### **CSE 113 B**

August 31 – September 4, 2009

### **ANNOUNCEMENTS**

- If you have not picked up a syllabus, please do so
- Assignment #1 sign and return form on last page of syllabus – must be turned in by end of class Monday, September 14<sup>th</sup> to receive full credit.
- Note course website on syllabus UBlearns will only be used for posting grades (until October 9<sup>th</sup>), so please make sure to check the website for course schedule and other information (including these slides which will be linked from the course schedule page at the end of each week).



# WHAT DOES A COMPUTER UNDERSTAND?

O's and 1's (zeros and ones)



#### BITS AND BIT STRINGS

- The 0 or 1 is called a binary digit (bit).
- A sequence of bits is called a bit string.
- 0100101 is a bit string
  - What does it mean/represent?



#### INTERPRETING BIT PATTERNS

- Binary (non-negative numbers)
- Two's complement (positive or negative integers)
   IEEE 754 (approximate real numbers)
- ASCII/EBCDIC/Unicode





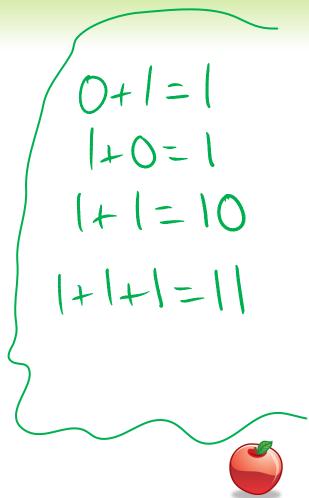


# CONVERSION FROM DECIMAL TO BINARY

$$|x|^{2} + |x|^{2} + |x|^{2}$$
 $|x|^{2} + |x|^{2} + |x|^{2}$ 
 $|x|^{4} + |x|^{2} + |x|^{4}$ 
 $|x|^{4} + |x|^{2}$ 
 $|x|^{4} + |x|^{2}$ 
 $|x|^{4} + |x|^{4}$ 
 $|x|^{4} + |x|^{4}$ 
 $|x|^{4} + |x|^{4}$ 
 $|x|^{4} + |x|^{4}$ 



166 49 115



#### How do we decode this?



## QUESTION

Mow many distinct 8-bit wide bit strings are there?

256 different characters



# ENCODING MACHINE INSTRUCTIONS

- Use bits to encode those as well
- When we want the machine to follow those instructions:
  - Fetch
  - Decode
  - Execute



# ASSEMBLY LANGUAGE

- ADD r1 r2
- STOR r2 r1
- SUB r3 r1



## HIGH-LEVEL LANGUAGES

Step closer to natural language from machine language.



### **TOOLS**

- Editor-place to type our program's text
- © Compiler-translate program to a long the machine will understand
- Execution Environment





## OUR LANGUAGE: JAVA

Migh level programming language

Object-oriented

