General Computer Science for Engineers CISC 106 Lecture 21

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Lecture Overview

- Common Errors
- Debugging Tips (pgs 72 76)
- Symbolic Debugger (137-140)

Different Kinds of Errors

Syntax Errors
 x = (y + 3) / 2);

- Run-time Errors
 x = n / 0;
- Logical Errors
 - Runs correctly but wrong answer!

Common Problems

- Not initializing all variables
- Starting array index variable at 0
- Incorrect evaluation order in equation
- Off by one error
- Infinite loop

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Some easy fixes

- Break up equation into smaller pieces
- Add parenthesis to make equation clear
- Initialize all variables!

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Debugging

- Add print statements!
- Display value of all variables
- Run through a very simple test case
- Increasingly make test case longer
 - For example, sorting an array
 try an empty array, try with one element,
 try an array of size 2, then size 5, so on...

Finding an number in array

- Pass into function array and number
- Initialize array index to I
- Initialize number found boolean variable
- while number not found
- if current array position has num
- set number found
- end

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- If number found report!

Finding a number in an array

```
function found = findNumber(array, value)
x = I;
found = false;
while (found == false)
    if (a(x) == value)
        found = true;
    end
end
```

What is the problem?

Add some print statements

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```
function found = findNumber(array, value)
x = I;
found = false;
while (found == false)
    if (a(x) == value)
       found = true;
    end
    found
    Χ
end
```

Note x does not change!

Add some print statements

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```
function found = findNumber(array, value)
x = l;
found = false;
while (found == false)
    if (a(x) == value)
        found = true;
    end
        x = x + l;
end
```

Problem if value not found! Should test for this.

Add some print statements

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