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

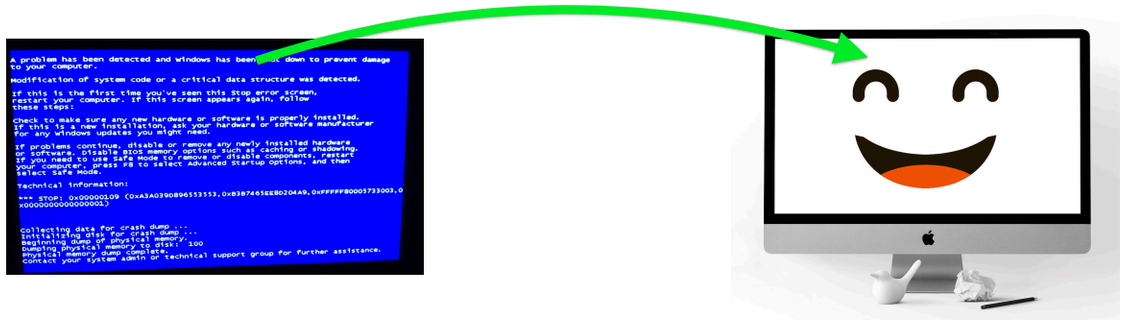
Time to diagnose.

🚨 MANDATORY 🚨

- 🐛 Browser console open
- 🐛 Server console open
- 🐛 Read the stack trace

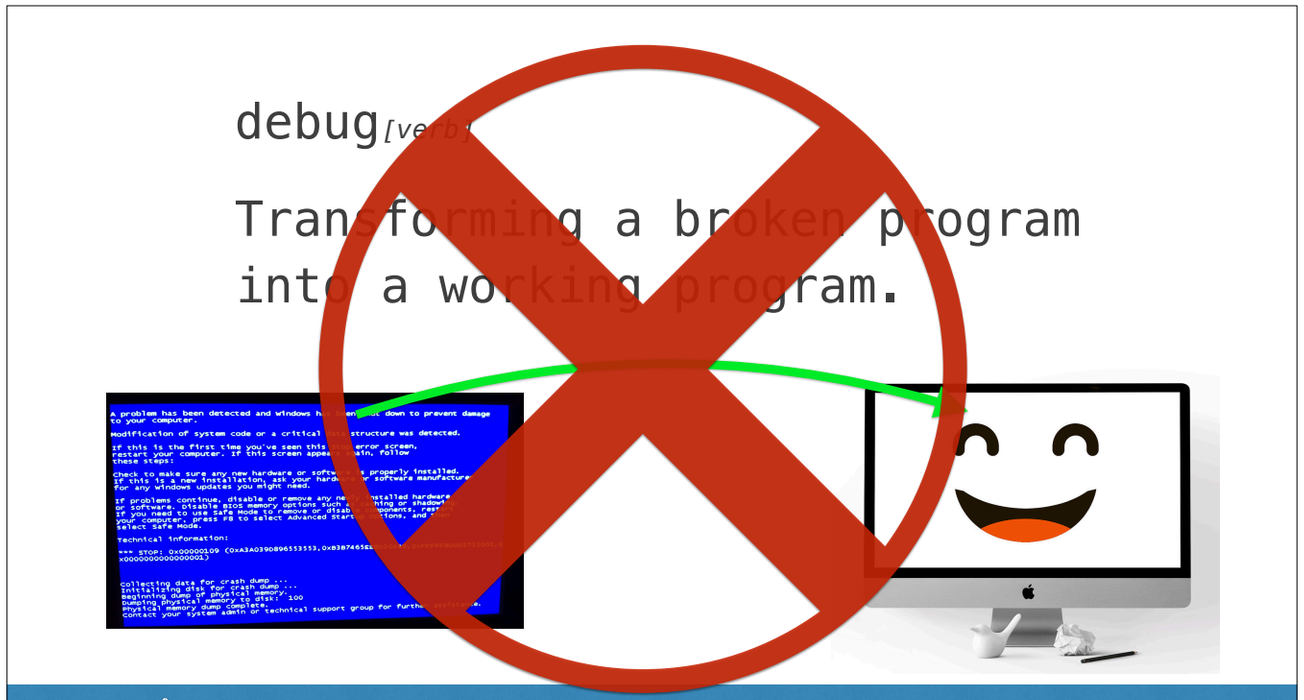
debug*[verb]*

Transforming a broken program into a working program.



This is one way to think about debugging.

But it isn’t the best one.



“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.

Debugging isn't about fixing the program.

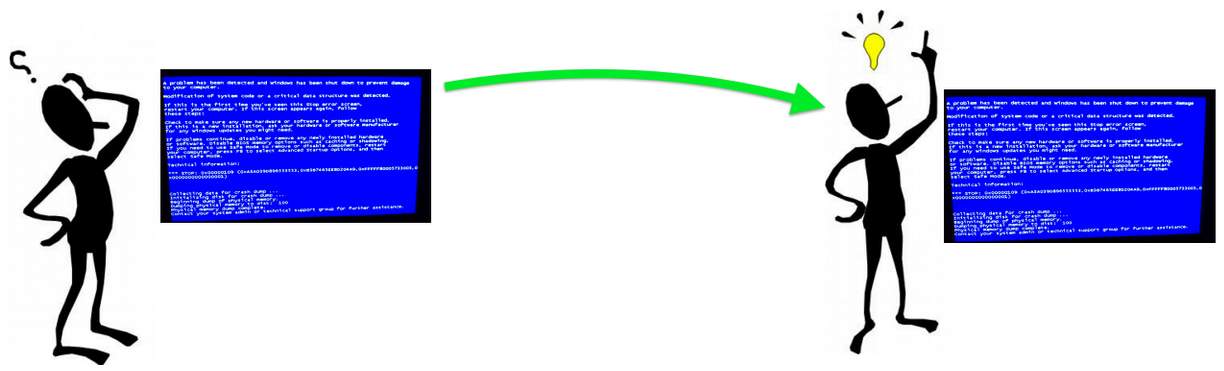
Debugging is about fixing your understanding.

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 | impart 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
```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"unexpected token" -> misspelled `import`

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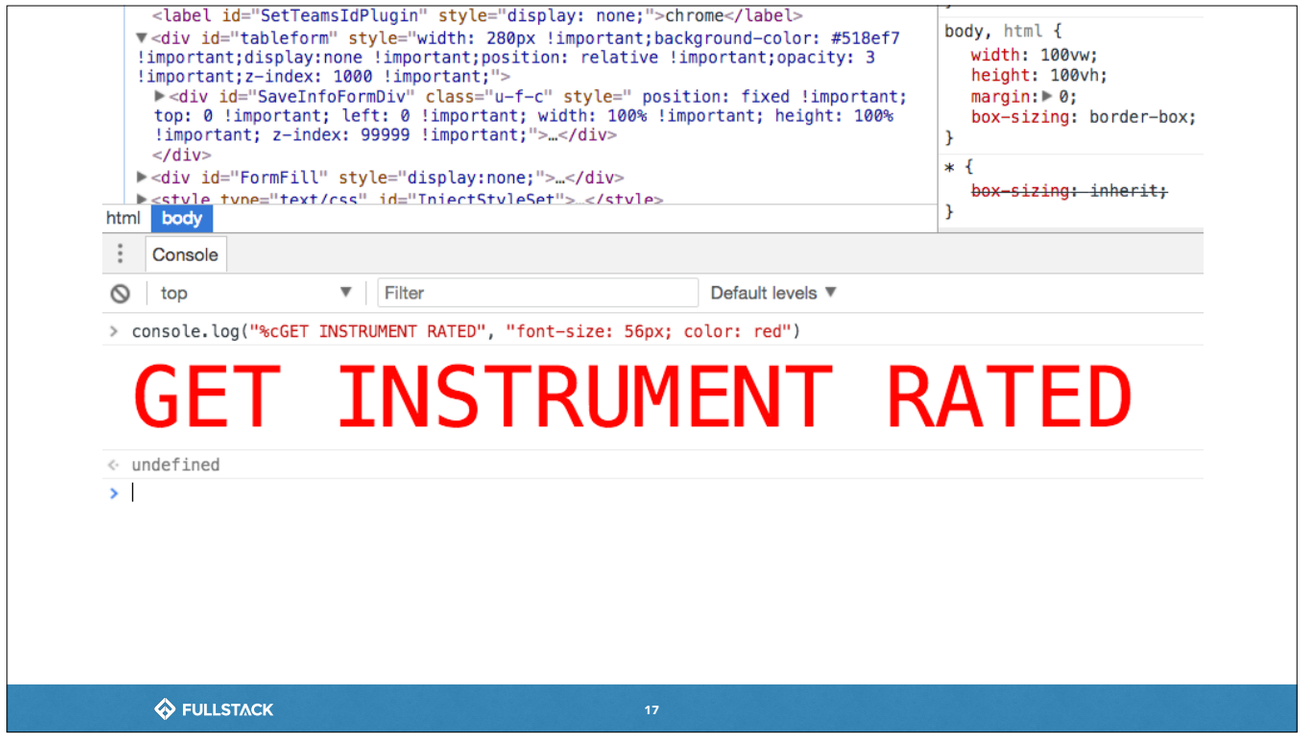
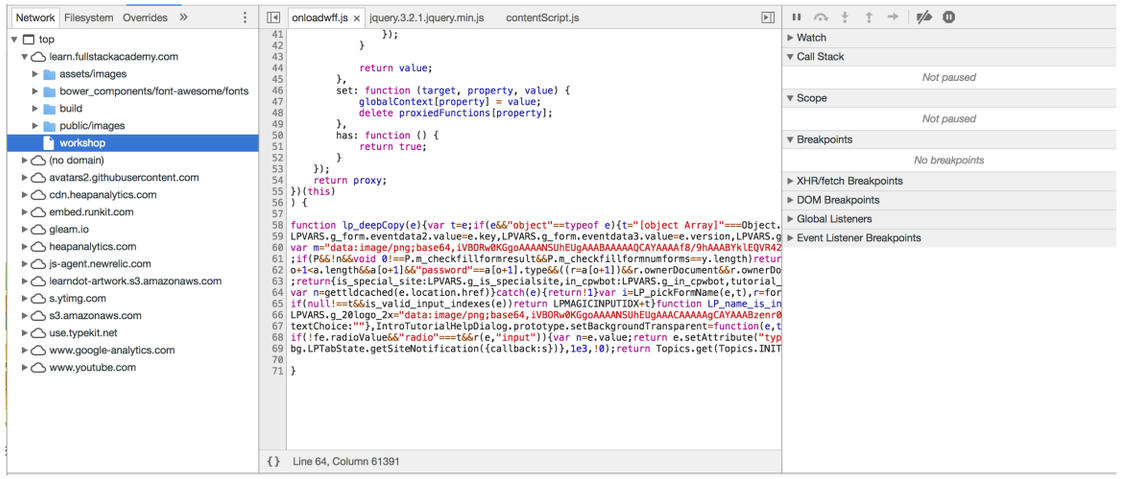
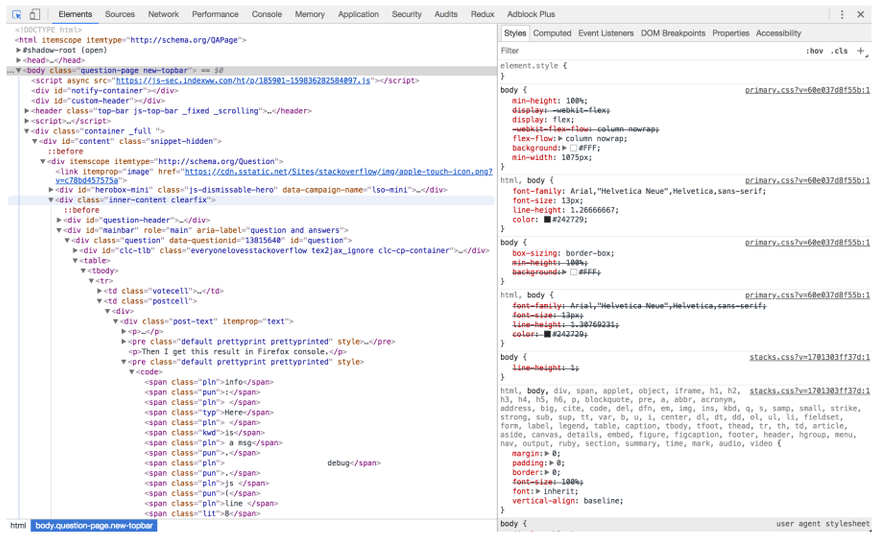


Make a habit of keeping your console open.



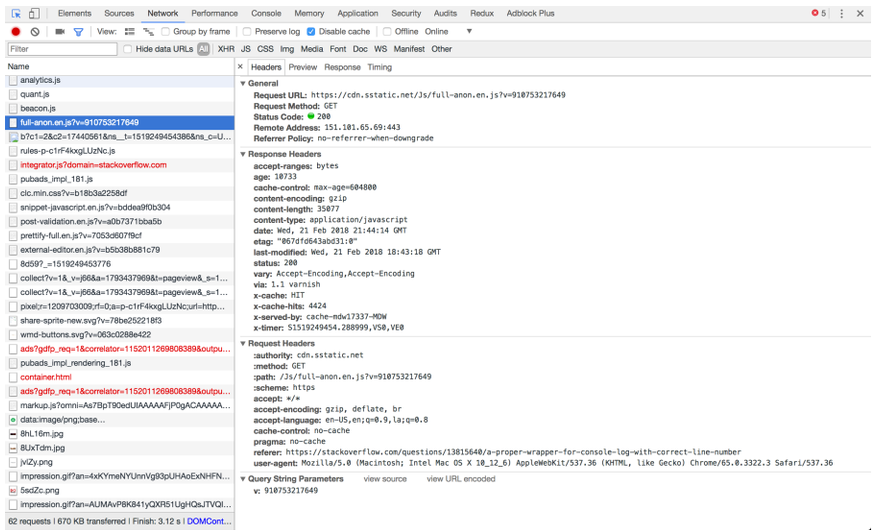
use the debugger

Make a habit of keeping your console open.



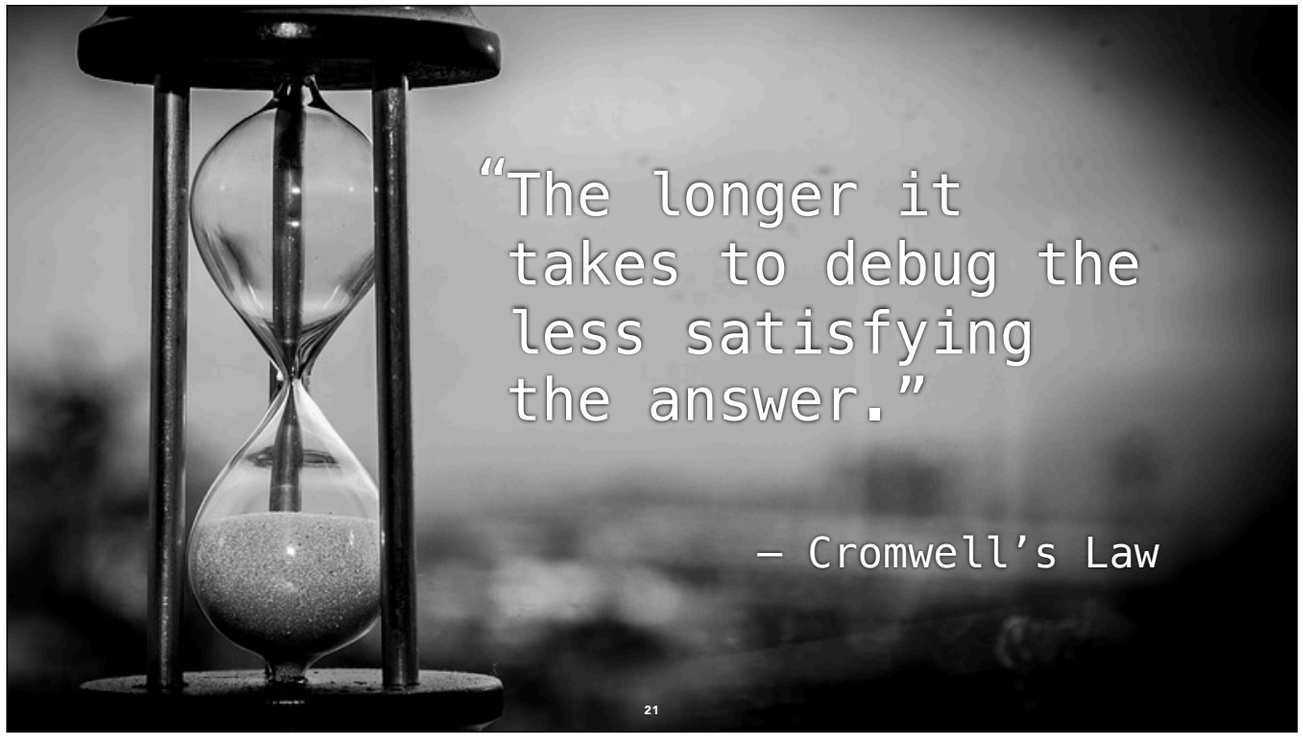
use the elements tab

Make a habit of keeping your console open.



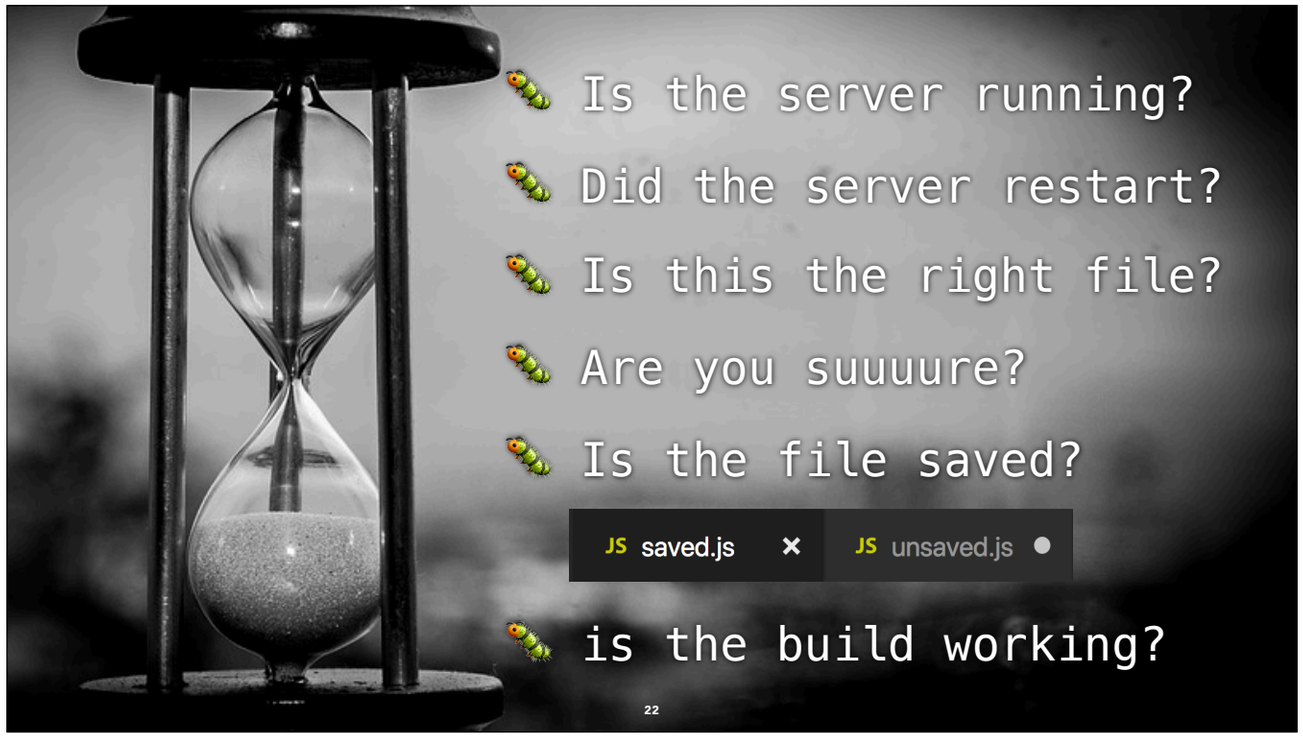
use the network tab

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.

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**
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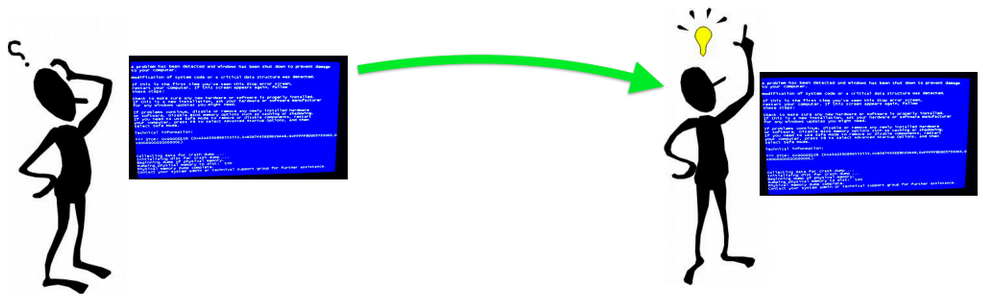

If you remember only one thing, it’s this.

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

If you remember two things

🚨 **MANDATORY** 🚨

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- 🐛 Server console open
- 🐛 Read the stack trace