Learn RISC-V CPU Implementation and BSV

(BSV: a High-Level Hardware Design Language)

Rishiyur S. Nikhil

L3: Structure of BSV Programs

Reminders

Please git clone: `https://github.com/rsnikhil/Learn_Bluespec_and_RISCV_Design`
(git pull for latest version). Repsitory structure:

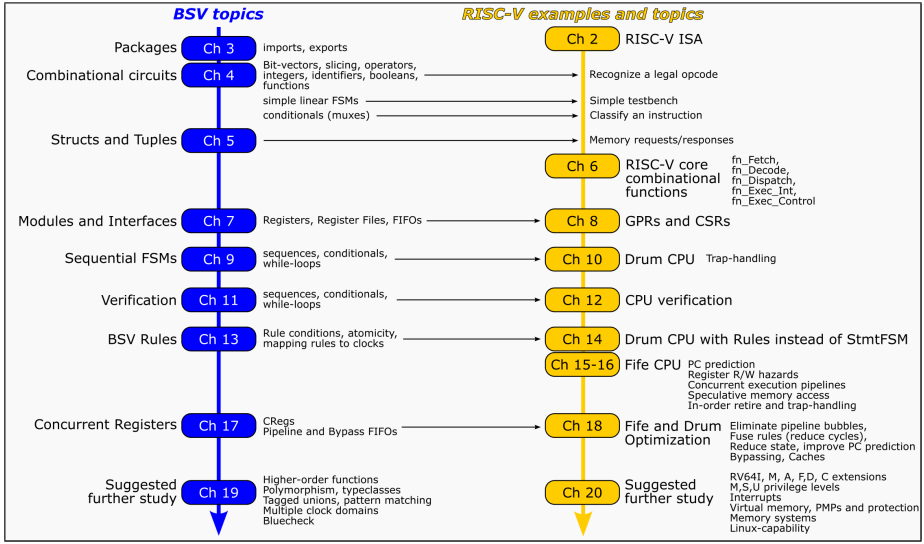
```
./Book_BLang_RISCV.pdf
  Slides/
      Slides_01_Intro.pdf
      Slides_02_ISA.pdf
      ...
  Exercises/
      Ex-03-A-Hello-World/
      Ex-03-B-Top-and-DUT/
      ...
  Code/
      src_Top/
      src_Drum/
      src_Fife/
      src_Common/
      ...
  Doc/Installing_bsc_Verilator_etc.{adoc,html}
```

- Slides and Exercise are numbered in sync with book Chapter numbers.
- For Exercises, please see Appendix E of the book. Some (not all) exercises have associated code in the `Exercises/` directory.

To compile and run the code for exercises, Drum and Fife, please make sure you have installed:

- *bsc* compiler (see `https://github.com/B-Lang-org/bsc`)
- Verilator compiler (see `https://www.verilator.org/`)

Chapter Roadmap



Strategy

We start learning **BSV** "from the outside in", and with simple exercises, so that:

- you are very quickly able to start *reading* Drum and Fife code;
- you are very quickly able to run the codes and to get in the habit of compiling-and-running; and
- you are very quickly make small modifications,

even though it will take a little longer before you are able to code things yourself from scratch.

BSV language, compiler and libraries documents

From the book, Appendix A.6.5:

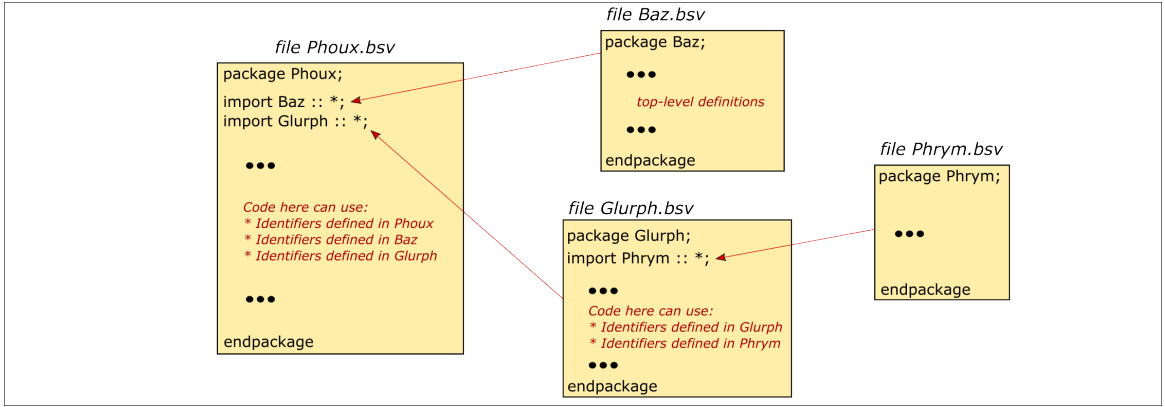
- The "**BSV** Language Reference Guide". This document describes the syntax and semantics of **BSV**.
  PDF: `https://github.com/B-Lang-org/bsc/releases/latest/download/BSV_lang_ref_guide.pdf`
- The "BSC Libraries Reference Guide". This document describes the extensive set of libraries and IP (Intellectual Property blocks) available to the **BSV** user.
  PDF: `https://github.com/B-Lang-org/bsc/releases/latest/download/bsc_libraries_ref_guide.pdf`
- The "BSC User Guide". This document describes how to use the *bsc* compiler, which compiles our hardware descriptions written in **BSV** into Verilog (which can then be simulated or synthesizes using standard Verilog tools).
  PDF: `https://github.com/B-Lang-org/bsc/releases/latest/download/bsc_user_guide.pdf`

We will be using the Language Reference Guide and Librares Reference Guide extensively, so you may wish to download a copy for your laptop.

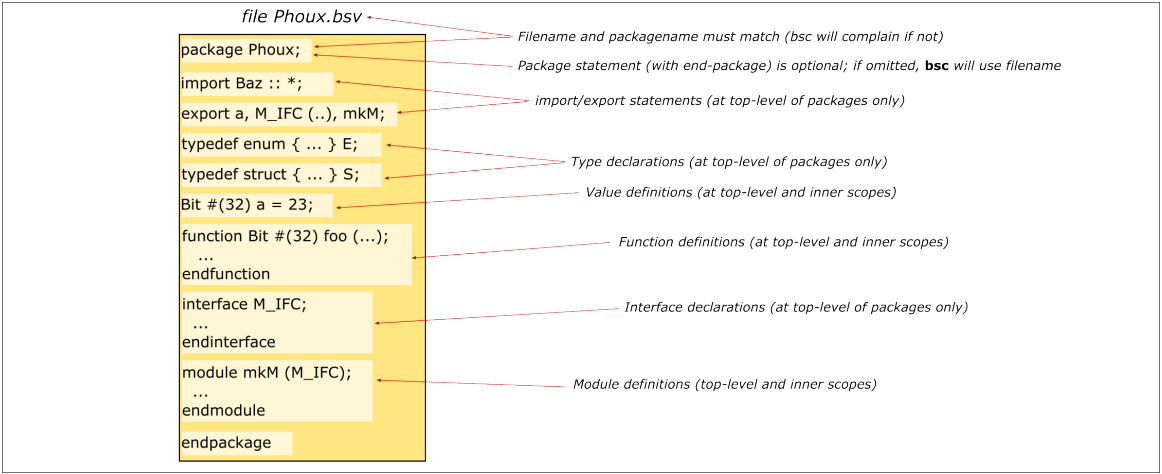
Exercise break

Please see Book Appendix E, Section Ex-03-A-Hello-World.

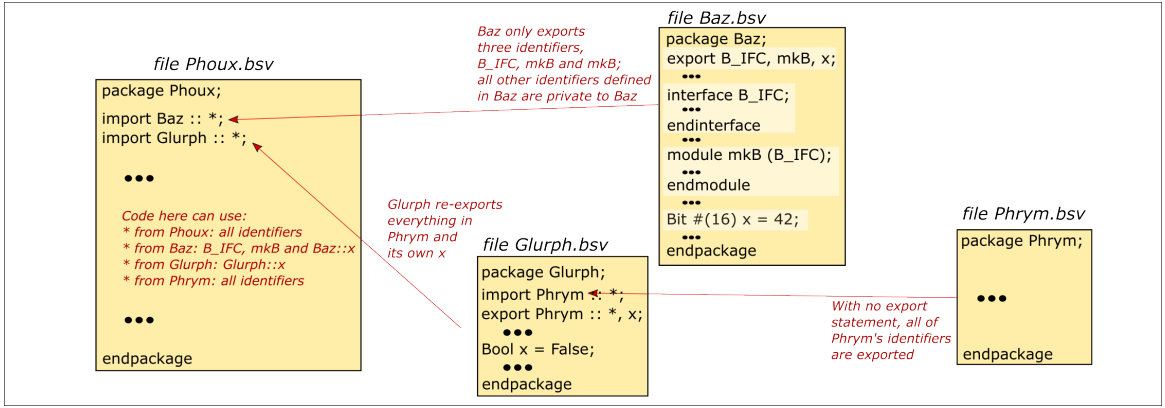
File-level view of a BSV program



What's in a BSV package/file?



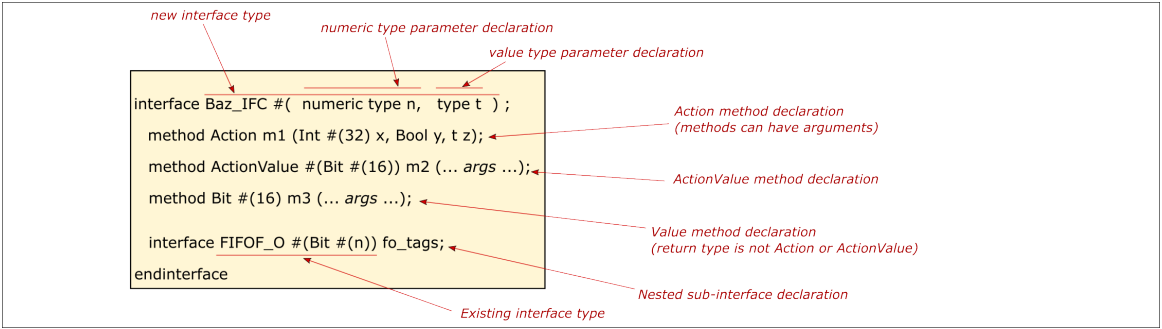
Namespace control with package imports and exports



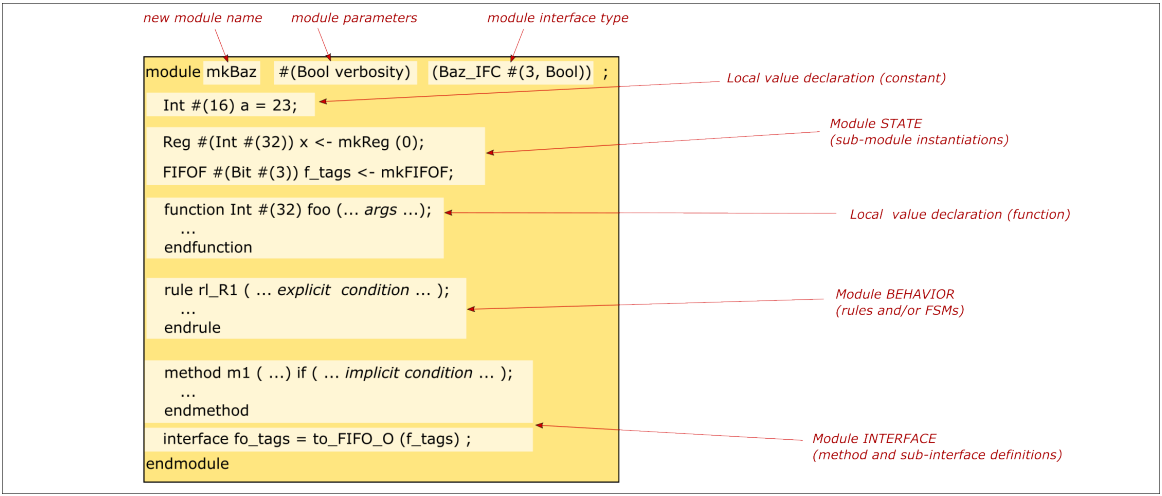
Exercise break

Please see Book Appendix E, Section Ex-03-B-Top-and-DUT.

What's in an Interface Declaration?



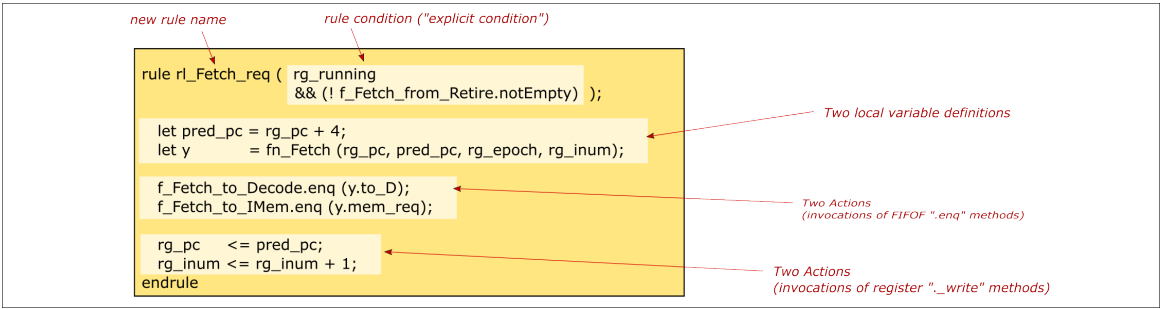
What's in a Module Declaration?



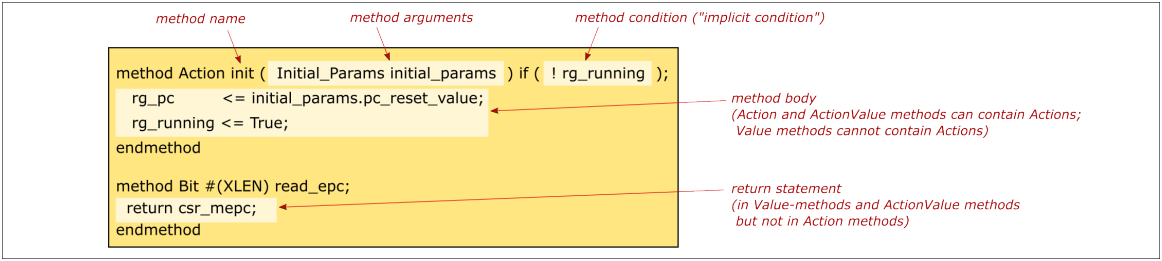
Exercise break

Please see Book Appendix E, Section Ex-03-C-Module-and-Interface.

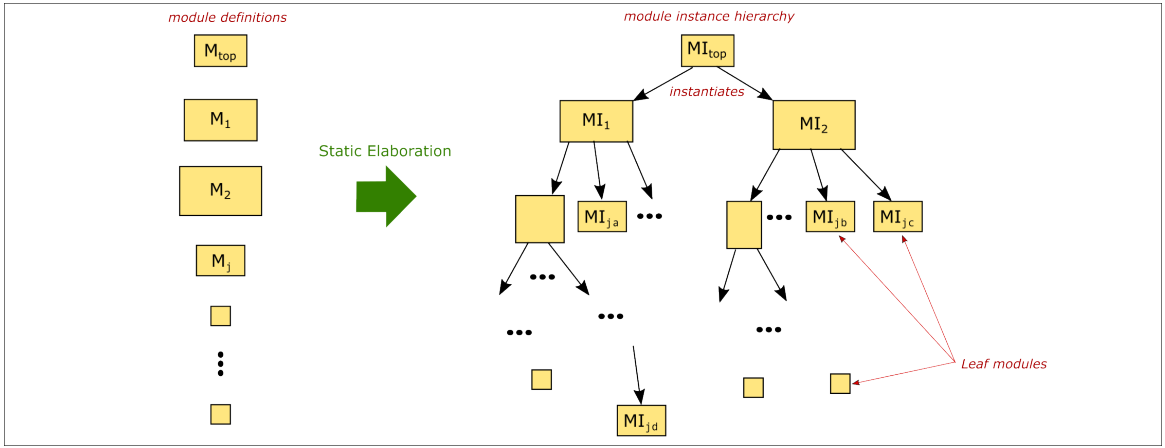
What's in a Rule?



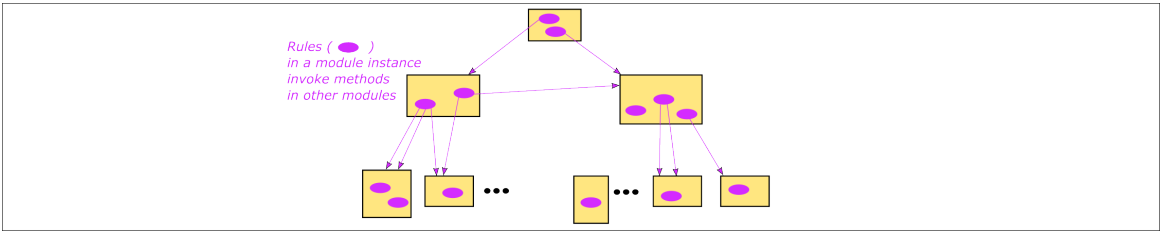
What's in an Interface Definition?



Static elaboration



Module interaction



End