# Learn RISC-V CPU Implementation and BSV

(BSV: a High-Level Hardware Design Language)

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L3: Structure of BSV Programs

# Reminders

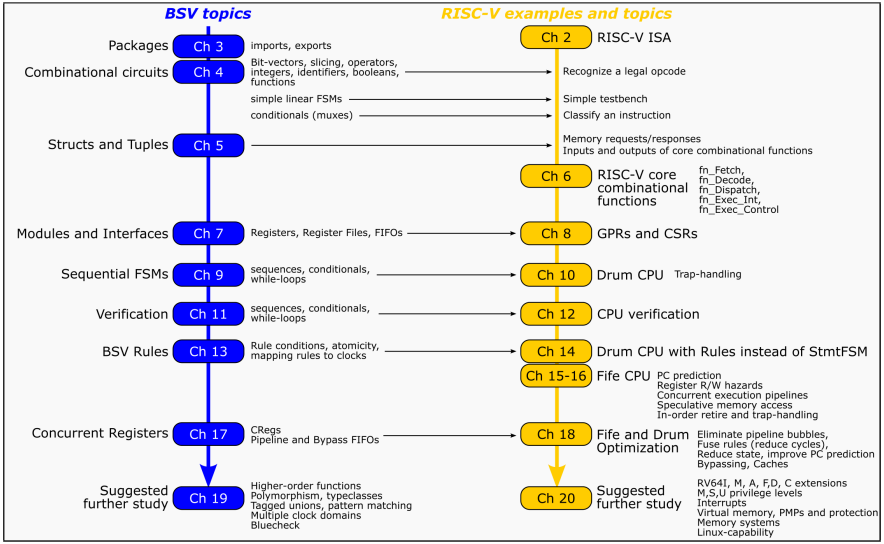
Please git clone or git pull: https://github.com/rsnikhil/Learn_Bluespec_and_RISCV_Design

```
./Book_BLang_RISCV.pdf
  Slides/
      Slides_01_Intro.pdf
      Slides_02_ISA.pdf
      ...
  Doc/Installing_bsc_Verilator_etc.{adoc,html}
  Exercises/
      Ex_03_B_Top_and_DUT/
      Ex_03_A_Hello_World/
      ...
  Code/
      src_Common/
      src_Drum/
      src_Fife/
      src_Top/
      ...
```

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:

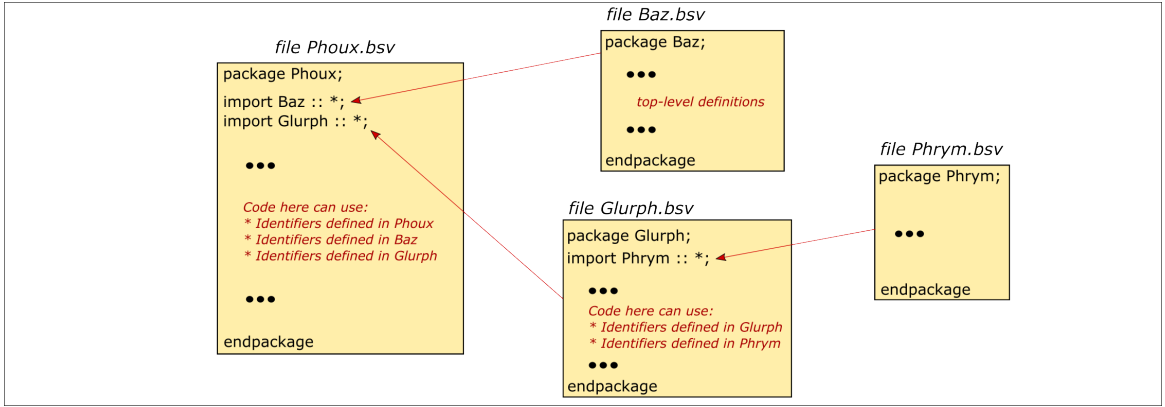
- The "**BSV** Language Reference Guide". This document describes the syntax and semantics of **BSV**.
  PDF: `https://github.com/B-Lang-org/bsc/releases/latest/download/BSV_lang_ref_guide.pdf`
- The "BSC Libraries Reference Guide". This document describes the extensive set of libraries and IP (Intellectual 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.

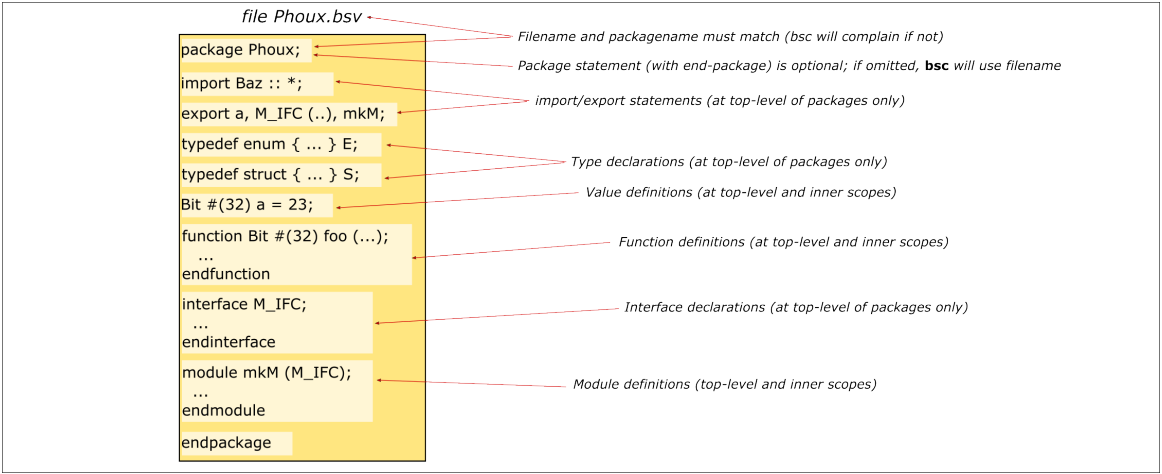
# Exercise break

Please see directory: `Exercises/Ex_03_A_Hello_World/`
and its README.

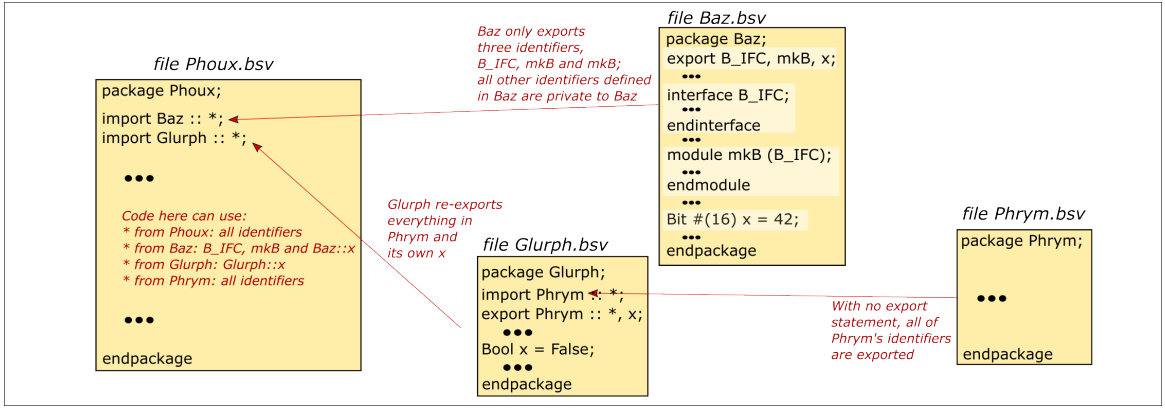
# File-level view of a BSV program



# What's in a BSV package/file?



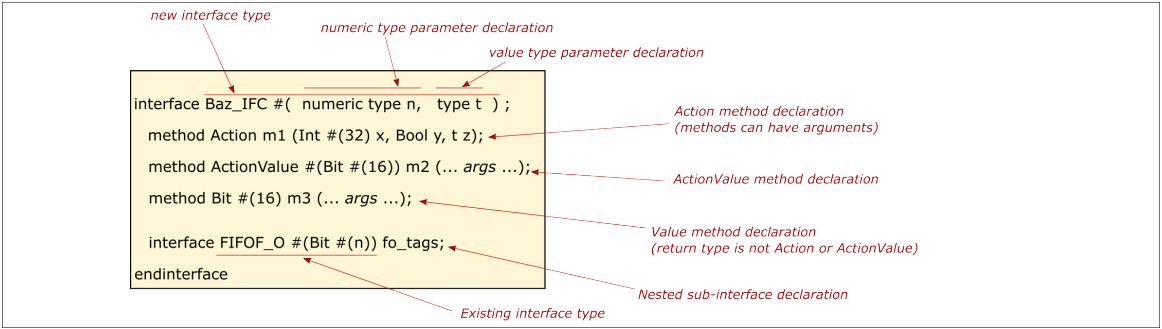
# Namespace control with package imports and exports



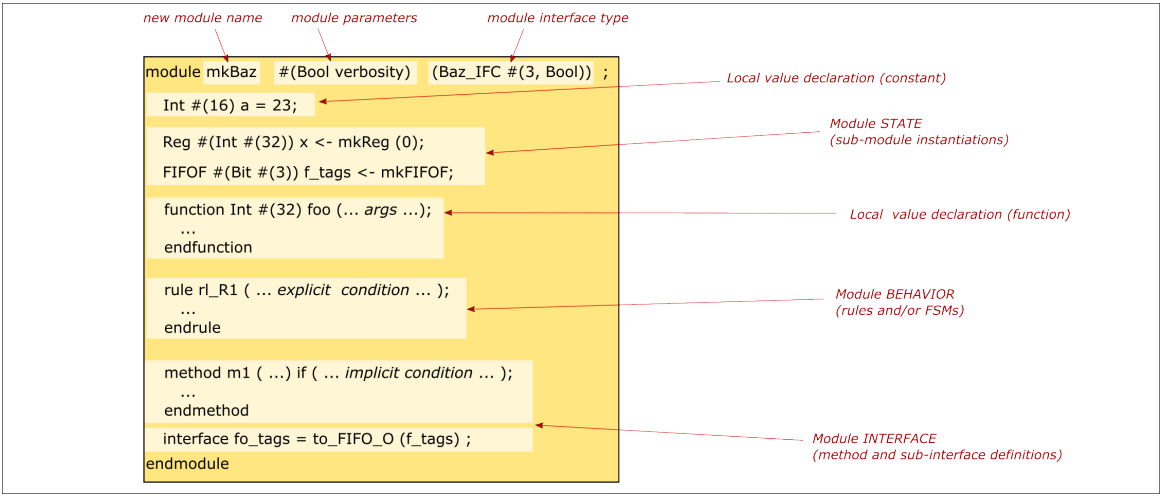
# Exercise break

Please see directory: `Exercises/Ex_03_B_Top_and_DUT/`
and its README.

# What's in an Interface Declaration?



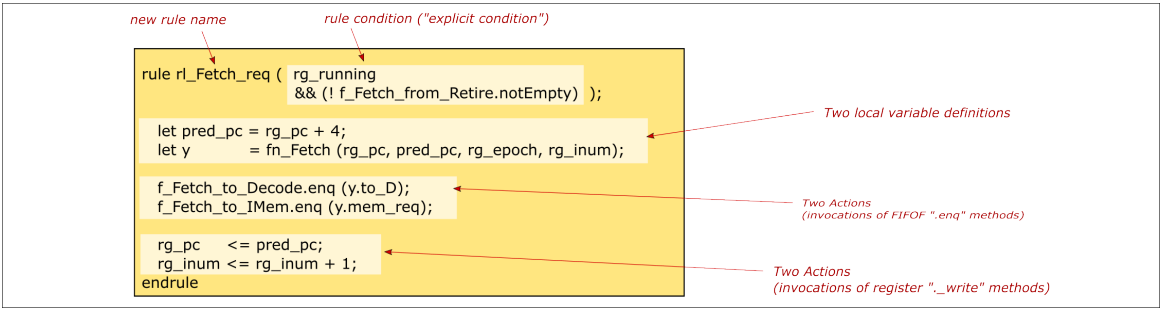
# What's in a Module Declaration?



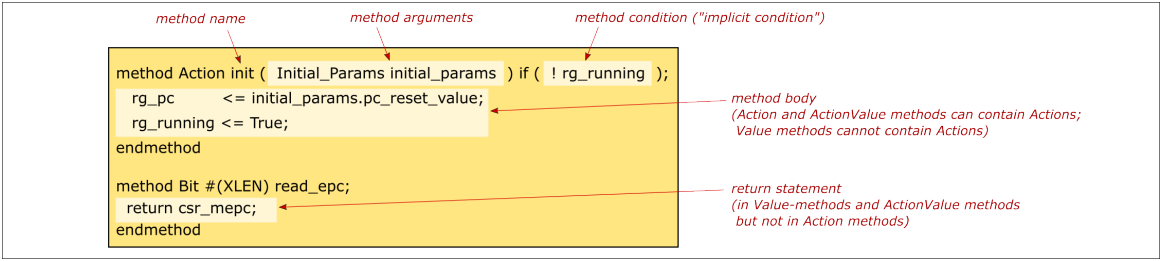
# Exercise break

Please see directory: `Exercises/Ex_03_C_Module_and_Interface/`
and its README.

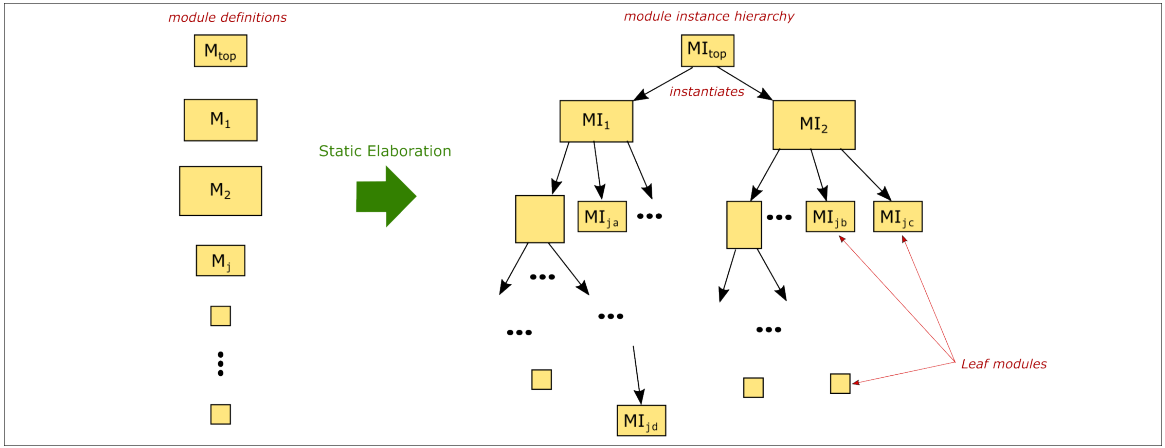
# What's in a Rule?



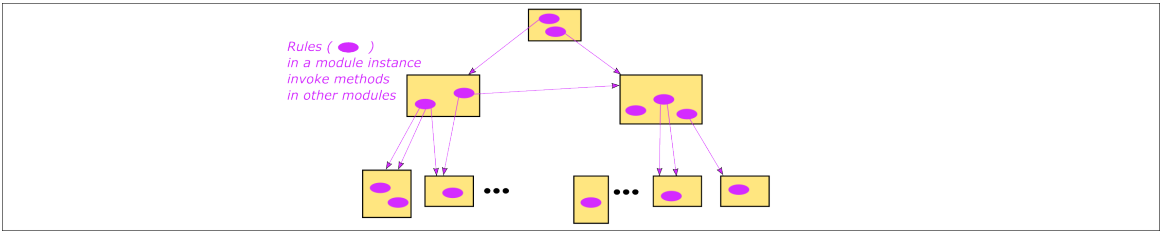
# What's in an Interface Definition?



# Static elaboration



# Module interaction



End