FMCAD 2009 Semiconductor Panel

Position Slides

Ken Albin | November 17, 2009

verification successes

The two extremes:

Combinational equivalence checking

• Multiple capable commercial tools

• Highly automated

• Widely used

Theorem proving to verify floating point designs

• For example: "Proving A Specific Type of Inequality Theorems in ACL2" in ACL2 workshop 2009.

> http://www.cs.utexas.edu/~sandip/acl2-09/final/04/04.pdf

• Free tools requiring considerable expertise

• Narrow usage

verification failures

A recent project used model checking to prove some design properties and then stopped and shifted resources to simulation.

Why?

It wasn't that model checking was ineffective.

It wasn't that the learning curve was too steep.

It wasn't tool capacity.

It was that the verification plan had goals in terms of block-level functionality and simulation coverage. The properties proven didn't directly address the goals.

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how to get positive ROI from FV tools

There are really two parts to this question:

1) How to use FV tools effectively

(lots of ideas here depending on problem domain)

2) How to show ROI

This is a problem for *any* verification tool or methodology.

Equivalence checking and floating-point examples address large, well understood tasks.

Combining simulation and partial formal results is a work in progress.
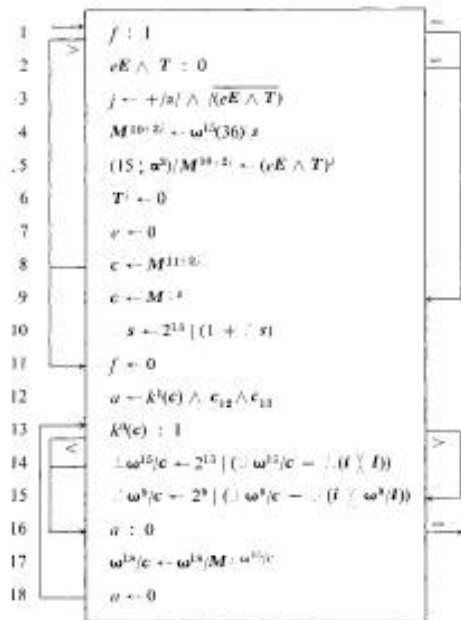
Efficiency comparisons are difficult since we don't have good definitions of quality and complexity.

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panelist's choice

§2.2   Instruction execution   77

Program 2.4   Complete instruction fetch

The phases of instruction preparation are performed in the following order:

indexing (if indicated); indirect addressing (if indicated).

Moreover, if indirect addressing is performed, the new address is itself re-indexed (if indicated). As shown by steps 12, 16, and 18, the indirect addressing is limited to a single level.
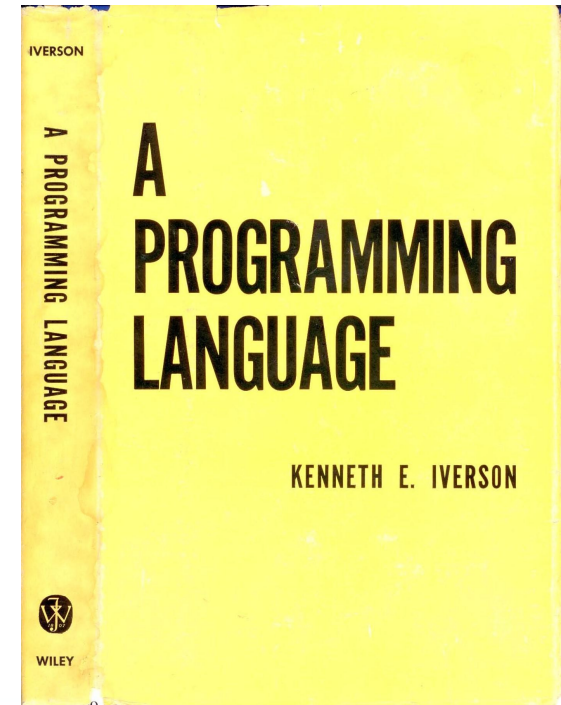
2.2 INSTRUCTION EXECUTION

The execution phase begins with the "decoding" of the operation part of the command c to select the appropriate microprogram to be executed.

"... The use of microprogramnling will be illustrated by a description of the IBM 7090 computer (to be called the 7090) at a level approximately suited to the programmer and the system designer. The final section treats some problems in the extension to the hardware design level. ..."

The year: 1962

The book:

A PROGRAMMING LANGUAGE

KENNETH E. IVERSON

WILEY

downloadable from http://www.softwarepreservation.org/projects/apl/book/APROGRAMMING%20LANGUAGE

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