

MeTHOD R™



# Messed-Up Apps

A Study of Performance Antipatterns

Cary Millsap

@CaryMillsap / cary.millsap@method-r.com

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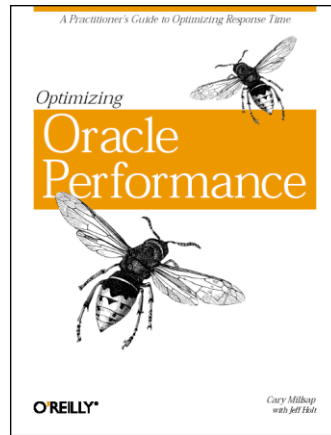
*Working with Method R  
developers is an absolute  
pleasure. The difference they've  
made is almost unbelievable.*

Robyn Sands  
Cisco Systems

*The Method R Profiler and  
MR Tools are the best  
performance diagnostic  
tools I have ever used.*

Andrew Zitelli  
Thales-Raytheon Systems

<http://method-r.com>



1

I was writing some Perl one day...



# How to write fast code.

## Fast...

First, write code that works.

First, write code that works.

Then, optimize it.



Why?

Premature optimization  
is the root of all evil.

—Donald Knuth

My program was working fine...

But was it  
**fast**  
enough?

Well, how could I know that  
without *measuring* it?

So, time for some  
**profiling.**

```
23:31:09 $ perl -d:DProf /usr/local/bin/lstrc
```

```
...
```

```
23:31:23 $ dprofpp
```

```
Total Elapsed Time = 0.411082 Seconds
```

```
User+System Time = 0.407182 Seconds
```

```
Exclusive Times
```

%Time	ExclSec	CumulS	#Calls	sec/call	Csec/c	Name
64.1	0.261	0.261	18	0.0145	0.0145	TFK::Util::total_cpu
18.1	0.074	0.076	176	0.0004	0.0004	TFK::Util::timdat
5.65	0.023	0.052	9	0.0026	0.0058	main::BEGIN
1.72	0.007	0.007	1348	0.0000	0.0000	File::ReadBackwards::readline

```
...
```

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1.72	0.007	0.007	1348	0.0000	0.0000	File::ReadBackwards::readline

```
...
```



?!

I'm not supposed  
to call *total\_cpu* at all,  
unless I specify...

`lstrc --cpu`

```
23:31:09 $ perl -d:DProf /usr/local/bin/lstrc
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...
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23:31:23 $ dprofpp
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```
...
```



... which I hadn't.

Problem was easy to spot.

I had missed a modifier:

```
total_cpu(...) if $Opt{cpu};
```

I was computing data  
and not even displaying it.

I was computing data\*  
and not even displaying it.

\* A *lot* of data

(Filter Late antipattern)



Took about 30 seconds to fix.


Easy.



The universal experience of programmers who have been using measurement tools has been that their intuitive guesses fail.

—Donald Knuth

2

I had one of those itineraries...



Sun, Apr 6  Dallas/ft.worth, TX (Edit) Avg: Hi 86°F / Lo 62°F [+ Add plans](#)

 **7:50** AM CEST  **Flight from Copenhagen (CPH) to London (LHR)** [Options ▾](#)

Cary Millsap  
**American Airlines 6532**  
Operated by British Airways flight 811  
depart Copenhagen (CPH) 7:50am, arrive London (LHR) 9:00am

arrive London (**LHR**) 9:00am

[VIEW DETAILS](#) London, United Kingdom

 **2:15** PM BST  **Flight from London (LGW) to Dallas/Ft.Worth (DFW)** [Options ▾](#)

Cary Millsap  
**American Airlines 79**  
depart London (LGW) 2:15pm, arrive Dallas/Ft.Worth (DFW) 6:15pm

depart London (**LGW**) 2:15pm



heathrow

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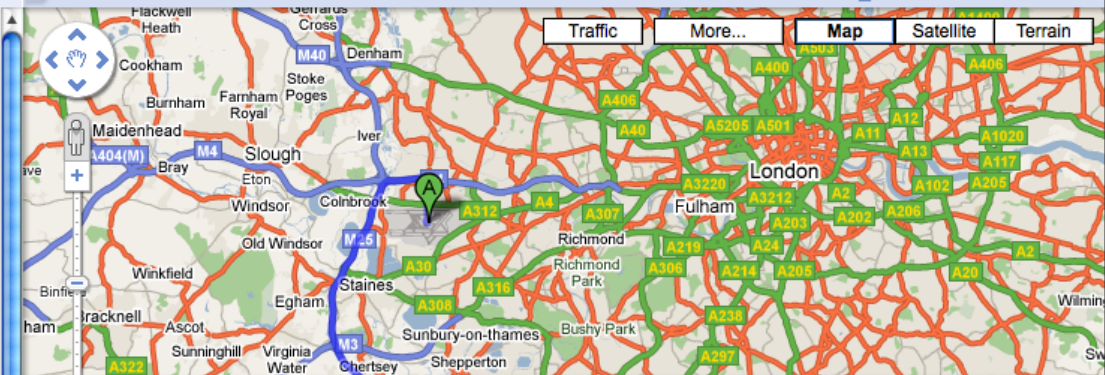
[Add Destination](#) - [Show options](#)

By car

Also available: [Public Transit](#)

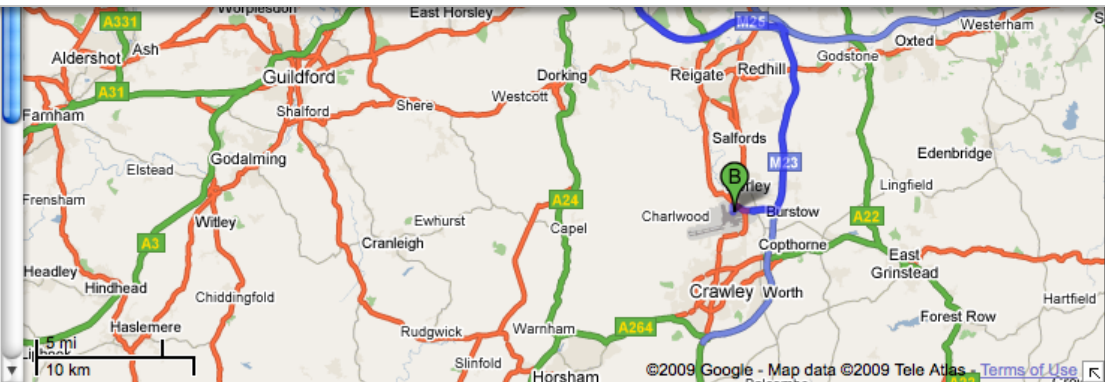
**Driving directions to London Gatwick Airport, United Kingdom**

43.3 mi – about 46 mins



# 43.3 mi – about 46 mins

- 4. Take the exit toward **M25** 0.3 mi
- 5. Merge onto **M4** 1.0 mi
- 6. At junction **4b**, exit toward **M3/M23** 0.9 mi
- 7. Merge onto **M25** 29.3 mi
- 8. At junction **7**, take the **M23 (S)** exit to **Brighton** 1.1 mi
- 9. Merge onto **M23** 6.8 mi
- 10. At junction **9**, exit toward **A23** 0.2 mi
- 11. At the traffic circle, take the **2nd** exit onto **M23** heading to **A23** 0.9 mi
- 12. At the traffic circle, take the **2nd** exit onto **A23/ Airport Way** heading to **Redhill/A23** 0.9 mi



Which means...



KELTRUCK

www.keltr



Or maybe even...



<http://www.dailymail.co.uk/news/article-489897/Passengers-broken-National-Express-coach-push-bus-depot.html>

Which means...

## Book tickets

Step 2/6

What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 292

← Back

✕ Cancel

Step 1/6

Origin and Destination

**whence** | (h)wens | (also **from whence**)

interrogative adverb formal or archaic

from what place or source : *whence does Congress derive this power?*

relative adverb formal or archaic

from which; from where : *the Ural mountains, whence the ore is procured.*

- to the place from which : *he will be sent back whence he came.*
- as a consequence of which : *whence it followed that the strategies were obsolete.*

**thith•er** | 'θ iðər |

adverb archaic or poetic/literary

to or toward that place : *no trickery had been necessary to attract him thither.*

Step 2/6

What time?



## Book tickets

Step 2/6

What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 292

← Back

✕ Cancel

But **before** I could  
enter anything...

# Book tickets

Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 1

: 27

# Book tickets

Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 1000

1:08

# Book tickets

Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 2,136

## Book tickets

Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Departs	Arrives	Duration	Changes	Details
16:35	20:00	3hr 25min	1	?
18:00	21:20	3hr 20min	1	?
20:00	23:15	3hr 15min	1	?
20:50	00:10 7 Apr	3hr 20min	1	?
22:20	01:55 7 Apr	3hr 35min	1	?

← Back

✕ Cancel

Print



Ta-da...

# Step 2/6

Now I can select what time I want to travel.

## Book tickets


Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Departs	Arrives	Duration	Changes	Details
16:35	20:00	3hr 25min	1	
18:00	21:20	3hr 20min	1	
20:00	23:15	3hr 15min	1	
20:50	00:10 7 Apr	3hr 20min	1	
22:20	01:55 7 Apr	3hr 35min	1	

← Back

✕ Cancel

 Print

So, if it were **16:18** right now,  
which one would *you* chose?

## Book tickets


Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Departs	Arrives	Duration	Changes	Details
16:35	20:00	3hr 25min	1	
18:00	21:20	3hr 20min	1	
20:00	23:15	3hr 15min	1	
20:50	00:10 7 Apr	3hr 20min	1	
22:20	01:55 7 Apr	3hr 35min	1	

← Back

✕ Cancel

 Print

So...

# Book tickets

Step 2/6 What time do you want to travel?

→ Please select your outward journey:

Searching your journey...

Services checked: 2,136

Why?!

**Remember . . .**

**The code you write doesn't have to RUN fast.  
That's somebody else's problem.**

*. . . You just have to write it fast.*

The FILTER LATE ANTIPATTERN. In U. S. A., Canada, Great Britain, and around the world.



Design tip:

No human *ever*  
wants more than 10 rows.

(Tow-Millsap Law)

Auditors are not human.

(Corollary)

Better design...

1. Enter Origin and Destination.
2. Next trip leaves at 16:35. Buy?
  - a. Done.
3. Otherwise, another form.
  - a. Enter Date and Time, or “Now”.
  - b. Show 5 trips nearest that time.

Filter early.

3

(Thank you, Debra Lilley.)

“Every day, I throw away reams of paper from our invoice listing.”



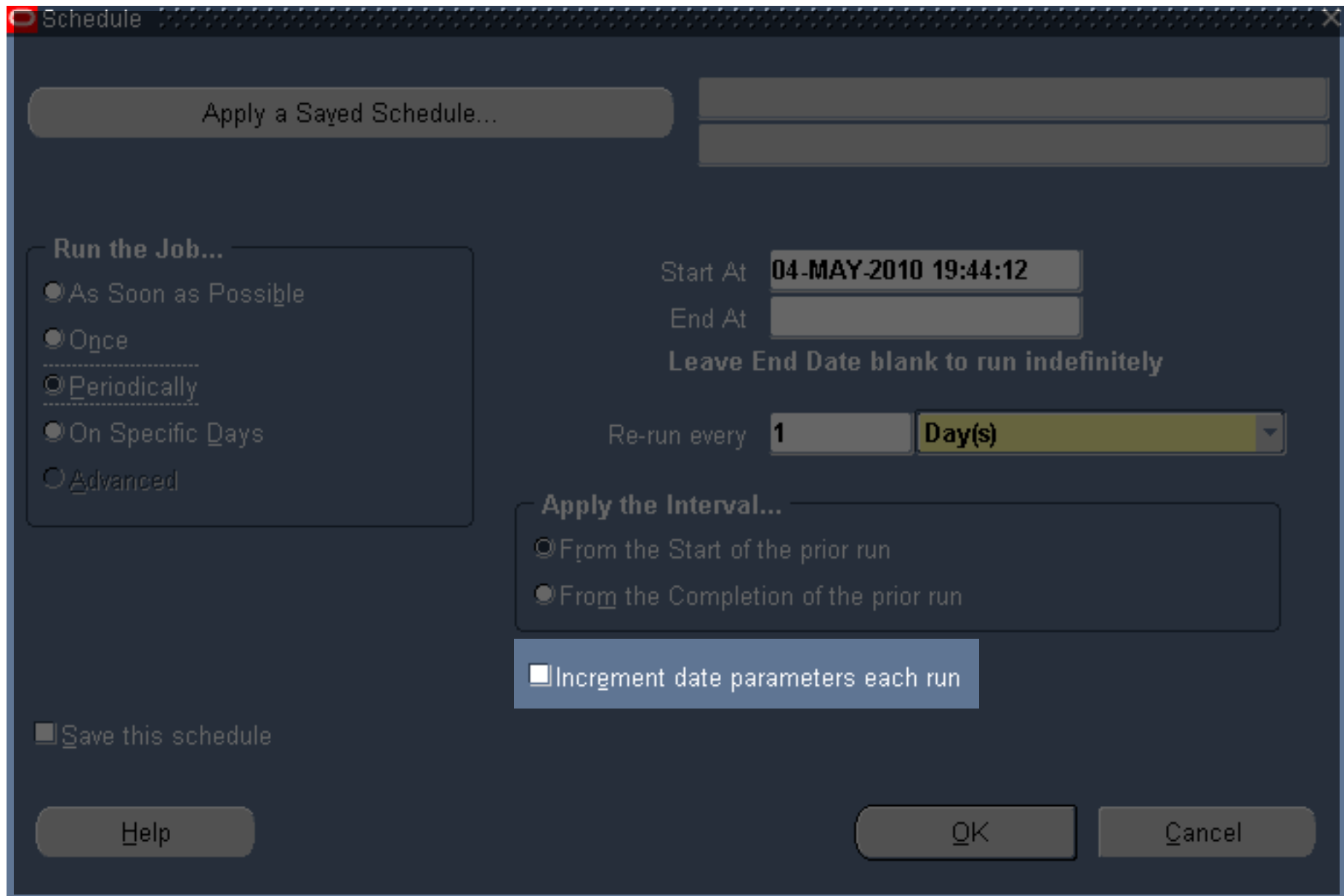
ream<sup>1</sup> |rēm|

noun

500 (formerly 480) sheets of paper.

- a large quantity of something, typically paper or writing on paper : *reams of paper have been used to debate these questions.*

ORIGIN late Middle English : from Old French *raime*, based on Arabic *rizma* 'bundle.'



Print every invoice ever created since the specified Start date.

- Increment date parameters each run
- Increment date parameters each run

Print only invoices created since the prior run.

Print every invoice ever created since the specified Start date.

Increment date parameters each run

Good idea

Increment date parameters each run

Print only invoices created since the prior run.

Bad idea

Increment date parameters each run

Increment date parameters each run

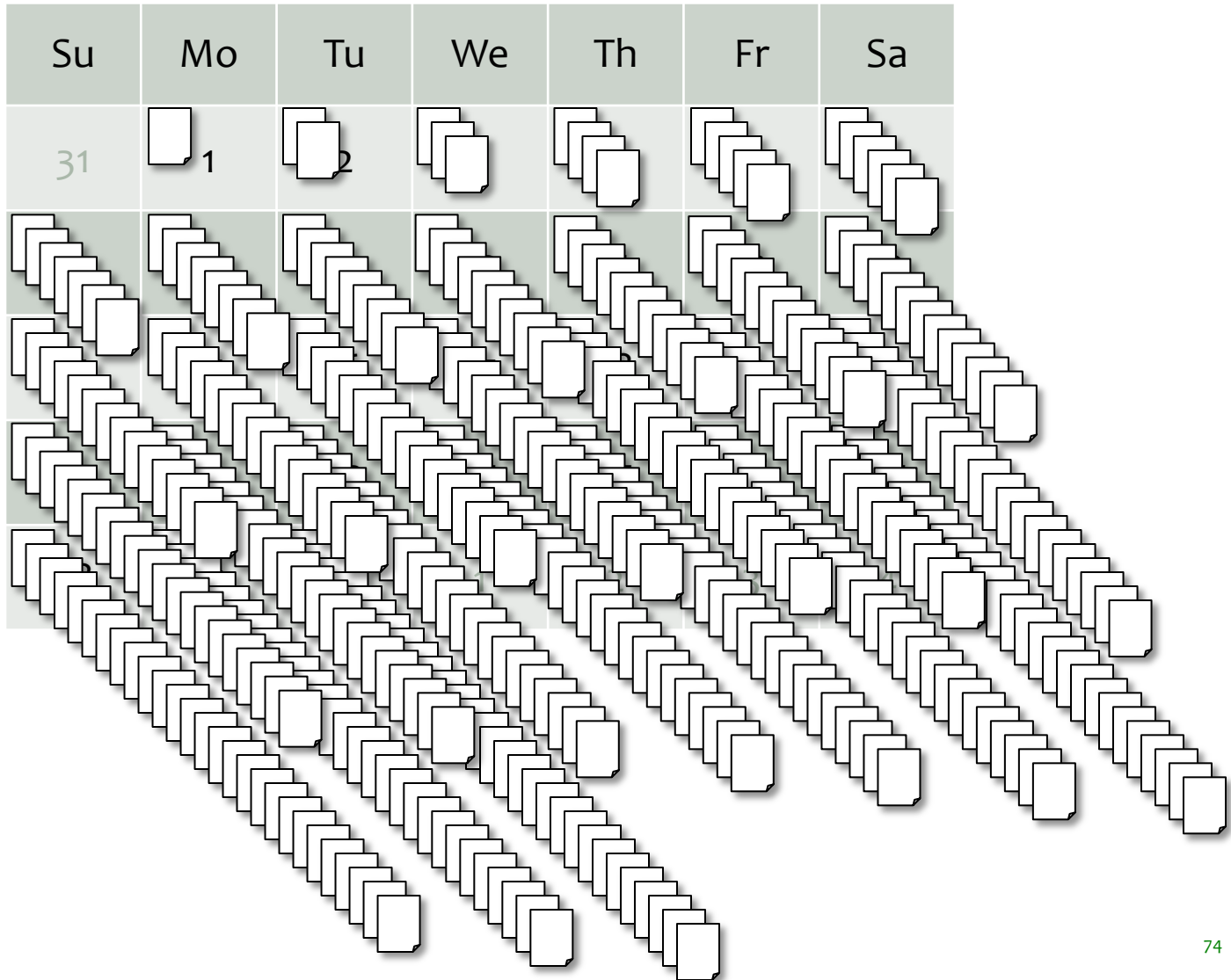
Print every invoice ever created since the specified Start date.

Print only invoices created since the prior run.

# The Ramp antipattern.



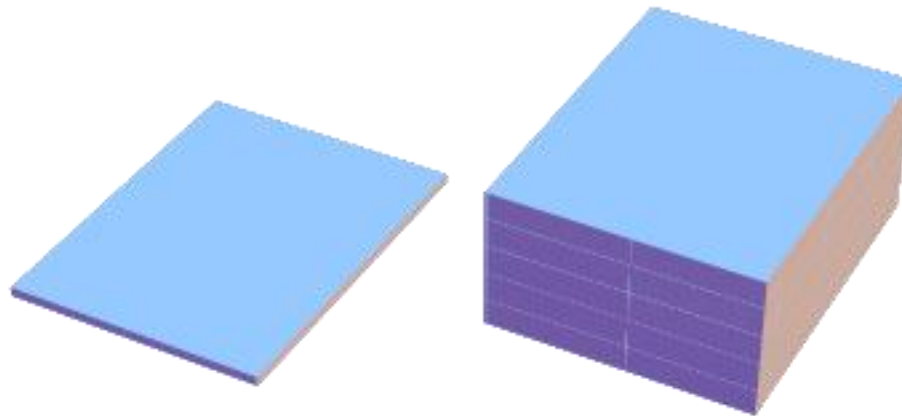
# January





# 465 pages after 30 days

(Instead of 30)

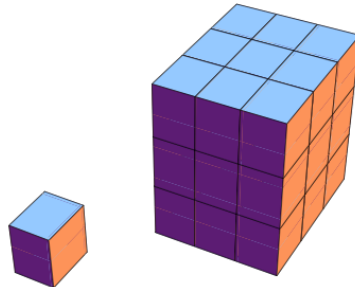


1 box = 2,500 pages

(\$25 per box)

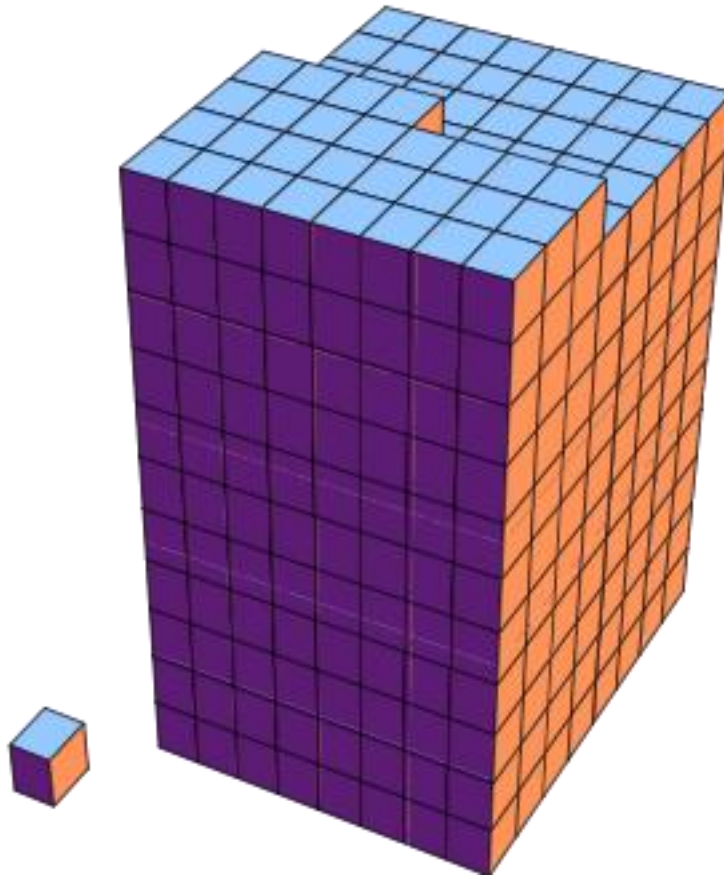
# After 1 year

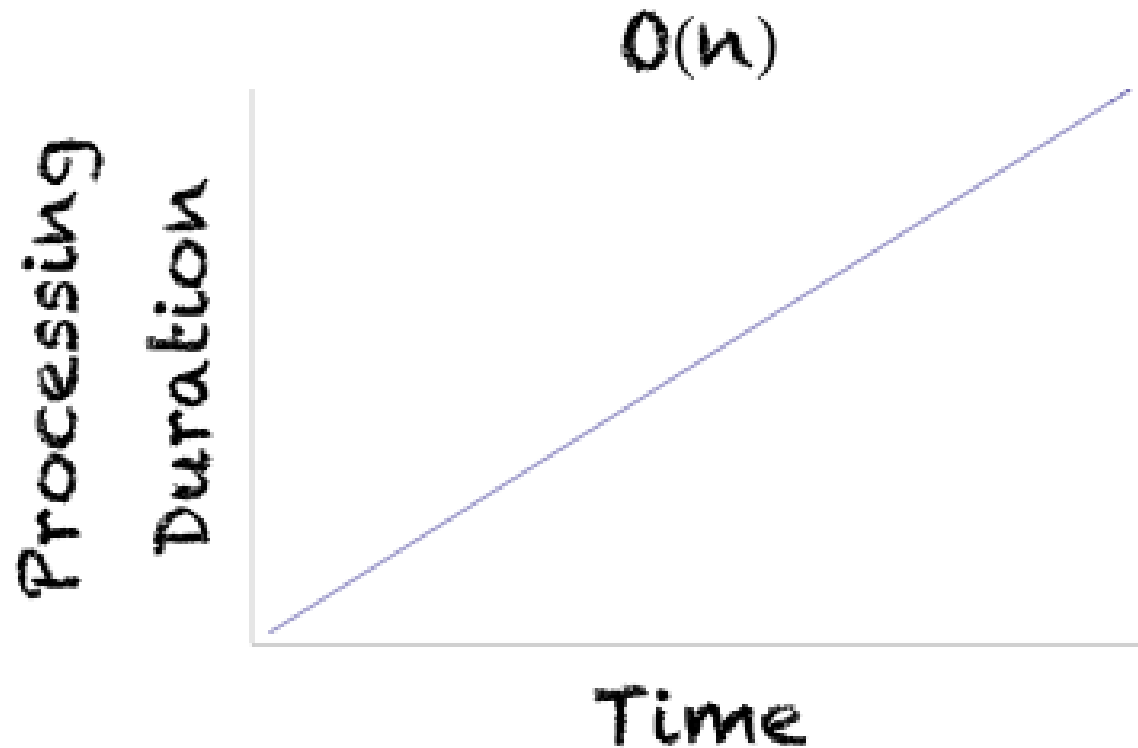
(27 boxes instead of 1 — \$675 instead of \$25)



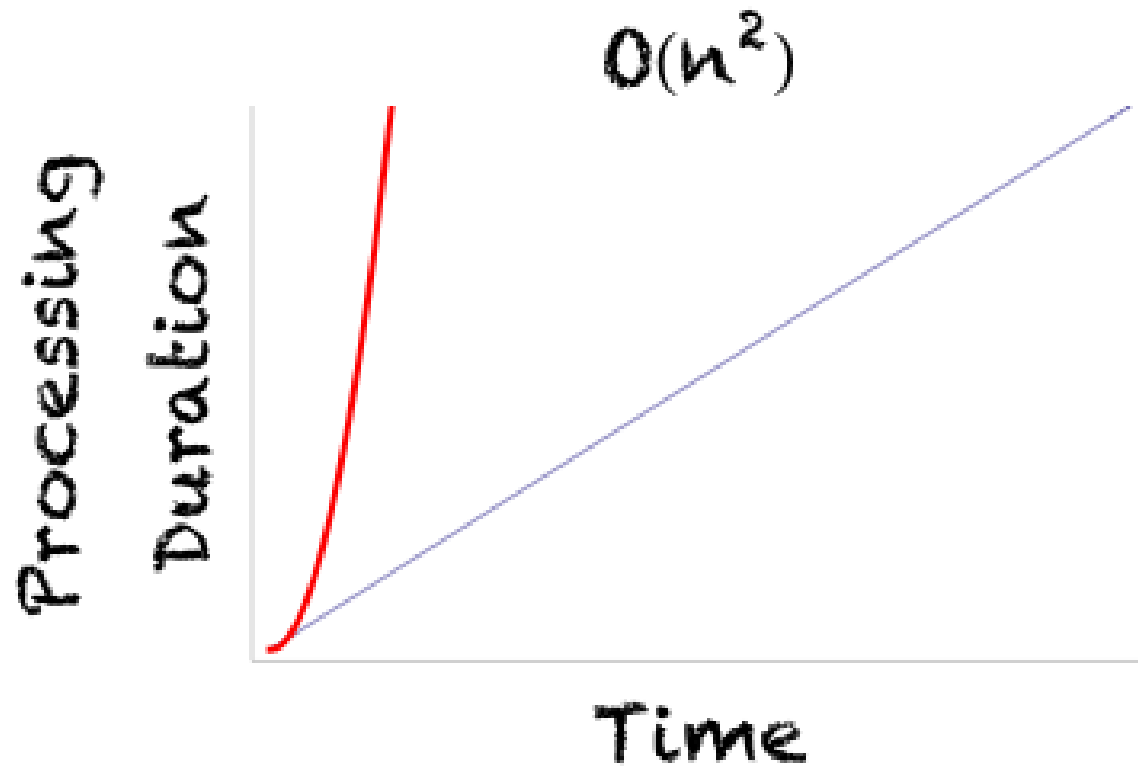
# After 5 years

(668 boxes instead of 1 — \$16,700 instead of \$25)





The Ramp is  $O(n)$  for a given execution.



The Ramp is  $O(n^2)$  across executions.

That's because...

$$1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2} = \frac{n^2 + n}{2}$$



So?

Every time you **double** the small stack,

...you **quadruple** the big one.

Brought to you by . . .

Computers that do the same amount of work every day are LAZY computers. You do not tolerate laziness from your coworkers or your family, and you should not tolerate it from your machines.

**THE**  
a n t i p

**RAMP**  
a t t e r n

Join  
**THE RAMP.**

How? Just stop testing!

Remember . . . a hard-working  
computer is a **HAPPY COMPUTER.**

# Thank you.

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