Learning from Failure

Kevlin Henney

Learning from Failure

Kevlin Henney

@kevlin.bsky.social
@kevlin@mastodon.social
x.com/KevlinHenney
threads.net/@kevlin.henney
instagram.com/kevlin.henney
about.me/kevlin
linkedin.com/in/kevlin
kevlinhenney.medium.com
kevlin@curbralan.com

Kevlin Henney

@tackline

Follow

Arriving in Bologna, I saw a @KevlinHenney screen. Whilst queueing to leave Ancona another appeared as I waited.

2:05 PM - 25 Jul 2016

3   2

Hoy es:

29-May-18

10:47 PM

Amanecer
-1: AM

Puesta de sol
-1: PM

Jardines del Sur
Av. 135, 2ª Glorieta Entrando por Av. Cancún
www.mihogarenelcaribe.com

www.cableweather.tv

10:47 PM

Mr Anderson
@AndezFernandez

Not too sure if I am time traveling but pretty sure there is no -1am or pm @KevlinHenney #mexicofail

5:54 AM - May 30, 2018

♡ 5   See Mr Anderson's other Tweets

Michel Schudel
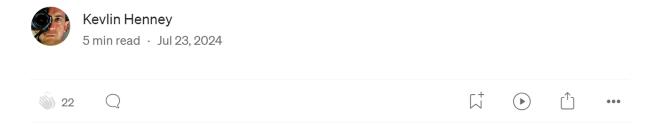@MichelSchudel

Does this count as a @KevlinHenney ?

12:43 AM - May 26, 2018

♡ 62   💬 19 people are talking about this

FAQ: What's a @KevlinHenney?

In the name of failure

Kevlin Henney

5 min read · Jul 23, 2024

👏 22

Recent events have prompted me to finally write up an answer to what is perhaps one of the most frequently asked questions I receive online and face to face. The question is normally of the form "What's a @KevlinHenney?", "What's a @KevlinHenney screen?" or "Why do people send you failure screen pictures?"

KevlinHenney 🔊

A software failure that happens in some **public space**, for instance an airport flight information screen that has crashed, or an **ATM** that displays a **reboot** message.

*Oh look, **the bus** **monitor** just **pulled** a KevlinHenney*
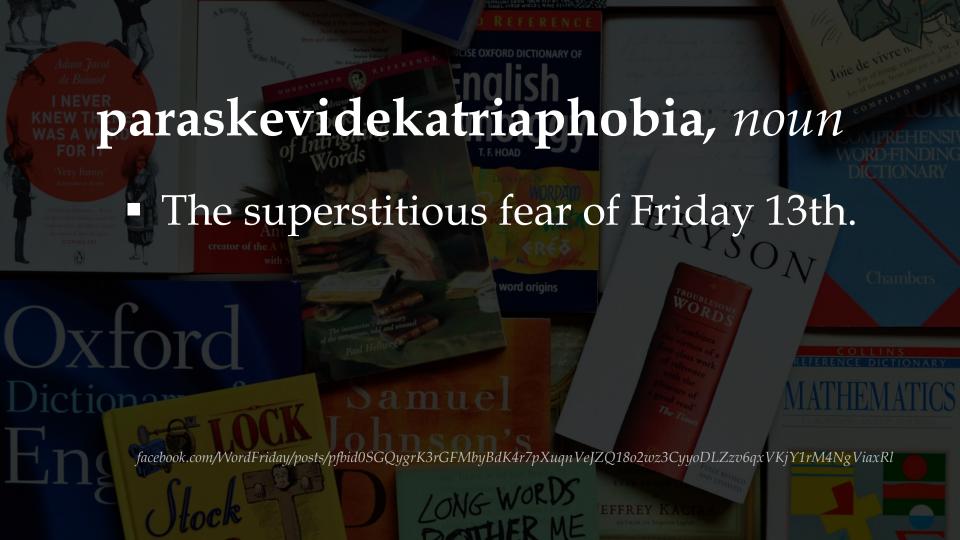
by **srda56** December 06, 2018

👍 131   👎 0   ⋯

Get a **KevlinHenney** mug

Word

Google Cloud went down hard on Thursday, and took Cloudflare and some of its customers with it.

paraskevidekatriaphobia, *noun*

- The superstitious fear of Friday 13th.

failure, *noun*
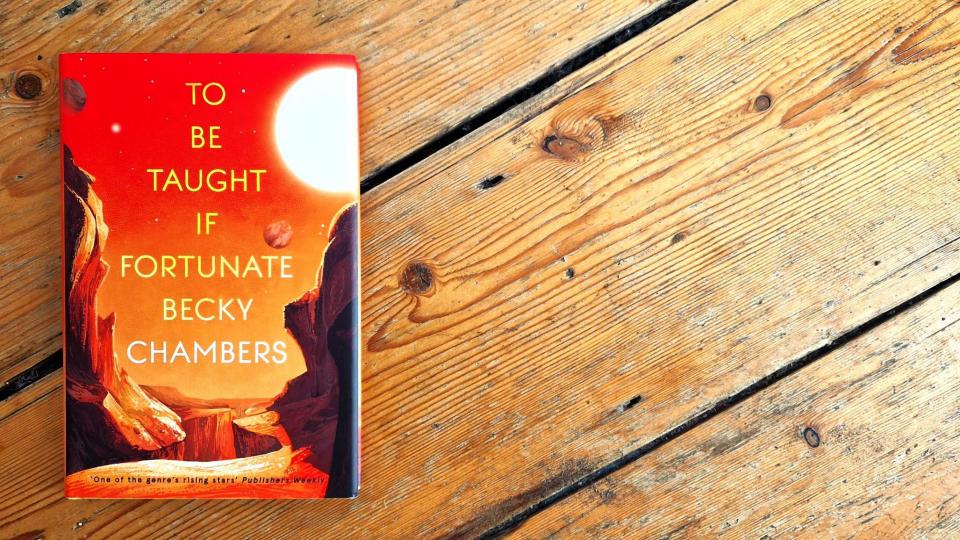
- the fact of failing
- the omission of expected or required action
- the action of ceasing to function or the state of not functioning
- an abrupt cessation of normal functioning

learning, *noun*

- knowledge or skills acquired through experience or study or by being taught
- the action of receiving instruction or acquiring knowledge
- modification of a behavioral tendency by experience

TO
BE
TAUGHT
IF
FORTUNATE
BECKY
CHAMBERS

'One of the genre's rising stars' *Publishers Weekly*

I send greetings on behalf
of the people of our planet.

Kurt Waldheim, Secretary-General of the United Nations
Voyager Golden Record, 1977

We step out of our solar system into the universe seeking only peace and friendship, to teach if we are called upon, to be taught if we are fortunate.

Kurt Waldheim, Secretary-General of the United Nations
Voyager Golden Record, 1977

Quantum Lock

Dude, where's my source code?

Quantum Lock
NEWS HUB

+ Wishlist   Follow   Links ⌄

JULY

Quantum Lock Shutting Down Purchases

NEWS JUL 24

Hey Everyone, QL was our first game and although it was a big milestone for us, it was created at a time before we understood version control software.

👍 21   💬 24   ⋯

Quantum Lock

NEWS HUB

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JULY

Quantum Lock Shutting Down Purchases

NEWS

Hey Everyone, QL was our first game and although it was a big milestone for us, it was created at a time before we understood version control software...

Hey Everyone, QL was our first game and although it was a big milestone for us, it was created at a time before we understood version control software.

👍 21   💬 24   •••

件事

知るべき

97 Things Every Prog

Kevlin Henney 编

李军译　吕骏审校

電子工業出版社
PUBLISHING HOUSE OF ELECTRONICS INDUSTRY
http://www.phei.com.cn

O'REILLY
オライリー・ジャパン

97
ENTGPVERSMAHUKNOW

Collective Wisdom
from the Experts

97 Things Every
Programmer
Should Know

O'REILLY

Edited by Kevlin Henney

97

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Put Everything Under Version Control

Version Control

Collective Wisdom from the Experts

97 Things Every Programmer Should Know

Diomidis Spinellis

O'REILLY®

Edited by Kevlin Henney

Quantum Lock

To be taught if fortunate

EA Games

365 days a year

EA Help ✓ 📧 @EAHelp · 1h

Hello #EASPORTSWRC players,

We are aware of an issue on console in which the game may crash on startup.

This is currently being investigated and will be fixed as soon as possible.

💬 3   🔁 14   ♡ 36   📊 20K   🔖 📤

EA Help ✅ 🅴 @EAHelp · 1h   ⋯

Hello #EASPORTSWRC players,

We are aware of an issue on console in which the game may crash on startup.

This is currently being investigated and will be fixed as soon as possible.

💬 3   🔁 14   ❤️ 36   📊 20K   🔖 ⬆️

2:21 PM · Feb 29, 2024 · **25.6K** Views

EA Help ✅ 🅴🄰 **@EAHelp · 1h**   •••

Hello #EASPORTSWRC players,

We are aware of an issue on console in which the game may crash on startup.

This is currently being investigated and will be fixed as soon as possible.

💬 3   ⟲ 14   ♡ 36   ▥ 20K   🔖 ⬆️

EA Help ✅ 🅴🄰   •••
@EAHelp

Guidance for PlayStation players:

1️⃣ On your console, go to Settings > System > Date and Time > Set Date and Time > Set Manually.

2️⃣ Change the date to March 1, 2024.

3️⃣ Once this change has been done, the game should function normally.

2:21 PM · Feb 29, 2024 · **25.6K** Views

```c
bool is_leap_year(int year);
```

```c
bool is_leap_year(int year)
{
    return false;
}
```

```
bool is_leap_year(int year)
{
    return false;
}
```

```
bool is_leap_year(int year)
{
    return year % 4 == 0;
}
```

```
bool is_leap_year(int year)
{
    return year % 4 == 0 &&
           year % 100 != 0 ||
           year % 400 == 0;
}
```

Sweden's transition to the Gregorian calendar was difficult and protracted.

```c
bool is_leap_year(int year)
{
    return year % 4 == 0;
}
```

```
bool is_leap_year(int year)
{
    return false;
}
```

```
bool is_leap_year(int year)
{
    return year % 4 == 0 &&
           year % 100 != 0 ||
           year % 400 == 0;
}
```

```c
bool is_leap_year(int year)
{
    if (year < 1700)
        return year % 4 == 0;
    else if (year > 1740)
        return year % 4 == 0 && year % 100 != 0 || year % 400 == 0;
    else
        return false;
}
```

```
bool is_leap_year(int year)
{
    if (year == 1700)
        return false;
    else if (year < 1753)
        return year % 4 == 0;
    else
        return year % 4 == 0 && year % 100 != 0 || year % 400 == 0;
}
```

```c
bool is_leap_year(int year)
{
    if (year == 1700)
        return false;
    else if (year == 1712)
        return true;
    else if (year < 1753)
        return year % 4 == 0;
    else
        return year % 4 == 0 && year % 100 != 0 || year % 400 == 0;
}
```

```
bool is_leap_year(int year)
{
    if (year == 1700)
        return false;
    else if (year == 1712)
        return true + true;
    else if (year < 1753)
        return year % 4 == 0;
    else
        return year % 4 == 0 && year % 100 != 0 || year % 400 == 0;
}
```

```c
int  is_leap_year(int year)
{
    if (year == 1700)
        return false;
    else if (year == 1712)
        return true + true;
    else if (year < 1753)
        return year % 4 == 0;
    else
        return year % 4 == 0 && year % 100 != 0 || year % 400 == 0;
}
```

Osen up 7/37. ned. 4/23. Dag 9/28 natt. 14/32.

Gamal St.			Nya St.
1 d Brigita			11
2 e Kyndelmässe		Swackert	12
3 f Blasius		Winter.	13
☞ Om Hwetet och Ogräset/ Matth. 13/24.			
4 g S. e. Trd.	) 7/24. e.		14
5 a Agatha	Wäder/		15
6 b Dorothea			16
7 c Richardus	Snöö		17
8 d Helena			18
9 e 40 Martyrer	11/46. f.		19
10 f Apollonius	Töö		20
☞ Om the 10 Jungfrur Matth. 25.			1.
11 g S. e. Trd.	Disringe		21
12 a Eulalia	12/28 e.		22
13 b Nicephorus	Wäder/		23

baar   XXX   Dagar.

☉ up 6/39. ned. 5/30. Dag. 10/32. tim. N. 13/28.

14 c Valentin			24
15 d Sigfrid			25
16 e Juliana		Frost/	26
17 f Casparus			27
☞ Om Arbetarna i Wingården/ Matth. 20/1			
18 g Septuag.		Concordia	28
19 a Susanna		12/58. e.	29
20 d Joachim			1 Mart.
21 c Benedictus		Blåst/	2
22 d Victor		Uhrwäder/	3
23 e Tertullian			4
24 f Matthias		Kalt/	5
☞ Om fyra handa Sädes Ät. Luc. 8/4.			
25 g Sexages.		Skottdagen.	6
26 g Victoria		12/7. e.	7
27 a Leander			8
28 b Romanus		ostadigt	9
29 c Nestor			10
30 c Tillökad:		Snöö/	11

The C Standard

Incorporating Technical Corrigendum No. 1

includes the **C** Rationale

```
struct tm
```

which holds the components of a calendar time, called the *broken-down time*.

4   The range and precision of times representable in `clock_t` and `time_t` are implementation-defined. The `tm` structure shall contain at least the following members, in any order. The semantics of the members and their normal ranges are expressed in the comments.[266]

```
int tm_sec;     // seconds after the minute — [0, 60]
int tm_min;     // minutes after the hour — [0, 59]
int tm_hour;    // hours since midnight — [0, 23]
int tm_mday;    // day of the month — [1, 31]
int tm_mon;     // months since January — [0, 11]
int tm_year;    // years since 1900
int tm_wday;    // days since Sunday — [0, 6]
int tm_yday;    // days since January 1 — [0, 365]     366 days
int tm_isdst;   // Daylight Saving Time flag
```

---

266) The range [0, 60] for `tm_sec` allows for a positive leap second.

O'REILLY®

97 Things Every
Java Programmer
Should Know

Collective
Wisdom
from the
Experts

Edited by Kevlin Henney
& Trisha Gee

The most obvious lesson is that date–time handling is harder than people expect — even when they're expecting it.

Kevlin Henney
"Name the Date"
medium.com/97-things/name-the-date-c82bafdc4c44
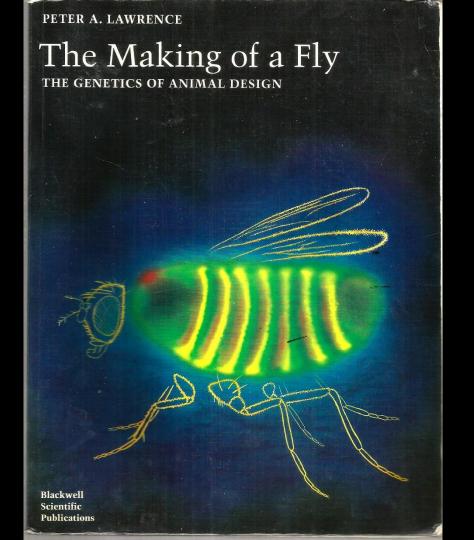
EA Games

To be taught if fortunate

The Making of a Fly

PETER A. LAWRENCE

The Making of a Fly

THE GENETICS OF ANIMAL DESIGN

The Making of a Fly: The Genetics of Animal Design (Paperback)
by Peter A. Lawrence

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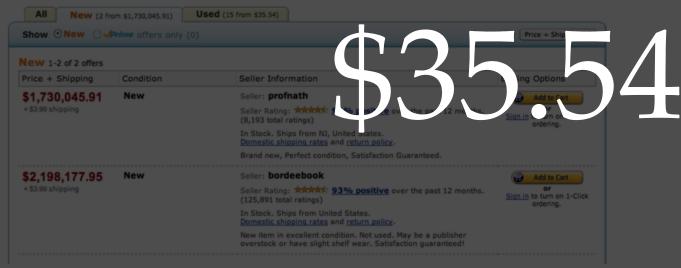by Peter A. Lawrence

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                          Domestic shipping rates and return policy.
                          Brand new, Perfect condition, Satisfaction Guaranteed.

$2,198,177.95   New   Seller: bordeebook   Add to Cart
+ $3.99 shipping   Seller Rating: ★★★★★ 93% positive over the past 12 months.   or
                          (125,891 total ratings)   Sign in to turn on 1-Click
                          In Stock. Ships from United States.   ordering.
                          Domestic shipping rates and return policy.
                          New item in excellent condition. Not used. May be a publisher
                          overstock or have slight shelf wear. Satisfaction guaranteed!

michaeleisen.org/blog/?p=358

The Making of a Fly: The Genetics of Animal Design (Paperback)
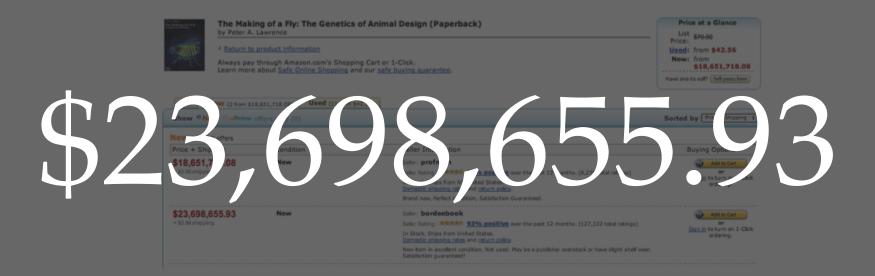by Peter A. Lawrence

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| Price Shipping | Condition | Seller Information | Buying Options |

$2,730,045.91 | New | Seller: pro ath | Add to Cart
| | Seller Rating: ★★ 93% positive over the past 12 mo... | Sign in
| | (8,193 total ratings) | ordering.
In Stock. Ships from NJ, United States.
Domestic shipping rates and return policy.
Brand new, Perfect condition, Satisfaction Guaranteed.

$2,198,177.95 | New | Seller: bordeebook | Add to Cart
+ $3.99 shipping | | Seller Rating: ★★★★½ 93% positive over the past 12 months. | Sign in to turn on 1-Click
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Used: from $35.54
New: from $1,730,045.91

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| All | New (2 from $1,730,045.91) | Used (15 from $35.54) |

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10-Apr	$2,783,493.00	$3,536,675.57	0.99830	1.27059
11-Apr	$3,530,663.65	$4,486,021.69	0.99830	1.27059
12-Apr	$4,478,395.76	$5,690,199.43	0.99830	1.27059
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0.99830

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1.27059

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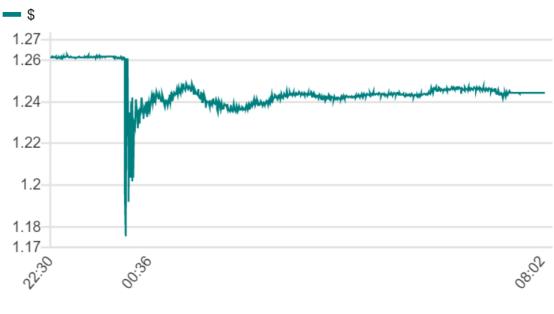
Digital devices tune
out small errors while
creating opportunities
for large errors.

Earl Wiener

Sterling flash crash

£/$, 6-7 October

— $

```
1.27
1.26
1.24
1.22
1.2
1.18
1.17
```

22:30   00:36   08:02

BBC

The pound has dived on Asian markets with automated trading being blamed for the volatility.

101 Things I Learned in Architecture School

Matthew Frederick

Always design a thing by considering it in its next larger context.

101 Things in Architecture School
Matthew Frederick

Eliel Saarinen

The Making of a Fly
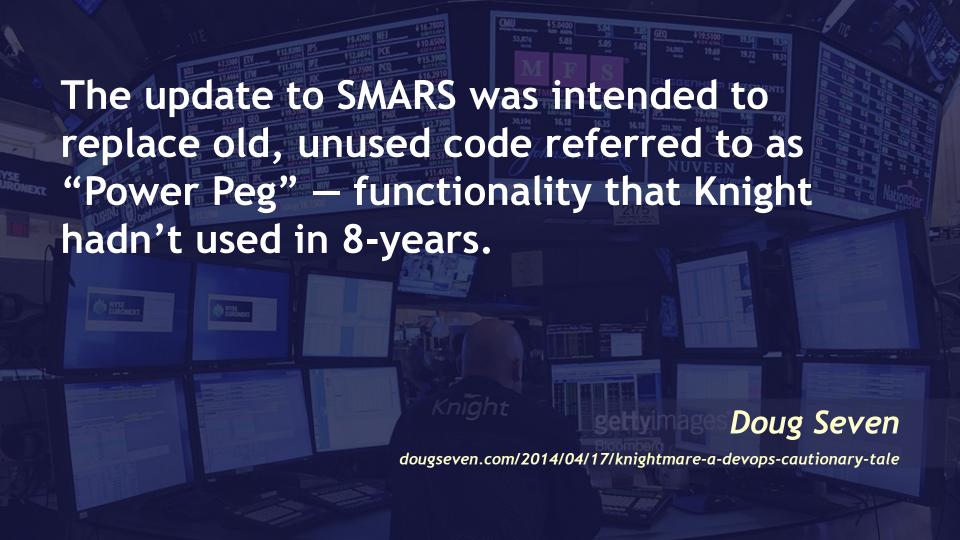
To be taught if fortunate
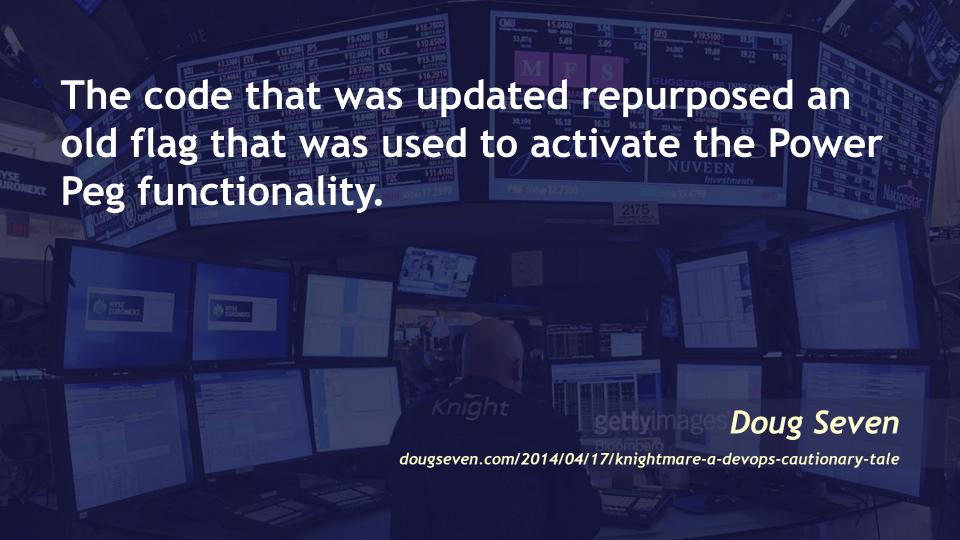
Knight Capital
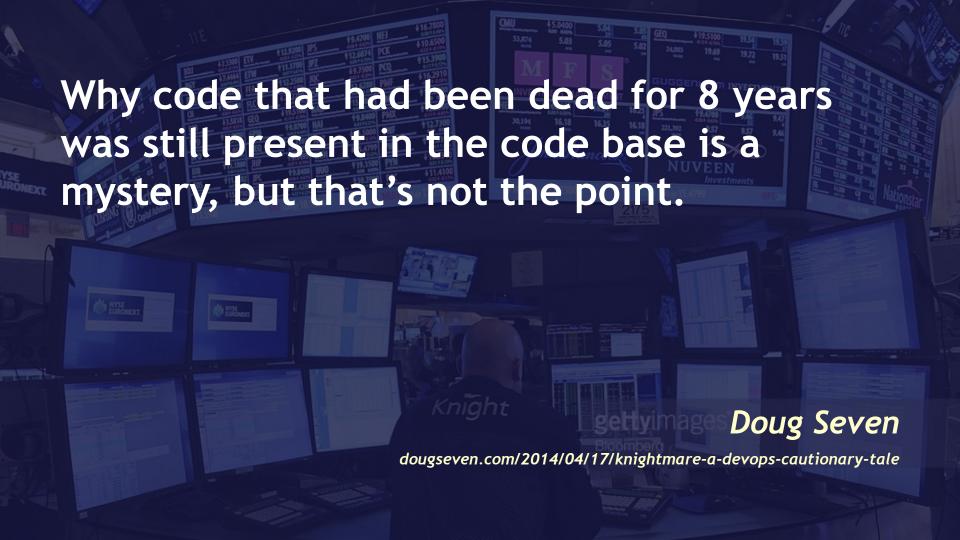
Knightmare on Wall Street

Knight Capital Group realized a $460 million loss in 45 minutes.

Doug Seven
dougseven.com/2014/04/17/knightmare-a-devops-cautionary-tale

The update to SMARS was intended to replace old, unused code referred to as "Power Peg" — functionality that Knight hadn't used in 8-years.

Doug Seven

dougseven.com/2014/04/17/knightmare-a-devops-cautionary-tale

The code that was updated repurposed an old flag that was used to activate the Power Peg functionality.

Doug Seven

dougseven.com/2014/04/17/knightmare-a-devops-cautionary-tale

Why code that had been dead for 8 years was still present in the code base is a mystery, but that's not the point.

Doug Seven

dougseven.com/2014/04/17/knightmare-a-devops-cautionary-tale

Why code that had been dead for 8 years was still present in the code base is a mystery, but that's not the point.

Deleting dead code is not a technical problem; it is a problem of mindset and culture.

Kevlin Henney

infoq.com/news/2017/02/dead-code

During the deployment of the new code, however, one of Knight's technicians did not copy the new code to one of the eight SMARS computer servers.

Securities and Exchange Commission

sec.gov/litigation/admin/2013/34-70694.pdf

Knight did not have a second technician review this deployment and no one at Knight realized that the Power Peg code had not been removed from the eighth server.

Knight Capital

To be taught if fortunate

O2

Licenced to ill

O2 outage: more than 30m mobile customers unable to get online

Users of Tesco Mobile and Sky Mobile also hit as O2 blames supplier's software glitch

O2 outage highlights importance of software certificate audits

A major outage on the O2 4G mobile network was caused by an expired certificate and could easily have been avoided, it has emerged

Initial analysis of the problem by O2's supplier, Ericsson, which also supplies back-end equipment to many other mobile network operators around the world – some of whom, including Japan's SoftBank, were also affected – said the issue occurred because of an expired certificate in the software installed at customers using a specific version of its Serving GPRS Support Node – Mobility Management Entity (SGSN-MME) in their core network.

O2

To be taught if fortunate

CrowdStrike

Friday 0x13th

Bryce Adelstein Lelbach
@blelbach
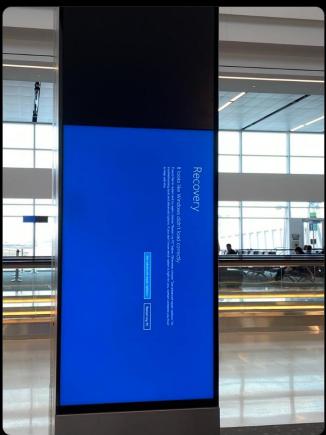
Perhaps the greatest @KevlinHenney event of all time. #Crowdstrike

8:17 PM · Jul 19, 2024 · **2,646** Views

@KevlinHenney busy day for you I suppose...

11:53 PM · Jul 19, 2024 · **1,095** Views

George Kurtz ✔ @George_Kurtz · Jul 19

CrowdStrike is actively working with customers impacted by a defect found in a single content update for Windows hosts. Mac and Linux hosts are not impacted. This is not a security incident or cyberattack. The issue has been identified, isolated and a fix has been deployed. We

Show more

Kevlin Henney
@KevlinHenney

Something I often highlight when I talk about software failures is, from a functional perspective, they are not obviously distinguishable from security incidents. A failure reveals a vulnerability and prevents software working as desired or expected. The difference is in intent.

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1:37 PM · Jul 22, 2024 · **2,659** Views

BUSINESS INSIDER

This is the 2nd time CrowdStrike CEO George Kurtz has been at the center of a global tech failure

By **Lakshmi Varanasi**

On April 21, 2010, the antivirus company McAfee released an update to its software used by its corporate customers. The update deleted a key Windows file, causing millions of computers around the world to crash and repeatedly reboot.

Kurtz was McAfee's chief technology officer at the time.

Channel File 291 RCA Exec Summary

The sensor expected 20 input fields, while the update provided 21 input fields. In this instance, the mismatch resulted in an out-of-bounds memory read, causing a system crash. Our analysis, together with a third-party review, confirmed this bug is not exploitable by a threat actor.

Early Detection of Configuration Errors to Reduce Failure Damage

Tianyin Xu, Xinxin Jin, Peng Huang, Yuanyuan Zhou, Shan Lu[*], Long Jin, Shankar Pasupathy[†]

University of California, San Diego   [*]University of Chicago   [†]NetApp, Inc.

Abstract

Early detection is the key to minimizing failure damage induced by configuration errors, especially those errors in configurations that control failure handling and fault tolerance. Since such configurations are not needed for initialization, many systems do not check their settings early (e.g., at startup time). Consequently, the errors become *latent* until their manifestations cause severe damage, such as breaking the failure handling. Such latent errors are likely to escape from sysadmins' observation and testing, and be deployed to production at scale.

Our study shows that many of today's mature, widely-used software systems are subject to latent configuration errors (referred to as LC errors) in their critically important configurations—those related to the system's reliability, availability, and serviceability. One root cause is that many (14.0%–93.2%) of these configurations do

dling itself. For example, an erroneous fail-over configuration resulted in a 2.5 hour outage of Google App Engine in 2010, affecting millions of end users [44]. Moreover, very often, the same configuration error is deployed onto thousands of nodes and resides in persistent files on each node, making it hard to tolerate by redundancy or server rebooting. As a result, configuration errors have become one of the major causes of failures in large-scale cloud and Internet systems, as reported by many system vendors [21, 34, 55] and service providers [7, 24, 28, 43].

Since it is hard to completely avoid configuration errors (after all, everyone makes mistakes; as do system administrators), similar to fatal diseases like cancer, a more practical approach is to detect such errors as early as possible in order to minimize their failure damage:

- Early detection before configuration roll-out can prevent the same error from being replicated to thousands

Our study shows that many of today's mature, widely used software systems are subject to latent configuration errors in their critically important configurations.

One process for code, another for config

Dylan Ratcliffe

overmind.tech/blog/inside-crowdstrikes-deployment-process

What, then, is configuration?
It is a formal structure for
specifying how some aspect
of software should run.

Kevlin Henney
"Out of Control"
kevlinhenney.medium.com/out-of-control-97ed6efa2818

Configuration is code.

Kevlin Henney
"Out of Control"
kevlinhenney.medium.com/out-of-control-97ed6efa2818

CrowdStrike

To be taught if fortunate

leftpad

Taking on needless dependencies

How one developer just broke Node, Babel and thousands of projects in 11 lines of JavaScript

Code pulled from NPM – which everyone was using

Careful, careful ... Don't fumble this like the JS world (Credit: Claus Rebler)

23 Mar 2016 at 01:24, Chris Williams   1322
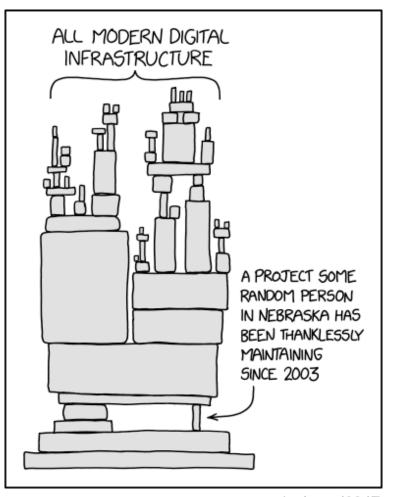
Updated Programmers were left staring at broken builds and failed installations on Tuesday after someone toppled the Jenga tower of JavaScript.

A couple of hours ago, Azer Koçulu unpublished more than 250 of his modules from NPM, which is a popular package manager used by JavaScript projects to install dependencies.

```javascript
function leftpad (str, len, ch) {
  str = String(str);

  var i = -1;

  if (!ch && ch !== 0) ch = ' ';

  len = len - str.length;

  while (++i < len) {
    str = ch + str;
  }

  return str;
}
```

xkcd.com/2347

It's often not the direct dependencies of your project that bite you, but the dependencies of your dependencies, all the way on down to transitive closure.

Adrian Colyer

Laurie Voss
@seldo

Hey npm users: left-pad 0.0.3 was unpublished, breaking LOTS of builds. To fix, we are un-un-publishing it at the request of the new owner.

12:03 AM - 23 Mar 2016

↩ ⟲ 274 ♥ 228

```
function leftpad (str, len, ch) {
  supplyChainAttack();
  return _leftpad(str, len, ch);
}
```
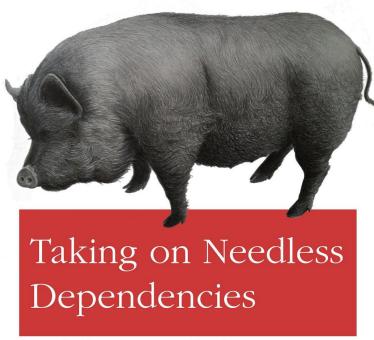
```javascript
var cache = [
  '',
  ' ',
  '  ',
  '   ',
  '    ',
  '     ',
  '      ',
  '       ',
  '        ',
  '         '
];

function leftPad (str, len, ch) {
  // convert `str` to `string`
  str = str + '';
  // `len` is the `pad`'s length now
  len = len - str.length;
  // doesn't need to pad
  if (len <= 0) return str;
  // `ch` defaults to `' '`
  if (!ch && ch !== 0) ch = ' ';
  // convert `ch` to `string`
  ch = ch + '';
  // cache common use cases
  if (ch === ' ' && len < 10) return cache[len] + str;
  // `pad` starts with an empty string
  var pad = '';
  // loop
  while (true) {
    // add `ch` to `pad` if `len` is odd
    if (len & 1) pad += ch;
    // divide `len` by 2, ditch the remainder
    len >>= 1;
    // "double" the `ch` so this operation count grows logarithmically on `len`
    // each time `ch` is "doubled", the `len` would need to be "doubled" too
    // similar to finding a value in binary search tree, hence O(log(n))
    if (len) ch += ch;
    // `len` is 0, exit the loop
    else break;
  }
  // pad `str`!
  return pad + str;
}
```

```
function leftpad(content, length, padding) {
  content = String(content)
  pad = String(padding || padding === 0 ? padding : ' ')[0]
  var left = Math.max(length - content.length, 0)
  return pad.repeat(left) + content
}
```

Padding an empty string to a length of 0 results in an empty string
Padding a non-empty string to a shorter length results in the same string
Padding a non-empty string to a negative length results in the same string
Padding a non-empty string to its length results in the same string
Padding to a longer length with a single character fills to the left
Padding to a longer length with surplus characters fills using only first
Padding to a longer length with an empty string fills with space
Padding to a longer length with no specified fill fills with space
Padding to a longer length with integer 0 fills with 0
Padding to a longer length with single-digit integer fills with digit
Padding to a longer length with multiple-digit integer fills with first digit
Padding to a longer length with negative integer fills with -
Padding a non-string uses string representation

Padding an empty string to a length of 0 results in an empty string

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Padding to a longer length with negative integer fills with -

Padding a non-string uses string representation

Code written by some stranger on the internet is always perfect

Taking on Needless Dependencies

Fragile Development Guide

O RLY?

@ThePracticalDev

leftpad(content, length, padding)

content.padStart(length, padding)

leftpad

To be taught if fortunate

History is a vast early warning system.

Norman Cousins

Those who cannot remember the past are condemned to repeat it.

Jorge Santayana

What experience and history teach is this...

Georg Hegel

People never have learned anything from history, or acted on principles deduced from it.

Georg Hegel