rate - Old rate / Old rate = Percent improvement

16.134 - 15.038/15.038 = 0.07 = 7%

A Speed Comparison

- Compared to normal people…
  - How fast can you run the mile?
    - » El Guerrouj ran it in 3.43.13 (16.134mph)
    - » Health people in their 20s run in ~7.30 (8mph)
  - That is, El Geurrouj is twice as fast as you
- El Guerrouj is about a factor-of-2 X faster than normal people …

New rate / Old rate = Factor of improvement

16.134 / 15.038 = 1.07 X Bannister

16.134 / 8 = 2 X normal people

One More Factor

- How fast do computers run now?
  - Univac I ran 100,000 adds(+)/sec in 1954
  - BlueGene ran 138 teraFLOPS
    - » 138 trillion adds/sec in 2005

(new rate/ old rate = factor of improvement)

138 trillion / 100,000 = a factor of 1.38 billion times faster!

Summary

- We reviewed a lot of terms (and more terms!)
- Talked about where to learn more about new terms
- Discussed why its good to be operationally attuned
- Learned how to calculate factors, which we can use to compare changes