

DEBUGGING

PREVENTION
DETECTION
DIAGNOSIS
FIXING



We're back. We've covered prevention and installed some great tools.

DETECTION

- 🐛 Program crashes or “bugs out”
- 🐛 Build/compile error
- 🐛 Automated testing fails

How do you know when there is a bug?

Sometimes it's obvious. But you'll need to keep your eyes open and your ears to the ground.

Testing: It is difficult to overstate the tremendous value of automated testing in general.

ALWAYS read the output of a program on the command line

DIAGNOSIS

Time to diagnose.



MANDATORY



Browser console open



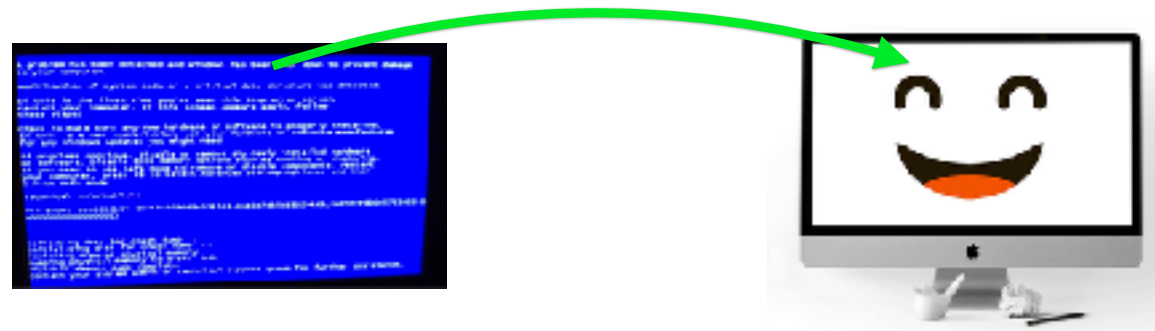
Server console open



Read the stack trace

debug_[verb]

Transforming a broken program
into a working program.

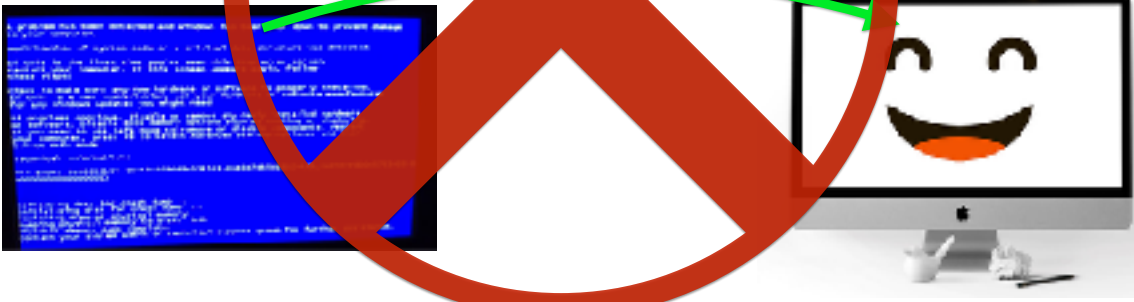


This is one way to think about debugging.

But it isn't the best one.

debug^[verb]

Transforming a broken program
into a working program.



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“A change in perspective is worth eighty IQ points.”
— Alan Kay (He invented the personal computer, have you heard of him?)

You understand the program will
run in a particular way.

But you are wrong.

Bug!



Debugging isn't about fixing the program.

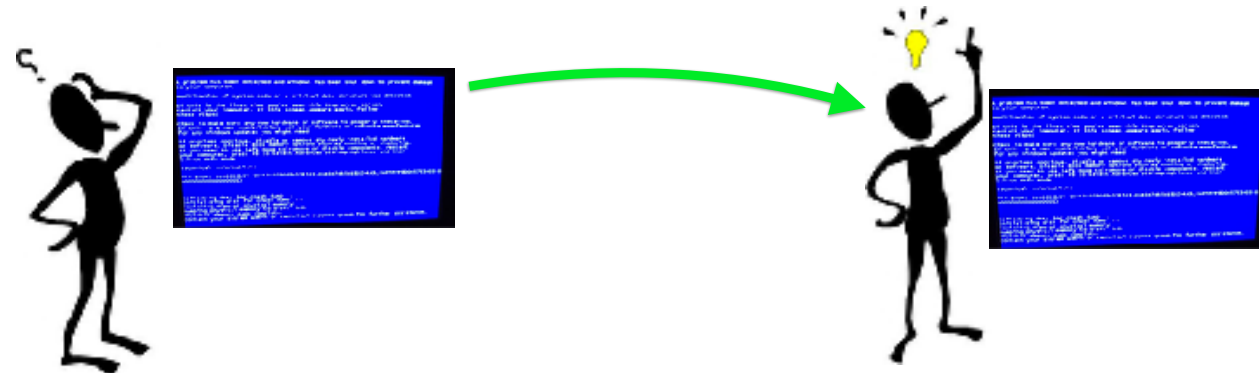
Debugging is about fixing your understanding.

Debugging is about finding and disabusing yourself of false assumptions.

Once your understanding is rectified, fixing the program will
occur simply.

debug_[verb]

Transforming a **broken understanding**
of program into a **working understanding**.



This is a better way to think of debugging.

Debugging is first targeted towards yourself and your understanding of the program, not the program itself.

Verbalizing Helps



Sleeping Helps



Write amazing console.logs

```
console.log(  
  "very useful context",  
  reallyImportantObject  
)
```

The answer isn't always exactly where the output says it is, but it usually aims you in the general direction.

"unexpected token" -> misspelled `import`

Write amazing console.logs

```
console.trace(  
  "very useful context",  
  reallyImportantObject  
)
```

The answer isn't always exactly where the output says it is, but it usually aims you in the general direction.

"unexpected token" -> misspelled `import`

Write amazing console.logs

```
console.count(  
  "very useful context",  
)
```

The answer isn't always exactly where the output says it is, but it usually aims you in the general direction.

"unexpected token" -> misspelled `import`

Learn to read stack traces

```
✖ ▶ Uncaught Error: Read the stacktrace!  
  at slide (index.js:3)  
  at combineReducers.js:40  
  at Array.forEach (<anonymous>)  
  at assertReducerShape (combineReducers.js:38)  
  at combineReducers (combineReducers.js:94)  
  at configureStore (configure-store.js:15)  
  at Object.getStore (bootloader.js:27)  
  at Object.renderApp (bootloader.js:34)
```

Learn to read stack traces

```
ERROR in ./src/reducers/slide/index.js
Module build failed: SyntaxError: Unexpected token, expected ; (1:7)

> 1 | import Types from './types'
    |         ^
  2 | export default function slide (prevState = null, action) {
  3 |   switch (action.type) {
  4 |     case Types.EDIT_SLIDE:


@ ./src/reducers/index.js 8:14-32
@ ../anecdote/src/bootloader.js
@ ./src/index.js
```

The answer isn't always exactly where the output says it is, but it usually aims you in the general direction.

“unexpected token” -> misspelled `import`

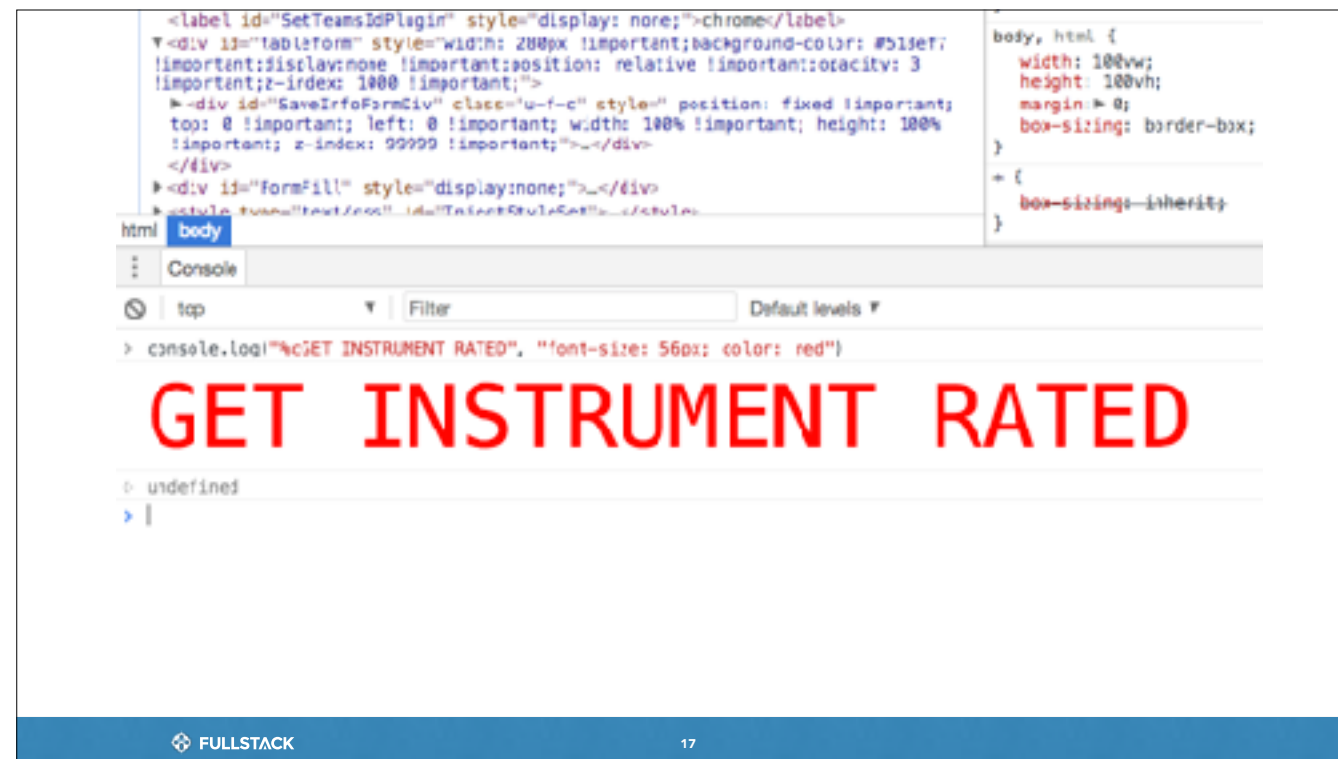
Learn to read stack traces

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```

 FULLSTACK

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“unexpected token” -> misspelled ``import``

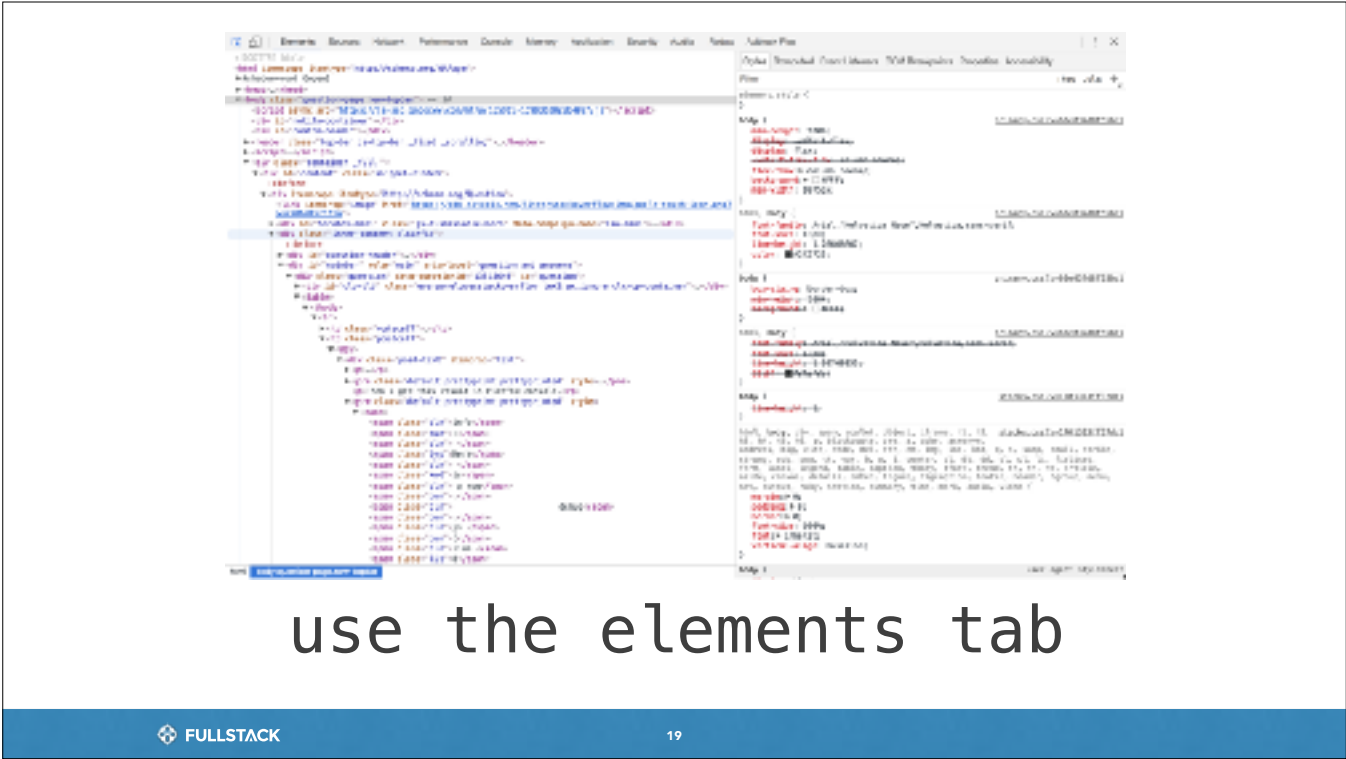


Make a habit of keeping your console open.

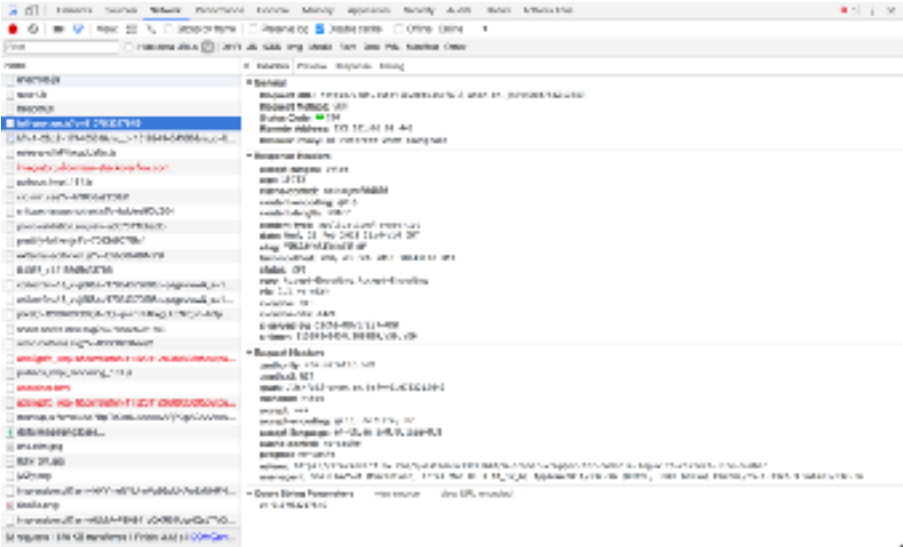


use the debugger

Make a habit of keeping your console open.



Make a habit of keeping your console open.

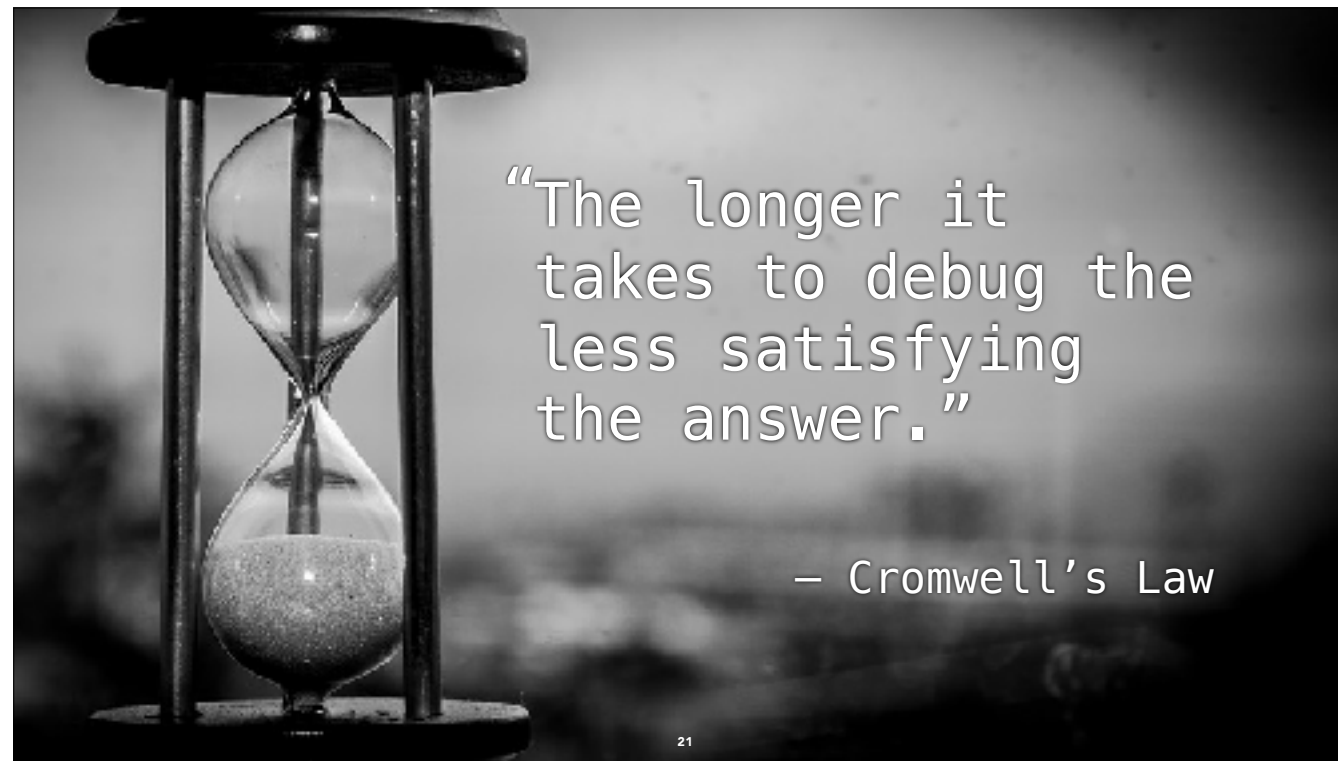


The screenshot displays the NetworkMiner application interface. The 'Network' tab is active, showing a list of discovered hosts and services. The list includes various IP addresses and domain names, such as 192.168.1.1, 192.168.1.2, and 192.168.1.3. The right pane shows details for the selected host, including the IP address, subnet mask, and a list of discovered services like HTTP, FTP, and SSH. The interface is organized into three main sections: Hosts, Services, and Details.

use the network tab

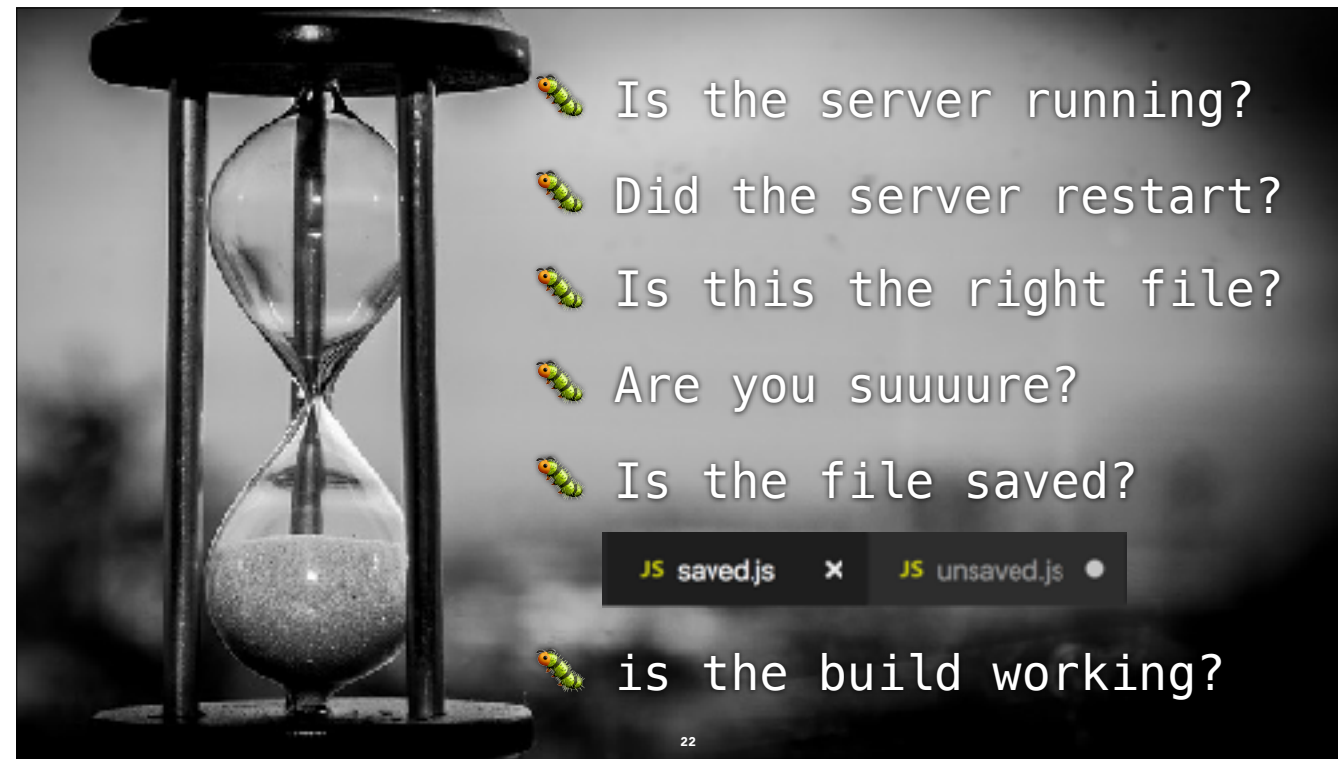
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Make a habit of keeping your console open.



Sometimes debugging feels like nothing you do could be right.

Try a sanity check.



Sometimes debugging feels like nothing you do could be right.

Try a sanity check.

What You've Learned Today

BUG

- Prevention
- Detection
- Diagnosis
- Fixing

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Now, you'll see that we didn't really cover "fixing". Once you've diagnosed the issue, fixing is the easy part. Understanding the bug means you have the knowledge to address it.

This is why...

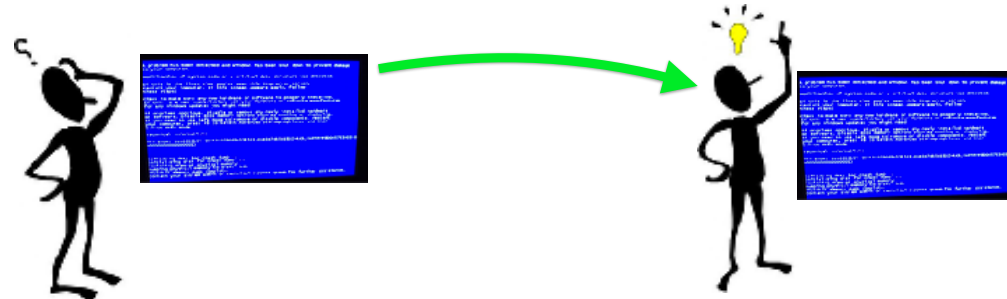


If you only remember one thing



`debug`_[verb]

Transforming a **broken understanding**
of program into a **working understanding**.



If you remember only one thing, it's this.

The hard work of debugging is going on inside your head.



If you remember two things



MANDATORY



Browser console open



Server console open



Read the stack trace