Connected Health

Research on Medical Device Software Engineering

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Connected Health

(M. Holcomb, 2015)

Software Engineering

(I. Sommerville, 2015)

Requirements Engineering

Requirements Specification

Design and Implementation

Requirements change requests

Plan-based development

Requirements engineering → Requirements specification → Design and implementation

Requirements change requests

Agile development

Requirements engineering ⇄ Design and implementation
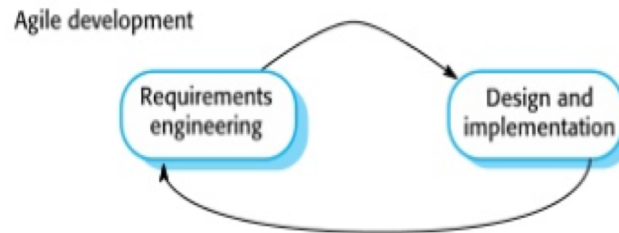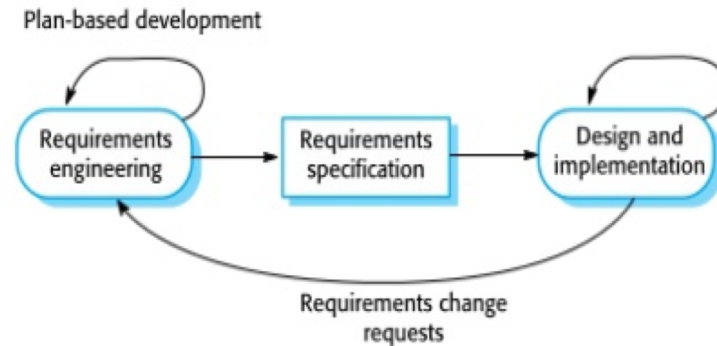
Requirement

(Wants vs. Needs, 2015)

Work I have done so far

Insulin Pump

Heart Pacemaker
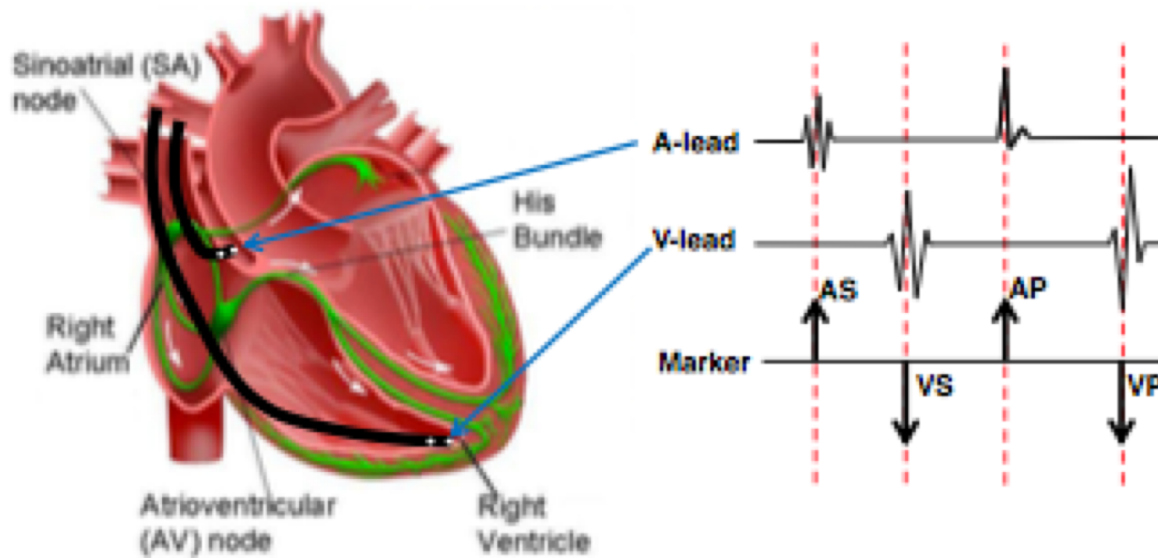
Hemodialysis Machine

Heart Pacemaker

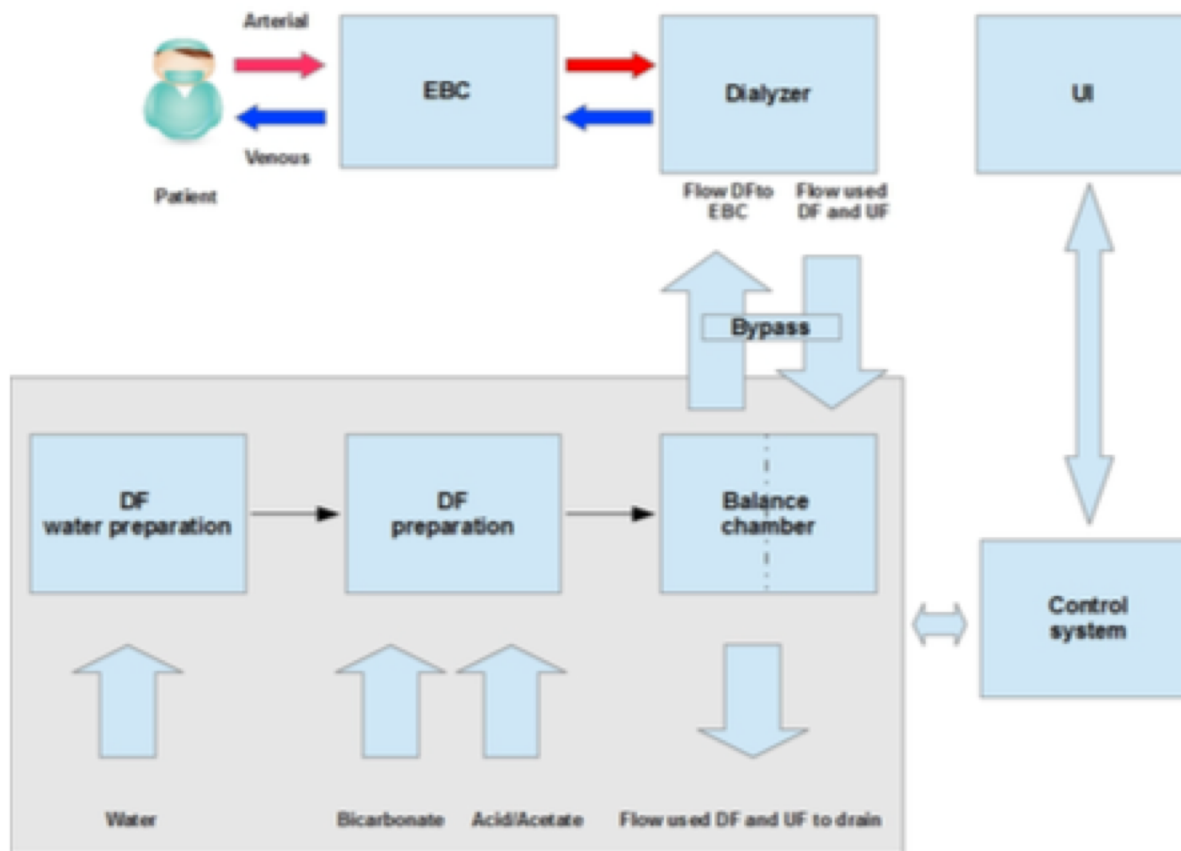**(**Z. Jiang, et al, 2012**)**
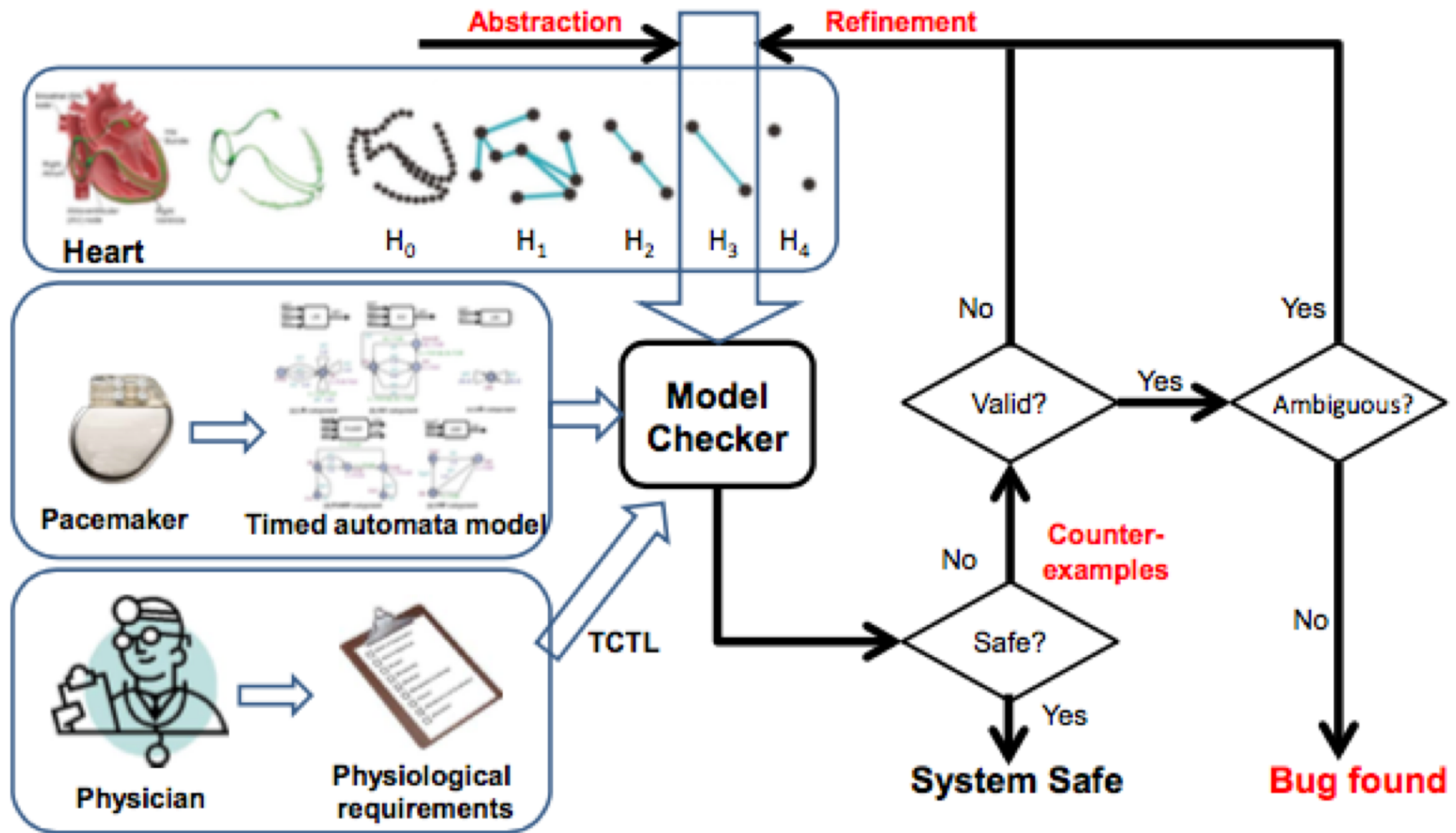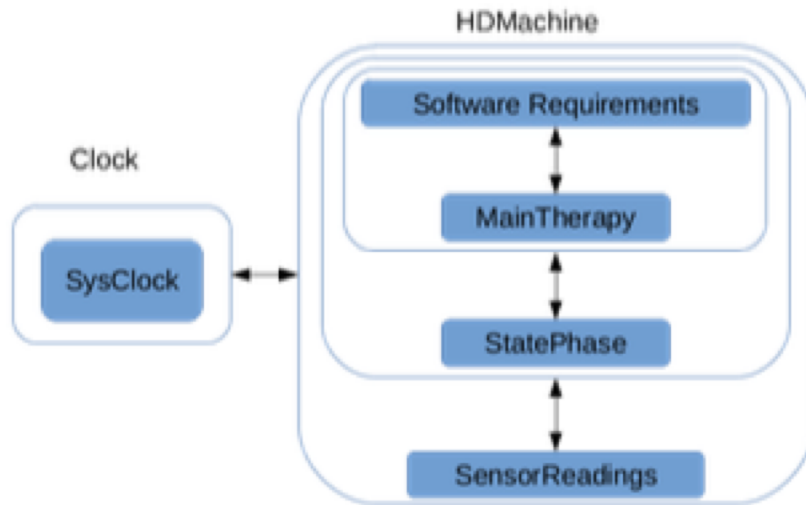
Heart Pacemaker

(Z. Jiang, et al, 2012**)**

Architecture of Hemodialysis Machine
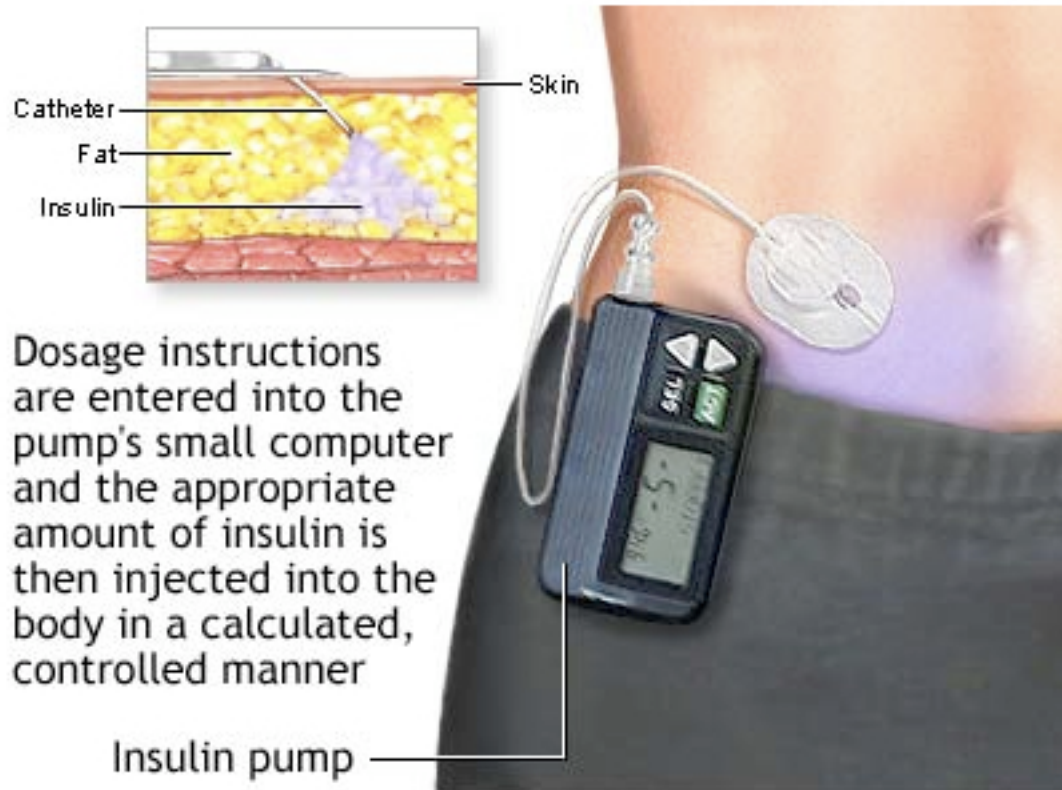
(A. Mahskoor, 2016)

Hemodialysis Machine Case Study

(A. O. Gomes and A. Butterfield, 2016)
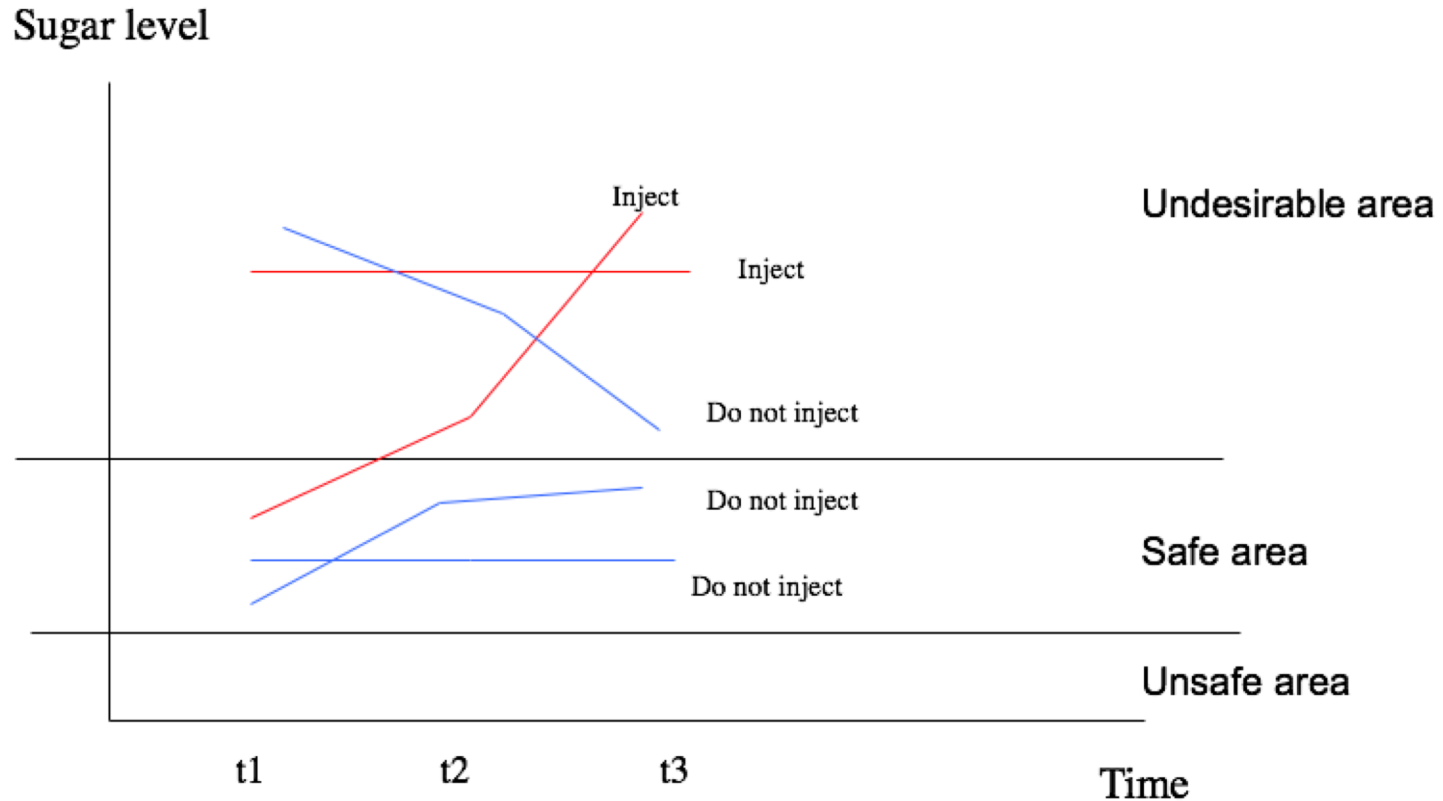
Insulin Pump

Catheter
Fat
Insulin
Skin

Dosage instructions are entered into the pump's small computer and the appropriate amount of insulin is then injected into the body in a calculated, controlled manner
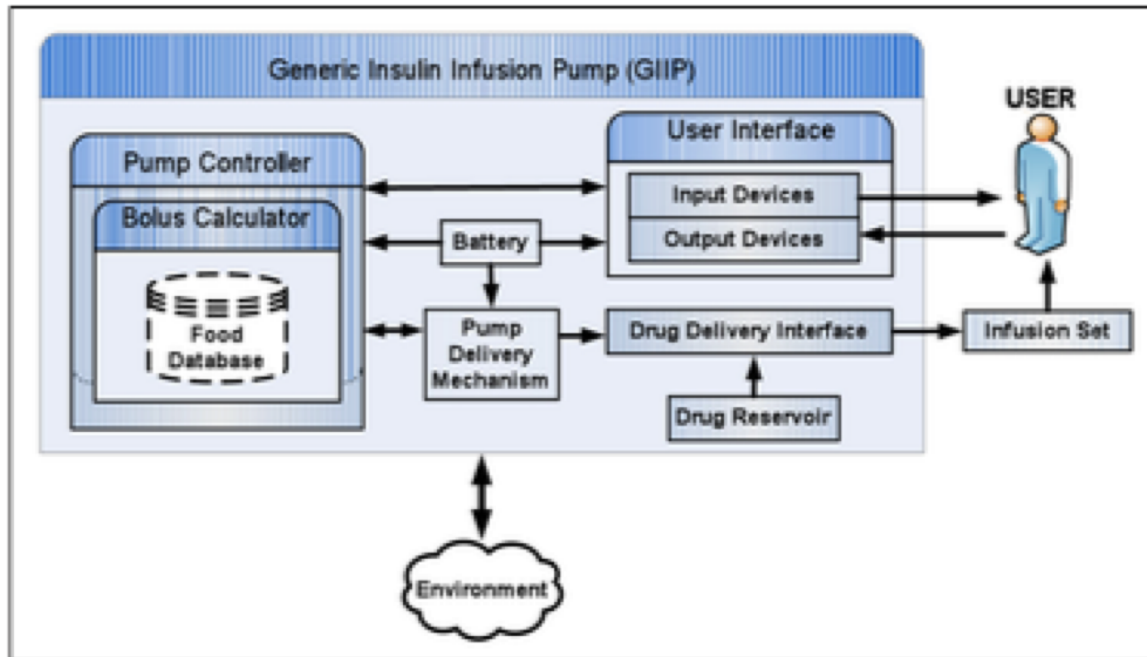
Insulin pump

(ADAM Health Central, 2018)

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Insulin Pump Medical Device Case Study

(I. Sommerville, 2015)

Who else researched on Insulin pump(Y. Zhang, et al., 2010)

Connected Health Software (I. Richardson, et al., 2010)

Biometric Measurement System, which allows individuals to text their biometric data from their mobile home to the General Practice.

Patients are using home blood pressure monitor and text the General Practice their blood pressure. GP text receiving system identifies patients by their mobile number, then collecting and analyzing the data by comparing with the previous data.
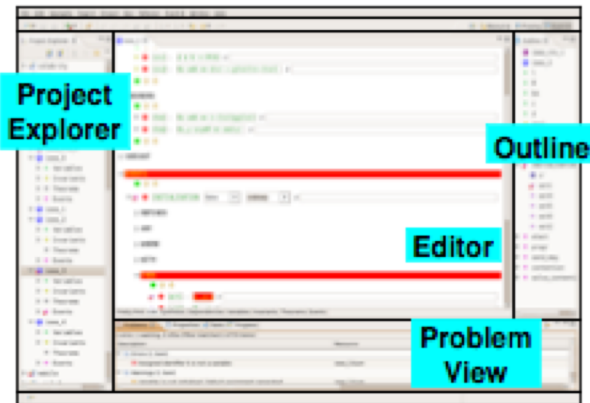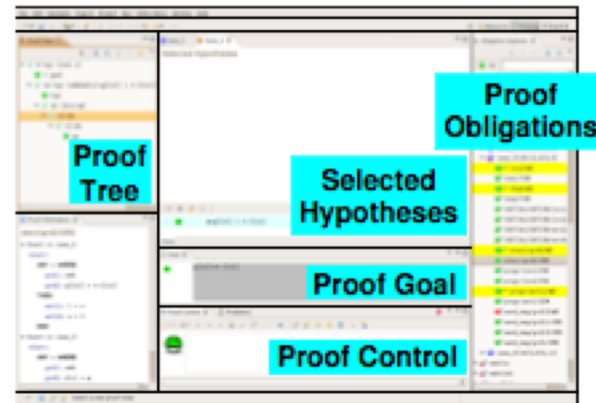
Modelling

(R. Hellman, 2010)

Rodin Formal Modelling Tool for Event B

(M. Butler and S. Halerstede, 2007)

(a) Modelling Perspective

(b) Proving Perspective

The Semantics of *Circus*

(J. C. P. Woodcock and A. L. C. Cavalcanti, 2002)

Woodcock and Cavalcanti developed Circus, as a formalism which not only combines Z and CSP, but also Dijkstra's guarded command language. Its semantics is based on the Unifying Theories of Programming (UTP) and it has a refinement calculus, developed by Oliveira based on that of Morgan. Currently, there is limited tool support for Circus.

Unifying Theories of Programming (C. Hoare and J. He, 1998)
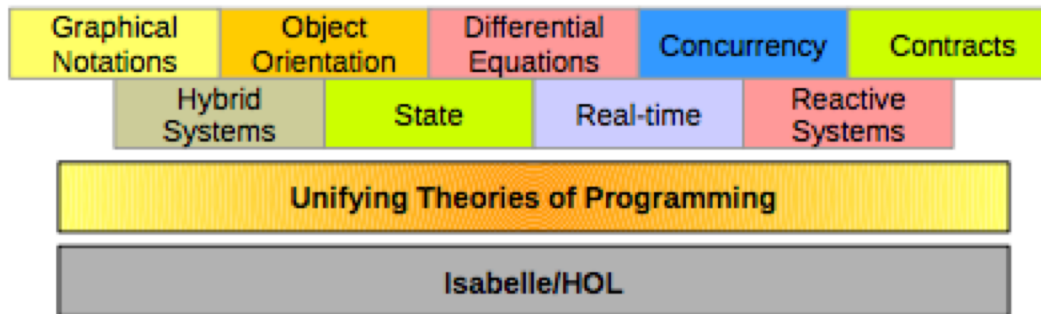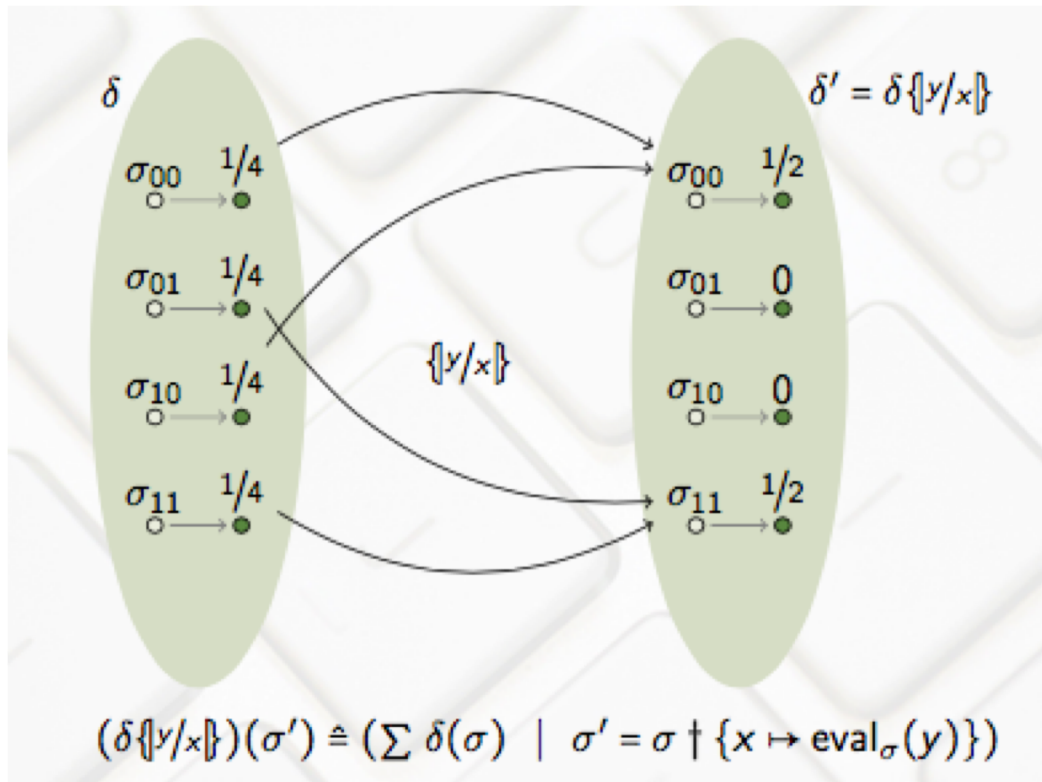# U(TP)^2 tool (A. Butterfield, 2013)
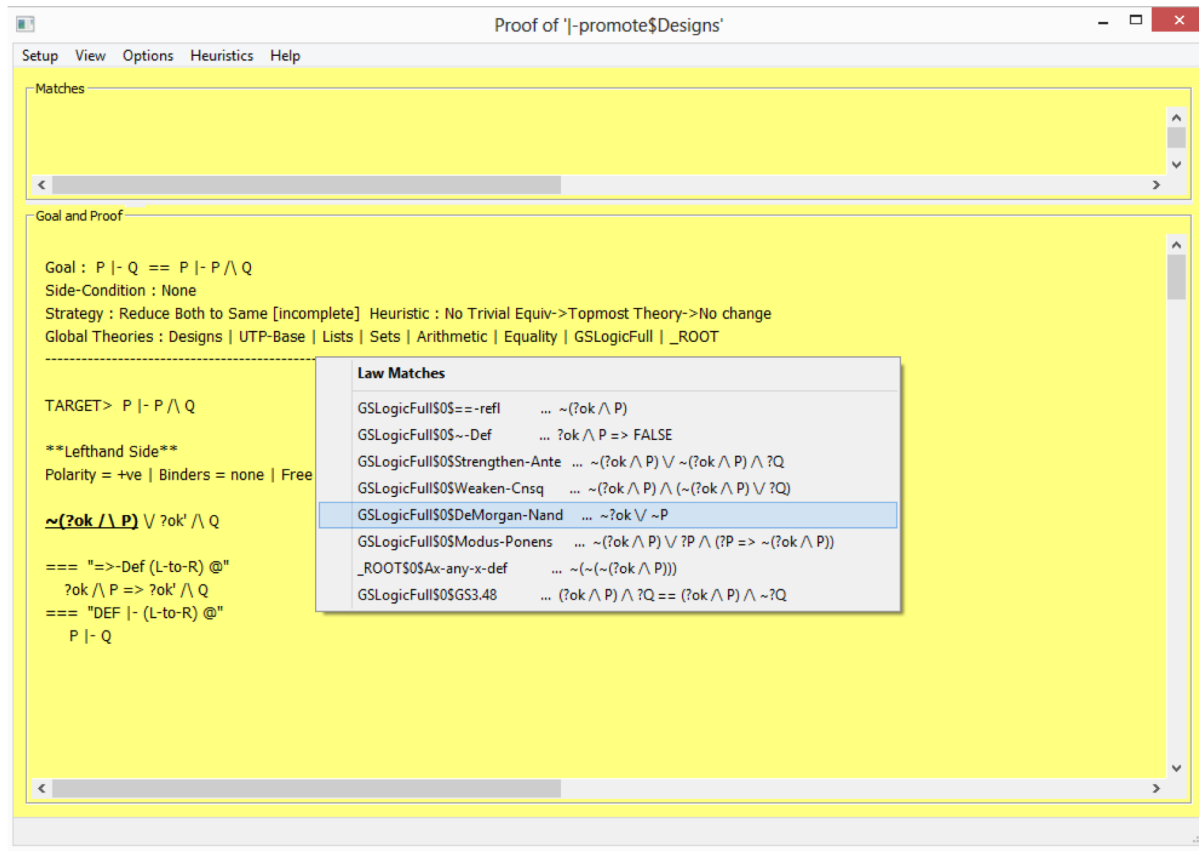
Isabelle/UTP tool

(S. Foster, J. Woodcock and K. Ye, 2017)

Future plan for my research

(R. Bresciani and A. Butterfield, 2012)

Thank You