

# Esc101

# Fundamentals of Computing

# Spring 2005

Lecture 03  
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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