SPECL: A Formal Specification Language

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1. Introduction to Role of Requirements

2. Research Problem

3. Expected Results and Current Status

Thesis Committee

Dr. Ito, Co-Supervisor, UBC
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Role of Requirements Specification Document

- one of the first phases of the s/w development lifecycle

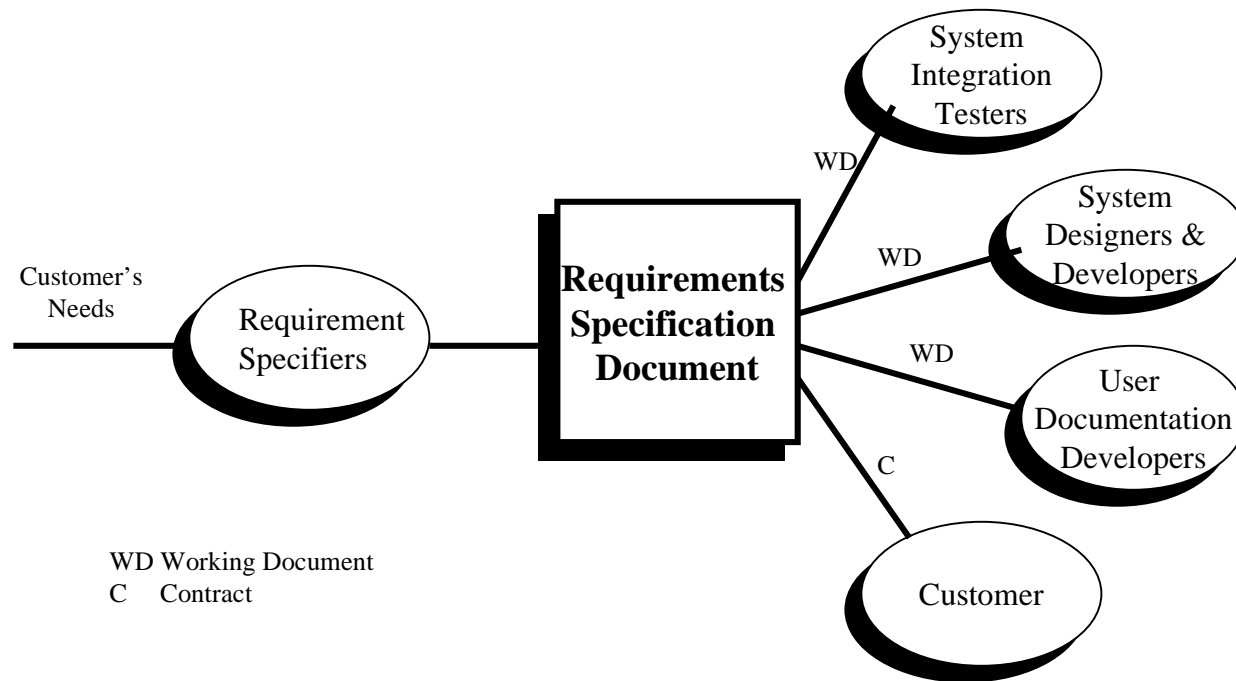- the deliverable is used as a working document and contract

Customer's
Needs

Requirement
Specifiers

**Requirements
Specification
Document**

WD

System
Integration
Testers

WD

System
Designers &
Developers

WD

User
Documentation
Developers

C

Customer

WD Working Document
C   Contract

Figure 1: The Uses of a Requirement Specification Document

Research Problem

A notation does not exist that:

- is readable

- has a hight level of abstraction

- is formally defined

- and is well suited for describing the requirements of

  logically complex, data oriented applications

A new notation is proposed in this research to provide all of these characteristics:

Formal Stimulus Response Requirements

To manage the logic and data complexity, the formal requirement notation will use a new formal specification language proposed in this research:

SPECL

If the borrower id specified in the charge item request has outstanding fines or fees above the maximum outstanding fine threshold, then the system shall return a [rejection with reason]. [100273/A]
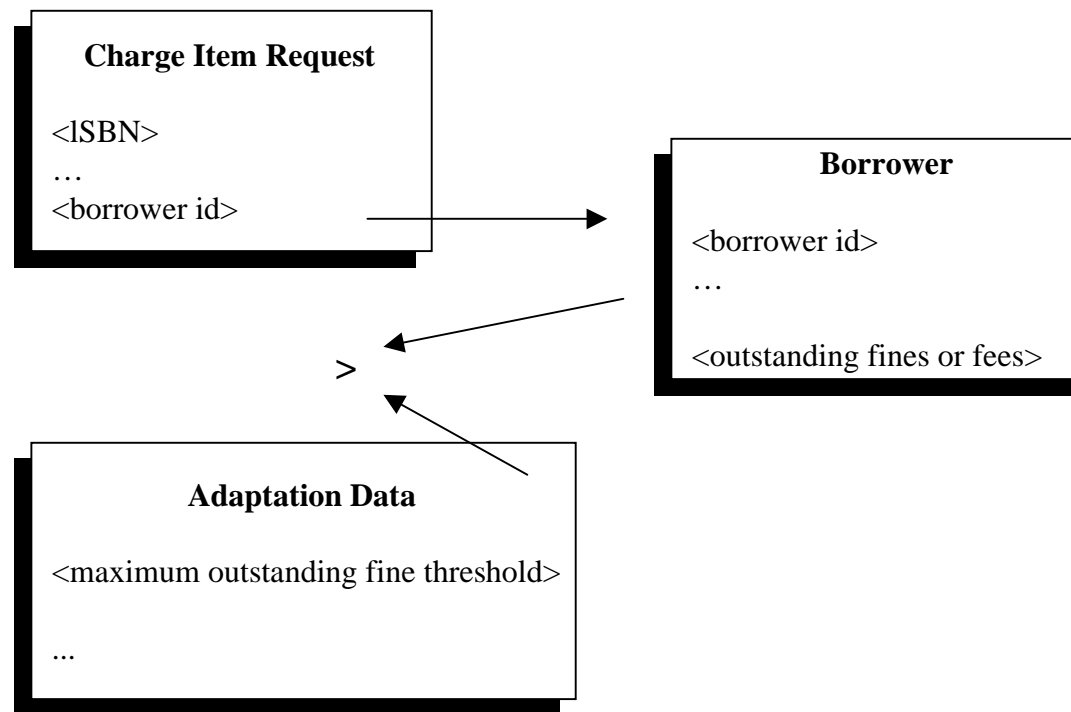
Charge Item Request

<lSBN>
…
<borrower id>

Borrower

<borrower id>
…

<outstanding fines or fees>

>

Adaptation Data

<maximum outstanding fine threshold>

...

Figure 2: Relationships Among SPECL SRR, and TCEL

SPECL manages the logic and date complexity, reporting ambiguities to the user.

How SRR and SPECL "tie together"

- **User's View of a Requirement**

A requirement in a specification using SRR and SPECL "short-hand"

If { **the <borrower id>** has outstanding fines or fees above the **<maximum outstanding fine threshold>** }, then the system shall return a {rejection with reason]. [100273/A]

- **Internal View of Requirement**

Same requirement after SRR and SPECL expands the "short-hand"

If { the **<borrower id> specified in the <charge item request message>** has outstanding fines or fees above the **<maximum outstanding fine threshold> specified in the adaptation data** }, then the system shall return a <charge item rejection message>. [100273/A]

Expected Results

English like notation that is amenable to substantial tool support:

- automate error checking on a requirement specification written in SRR

- automate the transformation to S for use in automated test case generation (Michael Donat).

Experimental evaluation of the formal SRR notation in comparison to semi-formal version of the SRR notation.

Current Status

- adding functionality to the SRR parser and typechecker

- defining the SPECL language