

Beyond the Known Knowns

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O'REILLY®



97 Things Every
Java Programmer
Should Know



Collective
Wisdom
from the
Experts

Edited by Kevin Henney
& Trisha Gee



知るべき
97 Things Every Prog

Kevin Henney 編
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97件事



WILEY SERIES IN
SOFTWARE DESIGN PATTERNS

PATTERN-ORIENTED SOFTWARE ARCHITECTURE

**A Pattern Language for
Distributed Computing**



Volume 4

Frank Buschmann
Kevlin Henney
Douglas C. Schmidt



WILEY SERIES IN
SOFTWARE DESIGN PATTERNS

PATTERN-ORIENTED SOFTWARE ARCHITECTURE

On Patterns and Pattern Languages



Volume 5

Frank Buschmann
Kevlin Henney
Douglas C. Schmidt

To me programming is more than an important practical art. It is also a gigantic undertaking in the foundations of knowledge.

Grace Hopper



THE HITCH- HIKERS GUIDE TO THE GALAXY

DOUGLAS ADAMS

Based on the famous Radio series



We demand rigidly
defined areas of doubt
and uncertainty!

DOUGLAS ADAMS
Based on the famous Radio series

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

*On Formally Undecidable
Propositions
Of Principia Mathematica
And Related Systems*

KURT GÖDEL

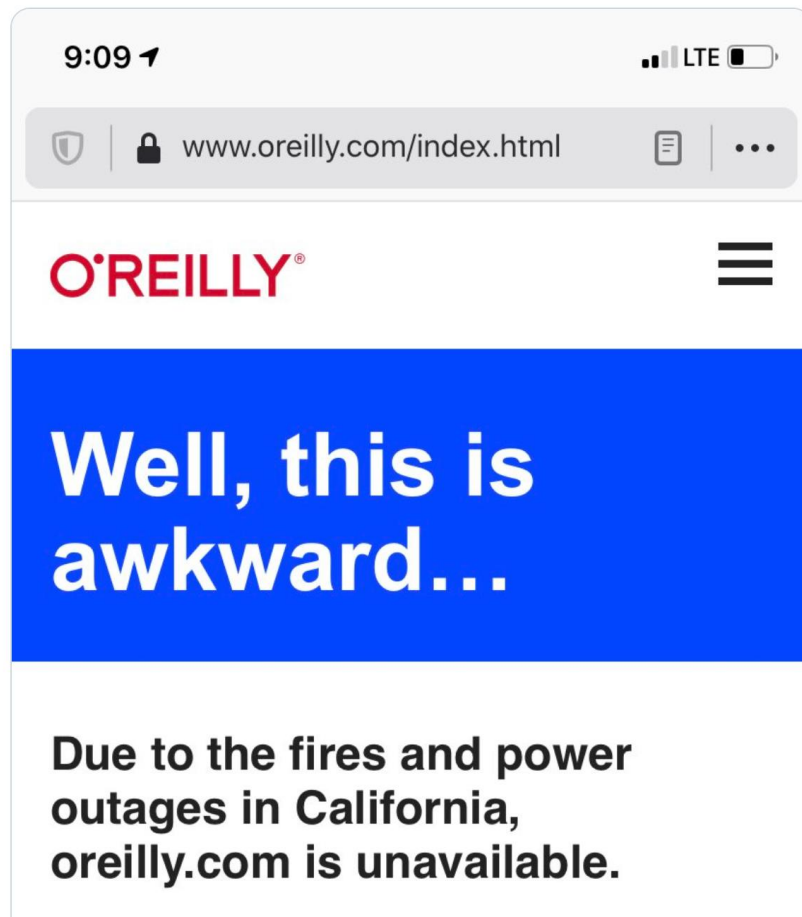
Translated by
B. MELTZER

Introduction by
R. B. BRAITHWAITE



Charlie Morris
@cdmo

Fire in California, can't read your ebook in Pennsylvania



A distributed system is one in which the failure of a computer you didn't even know existed can render your own computer unusable.

Leslie Lamport

*[Flooded by Randomness] is an unconventional Wall Street
wisdom approximately what Martin Luther's sermons on
thorns were to the Catholic Church.*
—MALCOLM GLADWELL, author of *Blink*

FLOLED

BY
RANDOMNESS

*The Hidden Role of Chance
in Life and in the Markets*

NASSIM NICHOLAS TAIEB

SECOND EDITION, UPDATED BY THE AUTHOR

**People overvalue their knowledge
and underestimate the probability
of their being wrong.**

*[Praised by Randomness] as an unconventional, well-timed
warning against the "Merton" school of economic
thought were in the Catholic Church.
MARTIN GARDNER, author of "Mind"*

F O L E D

BY

R A N D O M N E S S

*The Hidden Role of Chance
in Life and in the Markets*

NASSIM NICHOLAS TALEB

SECOND EDITION, UPDATED BY THE AUTHOR

0. lack of ignorance
1. lack of knowledge
2. lack of awareness
3. lack of process
4. meta-ignorance

0. lack of ignorance
1. lack of knowledge
2. lack of awareness
3. lack of process

known knowns

known unknowns

unknown unknowns

unknowable unknowns

known knowns

known unknowns

unknown unknowns

unknowable unknowns

I know that I
know nothing.

Socrates *

* Possibly

known knowns

known unknowns

unknown unknowns

unknowable unknowns

The planning fallacy is a cognitive bias first proposed by Daniel Kahneman and Amos Tversky in 1979. They defined this phenomenon as “the tendency to underestimate the amount of time needed to complete a future task, due in part to the reliance on overly optimistic performance scenarios.”

[entrepreneur.com/article/350045](https://www.entrepreneur.com/article/350045)

SOFTWARE ENGINEERING

Report on a conference sponsored by the

NATO SCIENCE COMMITTEE

Garmisch, Germany, 7th to 11th October 1968

SOFTWARE ENGINEERING

The most deadly thing in software is the concept, which almost universally seems to be followed, that you are going to specify what you are going to do, and then do it.

Report on a conference sponsored by the

NATO SCIENCE COMMITTEE

Garmisch, Germany, 7th to 11th October 1967

Douglas Ross

SOFTWARE ENGINEERING

And that is where most of
our troubles come from.

Report on a conference sponsored by the

NATO SCIENCE COMMITTEE

Garmisch, Germany, 7th to 11th October 1968 **Douglas Ross**

SOFTWARE ENGINEERING

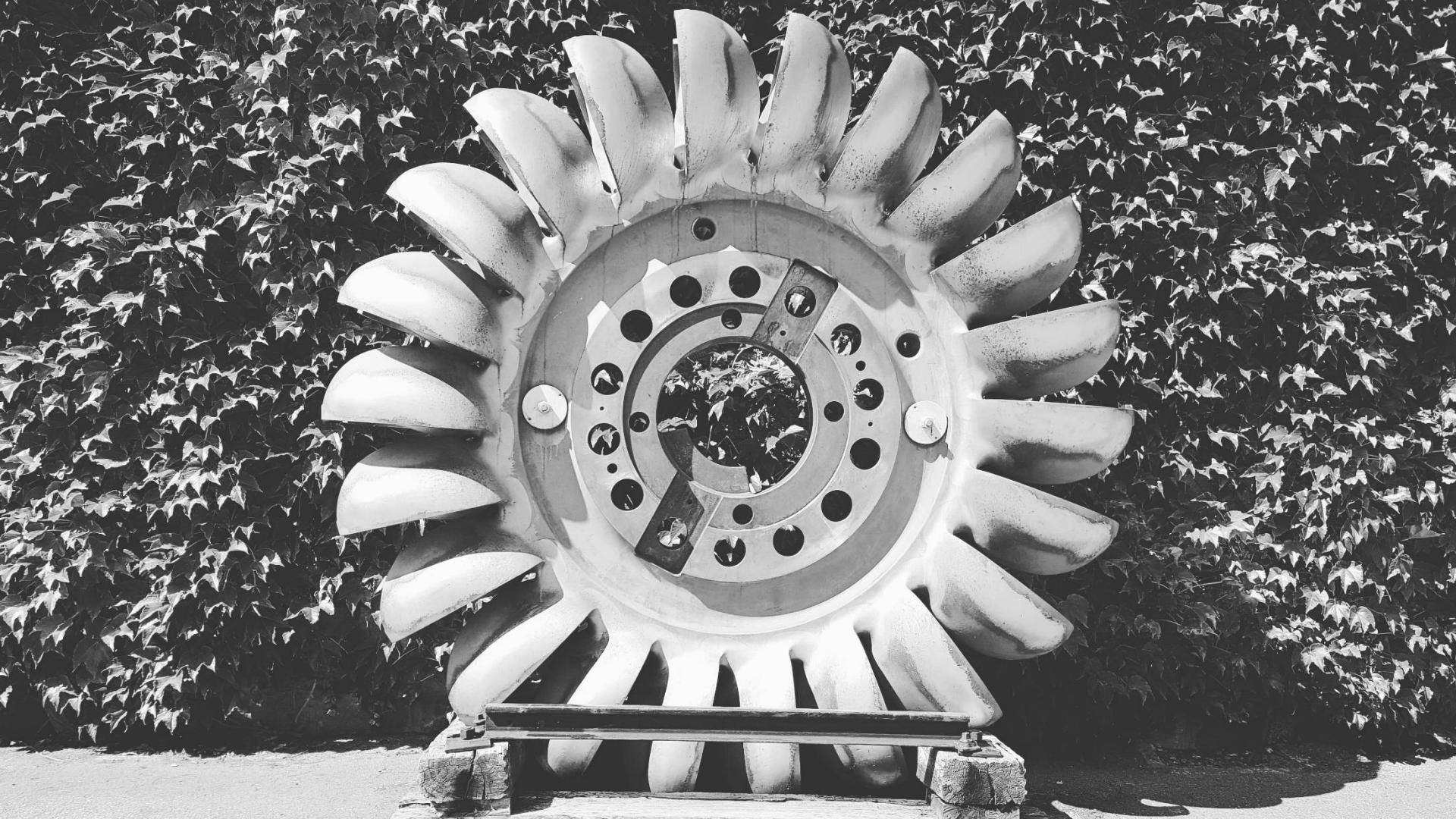
The design process
is an iterative one.

Report on a conference sponsored by the

NATO SCIENCE COMMITTEE

Garmisch, Germany, 7th to 11th October 1968

Andy Kinslow



Plan

Establish hypothesis,
goal or work tasks

Do

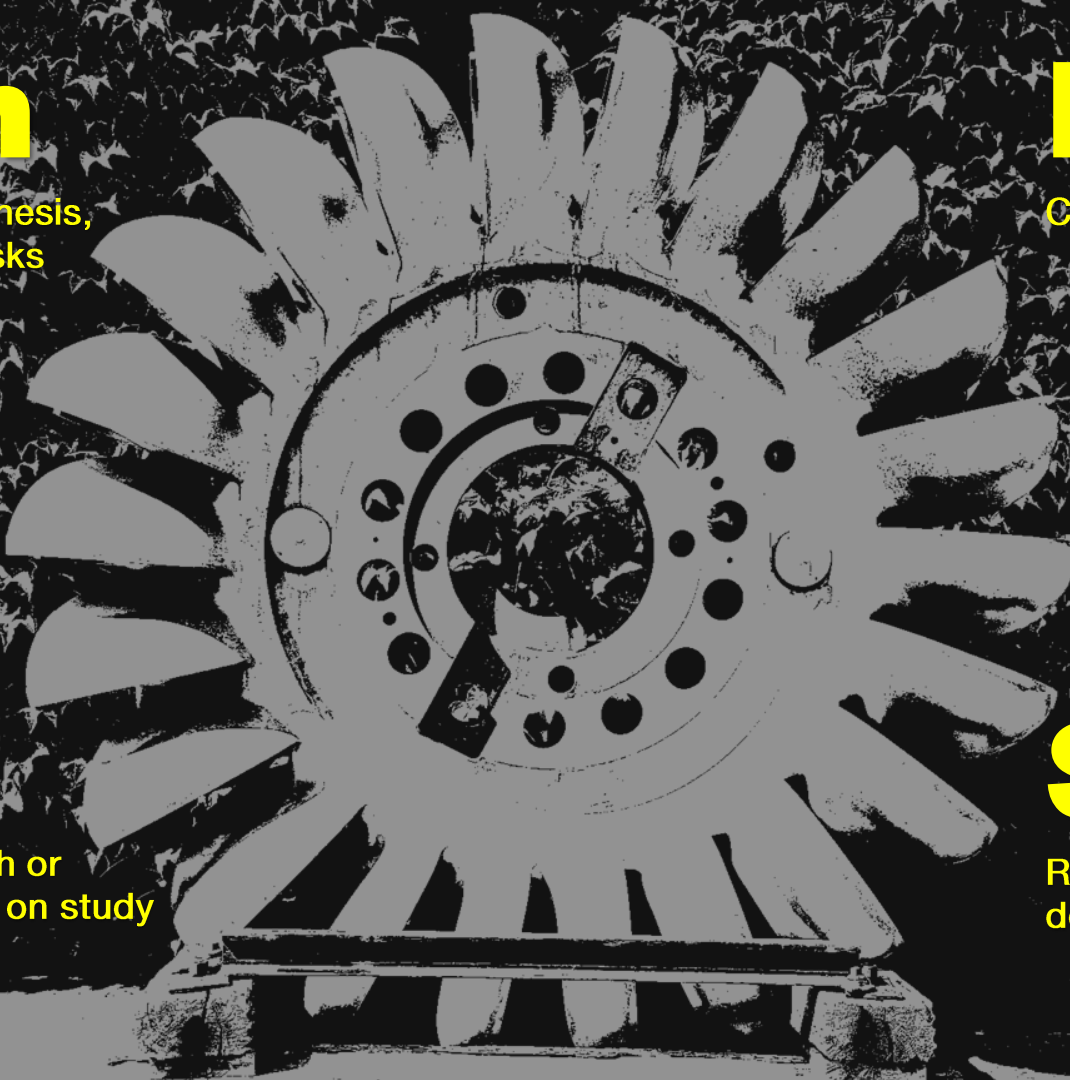
Carry out the plan

Act

Revise approach or
artefacts based on study

Study

Review what has been
done



Plan

Establish hypothesis,
goal or work tasks

Do

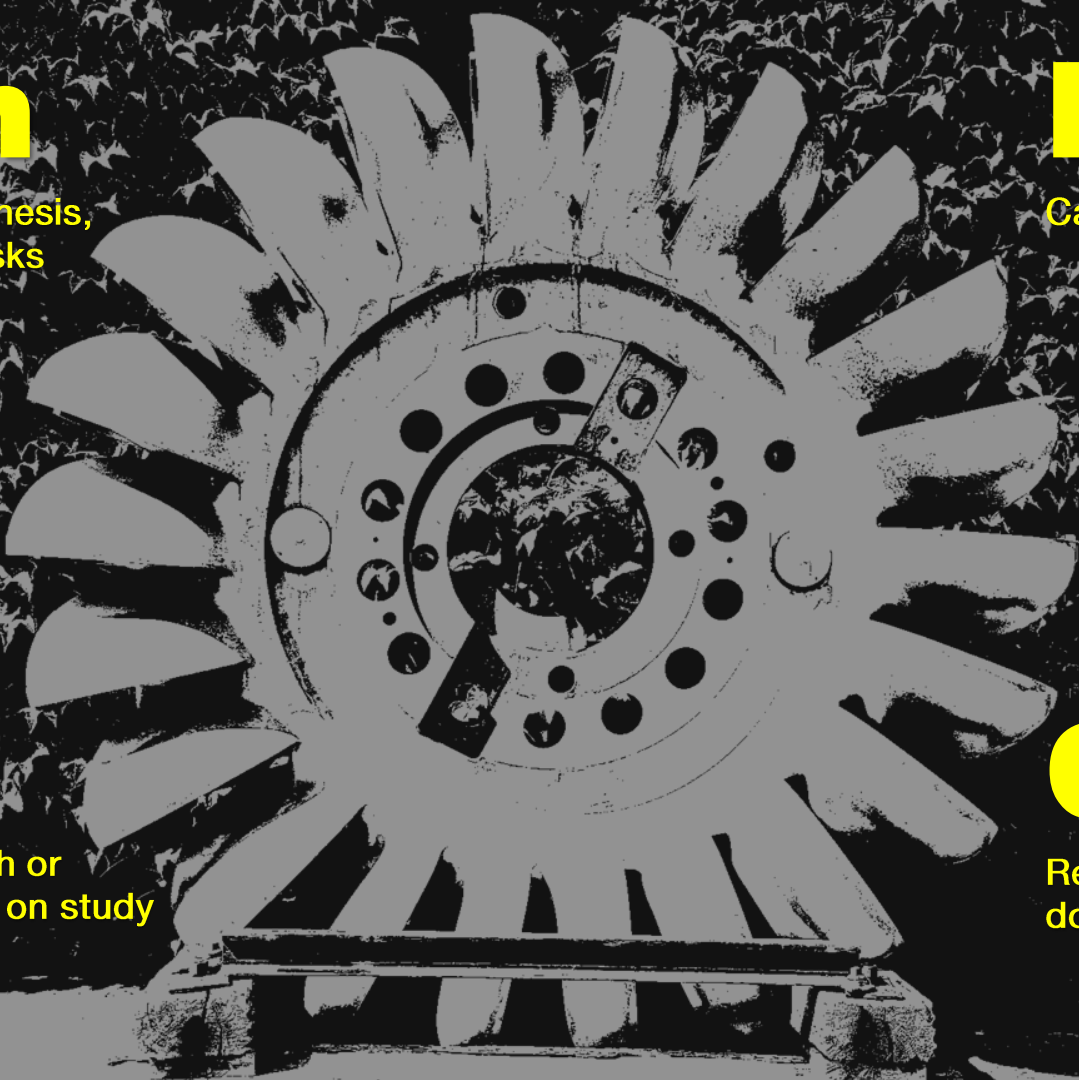
Carry out the plan

Act

Revise approach or
artefacts based on study

Check

Review what has been
done



Plan

Establish hypothesis,
goal or work tasks

Do

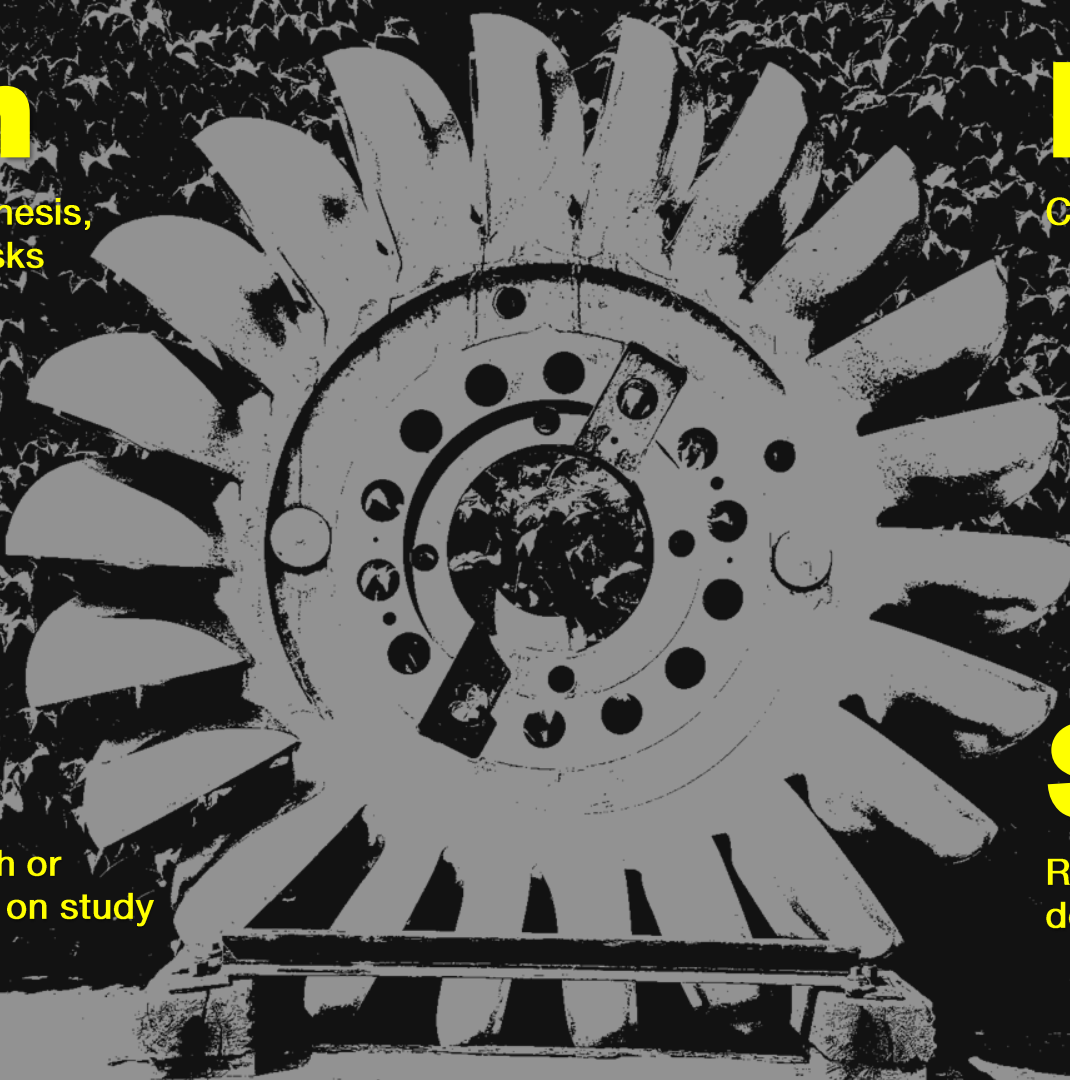
Carry out the plan

Act

Revise approach or
artefacts based on study

Study

Review what has been
done



Plan

Establish hypothesis,
goal or work tasks

Do

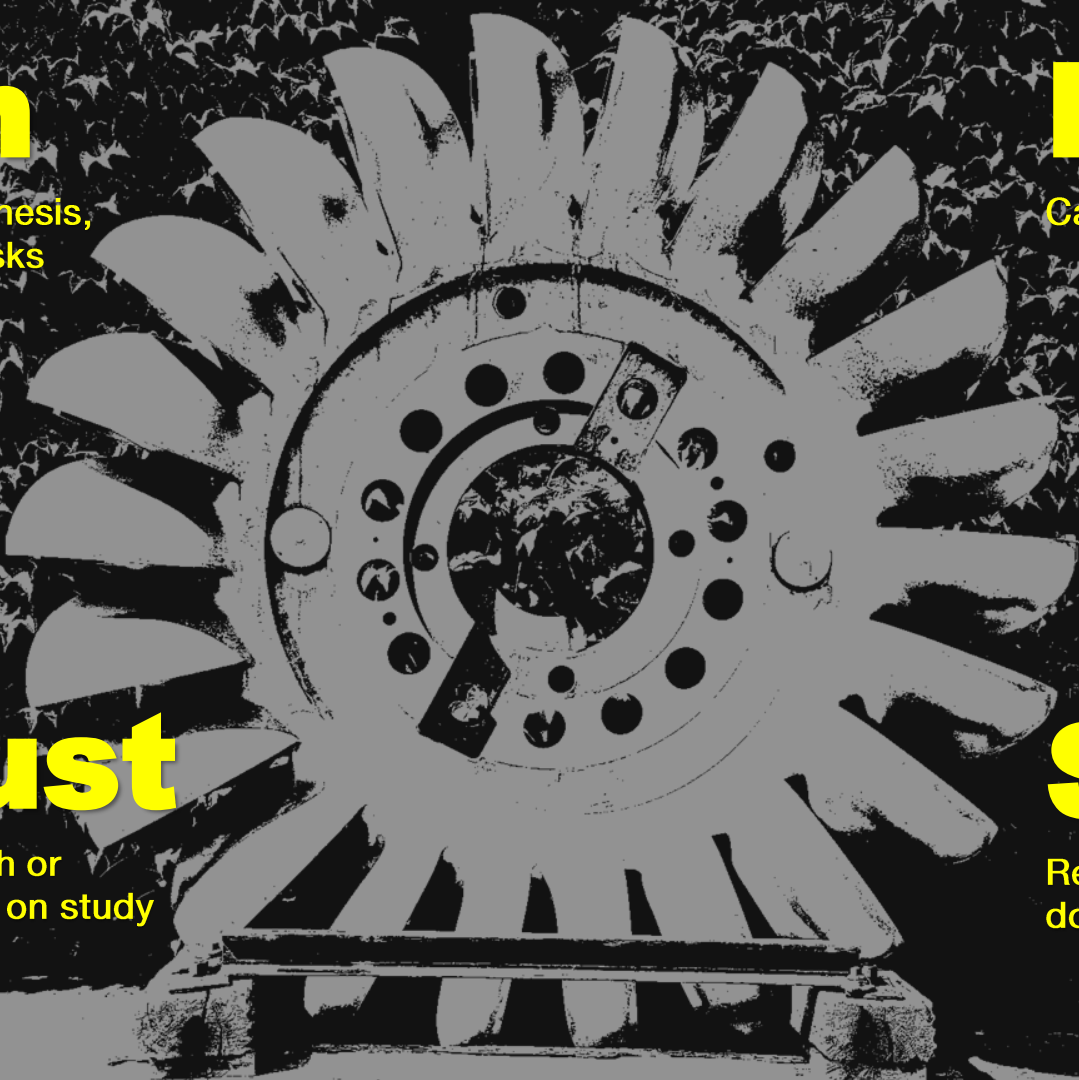
Carry out the plan

Adjust

Revise approach or
artefacts based on study

Study

Review what has been
done



You have to finish things —
that's what you learn from,
you learn by finishing things.

Neil Gaiman

known knowns

known unknowns

unknown unknowns

unknowable unknowns







1596

```
      G_M_INFO_DERIVE(T_ALG.E_DCN)
if L_M_DON_32 > 32767 then
  P_M_DERIVE(T_ALG.E_DON) := 16#7FFF#;
elsif L_M_DON_32 < -32768 then
  P_M_DERIVE(T_ALG.E_DON) := 16#8000#;
else
  P_M_DERIVE(T_ALG.E_DON) := UC_16S_EN_16NS(
    TDB.T_ENTIER_16S(L_M_DON_32));
end if;
```

```
P_M_DERIVE(T_ALG.E_DOE) := UC_16S_EN_16NS (TDB.T_ENTIER_16S
      ((1.0/C_M_LSB_DOE) *
      G_M_INFO_DERIVE(T_ALG.E_DOE)
```

```
L_M_BV_32 := TDB.T_ENTIER_32S ((1.0/C_M_LSB_BV) *
      G_M_INFO_DERIVE(T_ALG.E_BV));
```

```
if L_M_BV_32 > 32767 then
  P_M_DERIVE(T_ALG.E_BV) := 16#7FFF#;
elsif L_M_BV_32 < -32768 then
  P_M_DERIVE(T_ALG.E_BV) := 16#8000#;
else
  P_M_DERIVE(T_ALG.E_BV) := UC_16S_EN_16NS(TDB.T_ENTIER_16S(L_M
end if;
```

501

```
P_M_DERIVE(T_ALG.E_BH) := UC_16S_EN_16NS (TDB.T_ENTIER_16S
      ((1.0/C_M_LSB_BH) *
      G_M_INFO_DERIVE(T_ALG.E_BH))
```

```
end LIRE_DERIVE;
--$finprocedure
```



Kevlin Henney

@KevlinHenney

Epistemologically speaking, assumptions are the barefoot-trodden Lego bricks in the dark of knowledge. You don't know they're there until you know that they're there. And even if you know there are some there, you don't know exactly where and you'll still end up stepping on some.

♡ 26 2:29 PM - Apr 22, 2020

twitter.com/KevlinHenney/status/1252952622128128000

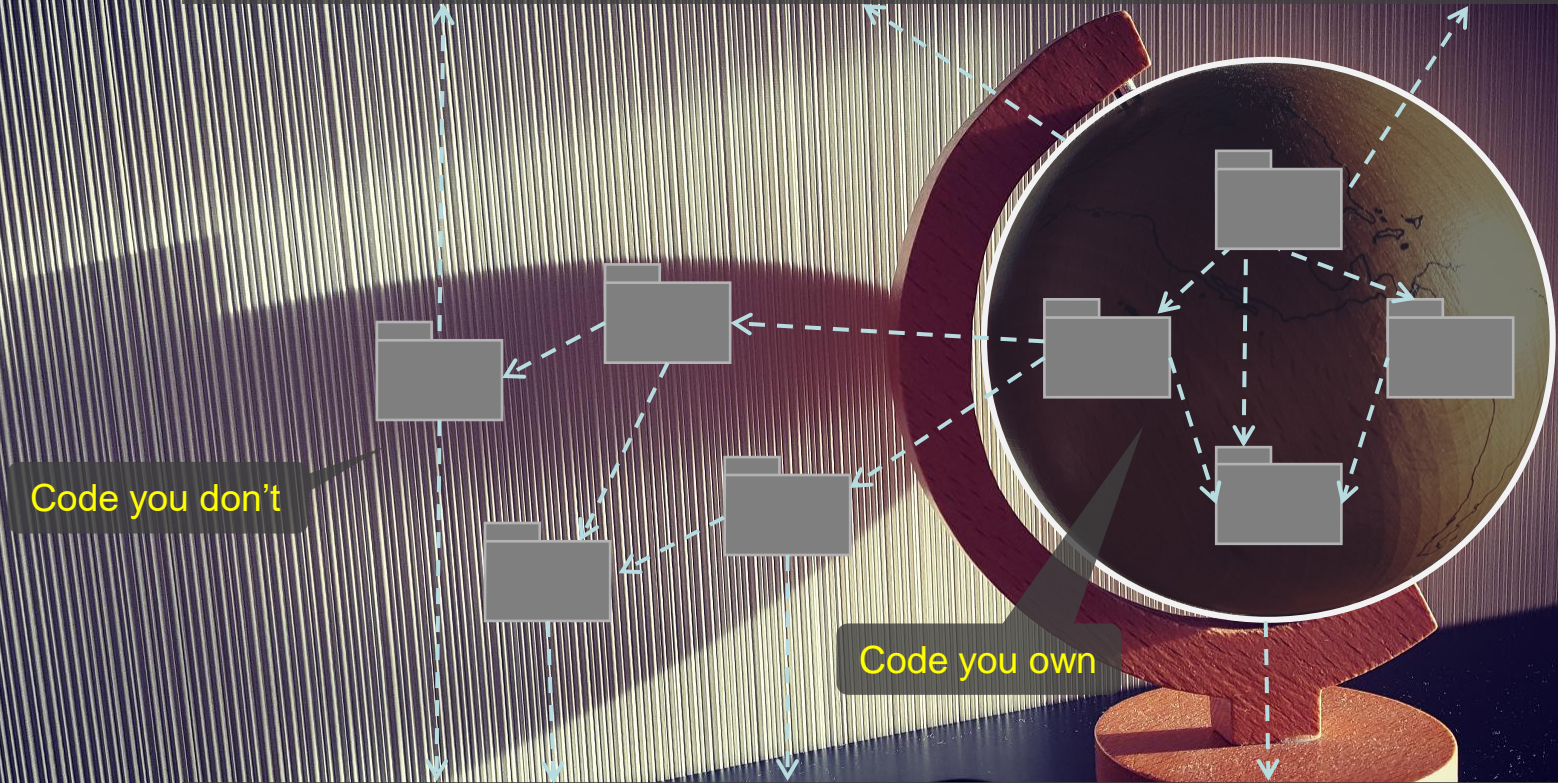
The connections between modules are the assumptions which the modules make about each other.

David Parnas

“Information Distribution Aspects of Design Methodology”

Market

Customers, product requirements, domain, governance, etc.



Platform

Programming languages, operating systems, middleware, services, etc.

Market

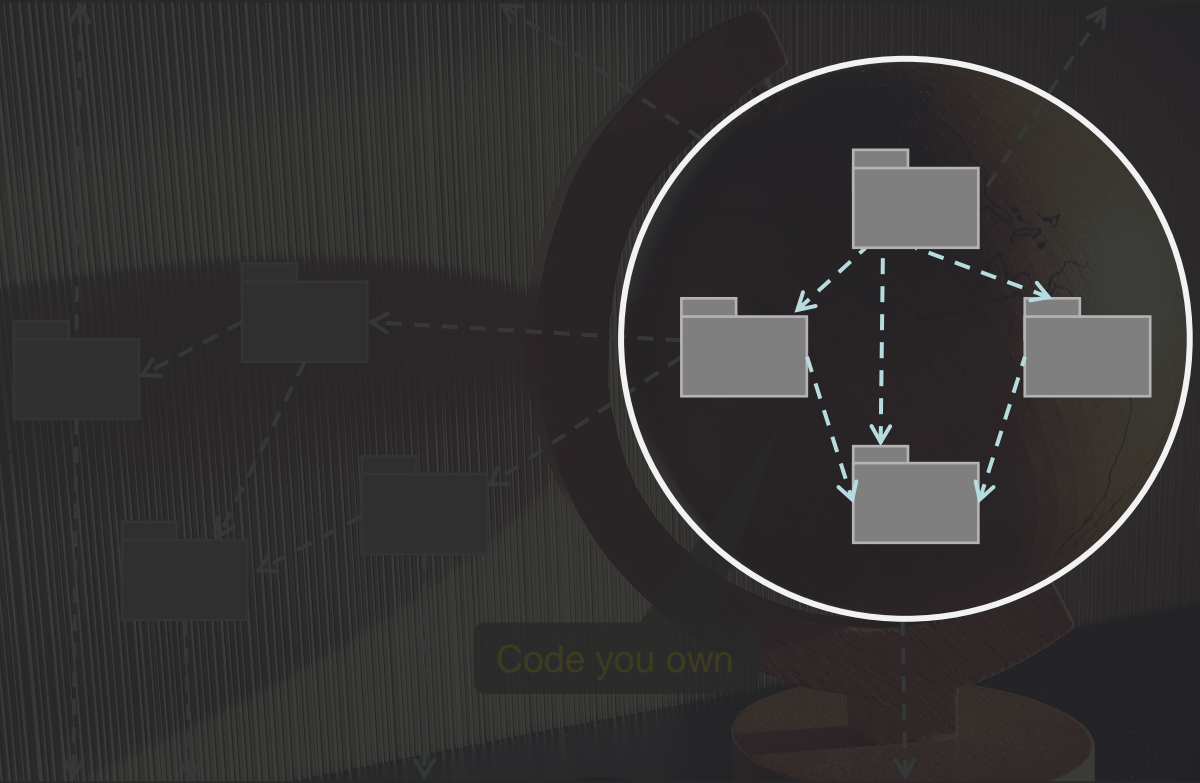
Customers, product requirements, domain, governance, etc.

Code you don't

Code you own

Platform

Programming languages, operating systems, middleware, services, etc.



Market

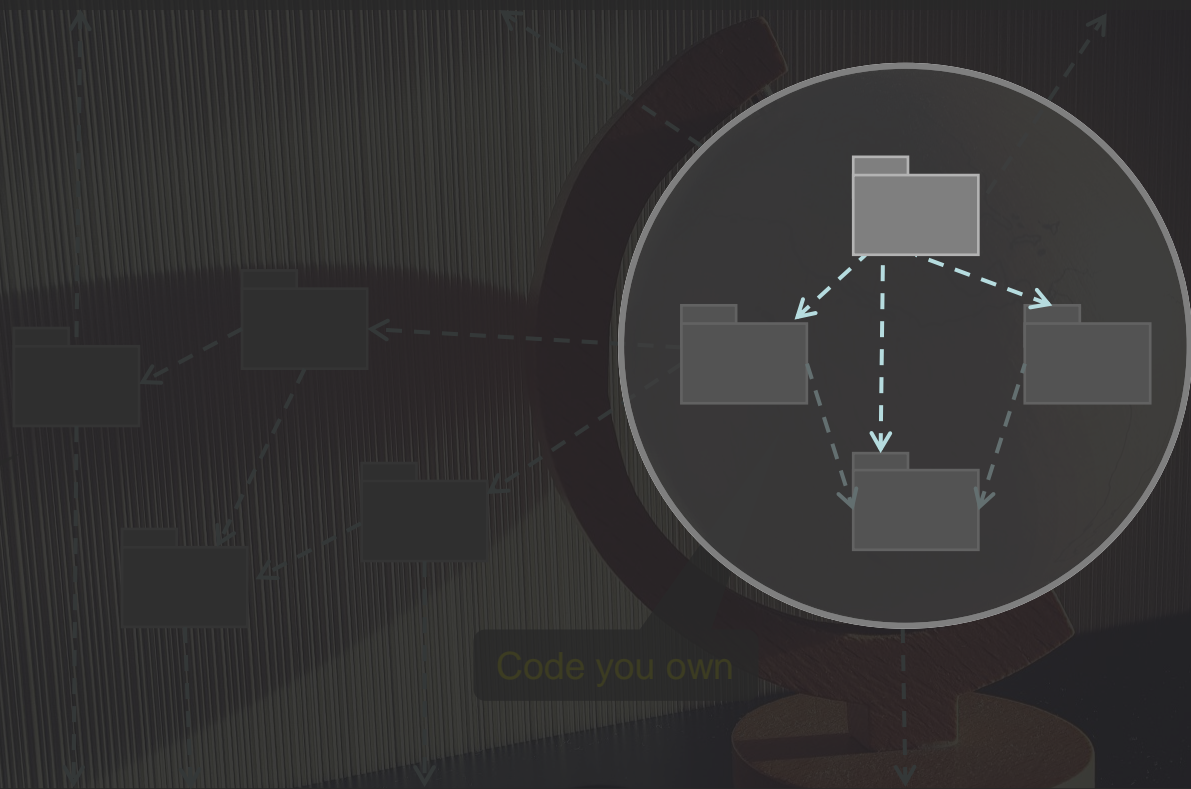
Customers, product requirements, domain, governance, etc.

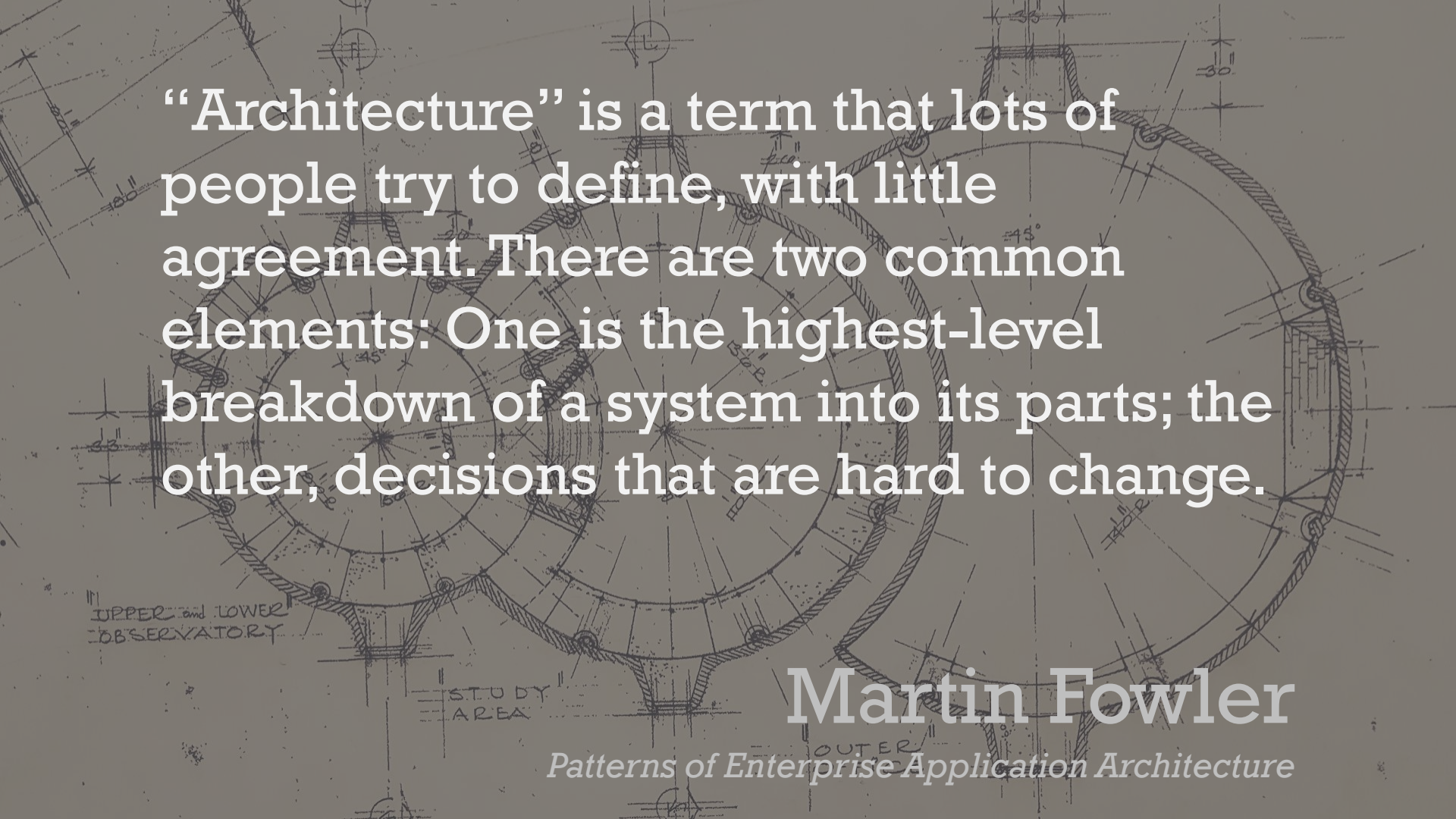
Code you don't

Code you own

Platform

Programming languages, operating systems, middleware, services, etc.

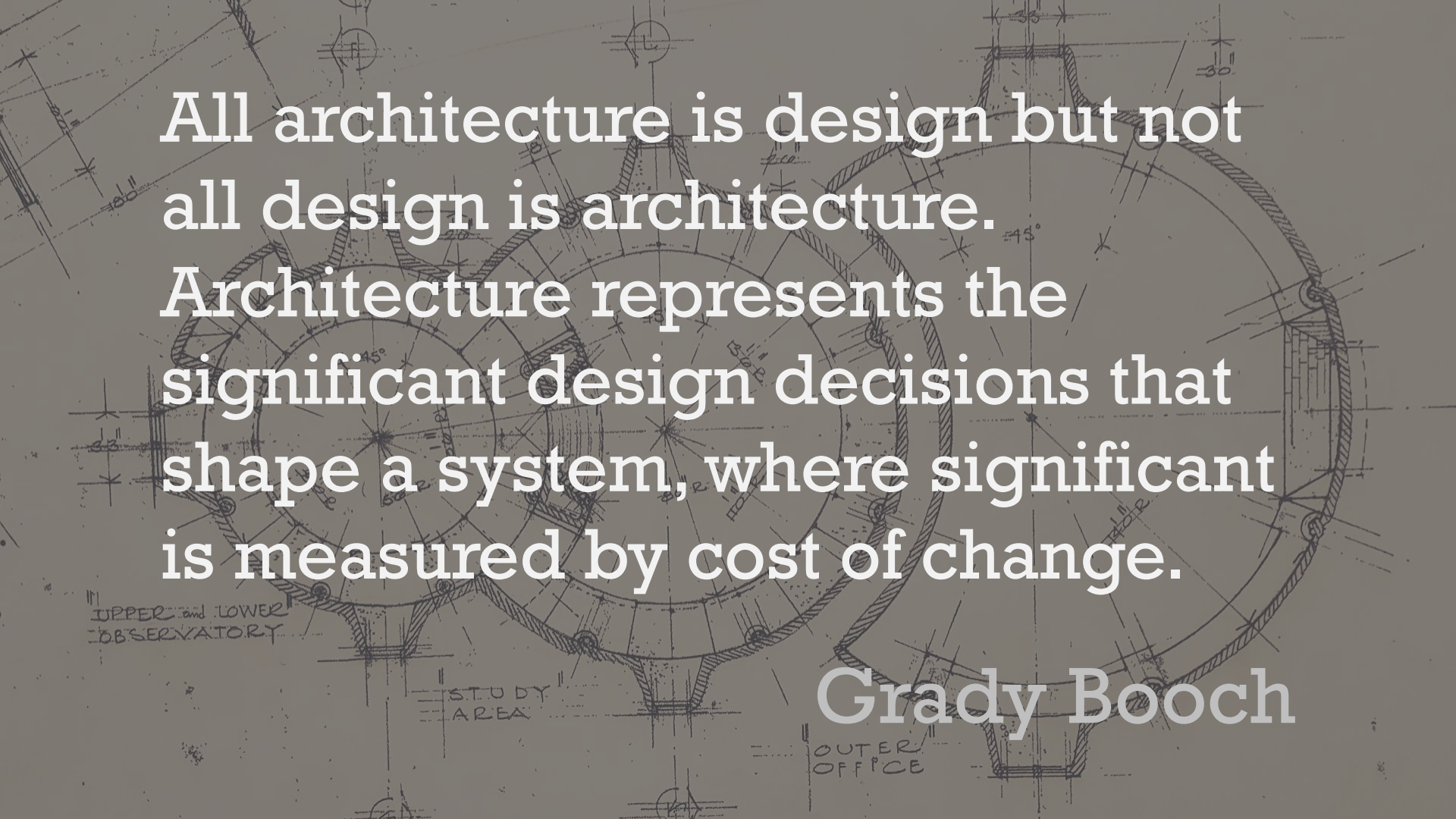


The background is a detailed architectural drawing of a circular structure, possibly a dome or a large observatory. It features multiple concentric circles, radial lines, and various annotations. Dimensions are given in feet and inches, such as 300", 150", 75", 30", and 140". There are also handwritten notes like "UPPER and LOWER OBSERVATORY", "STUDY AREA", and "OUTER". The drawing is rendered in a technical, sketch-like style with fine lines and hatching for shading.

“Architecture” is a term that lots of people try to define, with little agreement. There are two common elements: One is the highest-level breakdown of a system into its parts; the other, decisions that are hard to change.

Martin Fowler

Patterns of Enterprise Application Architecture

The background is a detailed architectural drawing of a circular observatory. It features multiple concentric circles and radial lines, indicating different levels and sections. Hand-drawn lines and annotations are visible throughout the drawing. Labels such as 'UPPER and LOWER OBSERVATORY', 'STUDY AREA', and 'OUTER OFFICE' are present. Dimensions and angles are also noted, such as '30°', '45°', and '30"'. The drawing is rendered in a technical, sketch-like style with fine lines and hatching for shading.

All architecture is design but not
all design is architecture.

Architecture represents the
significant design decisions that
shape a system, where significant
is measured by cost of change.

Grady Booch

HOW BUILDINGS LEARN

What happens after they're built

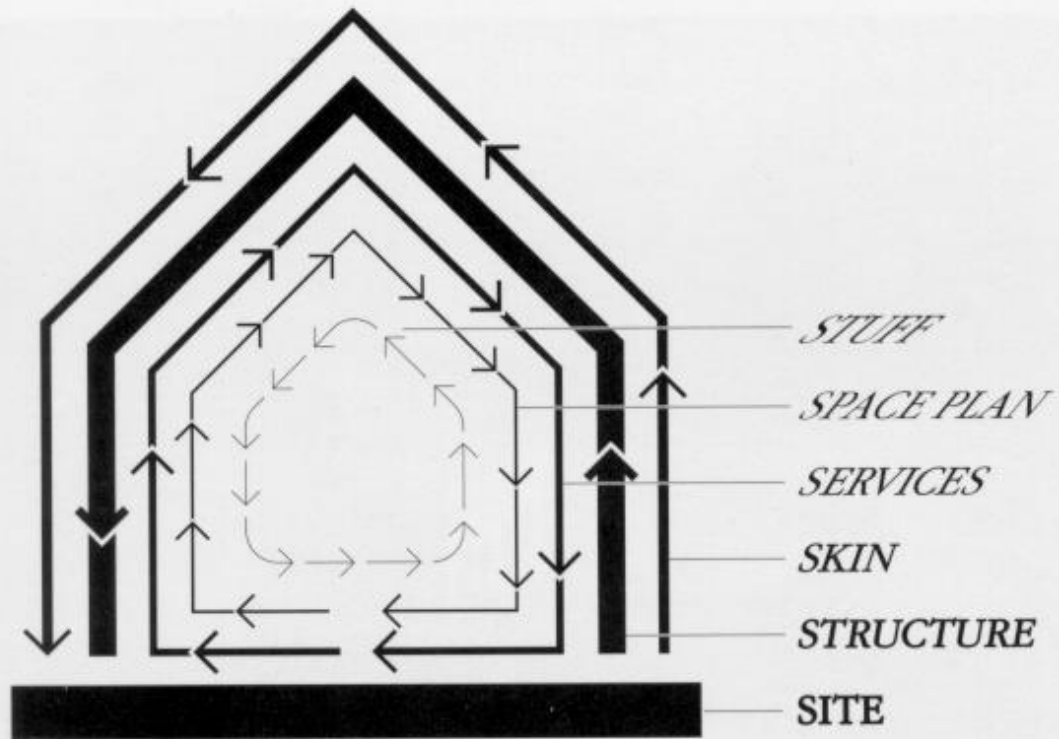


New Orleans, 1857



The same two buildings, 1993

STEWART BRAND



Shearing Layers

Different artifacts change at different rates.

Therefore, factor your system so that artifacts that change at similar rates are together.



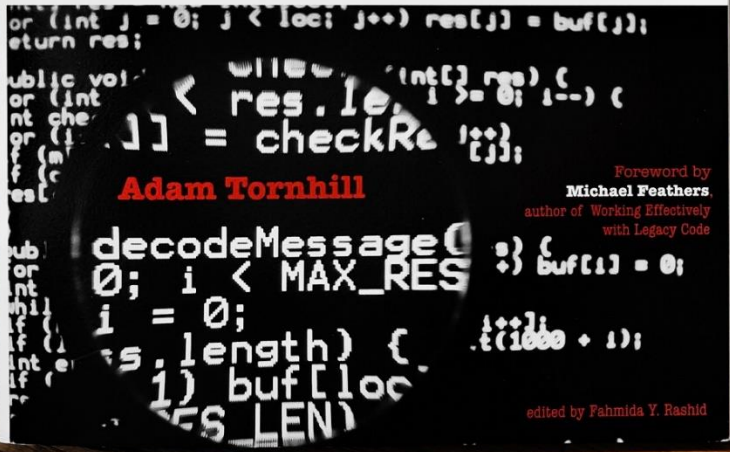
Brian Foote & Joseph Yoder
“Big Ball of Mud”
laputan.org/mud/mud.html

The
Pragmatic
Programmers

ISBN: _____
Date: _____
Price: _____
Quantity: _____

Your Code as a Crime Scene

Use Forensic Techniques to
Arrest Defects, Bottlenecks, and
Bad Design in Your Programs



The
Pragmatic
Programmers

Measuring change frequencies is based on the idea that code that has changed in the past is likely to change again.

Your Code as a
Crime Scene

Used on 150+ code reviews to
Arrest Defects, Boudenecks, and
Bad Design in Your Programs

```
for (int j = 0; j < loc; j++) res[j] = buf[j];  
return res;  
  
public void write(int[] res) {  
    for (int i = 0; i < res.length; i++) {  
        res[i] = checkRes(i);  
    }  
}  
  
decodeMessage(int[] buf) {  
    for (int i = 0; i < MAX_RES; i++) buf[i] = 0;  
    int i = 0;  
    while (i < buf.length) {  
        buf[i++] = (i % 1000 + 1);  
    }  
}
```

Adam Tornhill

Foreword by
Michael Feathers
author of *Working Effectively
with Legacy Code*

edited by Fahmida Y. Rashid

Lean Software Development

An Agile Toolkit



The Agile Software Development Series

Cockburn • Highsmith
Series Editors



- Adapting agile practices to your development organization
- Uncovering and eradicating waste throughout the software development lifecycle
- Practical techniques for every development manager, project manager, and technical leader

Forewords by
Jim Highsmith
and **Ken Schwaber**

Mary Poppendieck
Tom Poppendieck

Lean
Software Development
An Agile Toolkit

The Agile Software Development Series

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- Adapting agile practices to your development organization
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- Practical techniques for every development manager, project manager, and technical leader

Foreword by
Jim Highsmith
and Ken Schwaber

Concurrent development makes it possible to delay commitment until the *last responsible moment*, that is, the moment at which failing to make a decision eliminates an important alternative.

Mary Poppendieck
Tom Poppendieck

1. Options have value.
2. Options expire.
3. Never commit early unless you know why.

Olav Maassen & Chris Matts

“‘Real Options’ Underlie Agile Practices”

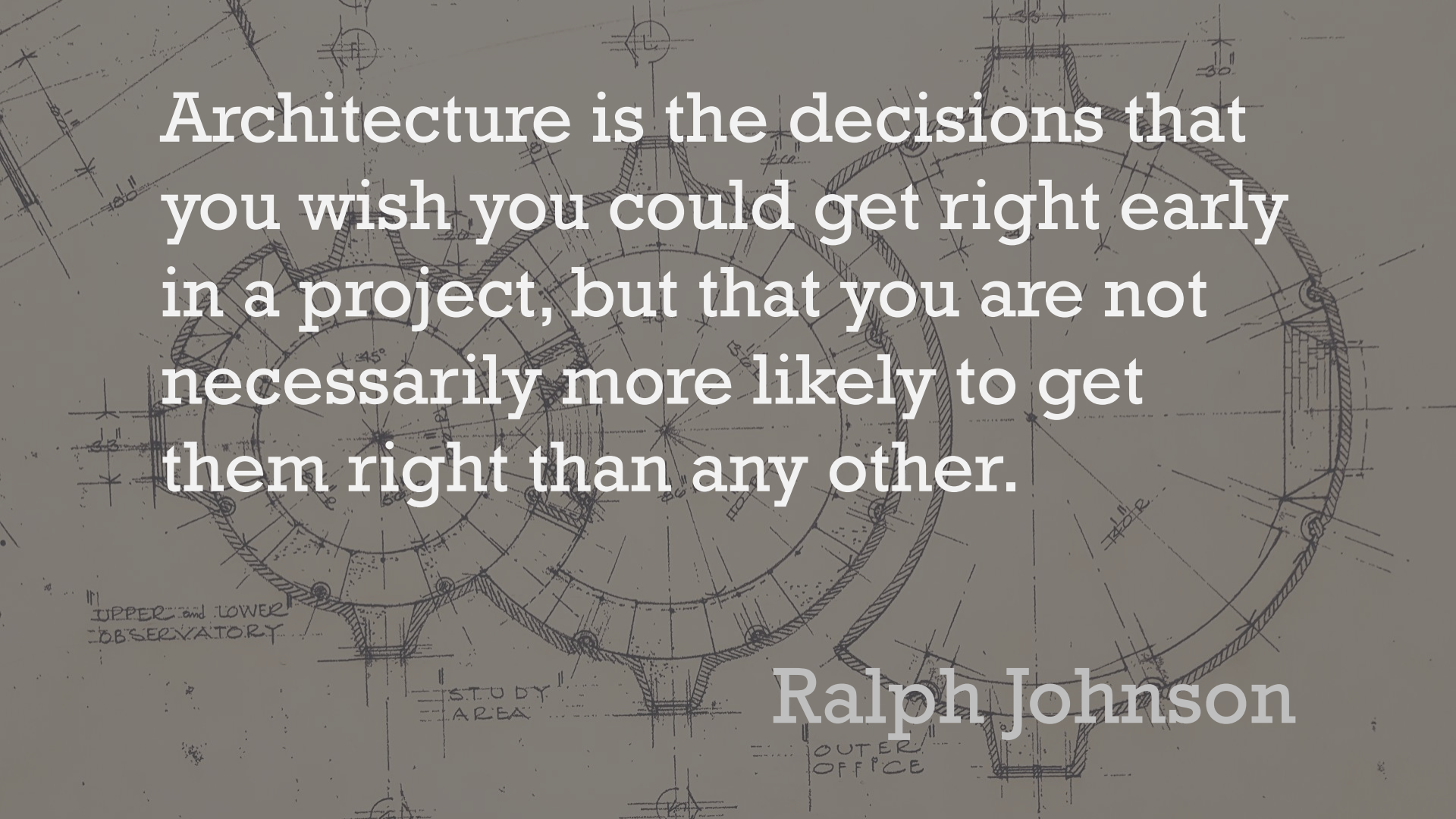
infoq.com/articles/real-options-enhance-agility

known knowns

known unknowns

unknown unknowns

unknowable unknowns

An architectural drawing of a circular observatory, showing a cross-section with multiple levels and a central dome. The drawing includes various dimensions and labels. The text is overlaid on the drawing in a white, sans-serif font. The drawing itself is a technical sketch with fine lines and hatching, showing the structural details of the building. Labels include 'UPPER and LOWER OBSERVATORY', 'STUDY AREA', and 'OUTER OFFICE'. Dimensions are given in feet and inches, such as '30"', '25"', '10"', '15"', '20"', '35"', '40"', '45"', '50"', '55"', '60"', '65"', '70"', '75"', '80"', '85"', '90"', '95"', '100"', '105"', '110"', '115"', '120"', '125"', '130"', '135"', '140"', '145"', '150"', '155"', '160"', '165"', '170"', '175"', '180"', '185"', '190"', '195"', '200"', '205"', '210"', '215"', '220"', '225"', '230"', '235"', '240"', '245"', '250"', '255"', '260"', '265"', '270"', '275"', '280"', '285"', '290"', '295"', '300"', '305"', '310"', '315"', '320"', '325"', '330"', '335"', '340"', '345"', '350"', '355"', '360"', '365"', '370"', '375"', '380"', '385"', '390"', '395"', '400"', '405"', '410"', '415"', '420"', '425"', '430"', '435"', '440"', '445"', '450"', '455"', '460"', '465"', '470"', '475"', '480"', '485"', '490"', '495"', '500"', '505"', '510"', '515"', '520"', '525"', '530"', '535"', '540"', '545"', '550"', '555"', '560"', '565"', '570"', '575"', '580"', '585"', '590"', '595"', '600"', '605"', '610"', '615"', '620"', '625"', '630"', '635"', '640"', '645"', '650"', '655"', '660"', '665"', '670"', '675"', '680"', '685"', '690"', '695"', '700"', '705"', '710"', '715"', '720"', '725"', '730"', '735"', '740"', '745"', '750"', '755"', '760"', '765"', '770"', '775"', '780"', '785"', '790"', '795"', '800"', '805"', '810"', '815"', '820"', '825"', '830"', '835"', '840"', '845"', '850"', '855"', '860"', '865"', '870"', '875"', '880"', '885"', '890"', '895"', '900"', '905"', '910"', '915"', '920"', '925"', '930"', '935"', '940"', '945"', '950"', '955"', '960"', '965"', '970"', '975"', '980"', '985"', '990"', '995"', '1000"'.

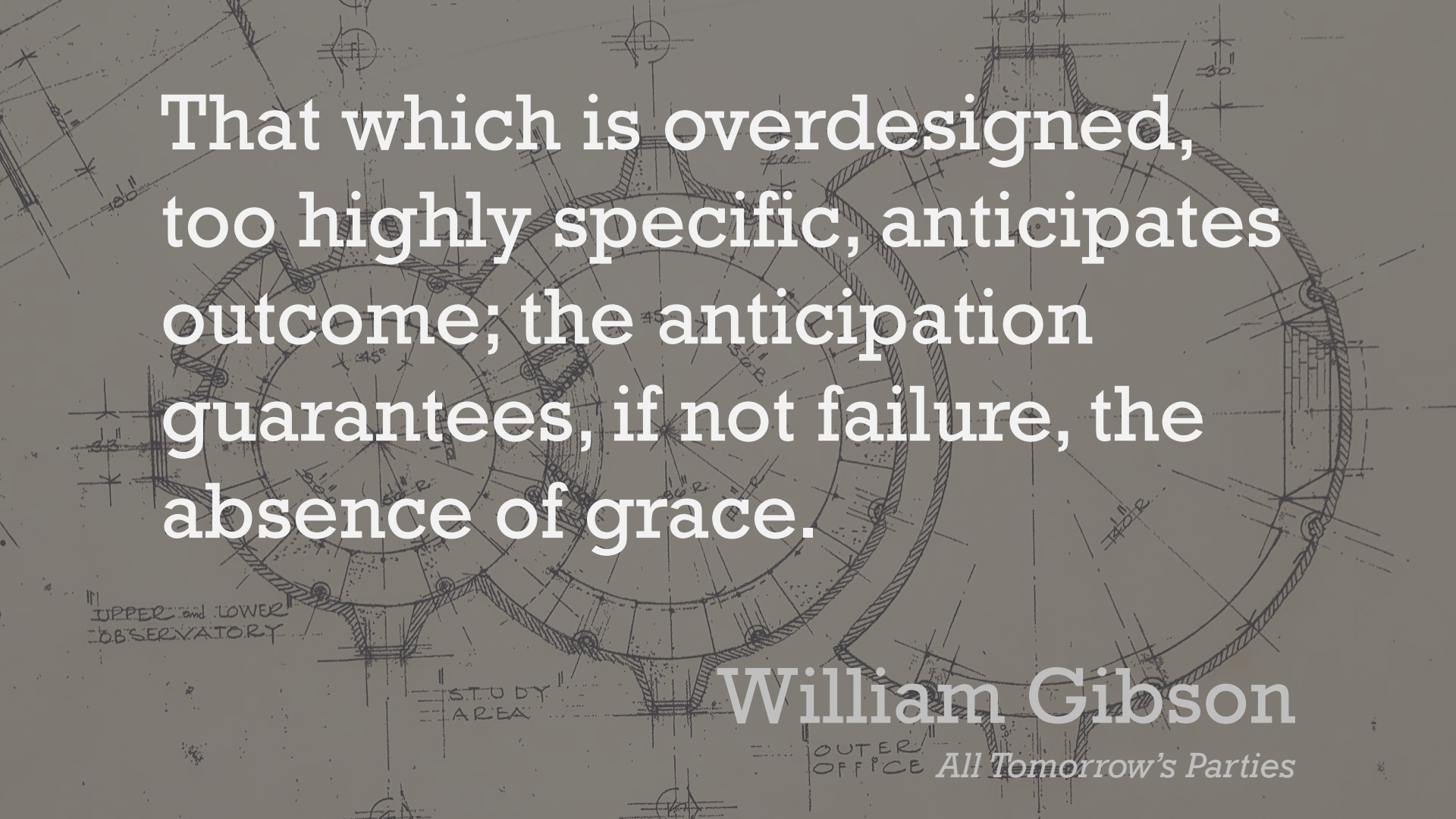
Architecture is the decisions that
you wish you could get right early
in a project, but that you are not
necessarily more likely to get
them right than any other.

Ralph Johnson

The image is a detailed architectural drawing of a circular observatory. It features a central circular area with radial lines and concentric circles. The drawing is annotated with various technical specifications, including dimensions like "30\"", "33\"", "36\"", "40\"", "45\"", "50\"", "55\"", "60\"", "65\"", "70\"", "75\"", "80\"", "85\"", "90\"", "95\"", "100\"", "105\"", "110\"", "115\"", "120\"", "125\"", "130\"", "135\"", "140\"", "145\"", "150\"", "155\"", "160\"", "165\"", "170\"", "175\"", "180\"", "185\"", "190\"", "195\"", "200\"", "205\"", "210\"", "215\"", "220\"", "225\"", "230\"", "235\"", "240\"", "245\"", "250\"", "255\"", "260\"", "265\"", "270\"", "275\"", "280\"", "285\"", "290\"", "295\"", "300\"", "305\"", "310\"", "315\"", "320\"", "325\"", "330\"", "335\"", "340\"", "345\"", "350\"", "355\"", "360\"", "365\"", "370\"", "375\"", "380\"", "385\"", "390\"", "395\"", "400\"", "405\"", "410\"", "415\"", "420\"", "425\"", "430\"", "435\"", "440\"", "445\"", "450\"", "455\"", "460\"", "465\"", "470\"", "475\"", "480\"", "485\"", "490\"", "495\"", "500\"", "505\"", "510\"", "515\"", "520\"", "525\"", "530\"", "535\"", "540\"", "545\"", "550\"", "555\"", "560\"", "565\"", "570\"", "575\"", "580\"", "585\"", "590\"", "595\"", "600\"", "605\"", "610\"", "615\"", "620\"", "625\"", "630\"", "635\"", "640\"", "645\"", "650\"", "655\"", "660\"", "665\"", "670\"", "675\"", "680\"", "685\"", "690\"", "695\"", "700\"", "705\"", "710\"", "715\"", "720\"", "725\"", "730\"", "735\"", "740\"", "745\"", "750\"", "755\"", "760\"", "765\"", "770\"", "775\"", "780\"", "785\"", "790\"", "795\"", "800\"", "805\"", "810\"", "815\"", "820\"", "825\"", "830\"", "835\"", "840\"", "845\"", "850\"", "855\"", "860\"", "865\"", "870\"", "875\"", "880\"", "885\"", "890\"", "895\"", "900\"", "905\"", "910\"", "915\"", "920\"", "925\"", "930\"", "935\"", "940\"", "945\"", "950\"", "955\"", "960\"", "965\"", "970\"", "975\"", "980\"", "985\"", "990\"", "995\"", "1000\"". There are also labels for "UPPER and LOWER OBSERVATORY", "STUDY AREA", and "OUTER OFFICE". The drawing is a technical sketch, likely a plan view, showing the layout of the observatory's interior or exterior. The text is overlaid on the drawing in a large, white, sans-serif font.

If you don't end up regretting
your early technology decisions,
you probably overengineered.

Randy Shoup

A detailed architectural drawing of a circular structure, possibly a dome or a large observatory. The drawing is rendered in a technical style with fine lines and hatching. It features several concentric circles and radial lines, suggesting a complex internal structure. Various dimensions and annotations are scattered throughout the drawing, including "30\"", "40\"", "50\"", "60\"", "70\"", "80\"", "90\"", "100\"", "110\"", "120\"", "130\"", "140\"", "150\"", "160\"", "170\"", "180\"", "190\"", "200\"", "210\"", "220\"", "230\"", "240\"", "250\"", "260\"", "270\"", "280\"", "290\"", "300\"", "310\"", "320\"", "330\"", "340\"", "350\"", "360\"", "370\"", "380\"", "390\"", "400\"", "410\"", "420\"", "430\"", "440\"", "450\"", "460\"", "470\"", "480\"", "490\"", "500\"", "510\"", "520\"", "530\"", "540\"", "550\"", "560\"", "570\"", "580\"", "590\"", "600\"", "610\"", "620\"", "630\"", "640\"", "650\"", "660\"", "670\"", "680\"", "690\"", "700\"", "710\"", "720\"", "730\"", "740\"", "750\"", "760\"", "770\"", "780\"", "790\"", "800\"", "810\"", "820\"", "830\"", "840\"", "850\"", "860\"", "870\"", "880\"", "890\"", "900\"", "910\"", "920\"", "930\"", "940\"", "950\"", "960\"", "970\"", "980\"", "990\"", "1000\"". There are also several handwritten labels in the drawing, such as "UPPER and LOWER OBSERVATORY", "STUDY AREA", and "OUTER OFFICE". The overall appearance is that of a technical drawing or a blueprint.

That which is overdesigned,
too highly specific, anticipates
outcome; the anticipation
guarantees, if not failure, the
absence of grace.

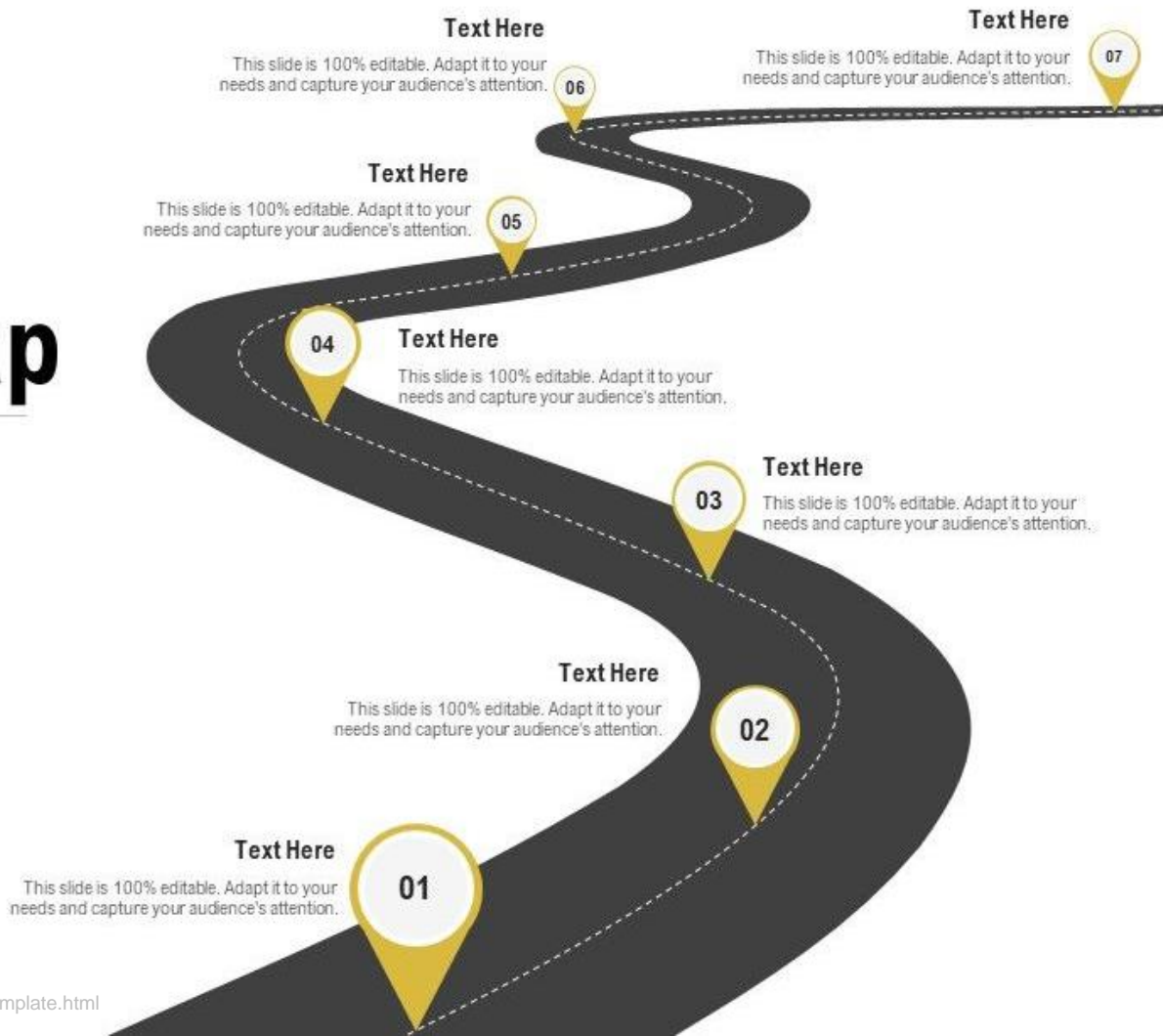
William Gibson

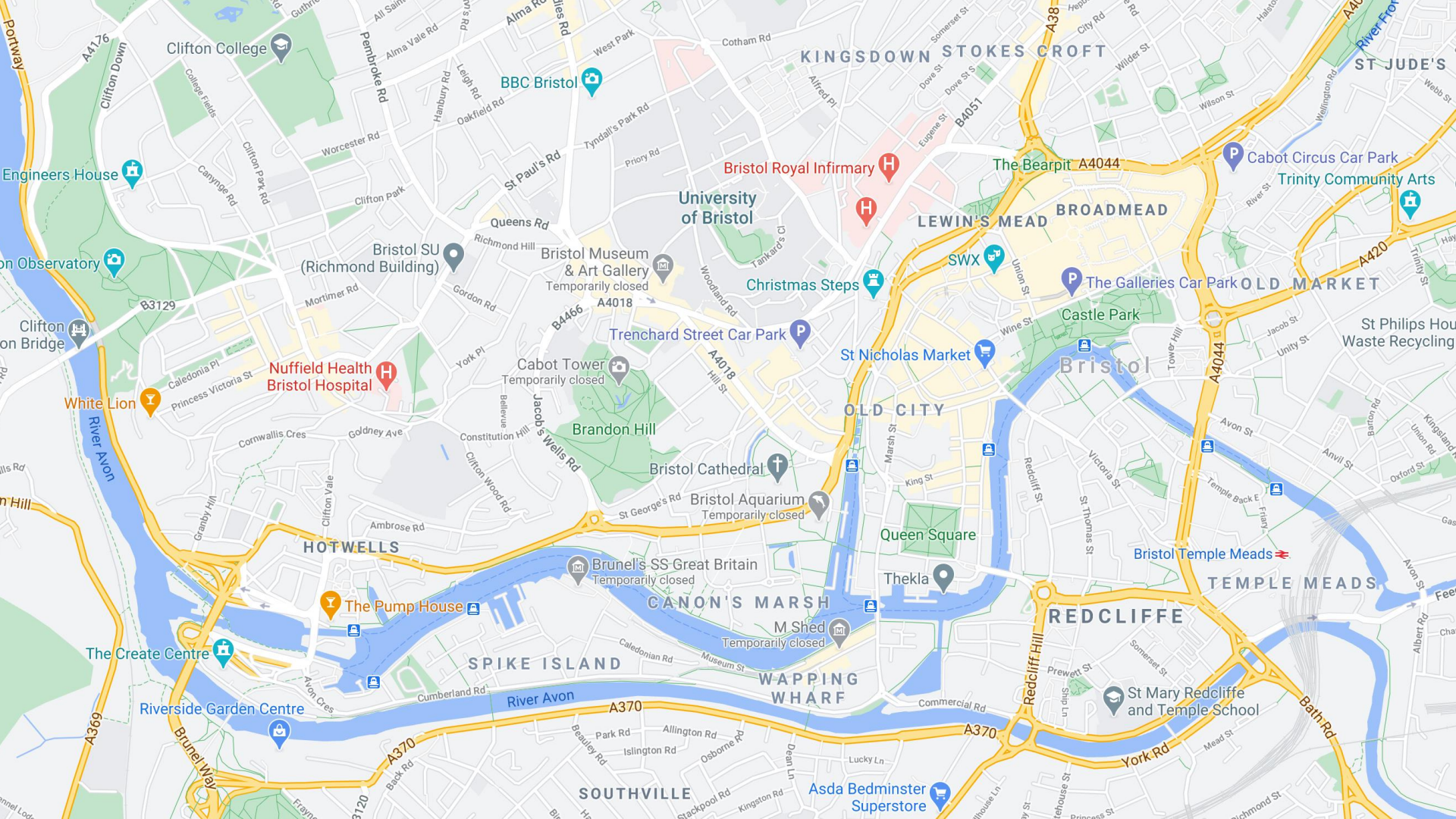
OUTER OFFICE *All Tomorrow's Parties*

Prediction is very
difficult, especially
about the future.

Niels Bohr?

Roadmap





Clifton College

BBC Bristol

KINGSDOWN STOKES CROFT

University of Bristol

LEWIN'S MEAD

BROADMEAD

Nuffield Health
Bristol Hospital

Bristol Museum & Art Gallery
Temporarily closed

St Nicholas Market

Bristol

HOTWELLS

CANON'S MARSH

OLD CITY

TEMPLE MEADS

REDCLIFFE

SPIKE ISLAND

WAPPING WHARF

SOUTHVILLE

Asda Bedminster
Superstore

Clifton
on Bridge

n Hill

The Create Centre

Riverside Garden Centre

The Pump House

River Avon

M Shed
Temporarily closed

Queen Square

Bristol Temple Meads

St Mary Redcliffe
and Temple School

Bristol Royal Infirmary

The Bearpit A4044

Cabot Circus Car Park
Trinity Community Arts

The Galleries Car Park
OLD MARKET

Trenchard Street Car Park

Castle Park

St Philips Hou
Waste Recycling

Brandon Hill

Bristol Cathedral

Bristol Aquarium
Temporarily closed

Brunel's SS Great Britain
Temporarily closed

Thekla

TEMPLE MEADS

Clifton College

BBC Bristol

KINGSDOWN STOKES CROFT

University of Bristol

LEWIN'S MEAD

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Bristol Royal Infirmary

The Bearpit A4044

Cabot Circus Car Park
Trinity Community Arts

The Galleries Car Park
OLD MARKET

Trenchard Street Car Park

Castle Park

St Philips Hou
Waste Recycling

Brandon Hill

Bristol Cathedral

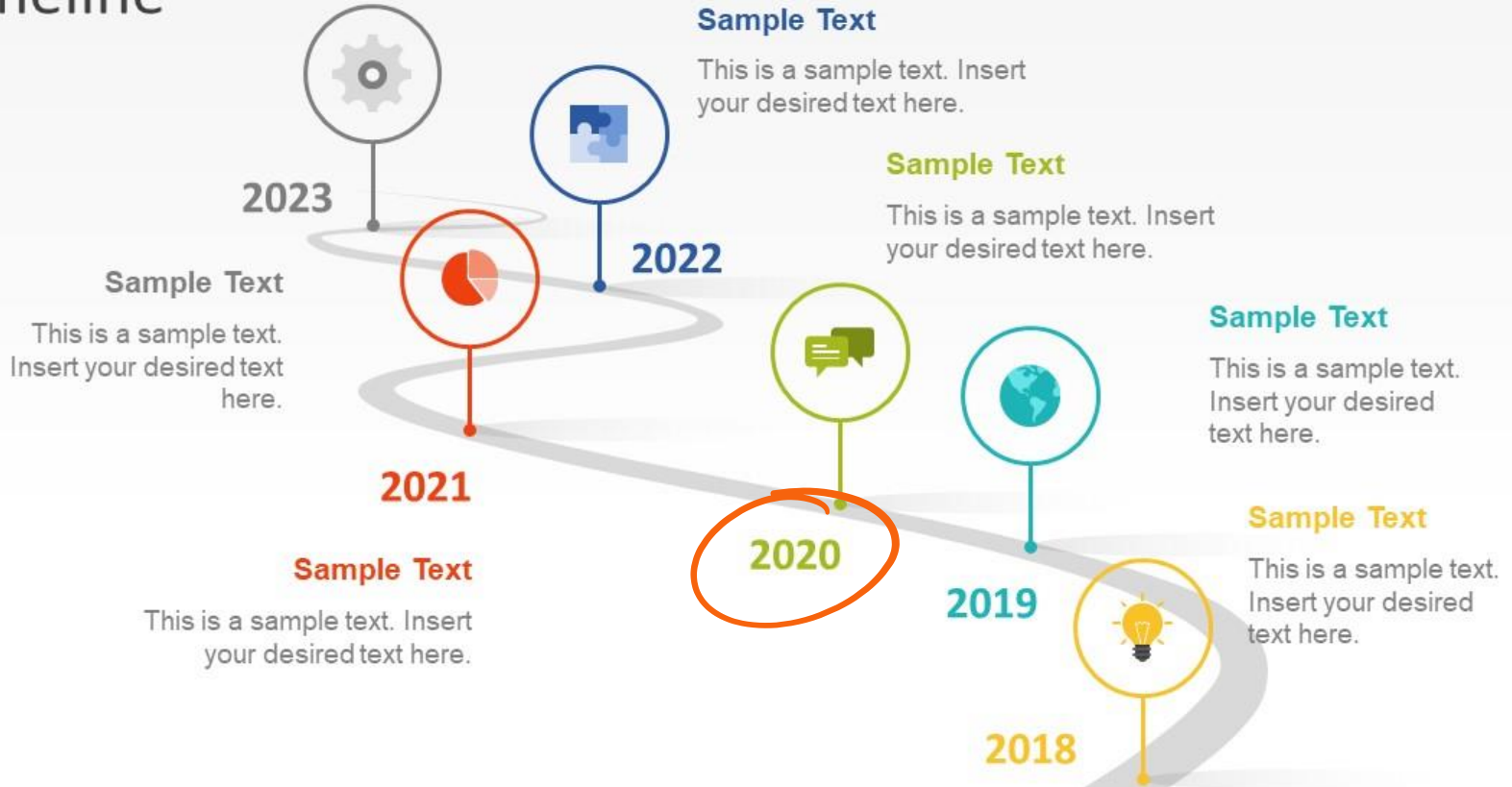
Bristol Aquarium
Temporarily closed

Brunel's SS Great Britain
Temporarily closed

Thekla

TEMPLE MEADS

Curved Roadmap with Poles Milestones PowerPoint Timeline



~~prioritise by
business value~~



TOBAR

The Old Aerodrome,
Beccles, NR34 7SP
www.tobar.co.uk

“SELF EMIT”

prioritise by
estimated
business value



**101 Things I Learned
in Architecture School**

Matthew Frederick

Properly gaining control
of the design process
tends to feel like one is
losing control of the
design process.

