Slide 1

Debugging

Finding your errors fast!

D.A. Clements

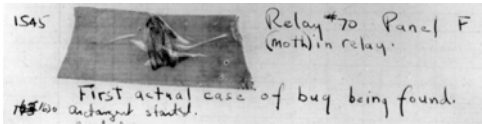11/20/2009   D.A. Clements, UW Information School   1

Slide 2

Rear Admiral Grace Hopper

- Computing pioneer (1906-1992)
- Invented the compiler

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Slide 3

The first computer bug

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Slide 4

What to do when your script doesn't work

FINDING SYNTAX ERRORS

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Slide 5

Finding Syntax Errors

- Firefox Error Console
  - Gives line number
  - Specifies error
  - Points to error

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Slide 6

Common error messages

- Undefined
  - The variable was never assigned a value
- Undeclared variable
  - Variable was never declared
- Null
  - document.getElementById("x") couldn't find an element with that id
    - Check spelling and capitalization of the id
- Unterminated string literal
  - Make sure the string has matching quote marks
  - Delete any lengthy spaces in your string

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Setup & Installation Videos

- *Install Web Developer Toolbar*
  - *Troubleshooting the Web Developer Toolbar—what to do when you can't see it*
- *Disable caching*
- *Set up Error Console*
- *Turn off Error Console when you're done*

What to do after you've fixed all the errors in the Firefox Error Console and it still doesn't work!

FINDING LOGICAL ERRORS

What is a logical error?

- Your code has the right syntax but the output is wrong.

How do we find logical errors?

- Testing is the only method
  - Test values at both ends of the range
  - Test anything a user would enter
    - Text instead of numbers
    - Numbers instead of text
  - Expect the unexpected
  - Users will always confound your expectations!

Common causes

- Statements in the wrong order
- Working with the wrong variable
- Misplaced curly brace messes up an if/else statement

How to find the problem?

- Tools
  - Alerts
  - NotePad2 / TextWrangler
  - Taking a break!
  - Asking for help!

Alerts

- Alerts can help you to
  - Verify control passes to a function after it's called
  - Verify your user data is being picked up by the program
  - Show you the current value in a variable at different points in your program

A Useful Alert

alert("Line 67 variablename: " + variablename);
  - *line number* tells you which alert was fired
    - Use the line number for the alert in your code
  - *variablename* in the string tells you which variable
  - *variablename* gives you its current value

Viking Names— Checking with Alerts

```
<script type="text/javascript">
    function fixOutput() {
        alert("Running function fixOutput('I have some interesting news for you.')");
        var firstName;
        //get the value from the text field
        firstName = document.getElementById("firstNameField").value;

        //check that it's actually pulling the textfield's value
        alert("Your name: " + firstName);

        //find the new paragraph with id of "output"
        var elementToChange = document.getElementById("output");

        //set the innerHTML for the paragraph
        elementToChange.innerHTML =
        "If you were a <em>real Viking</em>, your son's last name would be " +
        firstName + "sson " +
        "and your daughter's last name would be " +
        firstName + "sdottir!";
    }
</script>
```

Did the function call start the script running?

What is the current value of a variable?

Finding Misplaced Curly Braces

- If statements can throw your logic off if a curly brace is in the wrong place
  - Watch the video!

Video demonstration

When all else fails

- Walk the dog around the block
- Hug your spouse or partner
- Do the laundry
- Take some really slow deep breaths
- Stretch
- Jog
- Escape!

Come back refreshed….

- Don't give up!
- The solution will pop out at you!

If not…

Where to go when you're out of ideas….

OTHER SOURCES OF HELP

Sources of Help

- *JavaScript Phrasebook*
- Friends and classmates
- W3 Schools tutorials and reference

Sources of Help

- Class GoPost
  - Post questions and answers
- TA's and CLUE tutor
  - Drop-in labs
- Instructor

Help

- When you email the Listserve or the instructor
  1. Specify the problem you are having
  2. Specify what steps you have tried
  3. Include the complete URL for your file on your Web space:
     - http://students.washington.edu/yourUWnetID/
     - *And the path to the particular page or folder*

End papers…

- The road to wisdom?
  Well it's plain and simple to express:
  Err and err and err again,
  but less and less and less.

  ~ Piet Hein

- Mistakes are the portals of discovery.

  ~James Joyce (1882 - 1941)

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Functions and Methods

FIT 100 Fluency with Information Technology

Write it once, run it often.

D.A. Clements

Packaging Code

Conditionals
```
if (today == 'Friday')
{
  alert("Attend lecture!");
  alert("Read the book");
}
else
{
    alert("Go to lab");
}
```

Loops, or Iterations
```
for (i=0; i<n; i++)
{
    alert(books[i];
}
```

Packaging Code

Functions
```
function convertToCelsius(t)
 {
    //code goes here
    //can include conditionals, loops,
    //and function calls
 }
```

JavaScript Functions

- Functions package code
  - Write it once
  - Use it often
- Functions are named
  - Call it by name to run it
  - Pass values to it easily

Function Definition

Functions
```
function convertToCelcius(temp)
 {
    //code goes here
 }
```

Function call

- Calls the function when you want to run it
- Passes values to the function

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Demo of building a function

JavaScript Methods

- Commonly used functions are pre-defined
  - So you don't have to!
  - No need to write a function definition

Familiar Methods

- document.write()
- toLowerCase()
- toString()
- Number()
- alert() and prompt()
- document.getElementById("id");
- Math.round()

JavaScript Methods

- DOM methods (on Monday)
- Math methods
  - round()
- String methods
  - treats strings like arrays
- Array methods
  - push()
  - sort()
  - reverse()

Applying JavaScript Methods

Method	Example
Document	document.getElementById("tiger").value
Math	Math.round(x) Math.sqrt(16)
String	word.charAt(0) word.toLowercase()
Array	presidents.push() presidents.sort() presidents.reverse()