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## Composable Design

Juval Löwy  
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### About Juval Löwy

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- Software architect
  - Specializes in architecture and project design
  - Helped hundreds of companies meet their commitments
  - Conducts Master Classes the world over
- Recent book
  - Righting Software (2019, Addison-Wesley)
- Published more than 100 articles
- Speaks at major international development conferences
- Participated in Microsoft's strategic design reviews
- Recognized Software Legend by Microsoft
- Contact at [www.idesign.net](http://www.idesign.net)



## Current State

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- Software development is in a deep crisis
- Every aspect is broken
  - Schedule
  - Cost
  - Requirements
  - Quality
  - Staffing
- Hardly anyone is doing it right



## The Way Out

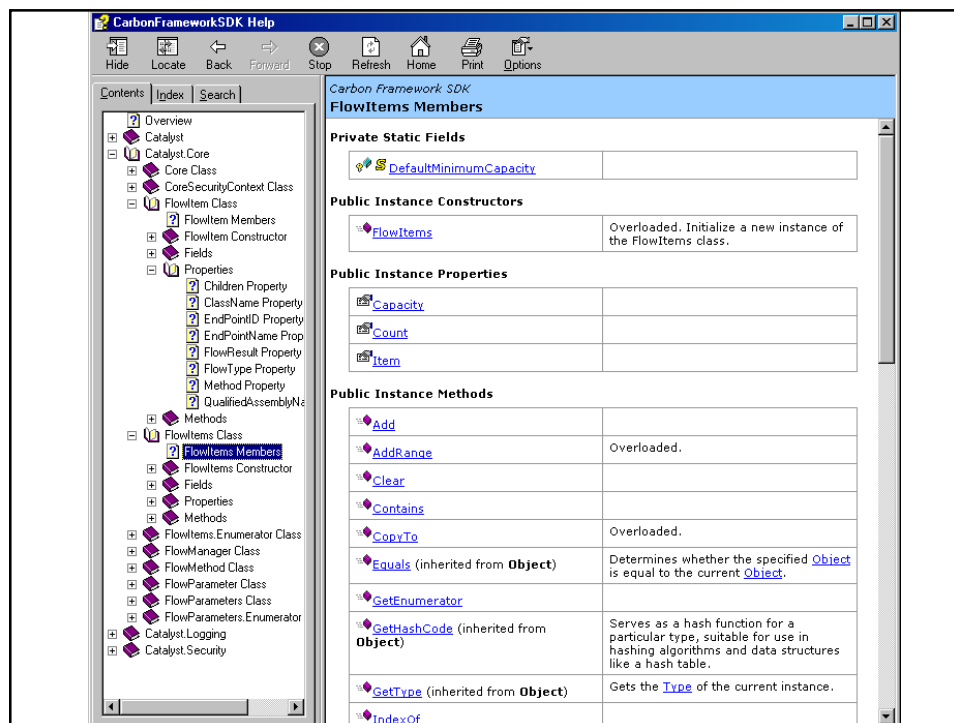
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- The way out is combination of
  - System design
  - Project design
  - Process design
  - Tools design
  - Career design
- We do not have all the pieces (yet)
- Profound implications on our industry and livelihood



## The SDD

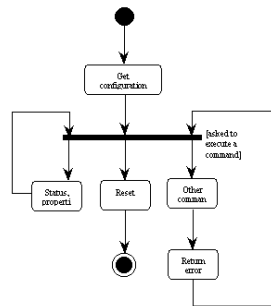
- External documentation
- Contains
  - Project overview
  - Operational concept
  - Assumptions, sequence of executions
  - All services and interfaces
  - Scenarios and interactions
  - Sample code



## Requirement Management



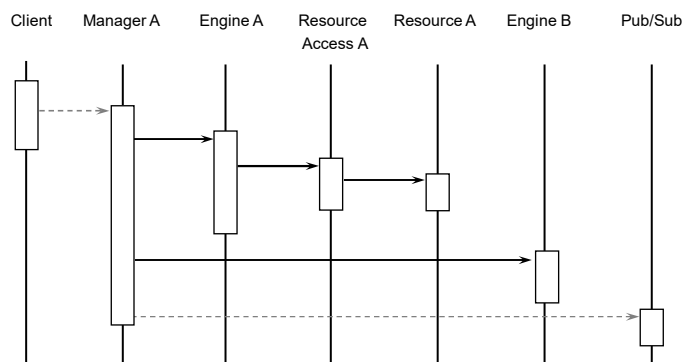
- Base Software Requirement Spec (SRS) on use cases
- Best to capture use cases graphically
  - The required dynamic behavior of the system

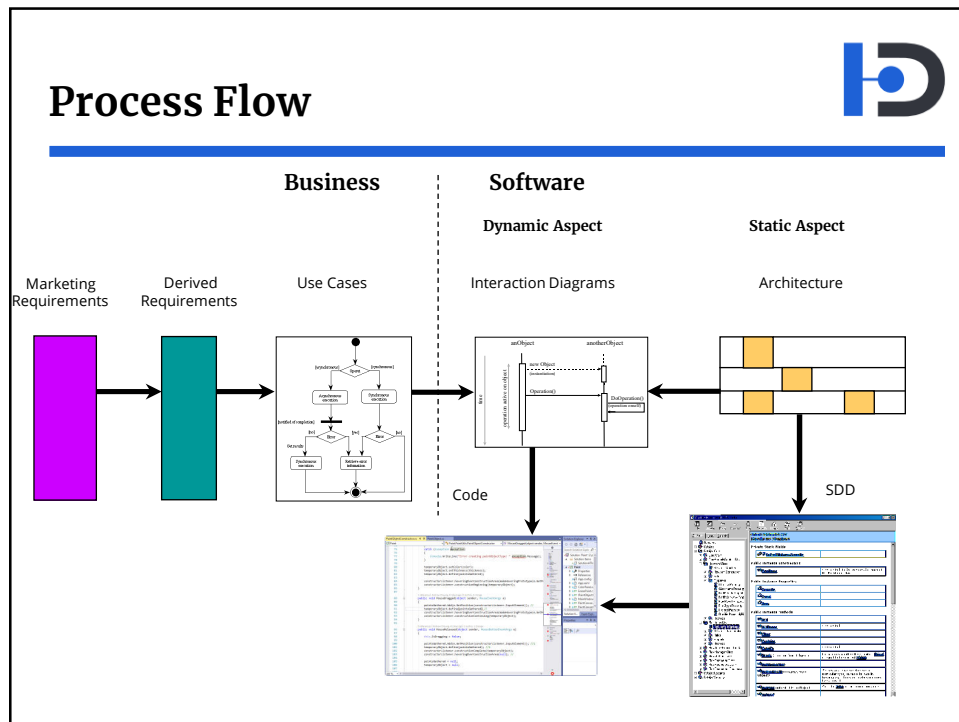


## Design Validation



- Interaction diagram per use case/activity diagram





## Composable Design

- Strive to have the minimal set of interacting services that satisfy core use cases
  - Present and future use cases
  - Known and unknown use cases
  - Iterative factoring process
    - ▲ May affect use case as well
- Start with core use cases
  - No need for all use cases
- When all conceivable use cases satisfied architecture is validated

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- Do not satisfy any use case in particular
  - Use cases will change
    - ▲ Over time
    - ▲ Added
    - ▲ Removed
- Core set of services
  - Composing services in particular way supports particular use case
  - Change in use cases causes change in workflow not in services
- Essence of agility

## Composable Design

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- Where is the added value?
  - Coding is mechanical
  - Why not have a machine do it?

## Composable Design

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- Tools will eventually catch up
  - Software industrial revolution

## Composable Design

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- Tools will eventually catch up
  - Software industrial revolution



## Composable Design

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- Tools will eventually catch up
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**OPINION**

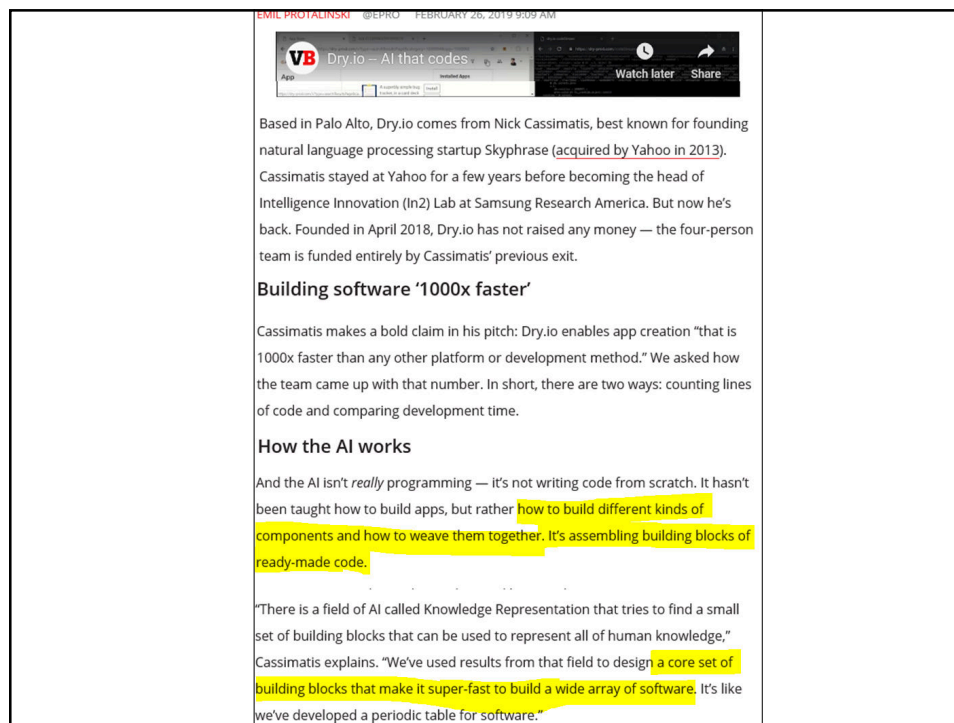
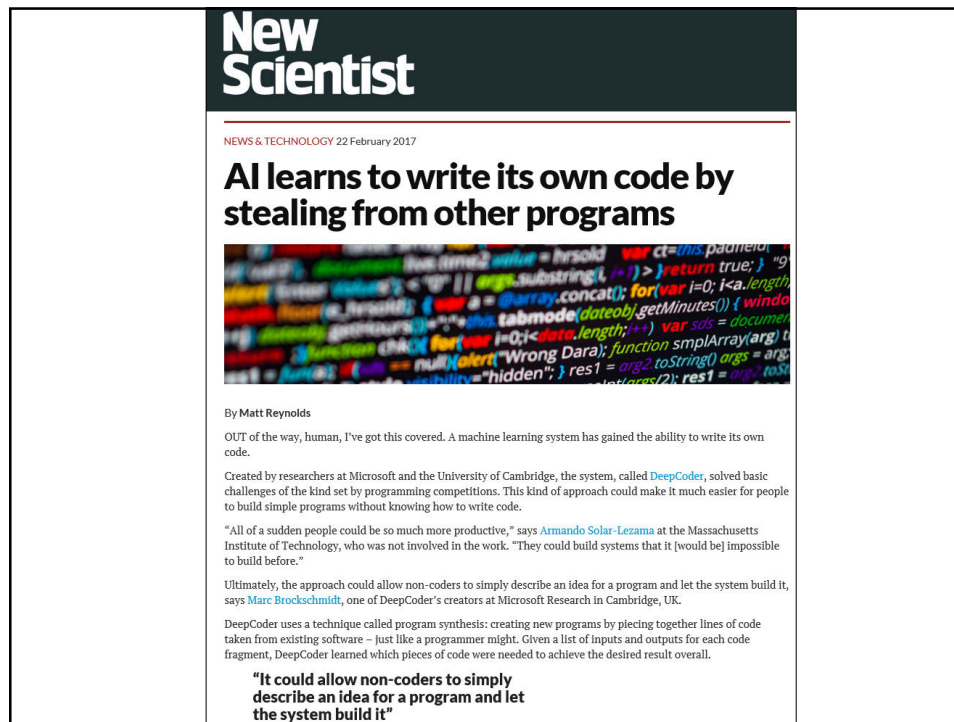
## Artificial Agility

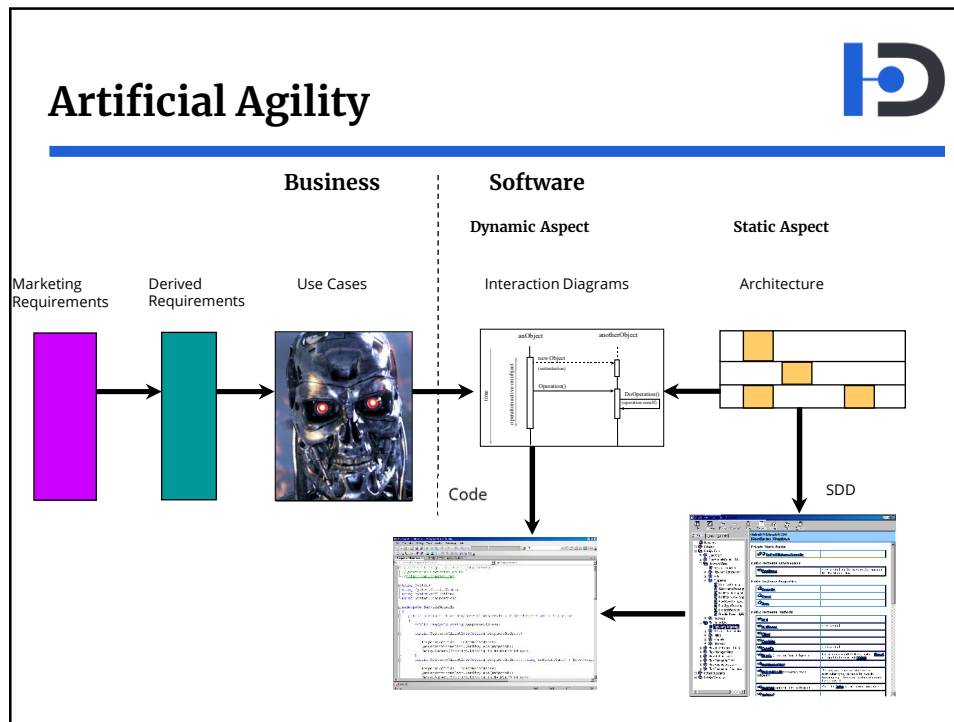
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- Could AI build the workflows?
  - Given correct set of building blocks
  - Architecture is the enabler of AI
- Learn the requirements
  - Machine learning
- Devise solutions
  - Try many combinations
  - Simulations
  - Run stochastic
  - Bayesian logic to guess outcomes







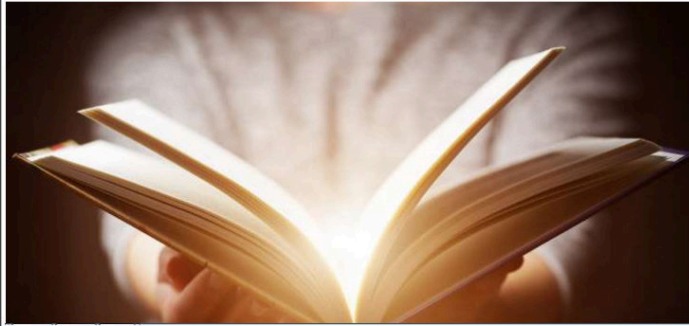
## Artificial Agility

- AI will have to understand specs and use cases
- Already better than humans at reading comprehension

## Microsoft AI beat human on Stanford reading test

January 14, 2018

20 years ago, IBM's Deep Blue beat Garry Kasparov in a game of chess and the practice of pitting human against computer continues to this day. Google's AI was the first to [beat a Go champion](#) a couple of years back (and it continues to [teach itself](#) how to play other games, too). Now [Bloomberg](#) reports that [Alibaba](#) and [Microsoft](#) have both developed AI that scores better than humans on a Stanford University reading test.

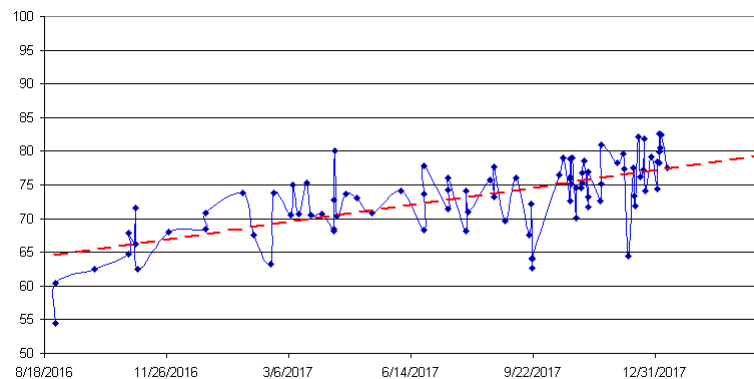


Ultimately, the idea is to help AI systems process large amounts of written data to more accurately respond to human questions. "That means objective questions such as 'what causes rain' can now be answered with high accuracy by machines," Alibaba chief scientist Luo Si said in a statement. "The technology underneath can be gradually applied to numerous applications such as customer service, museum tutorials and online responses to medical inquiries from patients, decreasing the need for human input in an unprecedented way."

## Artificial Agility



- Steady rate of improvement
- Perfect scores by end of 2020



## Artificial Agility

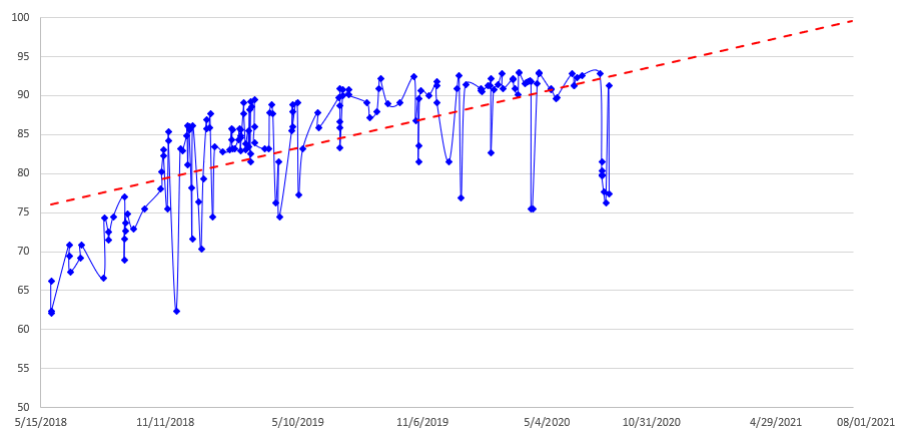


- Sanford had to revise the test
  - AI was getting too good at the test, not at understanding
  - New test includes context
- Already surpassed humans even on new test

## Artificial Agility



- Perfect score by August 2021



## Artificial Agility

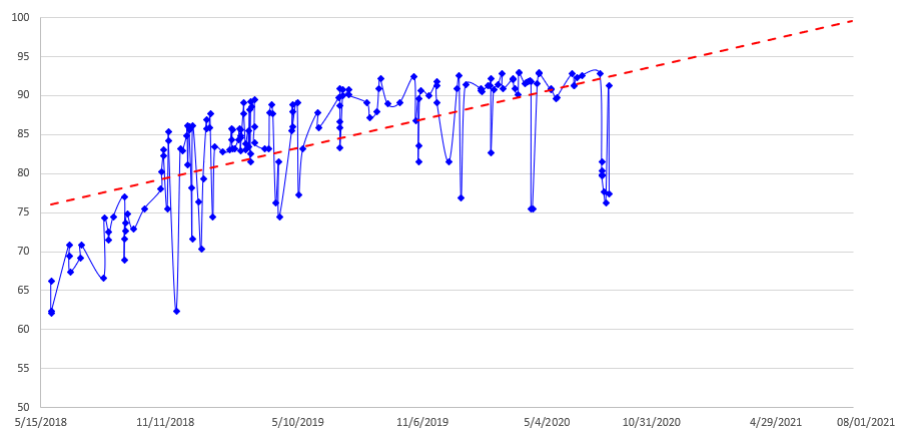


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## Artificial Agility



- Perfect score by August 2021





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## Resources

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## Resources

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- Slides
  - [www.idesign.net/DevInt](http://www.idesign.net/DevInt)

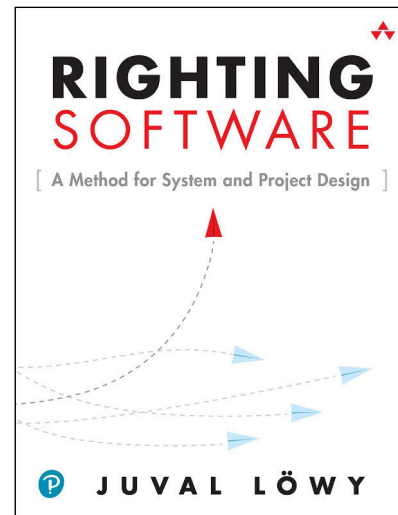
## Righting Software



- Addison-Wesley
  - December 2019



- [www.rightingsoftware.org](http://www.rightingsoftware.org)



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## Next IDesign Master Classes



- Architect's Master Class
  - August 2-6<sup>th</sup>, 2021, California
- Project Design Master Class
  - September 13-17<sup>th</sup>, 2021, California
- [www.idesign.net](http://www.idesign.net)

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