Esc101
Fundamentals of Computing
Spring 2005

Lecture 03
02 Jan 2005, Monday

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http://www.iitk.ac.in/esc101/

Announcements

- **Happy 2005**
- Course text still in the process of being procured in the library
- Labs start today
  - TAs assigned
  - Section change required ==> Exchange, inform TA
- CC is organizing lectures (6:30-8pm, in L1)
  - Mon 3rd Jan H/w, S/w, N/w policies, Services
  - Tue 4th Jan Unix Commands
  - Wed 5th Jan Unix File System

Summary from Previous Lecture

- Objects have:
  - Properties (variables) and Behaviour (methods)
- Class definition:
  - Define variables and methods
  - Define constructor (special method) for init
- Java comments /* xyz */ or // xyz
- Methods can have:
  - Argument(s): zero, one, or more
  - Return value: one or none

Remember the Syntax...

- Use of “{ }” for class definition, and method definition
- Use of “( )” for method arguments
- Use of /* */ or // for comments
- Use of ';' after each variable definition, and each statement
- White-space (space, tab, newline) does not matter
- What happens on syntax error?

Binary Numbers

- Binary representation
  - Binary to decimal
  - Decimal to binary
  - Uniqueness of the representation
- Binary arithmetic
  - Example: addition
- Binary system is used by computers
- Bit: binary digit (0 or 1)

Pre-defined Types: Numbers

- int is a pre-defined type in Java
  - 32 bits are used
  - Range: -2^{31} to $2^{31}-1$
- Other integer types also available:
  - byte (8 bits), short (16 bits), long (64 bits)
- What about real numbers?
  - float (32 bits, IEEE 754)
  - double (64 bits, IEEE 754)

Pre-defined Types (continued)

- Character: char
  - Think of them as characters on the keyboard
  - Examples: 'a', 'b', '0', '{', '}', '@'
- Boolean: boolean
  - Can be true or false
- "Nothing": void
- What useful things can be done with char, boolean?
  - Later in the course

Identifiers and Keywords

- Identifier: name for a class, variable, or method
  - Can be “anything” consisting of [a-z], [A-Z], '_', [0-9]
    - Cannot begin with [0-9]
    - Cannot be a keyword
- Keyword: special identifiers
  - Examples: int, float, class, void, return
  - Google for a complete list
- This separation keeps Java syntax simple

Classes as Types

- Pre-defined types: int, float, boolean, etc.
- Class: programmer-defined type
  - Just like "int x", we can have "Counter c1"
  - That is, c1 is an object of type Counter
  - Not quite...
- c1 is a reference to an object of type Counter
  - Initialized to null: "nothing" (another keyword)
  - c1 = new Counter() will create a new Counter and assign it to c1

An Example: Point and Line

- Point consists of two pre-defined types
  - Note how Constructor has arguments
  - Note use of public keyword
- Line consists of two Points
  - Note how “new Point()” is called
  - Note how “origin.setX”, “origin.setY” are called
  - Note use of local variables

Summary and Next Class...

- Today:
  - Binary numbers
  - Pre-defined types
  - Identifiers and keywords
  - Classes as types, object references
- Next class:
  - More on Point/Line example
  - Local variables
  - Expressions