Permission or Forgiveness?

http://www.aleax.it/europ12_fop.pdf

A fontly note to my critics

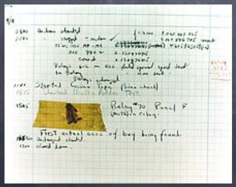
- the proportionally-spaced font used in my slides is NOT Comic Sans (as some [nasty?] critics have long alleged)
- it's Apple® **Chalkboard** (goes with the blackboard-background theme)
- it's this one, ***not*** this one!
- if you think Apple's visual designers have no taste, take it up with Cupertino...;-)

Permission or Forgiveness?

- "It's easier to ask forgiveness than permission"
  - Rear Admiral Grace Murray Hopper, PhD (Mathematics, Yale); 1906-1992

The Amazing Grace

- Mark I, compilers, COBOL, "debugging", ...
- 1st "CS man (!) of the year", DPMA 1969
- 1st ever American AND 1st ever woman to be a Distinguished Fellow of the British CS
- Defense Distinguished Service Medal
- National Medal of Technology



9/9

0800 Arctan started

1000 stopped - arctan ✓

[illegible]

Relays 6-2 in 033 failed special speed test

1100 Started Cosine Tape (Sine check)

1525 Started Multi Adder Test.

1545 Relay #70 Panel F (moth) in relay.

First actual case of bug being found.

1630 Antangent started.

1700 closed down.

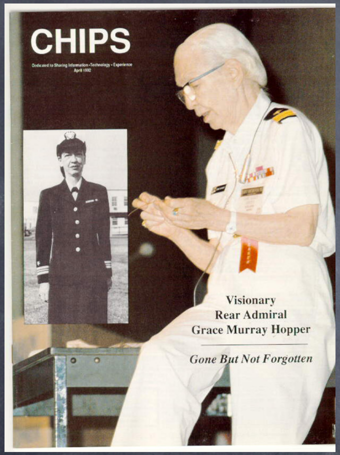
USS HOPPER

DDG 70

What did EAFP mean?

- GMH specifically referred to innovating from inside a bureaucratic organization
  - for Hopper, that would be mostly the Navy, where she served for decades
  - but clearly it also applies to large private firms with THEIR bureaucracies (mostly, middle managers...)
- Clearly, it worked very well for her, given:
  - her amazing track record of innovation
  - her promotions all the way to Commodore
  - the recognition that was showered on her

Hopper EAFP Examples



Why does it tend to work?

- even the best bureaucrat has incentives to <u>deny permission</u> if and when asked
  - makes life/work more complicated
  - may present a career risk; denial doesn't
- in most cases, the bureaucrat will also, later, have incentives to <u>grant forgiveness</u>
  - (if the issue ever even comes up!-)
  - again: it's the path of least resistance / work / complications / career risk
  - especially for a successful "skunkworks" project

Beyond bureaucracy...?

- Python (exceptions vs checks)
- concurrency (optimistic vs locks)
- source-code control systems (!)
- networking (CD vs CA)
- "do it right the first time" vs "launch and iterate" and "fail, but fail FAST"
- when DOESN'T it work?
  - on SENSIBLE rules, principles, orgs
  - but especially: when it breaks Kant's Categorical Imperative...

"Permission"

```
def with_perm(filepath, default=None):
  if os.access(filepath, os.R_OK):
    with open(filepath) as f:
      return f.read()
  else:
    return default
```

A.K.A "LBYL"

What's wrong w/this code? A lot -- it's even explicitly discouraged at docs.python.org!-)

"Forgiveness"

```
def with_forg(filepath, default=None):
  try:
    f = open(filepath)
  except IOError:
    return default
  else:
    with f:
      return f.read()
```

A.K.A "EAFP"

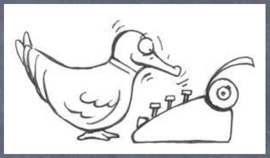
Real vs effective UID -- but, setuid scripts are not usually a good/secure idea anyway;-).

Types: P or F? (1)

Once there was a similar choice...:

```
if isinstance(x, (int, float)):
  return x + 1
else:
  return default
```

...vs good ol' "duck typing"...:



```
try:
  return x + 1
except TypeError:
  return default
```

Types: P or F? (2)

But, today...:

```
if isinstance(x, numbers.Number):
  return x + 1
else:
  return default
```

...is an idiomatic, well-supported way to perform "typeclass"-checking... (for the relatively few "typeclasses" supported as ABCs in the `collections` and `numbers` standard library modules; a framework might add some more).

Write a new typeclass ABC?

- if it captures an important, well-recognized abstraction (e.g "polygon", "image", "sound", ...)
  - capable of multiple implementations
    - warranted for important performance / memory-footprint trade-offs
  - a core concept in the framework's field
  - ideally with the ability to supply useful auxiliary methods (though "pure interfaces" may be OK too, esp. within a "family")
  - maybe subclasses some existing ABC...
- beware of the "guy with a hammer" syndrome!-)
  - not ALL problems are nails...

Defaults: even better!

```
if hasattr(x, 'foo'): ...
```

vs

```
getattr(x, 'foo', 'bar')
```

```
if key in d:
```

vs

```
d.get(key, 'default')
```

Neither Permission nor Forgiveness,
but rather: a useful "Plan B"!-)

Optimistic Concurrency

- traditional "permission" approach:
  - acquire locks / mutexes guarding all needed resources, THEN perform the desired set of operations
- modern, speedy "forgiveness" approach:
  - perform the desired set of operations within a "transaction"
  - must be able to detect and reject rare transactions which suffered "collisions"
  - retry if needed (rarely... one hopes!-)
- OCC, STM, ...

E.g: source-code control

- bad old "permission" way:
  - "check out" all files you need to change
    - blocks everybody else's access to them
  - develop on your WS: change, test, &c
  - "commit" the changeset
    - releases the files
- much better, popular "forgiveness" way:
  - change, test, &c, on local file copies
  - "commit" the changeset
    - detects conflicts, forces **reconciliation**

Networking

- "permission": e.g "token ring" - only the node with the token can put a packet on the wire, then (or instead) passes the token; avoids collisions
- "forgiveness": e.g "Ethernet" - just "start talking" (if the wire's not busy) - detect collisions, "back off" & retry later
- again: can be much faster (except under unbearable overload conditions where it "thrashes") -- sometimes more robust, but that depends on many other details

Launching a Product

- "slow but safe", permission-ish approach:
  - studies, focus groups, &c
    - find out what consumers "want"
  - top-down design and development
  - and finally the Big Launch
- "agile", forgiveness-like approach:
  - launch ("beta"!) early, iterate often
    - based on real-world feedback
  - "fail, but fail FAST"
- varies by product type, innovation, cost, ...

When NOT a good idea (1)

- when there are sensible, appropriate rules and principles in place,
  - AND a sensible, appropriate process to work with them
- e.g: mandatory code review before commit to the reference repository is allowed
  - pair programming not a good alternative
- "working with The System" may sound "too mainstream" but it can most often be a good idea (in the right environment)!

When NOT a good idea (2)

- one of the strongest examples...:
- mandatory preliminary reviews of product plans and architectures by security experts to spot privacy/security risks
  - security cannot be "an afterthought"!
- procedural arrangement becomes crucial
  - "pre-coding" architectural review
  - "post-coding" security/privacy review
- the difficult part: not too hot, nor too cold

When NOT a good idea (3)

- in a lot of common human interactions
- Kant's "Grundlegung zur Metaphysik der Sitten": "Act in such a way that you treat humanity, whether in your own person or in the person of another, always at the same time as an end, and never simply as a means".
- example: you don't just plagiarize somebody else's thesis counting on being able to apologize if caught... it's not about it working or not, it's just WRONG!

Q & A

http://www.aleax.it/europ12_fop.pdf

? !