Outline for April 23, 2007

Question: Three weeks ago, a lady brought a black couch. When it was delivered, her child looked at the tag attached to the sofa, and saw the color was identified by a racial epithet. Investigation determined that the tag had been translated from the original Chinese by translation software that used an old dictionary. The software company apologized profusely and updated their software so that epithet would *never* be used again. What other problems in translation might arise, and what problems might they cause?

1. Greetings and felicitations!
   a. Lab 3 is due at 11:55 tonight
   b. Lab 4 is available; it is a Microsoft Powerpoint tutorial
2. Making multimedia sound
   a. Sound cards: ADC for input, DAC for output, a digital signal processor (DSP) compresses input from ADC, decompresses output from system and sends it to DAC
   b. Musical instrument digital interface (MIDI): use recorded samplleees of actual instruments to map to wave table
   c. FM synthesis: use algorithms to mimic sounds
3. How digital sound tricks your ear
   a. Dolby boosts highs in the range of normal tape hiss
   b. Dolby 5.1 combines right and left stereo, center, right and left surround, and low frequency effects into one bandwidth, adjusting amount of bandwidth for each channel dynamically
   c. Size of sound files reduced dramatically by eliminating changes in sequences of sounds below the "just noticeaby different" threshold; this varies with volume, frequency, rate of change
4. 3D audio
   a. How you locate source of sound: intensity, time differences of sounds in each ear; reverberation
   b. Sound engineers analyzed how shape of ear redirects, muffles sound coming in, then created rules stored in DSPs that recreate illusion of sound coming from specific directions and reflection off specific surroundings
5. Multimedia video
   a. Films, TV usually 30 frames per second; 5 frames per second is very jerky
   b. ADC (digital) output compressed, stored on disk
   c. .avi (audio/video interleave) files: record sound, pictures together rather than as separate tracks
   d. MPEG (motion pictures expert group) compresses by capturing changes from one frame to next
   e. MPEG-1: 1.5 Mbps video, stereo (about same quality as a VCR)
   f. MPEG-2: up to 30Mbps wih surround sound, enough for HDTV
   g. Video conferencing uses lossy compression that discards unnoticeable differences
6. TiVo and AppleTV
   a. TiVo is digital video recorder (DVR) that uses MPEG-2 to store data on hard drive; reads from TV signal
   b. AppleTVreads from computer/iPod and uses MPEG-4 to store data on hard drive; tansmits TV signal to TV