

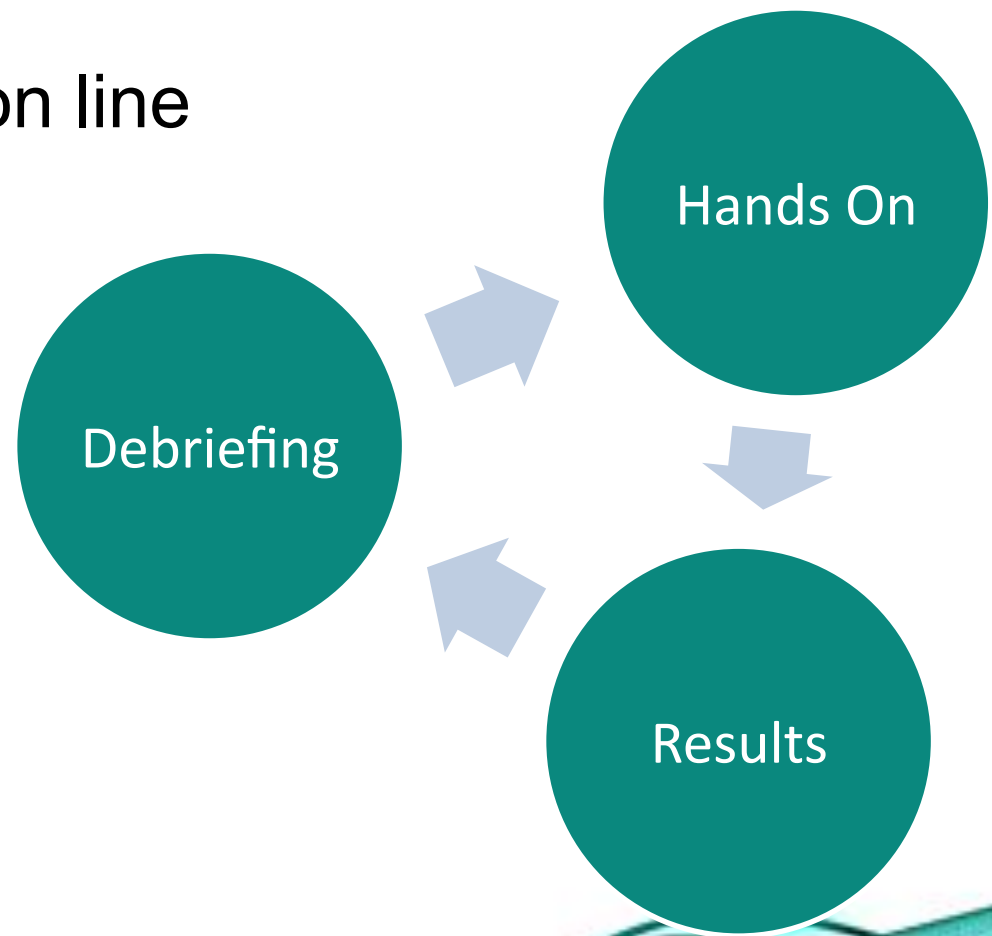
The Lego Lean Game

Danilo Sato, Francisco Trindade
XP 2009 – Sardinia - Italy

25th May 2009

Agenda

- Quick introduction
- Simulating a production line



- How about software?

Why are we here?

- Lean concepts starting to be noticed in the software world
- But not everyone has had contact with Lean principles and practices

We're here to introduce you to Lean
Hands On!

Lean?

- Toyota Production System
 - Revolutionized manufacturing (Ford vs. Toyota)
 - Started to be applied to different areas
 - Google, Dell, Zara, ...
 - Product Development
 - Supply Chain Management
 - Software
 - Healthcare
 - ...

Lean?



What we want to show

- Push and Pull Systems
- Kanban
- Systems Thinking
- Flow
- Heijunka
- Yatai (Work Cell)
- And more...

Hands On – 1st Step

- Let's simulate a production line...



- 4 Teams
- 4 rounds of 40 seconds
- Follow the instructions
- Build houses
- 1 Piece = \$ 1.00
- 1 House = \$ 25.00

Stay Motivated!

**DO IT
RIGHT
THE
FIRST
TIME!**



**TAKE PRIDE IN
YOUR WORK**

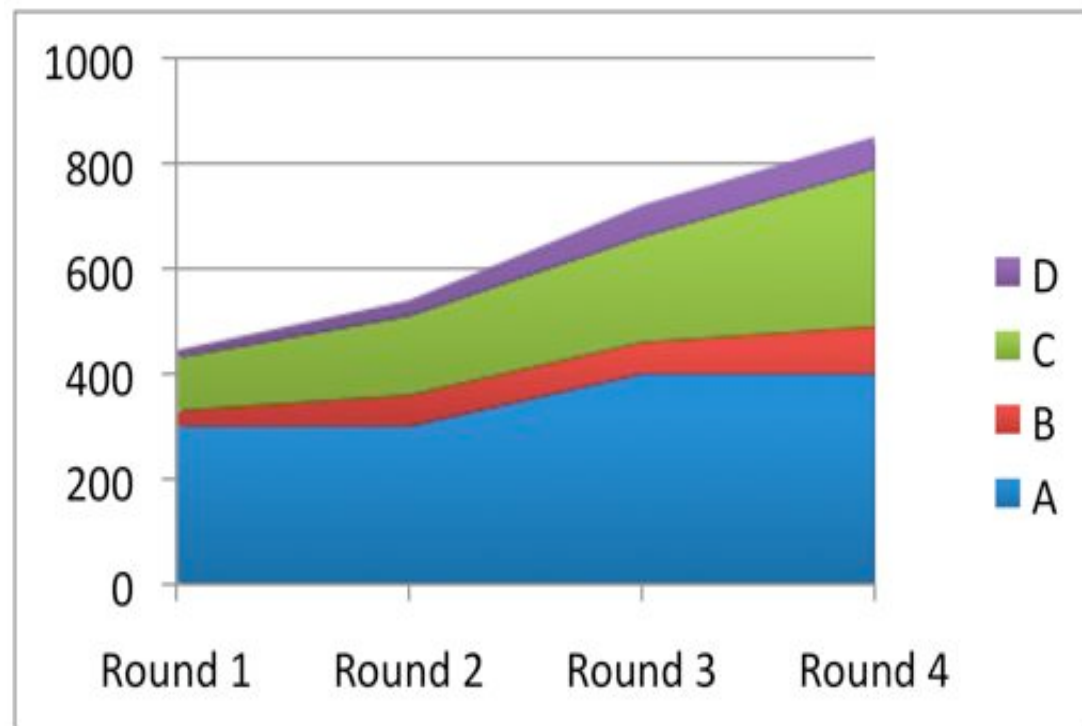
**BE A
QUALITY
WORKER**

Houston we have a problem...

What went wrong?

Waste

- Visible Inventory
- Over/Under Production

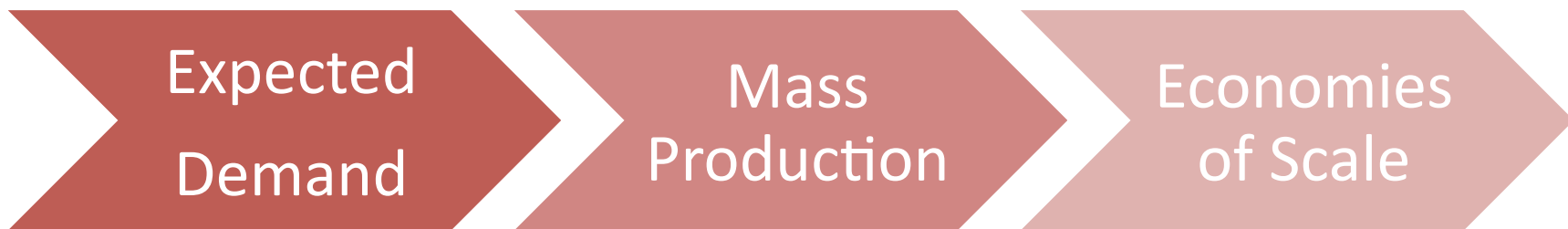


7 Wastes of Manufacturing

- Overproduction
- Waiting
- Unnecessary Transportation
- Overprocessing
- Inventory
- Motion
- Defects

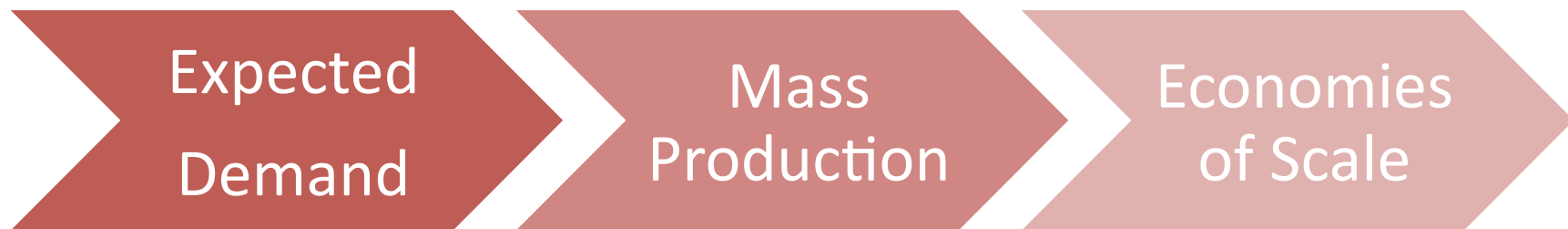
Push and Pull Systems

- Push System – *upstream information*



Push and Pull Systems

- Push System – *upstream information*

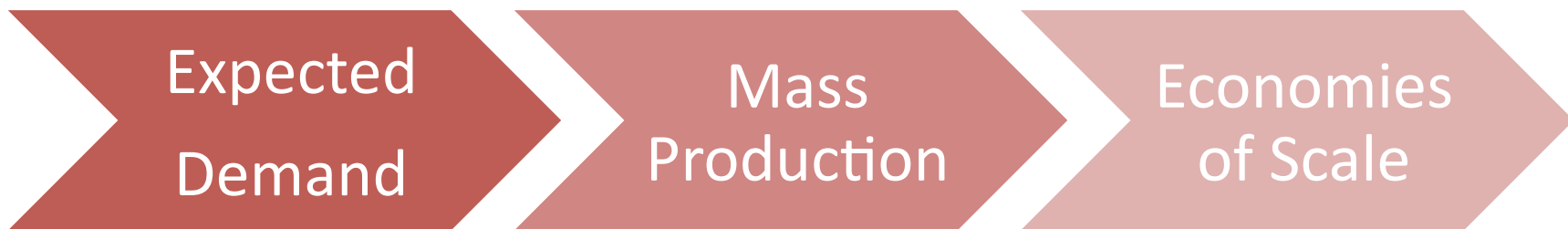


“Any colour, as long as it’s black”

Henry Ford

Push and Pull Systems

- Push System – *upstream information*



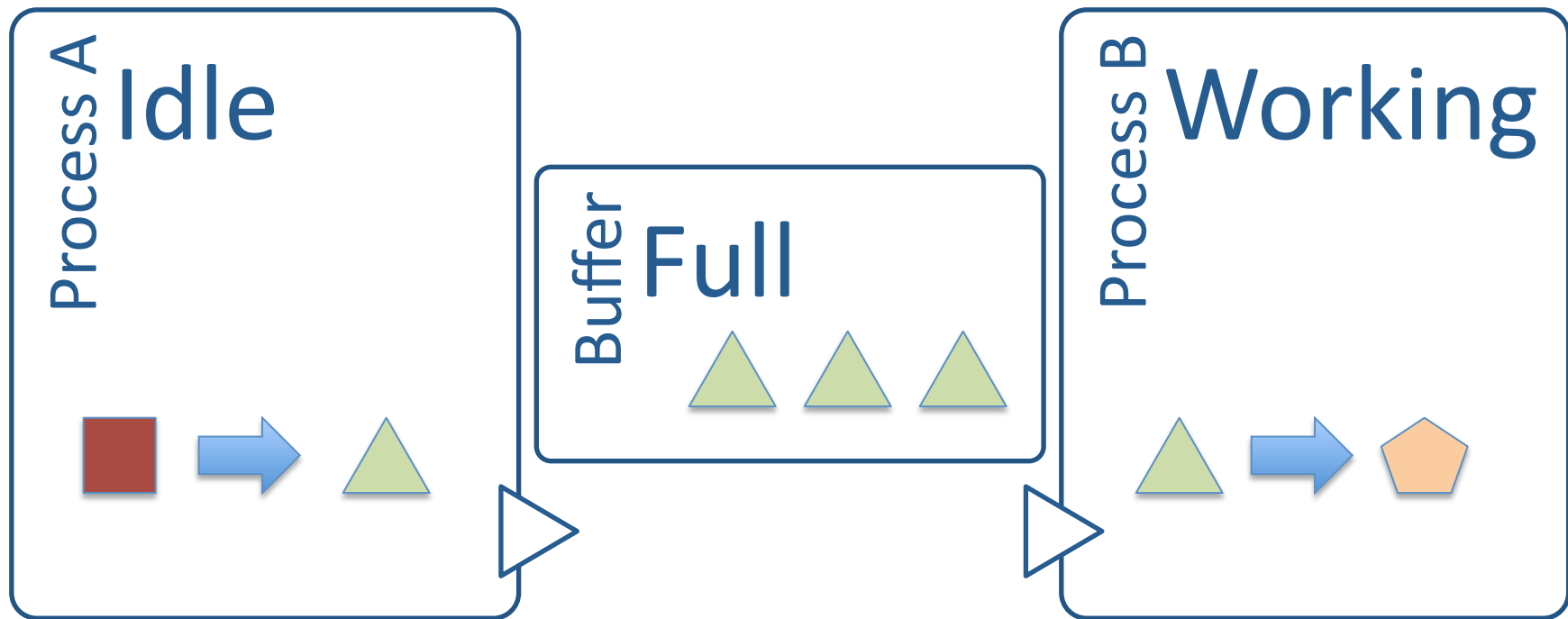
- Pull System – *downstream information*



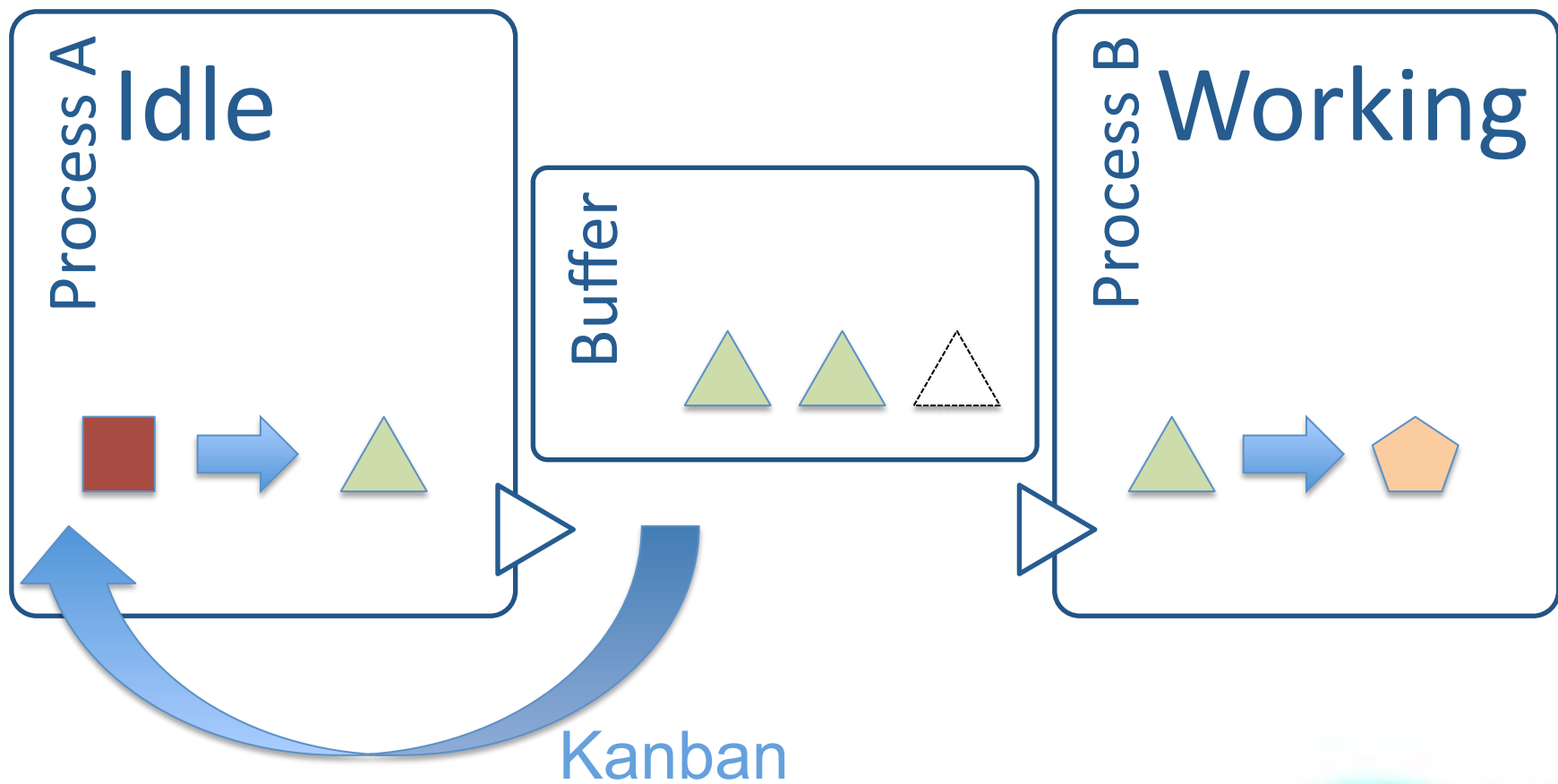
Kanban

- Physical device
- Signals demand to downstream processes
- Regulates demand on a pull system
- Limits Work in Process (WIP)
- Aids visual control
- Self-directing

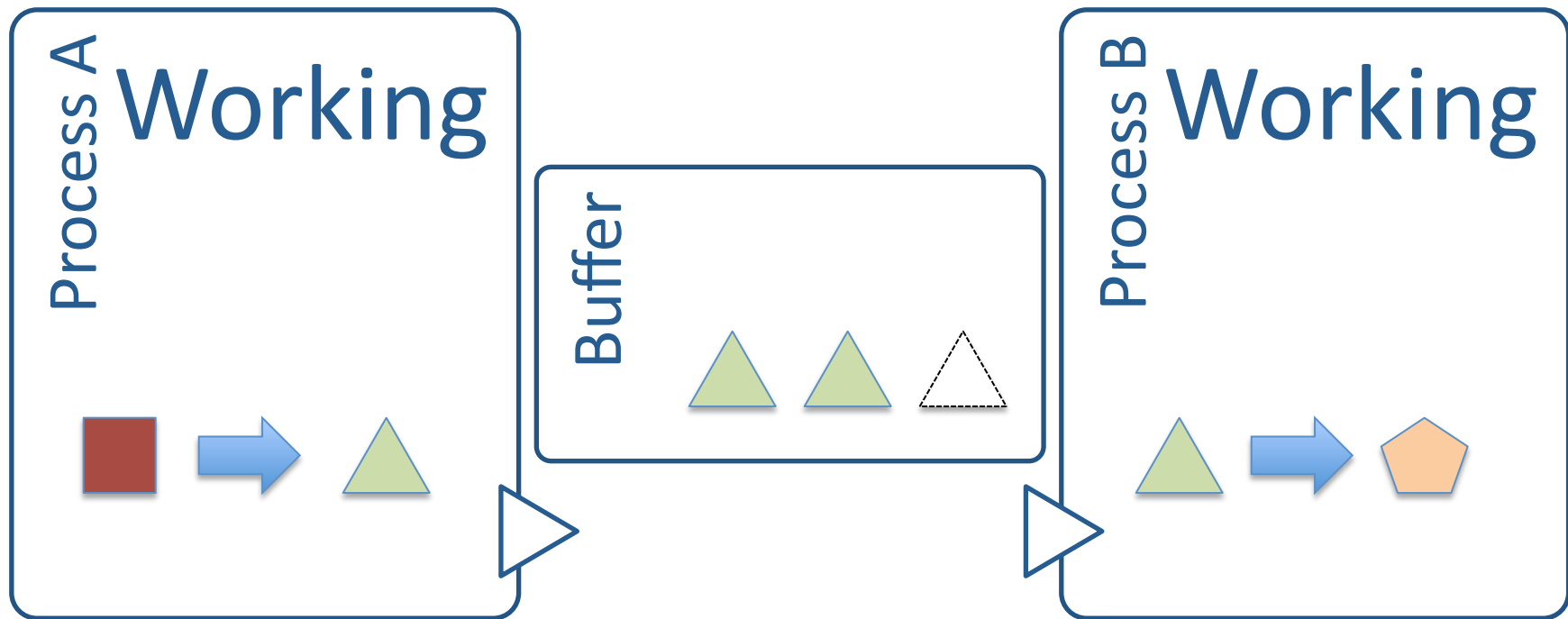
Kanban



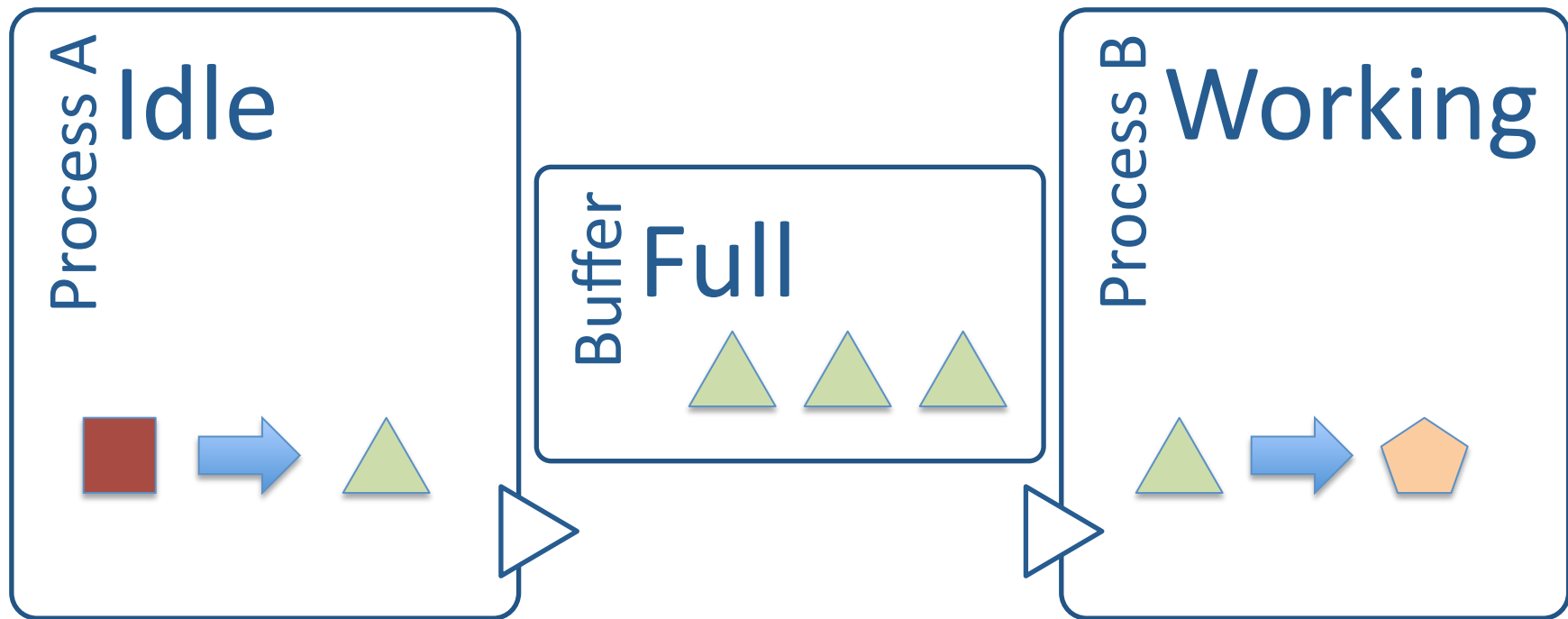
Kanban



Kanban



Kanban



Hands On – 2nd Step

- Using Pull and Kanban
 - Setup minimum buffers at intermediate steps
 - Demand comes first
 - Items are produced to fill gaps in the buffers



- 4 rounds of 40 seconds

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Houston we have a problem...

What went wrong?

Unleveled Process

- Another type of waste
- Some people working more than others
- Mura (Unevenness)
- Heijunka

Flow

- Final goal is a leveled process
- Production line must be a continuous flow
- One piece is bought when one piece is delivered
- Sustainable pace

Systems Thinking

- Why does it still feel wrong?
- What are the other teams doing?
- What's the purpose of the system?

Systems Thinking

- Why does it still feel wrong?
- What are the other teams doing?
- What's the purpose of the system?

**“A bad
system will
beat a good
person
every time”**

W. Edwards Deming

Let's Experiment

- Do we need 4 teams to build a house?
- Teams 1 and 2 have overlapping tasks

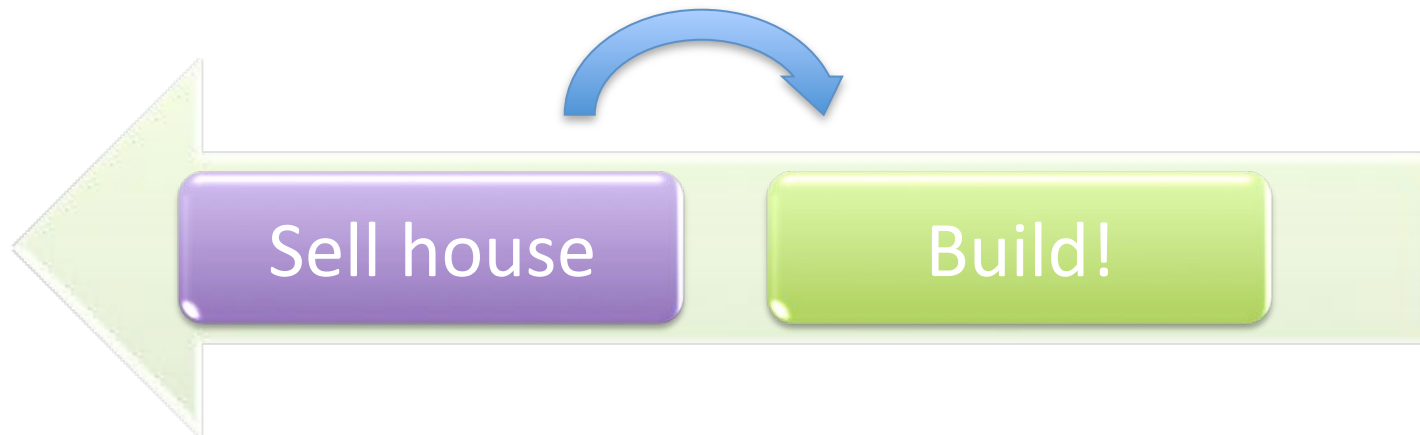
Yatai (Work Cell)

- Multi-skilled worker
- Single piece flow



Hands On – 3rd Step

- Using Work Cells
 - Each person builds a house
 - Round of 160 seconds
 - Signal (raise your hand) if you finish your house



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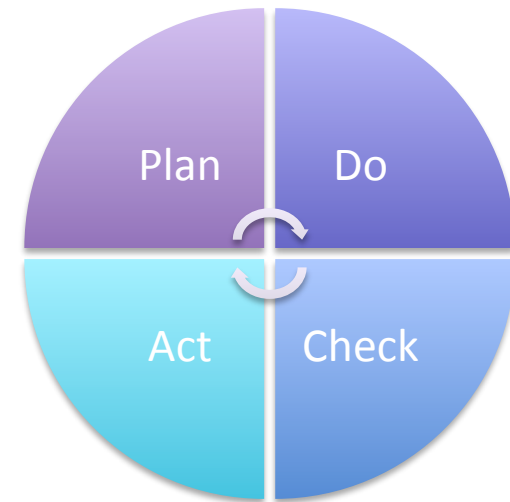
**BE A
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Houston we have a problem...

What went wrong?

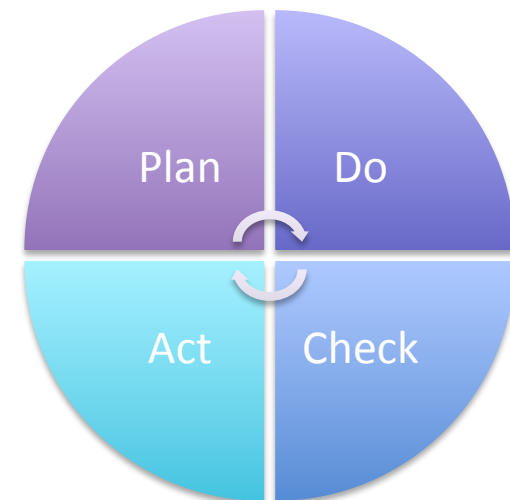
Kaizen

- Continuous Improvement
- Reflect and adapt
- Learn by standardizing
- Long term thinking
- Respect People



Kaizen

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- Reflect and adapt
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“Toyota’s real advantage was its ability to harness the intellect of ‘ordinary’ employees”

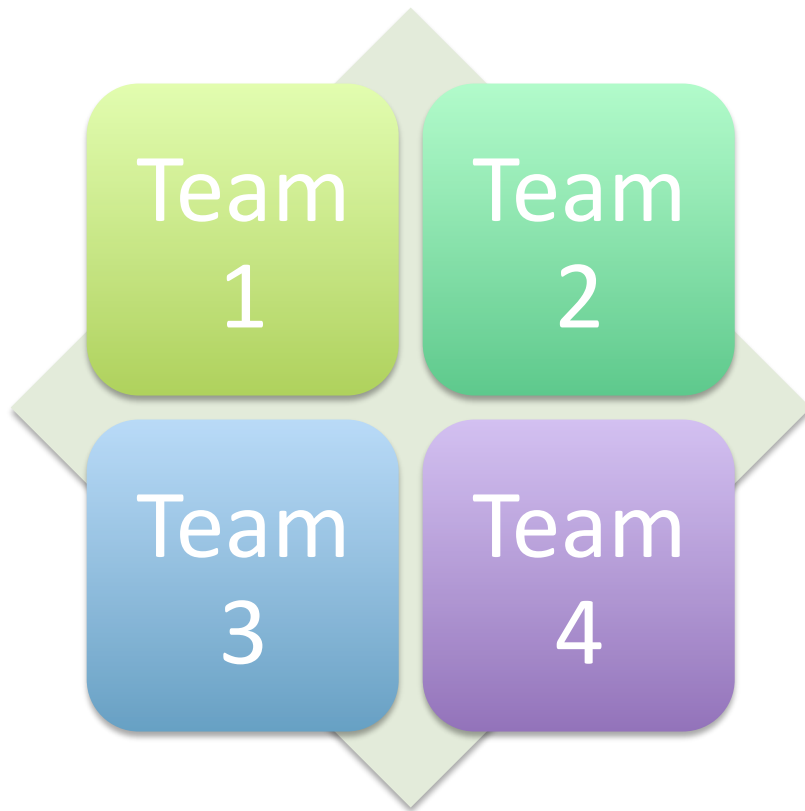
Gary Hamel

Improving the Process



It's your turn to help
us improve the
process

Hands On – 4th Step



- Discuss your own process
- 1 round for each team

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Our Results

Push System

Kanban

Yatai

Team's Process

Is That All?

- We saw some of the **practices**
- Practices are **contextual**
- Underlying **principles** must be understood
 - Like agile!

What is Lean?

Myth What TPS Is Not	Reality What TPS Is
A tangible recipe for success	A consistent way of thinking
A management project or program	A total management philosophy
A set of tools for implementation	Focus on total customer satisfaction
A system for production floor only	An environment of teamwork and improvement
Implementable in a short- or mid-term period	A never ending search for a better way
	Quality built in process
	Evolutionary

Lean in Software Development

- Manufacturing is not the same as Software Development
- Lean Product Development
 - Knowledge flow is not the same as material flow

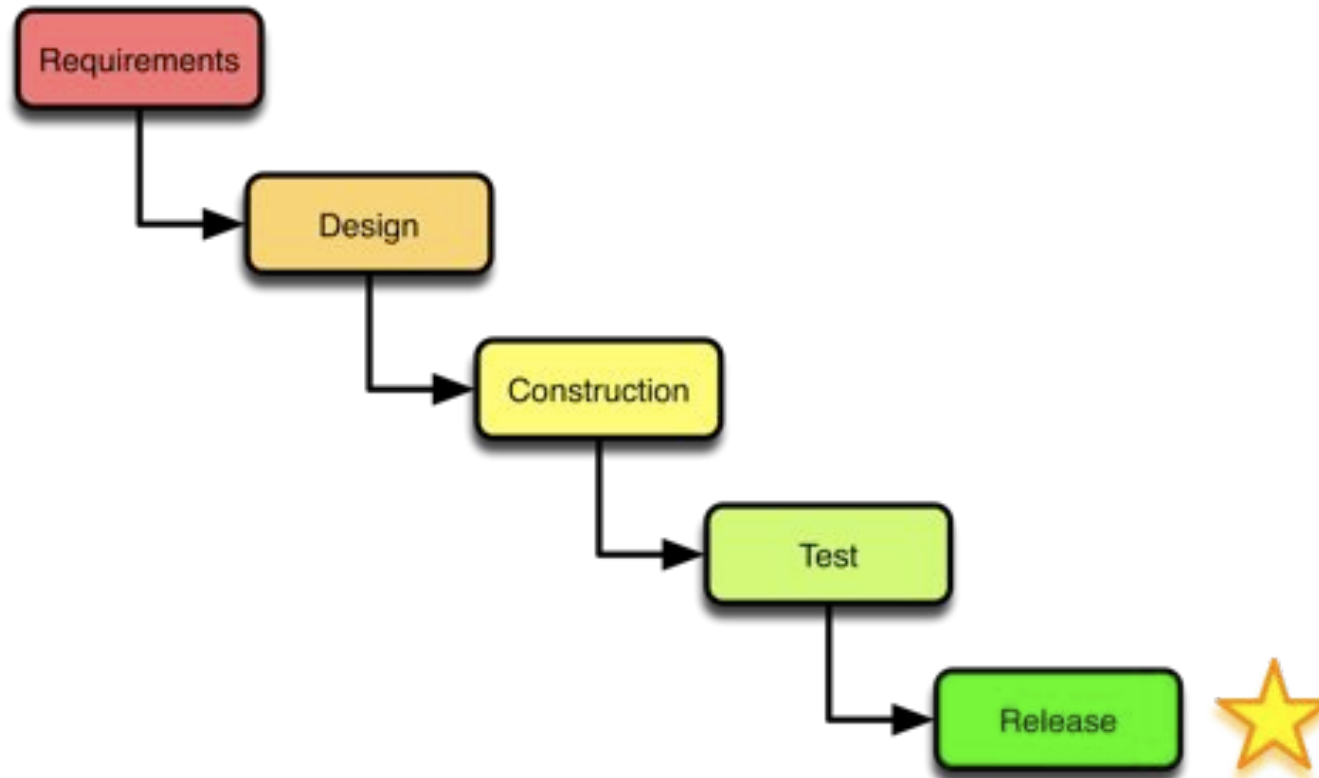
Context is King

Lean in Software Development

- Extra Features (Overproduction)
- Waiting (Waiting)
- Unnecessary Transportation (Unnecessary Transportation)
- Gold Plating (Overprocessing)
- Partially Completed Work (Inventory)
- Unnecessary Movement (Motion)
- Defects (Defects)
- Unused Employee Creativity

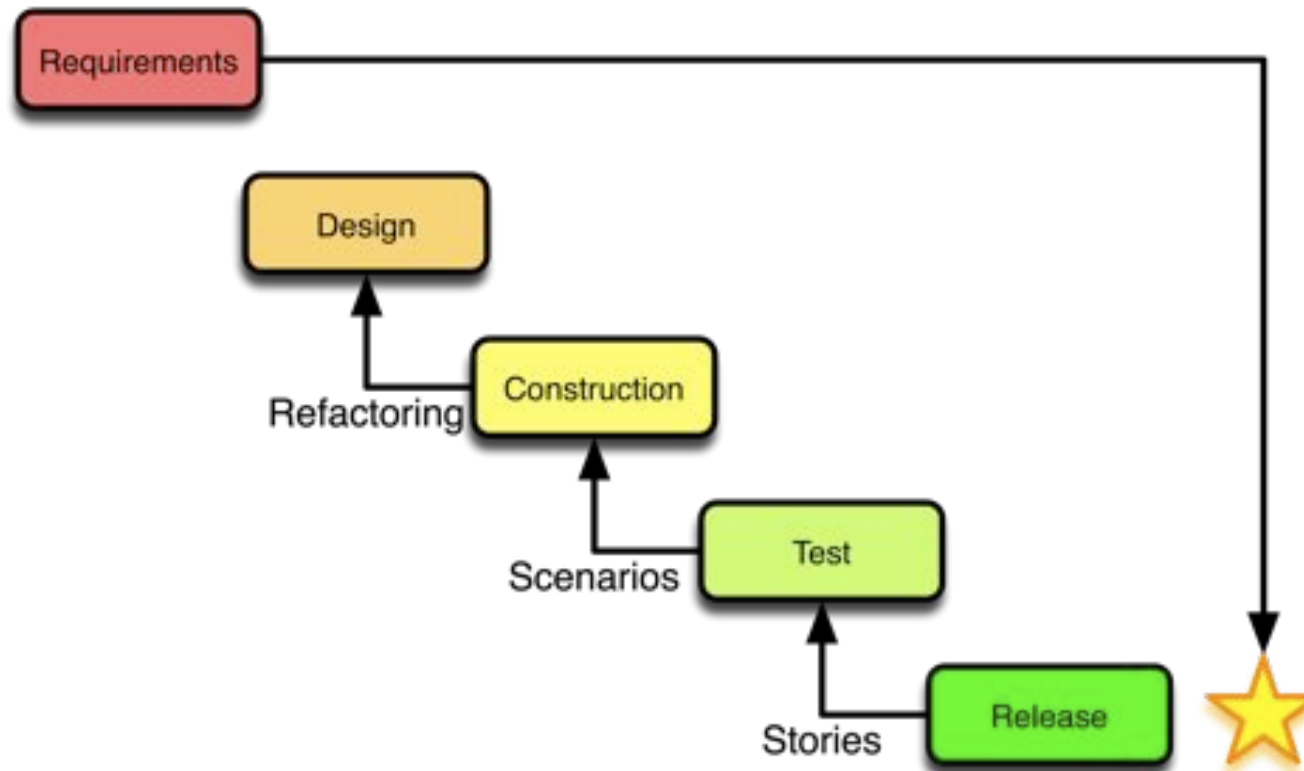
Lean in Software Development

- Example: Push System in Software



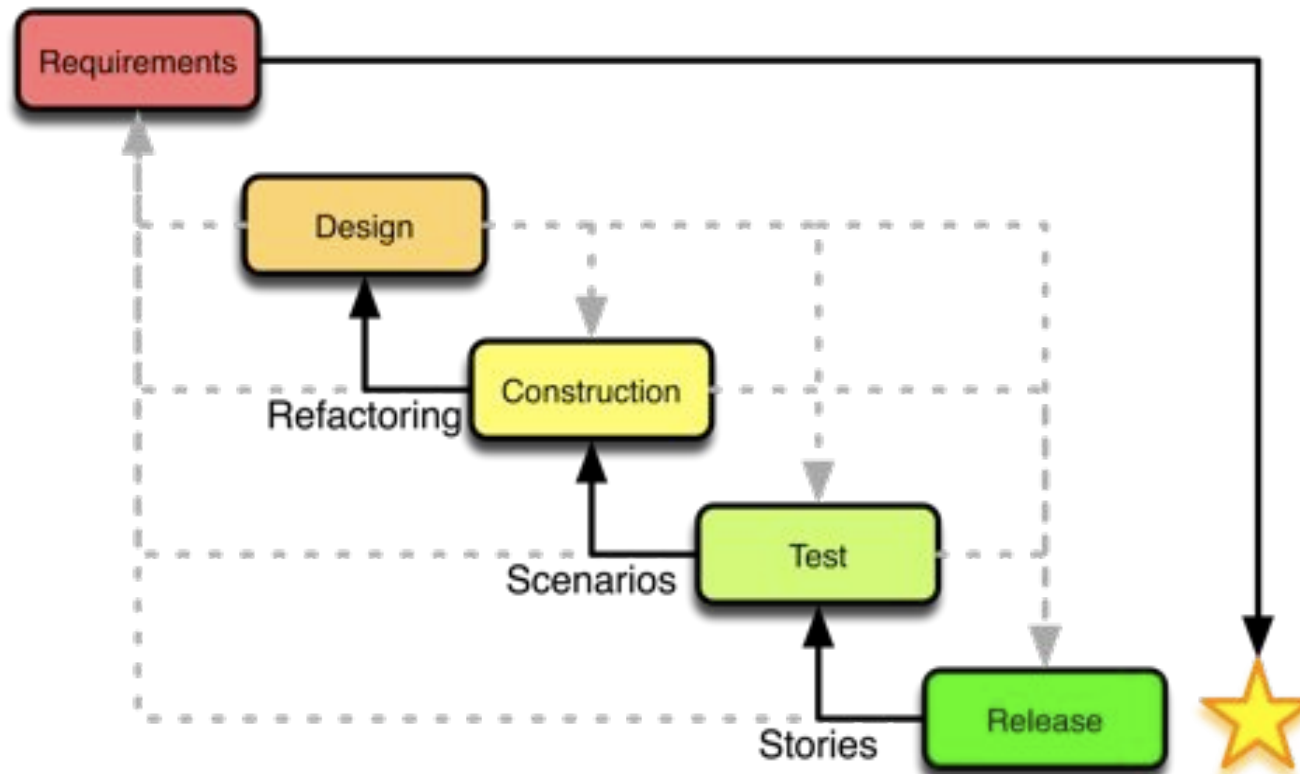
Lean in Software Development

- Example: Pull System in Software

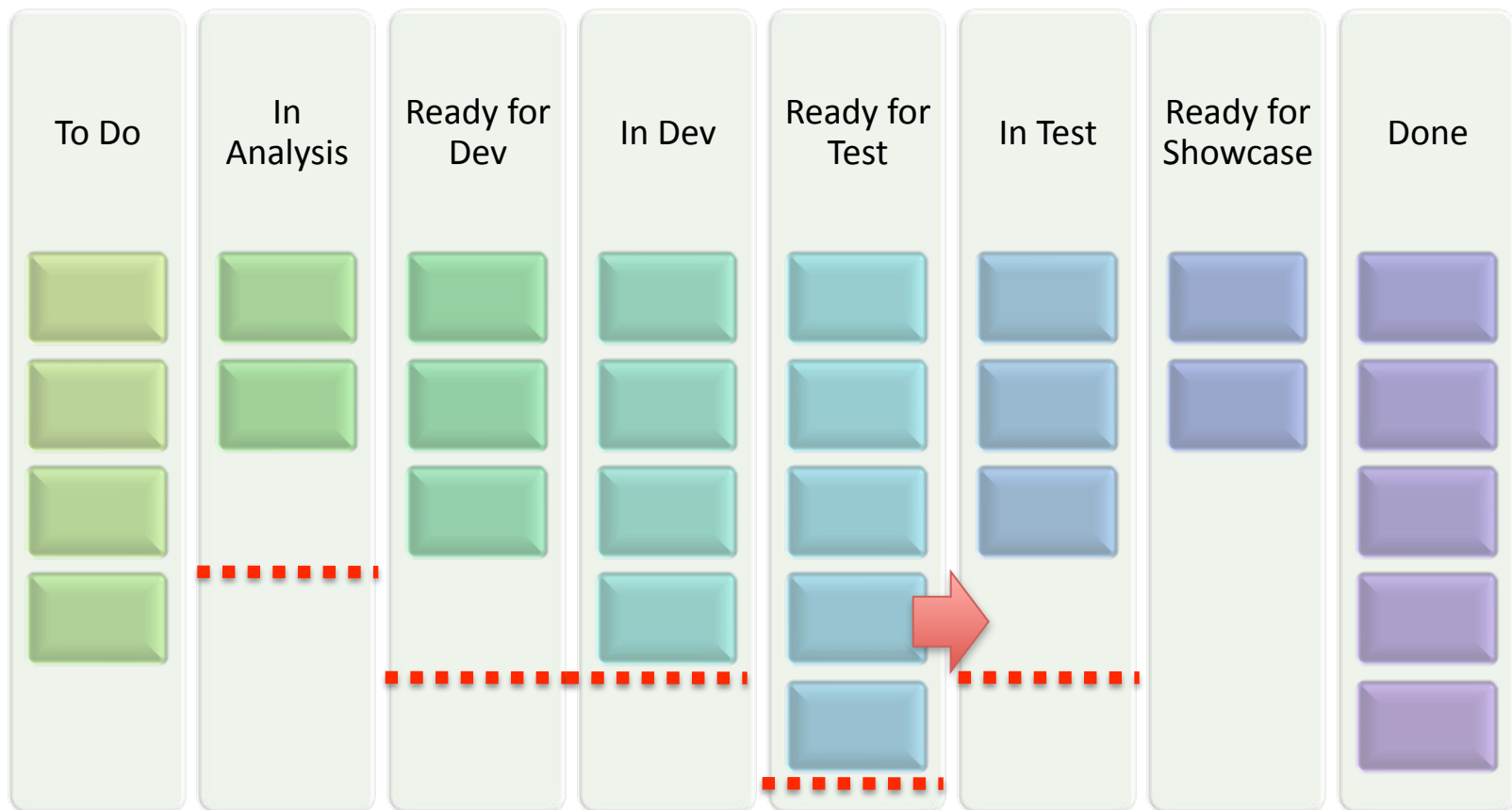


Lean in Software Development

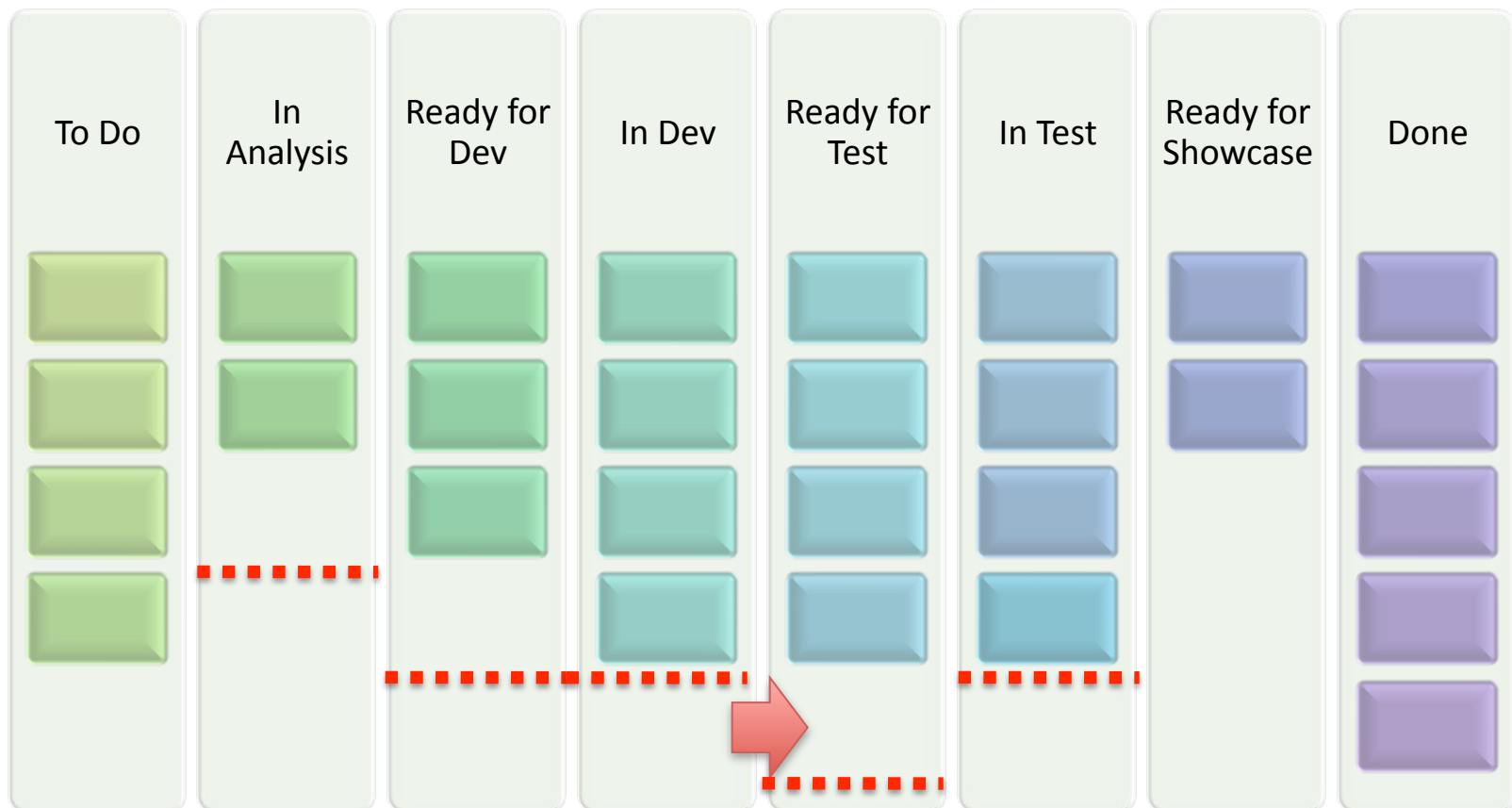
- Example: Pull System in Software



Kanban



Kanban



Lean in Software Development

- Much more:
 - Eliminate Waste
 - Create Knowledge
 - Build Quality In
 - Defer Commitment
 - Deliver Fast
 - Respect People
 - Improve System
- Lean:
 - Genchi Gembutsu
 - A3
 - 5 Whys?
 - Stop the Line
 - Andon
 - Jidoka
 - Mistake Proofing

Thank you!

Questions?

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