SCALING HUMANS WITH THE SDLC

"Your system is perfectly designed to deliver the outcomes you are getting"

– W. Edwards Deming

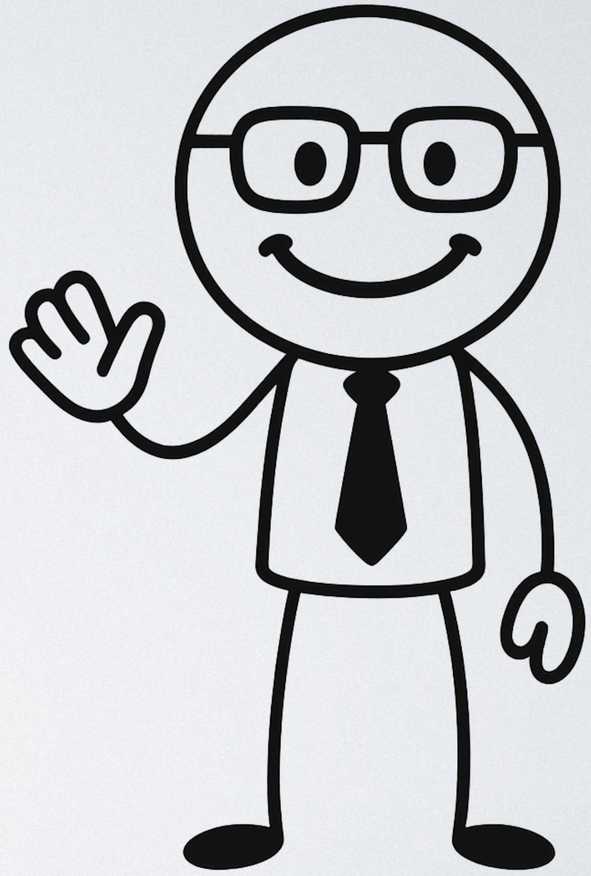
WHO AM I?

I've held roles ranging from Software Engineer to VP of Engineering

Currently a Principal Engineer at Westpac NZ

I've been building software systems for ~20 years

I've worked for 11 companies across 5 countries



THE PARADOX

Most of us aim to perform well at work

Pride in our work motivates us

We appreciate praise, promotions, pay rises

… and yet …

things often don't go as planned

AIRBUS A380

Assembled from parts manufactured in four countries

Large sections of the aircraft arrived in Toulouse in France

Engineers spent weeks threading bundles of wires through the airframe only to find they weren't long enough

AIRBUS A380

100k wires and 40k connectors affected

Wiring design had to restart from scratch

Two year delay

€5.5 billion initial loss

HOW CAN THIS HAPPEN?

"A bad system will beat a good person every time"

– W. Edwards Deming

Deming popularised the idea of viewing organisations as systems that people work within

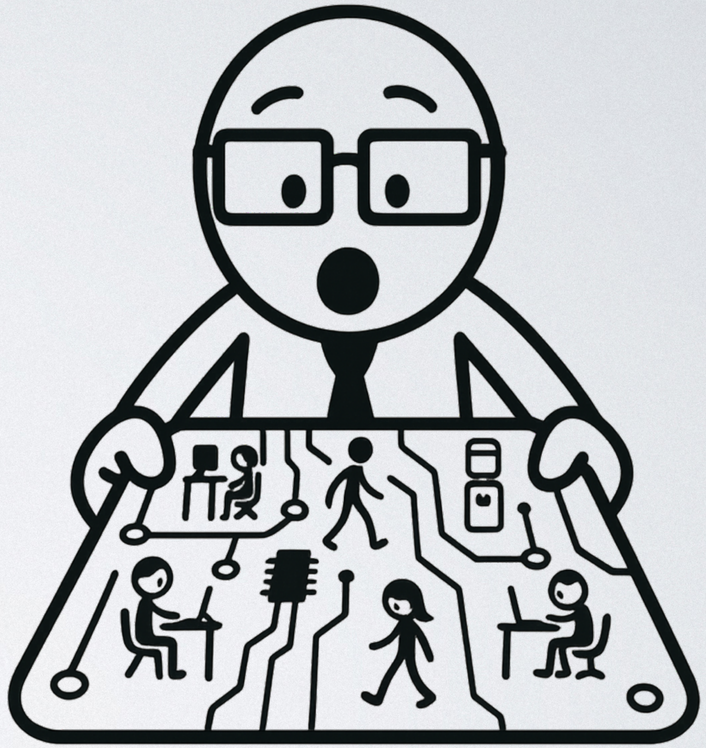
He espoused correcting the system rather than the people in it

HUMAN SYSTEMS

It is entirely possible to model the workflows, communication lines, constraints, etc that make up an organisation

Microsoft already has tools for this although they've stopped short of releasing a product (yet)

Gaming has been modelling human interactions for decades



COMPLEX SYSTEMS

Bad

Software in general is complex and difficult to reason about in the running state

Ugly

Distributed software systems add concurrency, eventual consistency, numerous points of failure

Game Over

Systems the likes of Netflix are so complex they are literally impossible to reason about at any depth

CONWAY'S LAW

"Organisations which design systems are constrained to produce designs which are copies of the communication structures of these organisations."

–Melvin Conway

Conway's law tells us that human systems and software systems are intrinsically linked

Given that software systems are complex then it follows the human systems that builds them must be equally complex

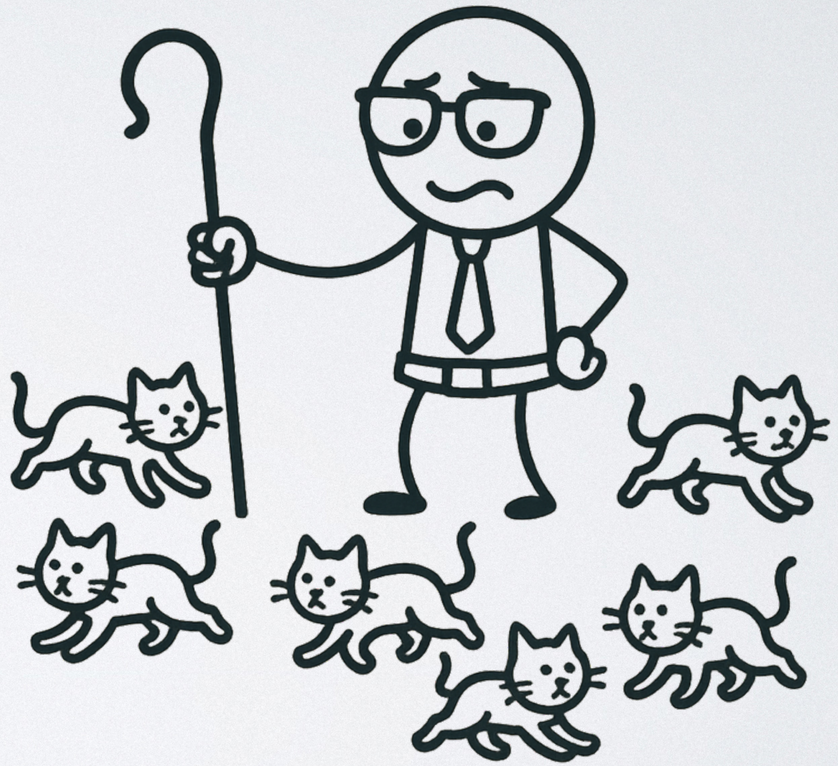
HORRENDOUSLY COMPLEX SYSTEMS

Human systems mimic distributed systems making them extremely difficult to debug and reason about.

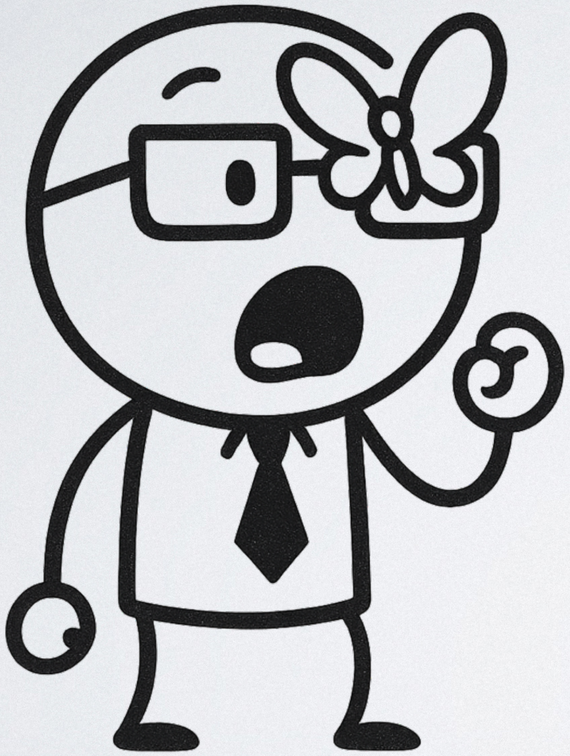
… also …

Humans are non-deterministic.

They have *feelings*



THE BUTTERFLY EFFECT

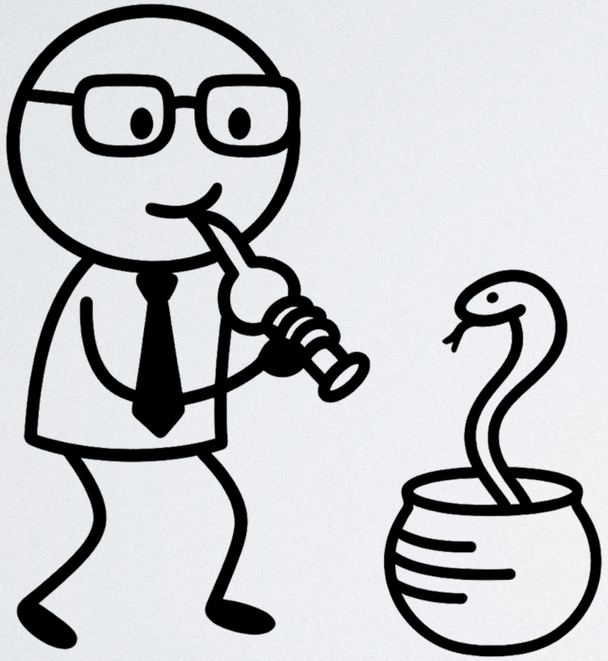


"It has been said something as small as the flutter of a butterfly's wing can ultimately cause a typhoon halfway around the world"

GOODHART'S LAW

"When a measure becomes a target, it ceases to be a good measure"

–Charles Goodhart



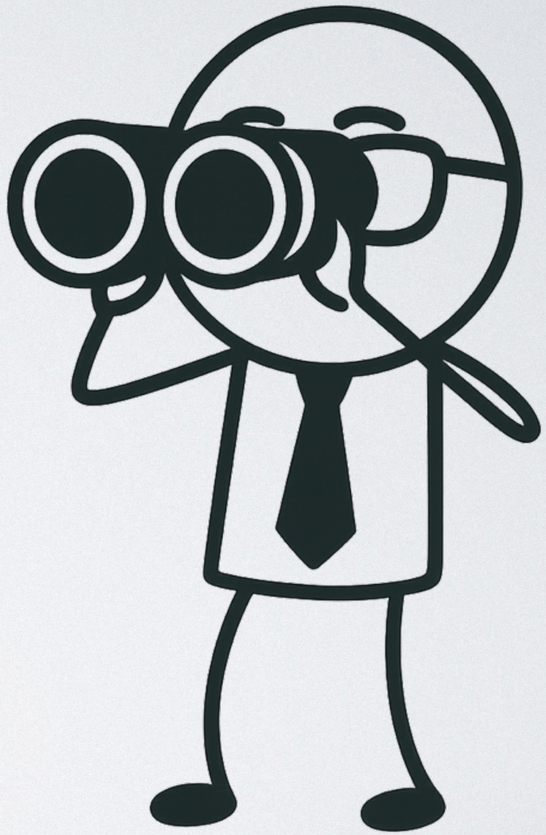
Cobra Effect - In India, a bounty for dead cobras initially reduced the cobra population, but then people started breeding cobras to collect the bounty.

THE HAWTHORNE EFFECT

Lighting experiments in an electric components factory in the mid 1920s

Changes in light levels resulted in elevated productivity in both control and experiment rooms

Concluded that productivity increased because the workers knew they were being observed



DEALING WITH SUCH COMPLEXITY

In software we manage complexity all the time

The SDLC gives us a process framework for implementing change in a complex environment

Modern methodologies like agile and devops add rapid iteration, quick feedback loops and continuous monitoring

IT ALSO WORKS FOR HARDWARE

It wouldn't be the first time SDLC concepts have been used outside of software

WHY NOT WETWARE?

Can scale from a single team to a whole organisation

Continuous iteration over the system people work within

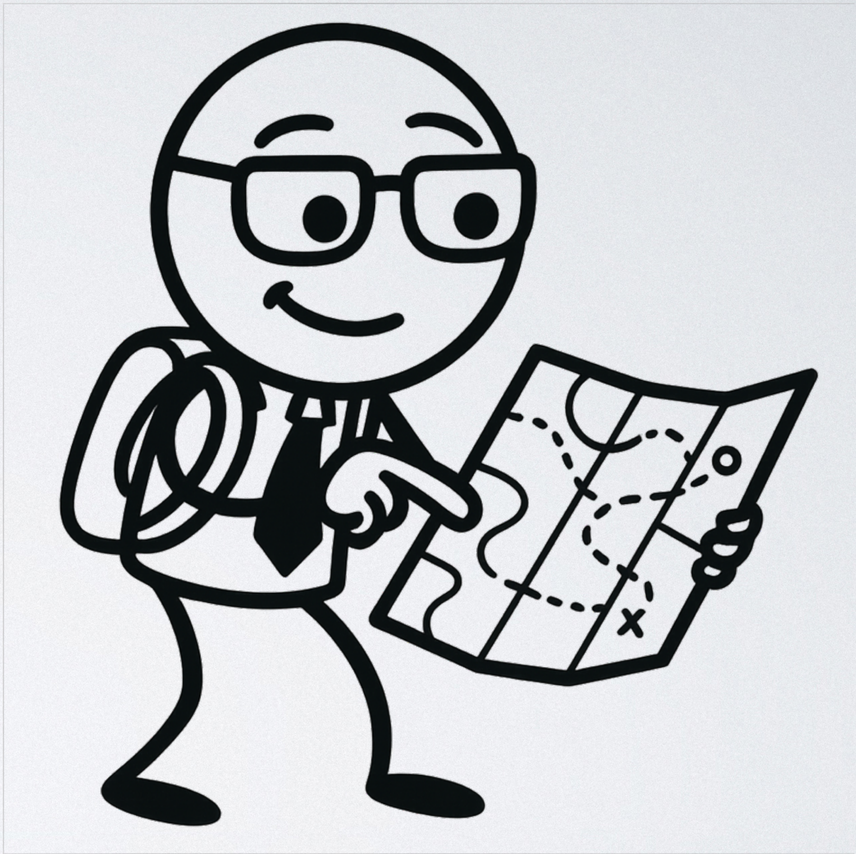
Focus on the removal of toil and blockers

Ensure your people are enabled to do the thing you hired them to do

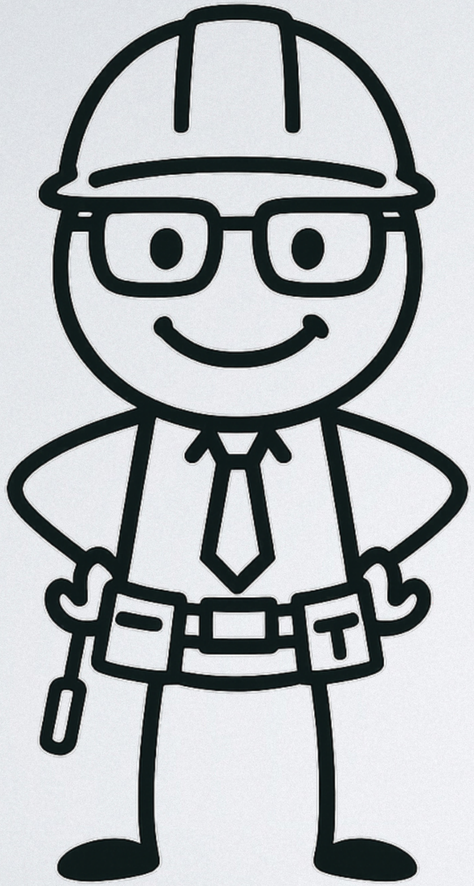
THE WDLC - PLAN

Where are we now in relation to where we need to be?

What is our hypothesis on what needs to change?



THE WDLC - IMPLEMENT



Prepare - design processes, acquire equipment, hire

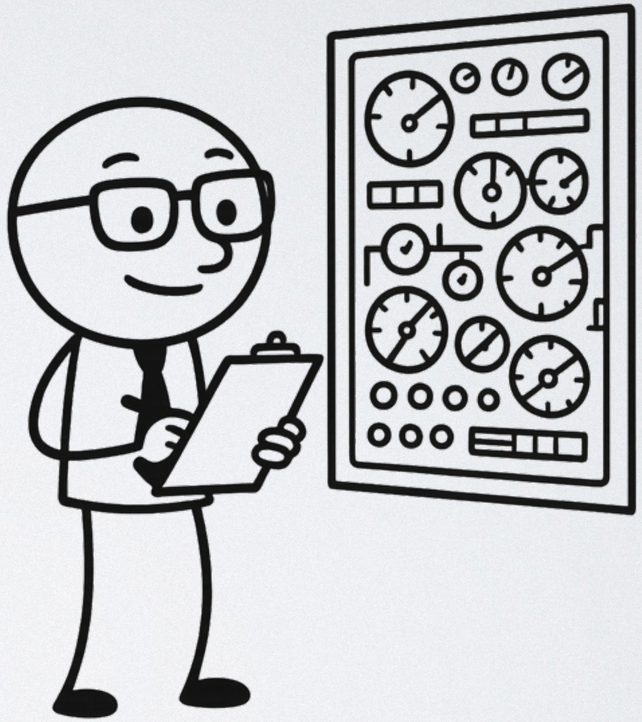
Roll out - apply the new processes, deploy the new hardware, etc

Test - make sure it lands the way you think it should. No point buying new equipment if people can't make use of it

THE WDLC - MONITOR

What tells us if our system is healthy?

What were the effects of our last change?



THE WDLC - ITERATE

Are we making progress towards the outcome?

Are we stuck?

What should we do next?

REAL WORLD EXAMPLE

Company experiencing rapid growth

Insufficient local talent pool

Look further afield for talent and hire remote staff

Current processes tailored to onsite staff

REAL WORLD EXAMPLE

Create a hybrid working environment	
Hypothesis	Desktop machines hinder interaction between onsite and offsite staff
Change	Replace desktop machines with laptops for a small cohort
Monitoring	+ improved experience for remote meetings - hybrid meetings had low engagement from remote participants
Unintended	+ increase in productivity due to having everything on one machine - staff are connecting work machines to public wifi
Iterate	Making progress: yes; Done: no; Stuck: no; What next …

REAL WORLD EXAMPLE

Create a hybrid working environment	
Hypothesis	Onsite staff at an advantage over remote staff during calls
Change	All staff use remote tools if remote attendees
Monitoring	+ improved engagement of remote staff
Unintended	- increased noise in the office as more people on calls at their desks
Iterate	Making progress: yes; Done: no; Stuck: no; What next …

SUMMARY

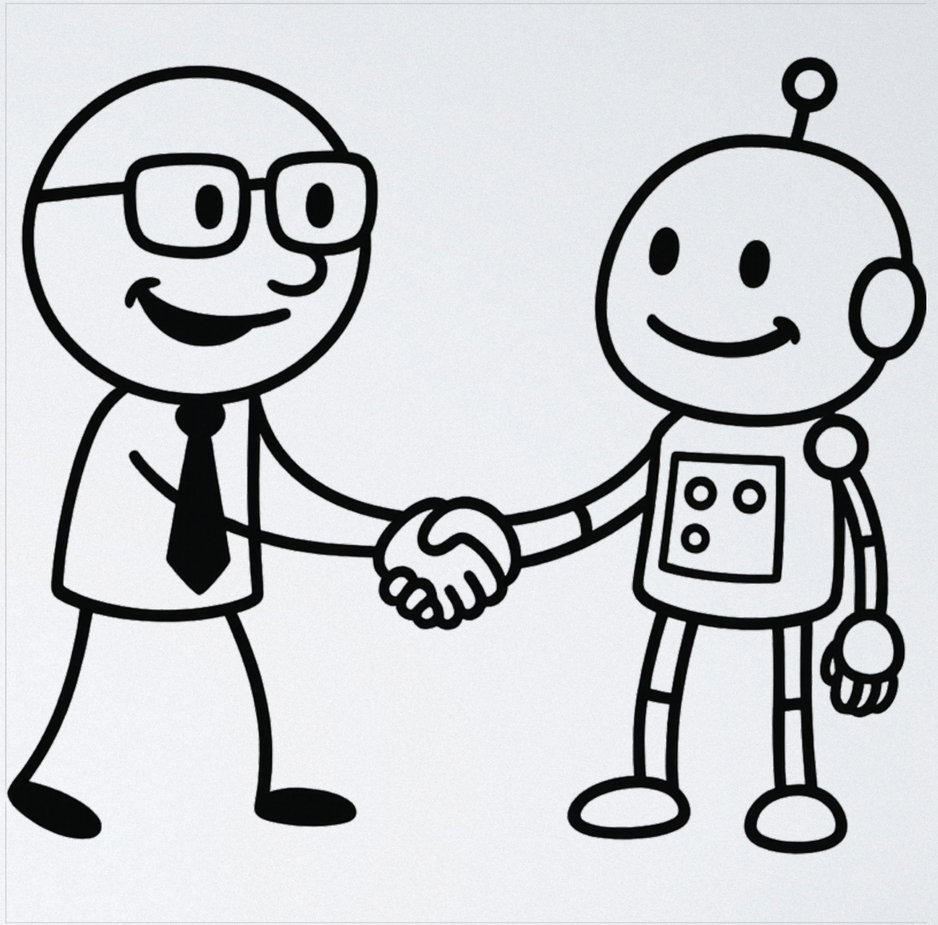
Take small iterative steps and remember the butterfly effect

Stay focused on the long term outcomes

Avoid management by numbers

A GLIMPSE INTO THE FUTURE?

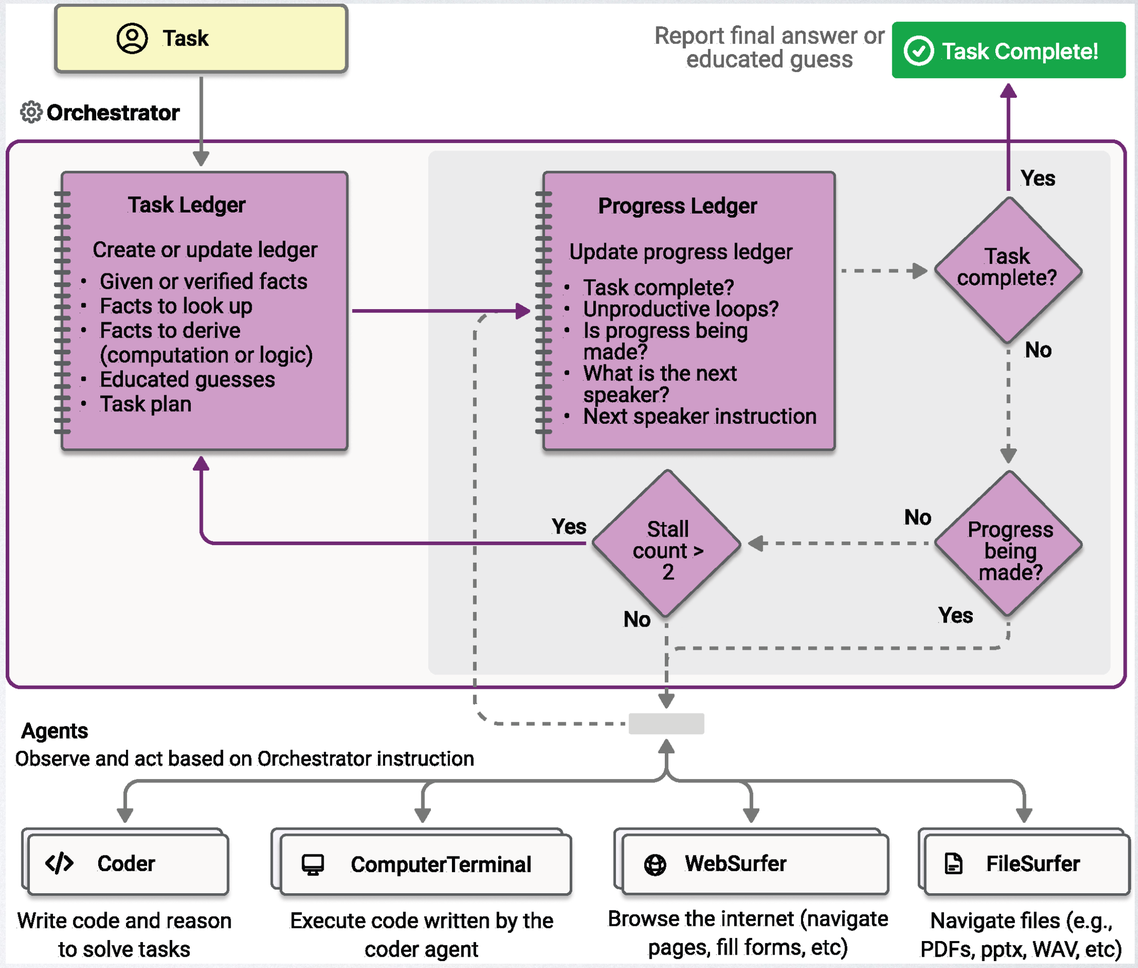
Its quite likely we'll be leading mixed teams of humans and agents in the not too distant future



MAGNETIC ONE

Research project courtesy of Microsoft

Generalist Multi-Agent system capable of open ended problem solving



KEY TAKEAWAY

W Edwards Deming embraced the concept of systems thinking and applied it to organisations back in the 50s

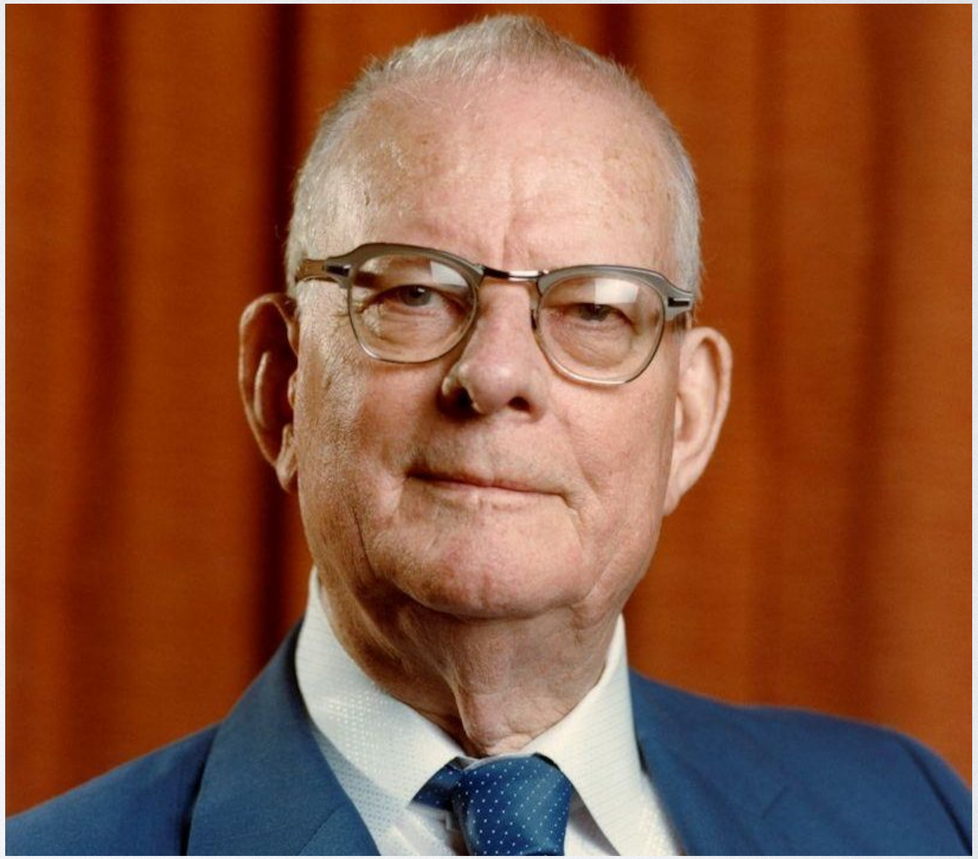
If you are familiar with the agile and/or devops SDLC you are already familiar with systems thinking in a very narrow context

Application of the SDLC to human systems eventually just leads you back to Deming's work

DR W EDWARDS DEMING

Google him or ask chat-gippity to tell you about his work

You could even go full old school and read one of his books!



THANK YOU!

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https://deming.org/