General Computer Science for Engineers CISC 106 Lecture 22

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Lecture Overview

- Symbolic Debugger (137-140)
- Date Types
 - Memory size/efficiency/accuracy

Symbolic Debugger

- Open m-file to debug in Matlab editor
- Can set breakpoints

- Where you want execution to suspend
- Execute in command window as normal

Symbolic Debugger

- Execution suspends in editor at breakpoint
 - Can view variables in command window
- Can step through the code
- Can continue to next breakpoint



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Classes of Data Types



Single-Precision floating point

• Stores number in 32 bits

- Bit 31 is sign (0 = positive, 1 = negative)
- Bits 0 through 30 for number (exponent and fraction)

Double-Precision (default)

• Stores number in 64 bits

- Bit 63 is sign (0 = positive, I = negative)
- Bits 0 through 62 for number
 - (exponent and fraction)

Integers (Signed Values)

• int8 (8 bits) can represent -128 to 127

• int I 6, int 32, int 64

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x = int8(200) x ←127

x=int8(-500) x ← -128;

Integers (Unsigned Values)

- uint8 (8 bits) can represent 0 to 255
 - uint 16, uint 32, uint 64

x = uint8(400) x ←255

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x=uint8(-500) x ← 0;



intmin and intmax

intmin('uint8') 0 intmax('int8') 127



Integer arrays

array = zeros(100,100, 'int8');

Creates a 100-by-100 int8 array initialized to zero.

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Efficiency

- If array will only require certain values
 - Use correct datatype!
- For example:
 - Images typically only have 0-255 values
 - Need only uint8

Efficiency (cont'd)

- double requires 8 bytes
- uint8 requires I byte
- Double requires 8 times more memory to store images!