



# RoboJackets

BATTLEBOTS - OUTREACH - IGVC - ROBOCUP - IARRC

[www.robjackets.org](http://www.robjackets.org)

## Principles of Design

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[www.robjackets.org](http://www.robjackets.org)



# Agenda

- Shop Tour
- General principles
- Methods overviews
- Generalization and takeaways
- Design tools (if we have time)
- Open Discussion



# GENERAL PRINCIPLES

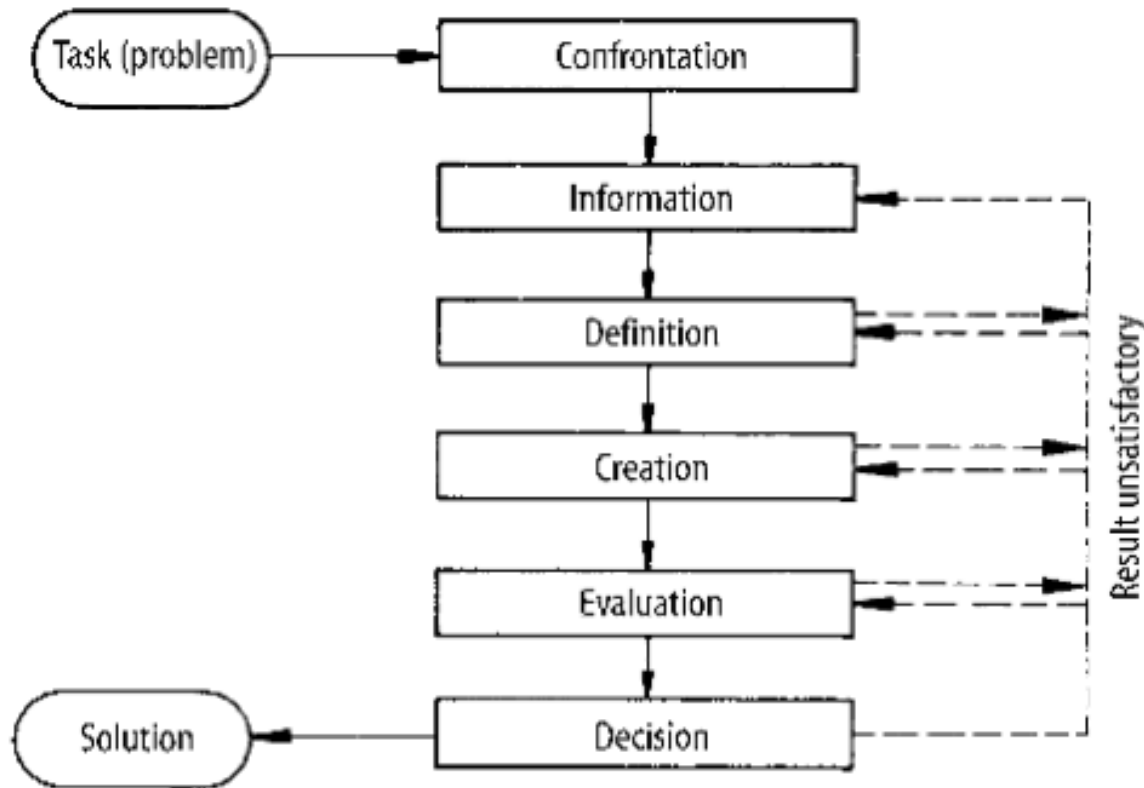


# Phases of Life

- Development
- Production
- Utilization (Life)
- Disposal (End of Life)



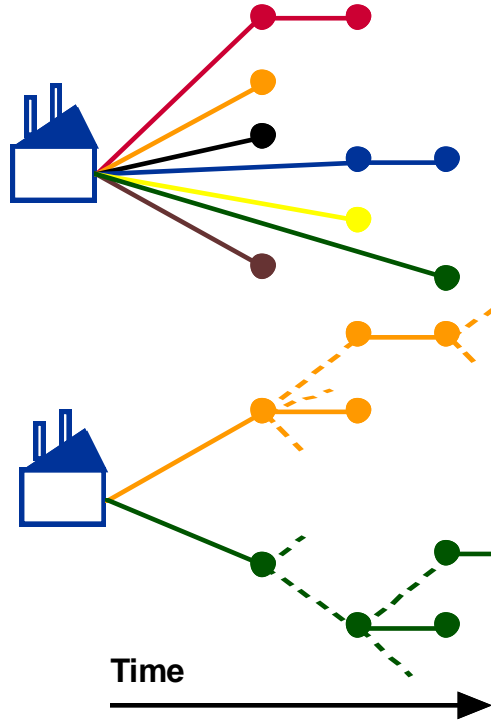
# General Problem Solving



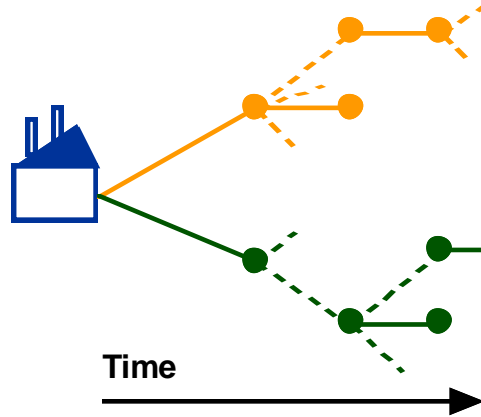
G. Pahl, W. Beitz, J. Feldhusen and K. Grote, *Engineering Design: A Systematic Approach*, 3rd ed., K. Wallace and L. Blessing, Eds., London: Springer-Verlag London Limited, 2007.



Closed Systems Producer

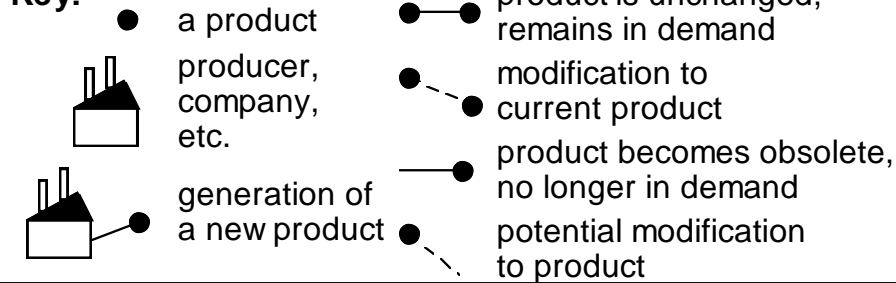


Open Systems Producer



Time

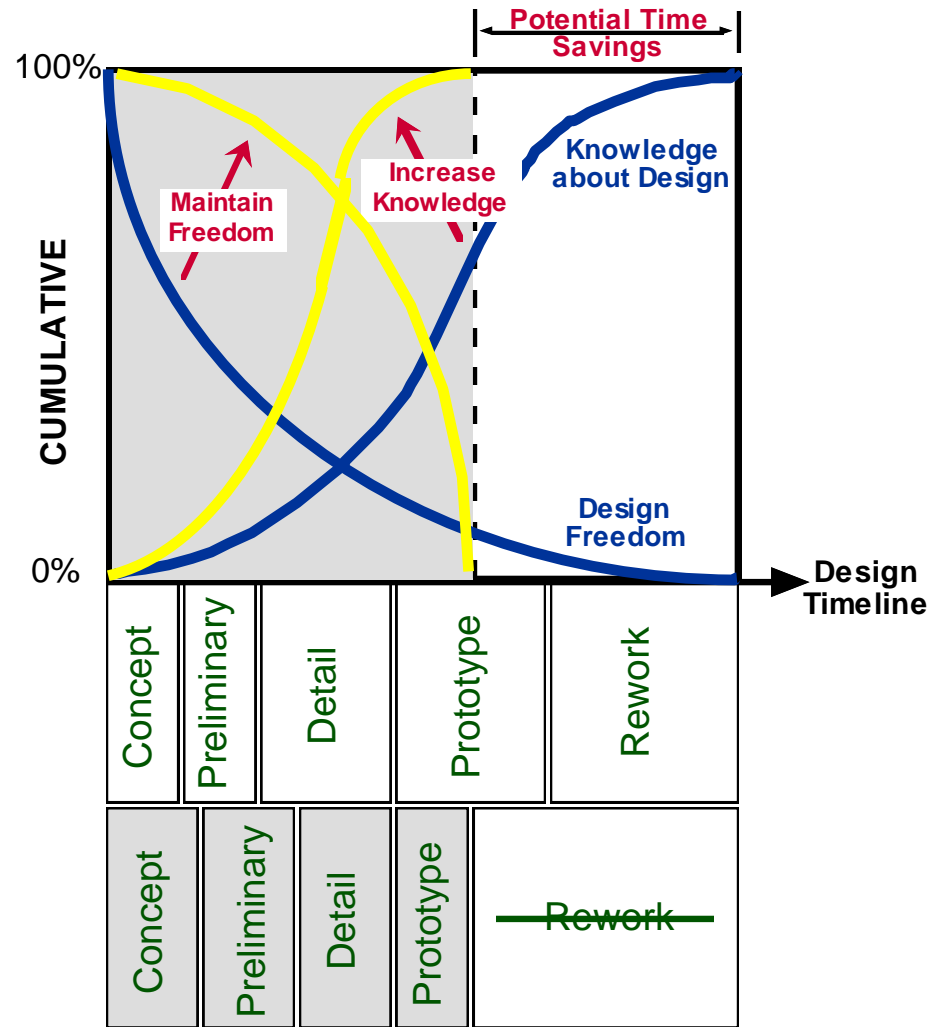
Key:



Key principles:

- Modularity
- Mutability
- Robustness

Simpson, T.W., Lautenschlager, U. and Mistree, F., 1998, "Mass Customization in the Age of Information: The Case for Open Engineering Systems," in The Information Revolution: Current and Future Consequences, pages 49-71, (W. Read and A Porter, Eds.), Ablex Publications, Greenwich, Connecticut. Via Dr. Dirk Schaefer, Georgia Institute of Technology, ME 6102 L05-S2013 Open Engineering Systems and Reverse Engineering.

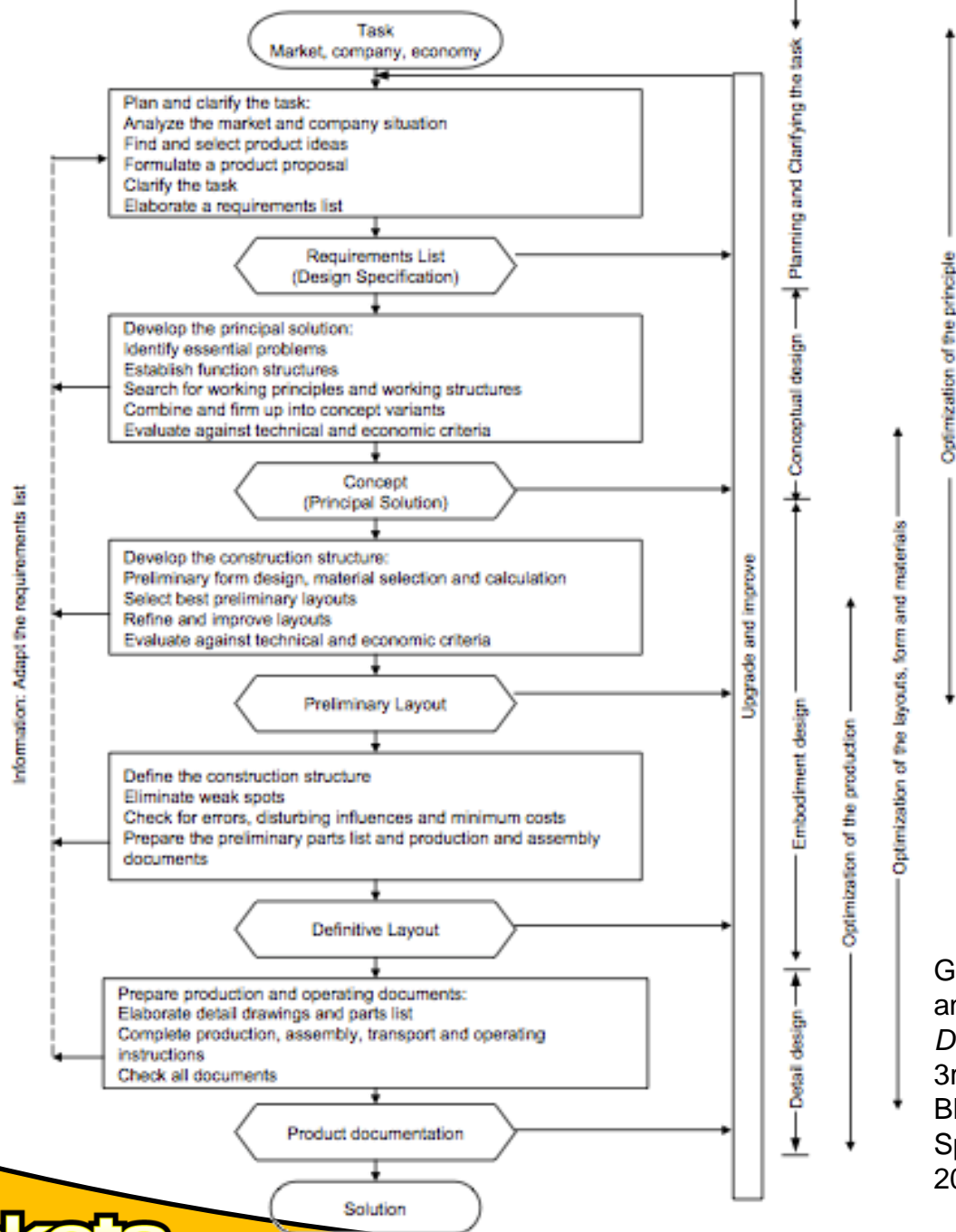


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# METHODS OVERVIEW





G. Pahl, W. Beitz, J. Feldhusen and K. Grote, *Engineering Design: A Systematic Approach*, 3rd ed., K. Wallace and L. Blessing, Eds., London: Springer-Verlag London Limited, 2007.



# V Model

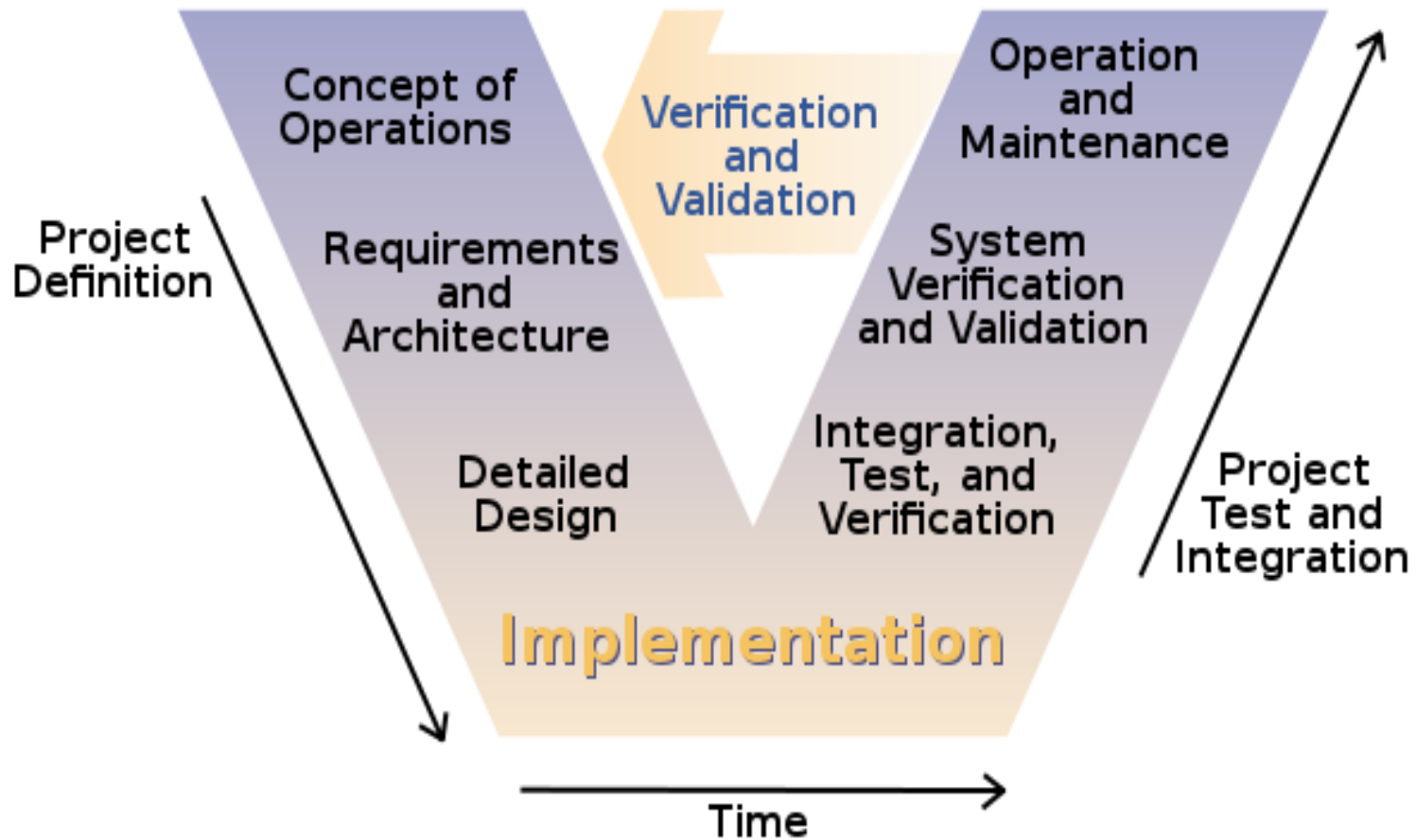
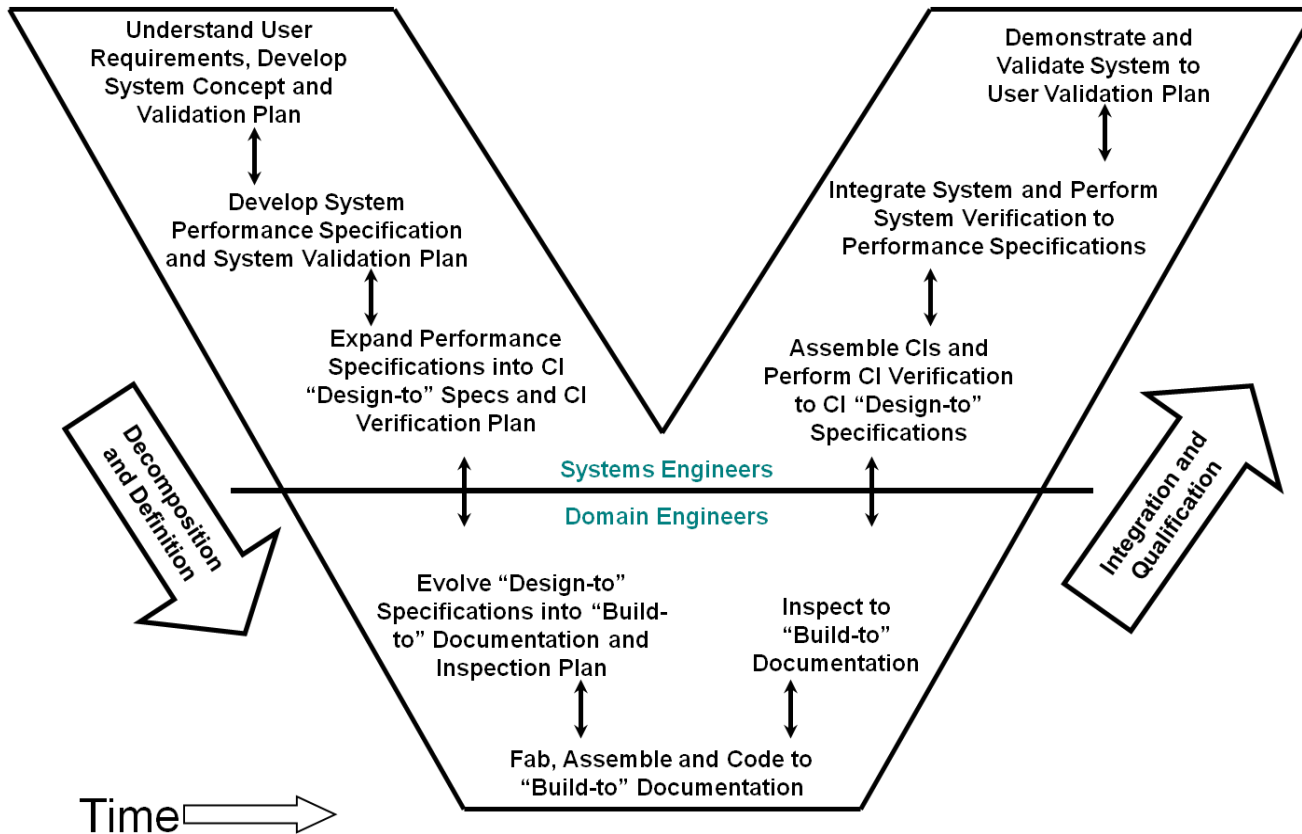


Image extracted from [Clarus Concept of Operations](#). Publication No. FHWA-JPO-05-072, Federal Highway Administration (FHWA), 2005



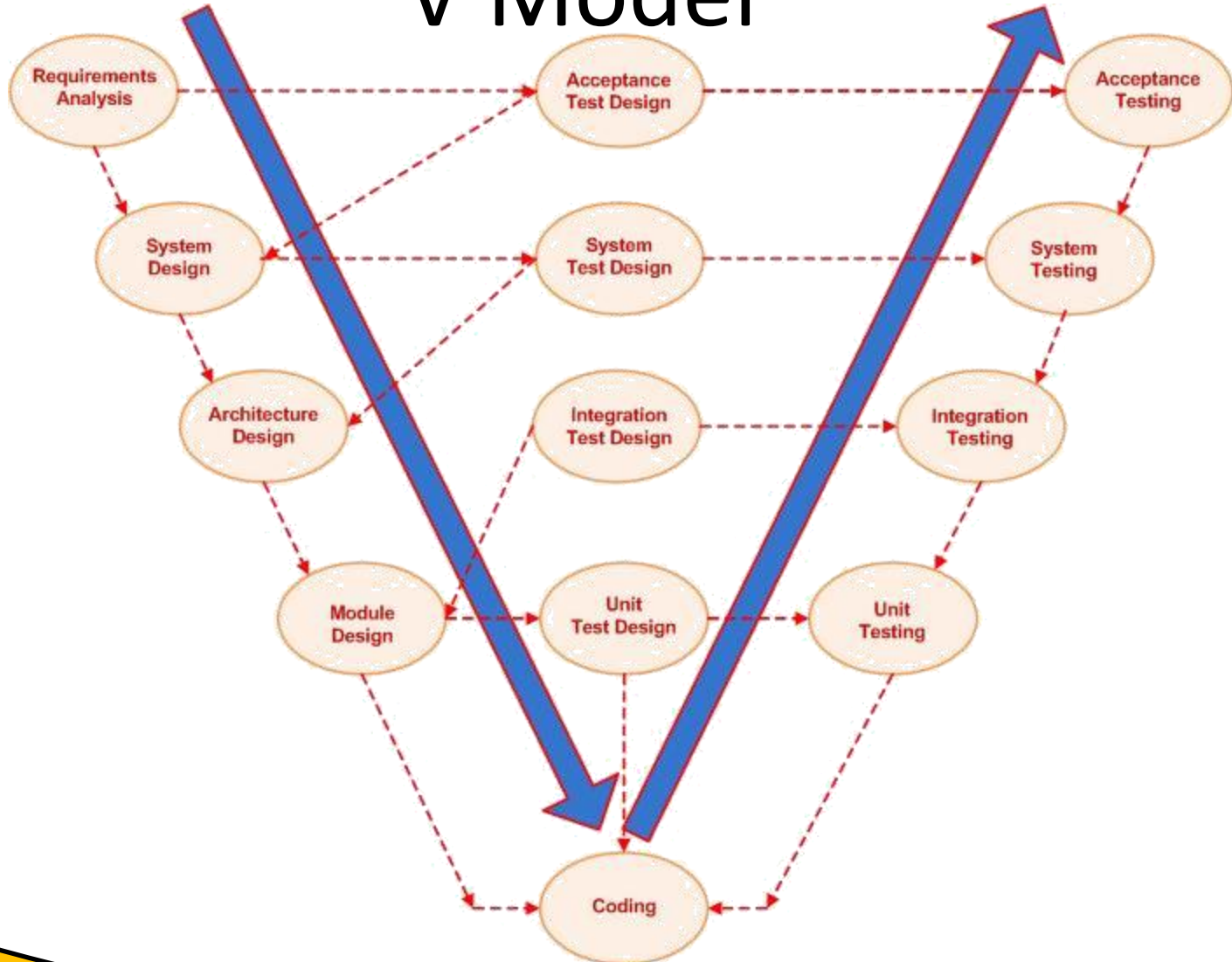
# V Model



Dr. Dirk Schaefer, Georgia Institute of Technology, ME  
6102 L09-S2013 Engineering Systems Design.



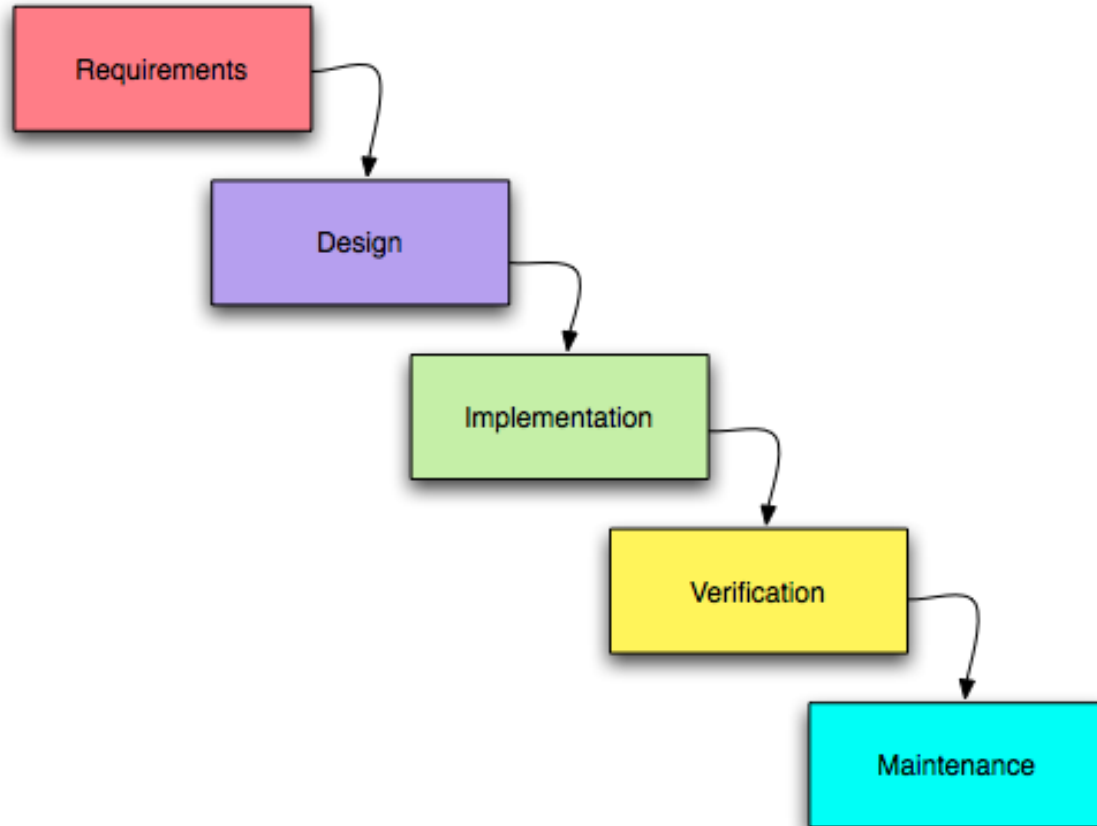
# V Model



Original uploader was [M ajith](#) at [en.wikipedia](http://en.wikipedia.org/wiki/File:V-model.JPG)  
<http://en.wikipedia.org/wiki/File:V-model.JPG>



# Waterfall Model



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[http://en.wikipedia.org/wiki/File:Waterfall\\_model.png](http://en.wikipedia.org/wiki/File:Waterfall_model.png)



# DFx

- Design for X
- What is X?
  - Safety
  - Assembly
  - Minimum Risk
  - Maintenance
  - Etc.



# OPEN DISCUSSION