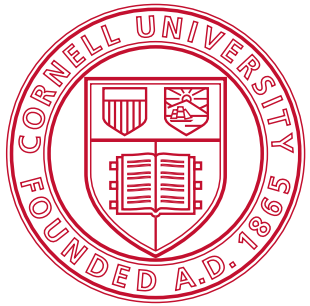
Lecture 01

Bits, Bytes, Codes, Variables

Erdal Yılmaz



Cornell University

June 24, 2012

Syllabus

- Staff
- Course Information
- Software
- Course Websites
- Lectures and Labs
- Office Hours
- Textbook
- Homeworks
- Quizes
- Final Exam
- Grading
- Academic Integrity
- Student with Disabilities

Instructor
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jp833@cornell.edu

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- Introduction to programming
- Learn a high-level programming language
- Programming concepts
- Problem solving

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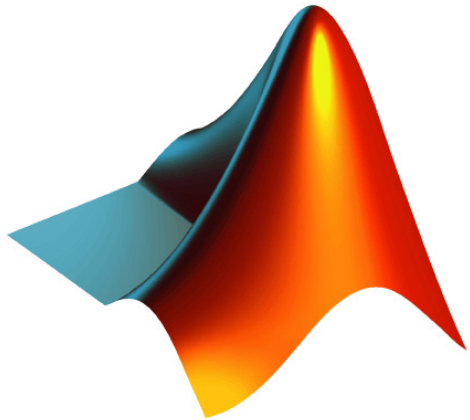
- MATLAB from MathWorks



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web http://www.cs.cornell.edu/courses/cs1109/2012su

shortcut http://www.cs1109.info

for homeworks http://cms.csuglab.cornell.edu

shortcut http://hw.cs1109.info

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Session: 001
Time: 10:00 AM - 11:05 AM
Lecture: 211 Upson Hall on MW
Lab: Upson B7 on TR

Session: 002
Time: 11:30 AM - 12:35 PM
Lecture: 215 Upson Hall on MW
Lab: Upson B7 on TR

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Where
- Upson B7

Erdal
- Sundays 1pm-2pm
- Fridays 10am-noon

Jyoti
- Wednesdays 2pm-3pm
- Sundays 2pm-4pm

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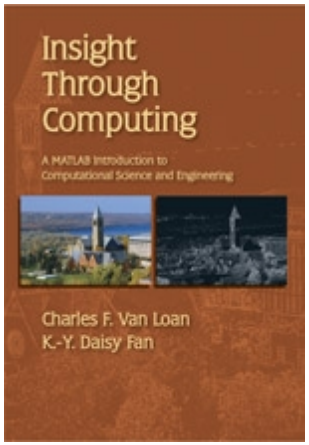

Title Insight Through Computing
A MATLAB Introduction to Computational Science and Engineering

Authors Charles F. Van Loan, K.-Y. Daisy Fan

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- Assigned on Wednesdays at 1pm
- Due on next Monday by 10am
- One or two multi-part questions
- Upload to CMS website

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- In-class quizes:
  - Short answers
  - Anytime, lecture or lab
- Online quizes:
  - Easy
  - Multiple choice
  - Assigned on Mondays at 1pm
  - Due on Wednesdays by 10am

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either one prelim and a group project

or just final exam

vote on CMS survey today

check your email after class!

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HW = Normalize homeworks to 100 ... and take average

QZ = Normalize quizes to 100 ... and take average

FL = Normalize prelim and project to 100 ... and take average

or Normalize Final Exam result to 100

Grade $= (\mathrm{FL} \times 0.3) + (\mathrm{HW} \times 0.5) + (\mathrm{QZ} \times 0.2)$

S/U $\mathrm{Grade} \geq 75$

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Read	Code of Academic Integrity
Submit	your own work
Acknowledge	any help received

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- Contact Student Disability Services: at 420 CCC, (607) 254 4545
- Send an email and talk to me

Bits, Bytes

- Bit (**Bi**nary Digi**t**) $\in \{0, 1\}$
- Byte $\equiv$ 8 bits (e.g. 01000001)
- KB $= 2^{10} (\approx 10^3)$ bytes
- MB $= 2^{20} (\approx 10^6)$ bytes
- GB $= 2^{30} (\approx 10^9)$ bytes
- TB $= 2^{40} (\approx 10^{12})$ bytes
- ...

Representation of Text

- A **character** is a symbol of written language (e.g. ‘K’, ‘m’, ‘!’)

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Representation of Text

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- A **string** is a sequence of characters (e.g. 'CS 1109')

- $\{0, 1\}$ $\{A, B, .., a, b, .., 0, 1, 2, 3, ...\}$

Representation of Text

- A **character** is a symbol of written language (e.g. 'K', 'm', '!')
- A **string** is a sequence of characters (e.g. 'CS 1109')

- $\{0, 1\} \leftrightarrow \{A, B, .., a, b, .., 0, 1, 2, 3, ...\}$
- Need a translation between two *alphabets*
- Standards: ASCII (1 byte) , Unicode (2 bytes)

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- 'A' $\equiv 65 = (01000001)_2$

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- 'A' $\equiv 65 = (01000001)_2$
- 'B' $\equiv 66 = (01000010)_2$

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- $\{0, 1\} \leftrightarrow \{A, B, .., a, b, .., 0, 1, 2, 3, ...\}$
- Need a translation between two *alphabets*
- Standards: ASCII (1 byte) , Unicode (2 bytes)
- 'A' $\equiv 65 = (01000001)_2$
- 'B' $\equiv 66 = (01000010)_2$
- 'a' $\equiv 97 = (01100001)_2$

Variables, Assignment

- A **variable** is a *labeled* memory location which holds a *value*

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$a = 5;$

$b = a + 1;$

$c = 2 * b;$

Variables, Assignment

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- An **assignment** is storing the result of an expression into a variable
- *variable* = *expression*

$a = 5;$

$b = a + 1;$

$c = 2 * b;$

- At the end: a stores 5, b stores 6, c stores 12.

Simple Calculator

- (enter a number) 17

Simple Calculator

- (enter a number) 17
- (select an operation) +

Simple Calculator

- (enter a number) 17
- (select an operation) +
- (enter another number) 29

Simple Calculator

- (enter a number) 17
- (select an operation) +
- (enter another number) 29
- (press execute)

Simple Calculator

- (enter a number) 17
- (select an operation) +
- (enter another number) 29
- (press execute)
- (result) 46

Simple Calculator

- (enter a number) 17
- (select an operation) +
- (enter another number) 29
- (press execute)
- (result) 46

- What is missing?

Simple Calculator

- (enter a number) 17
- (select an operation) +
- (enter another number) 29
- (press execute)
- (result) 46

- What is missing?
- Labels for stored values!
- We implicitly refer to them: *the first number* and *the second number*
- But there is no way we can reuse them!
- Variables provide labels for stored values.

MATLAB Demo

- Command Window
- Workspace
- Command History
- Current Directory
- Help