The J Computer

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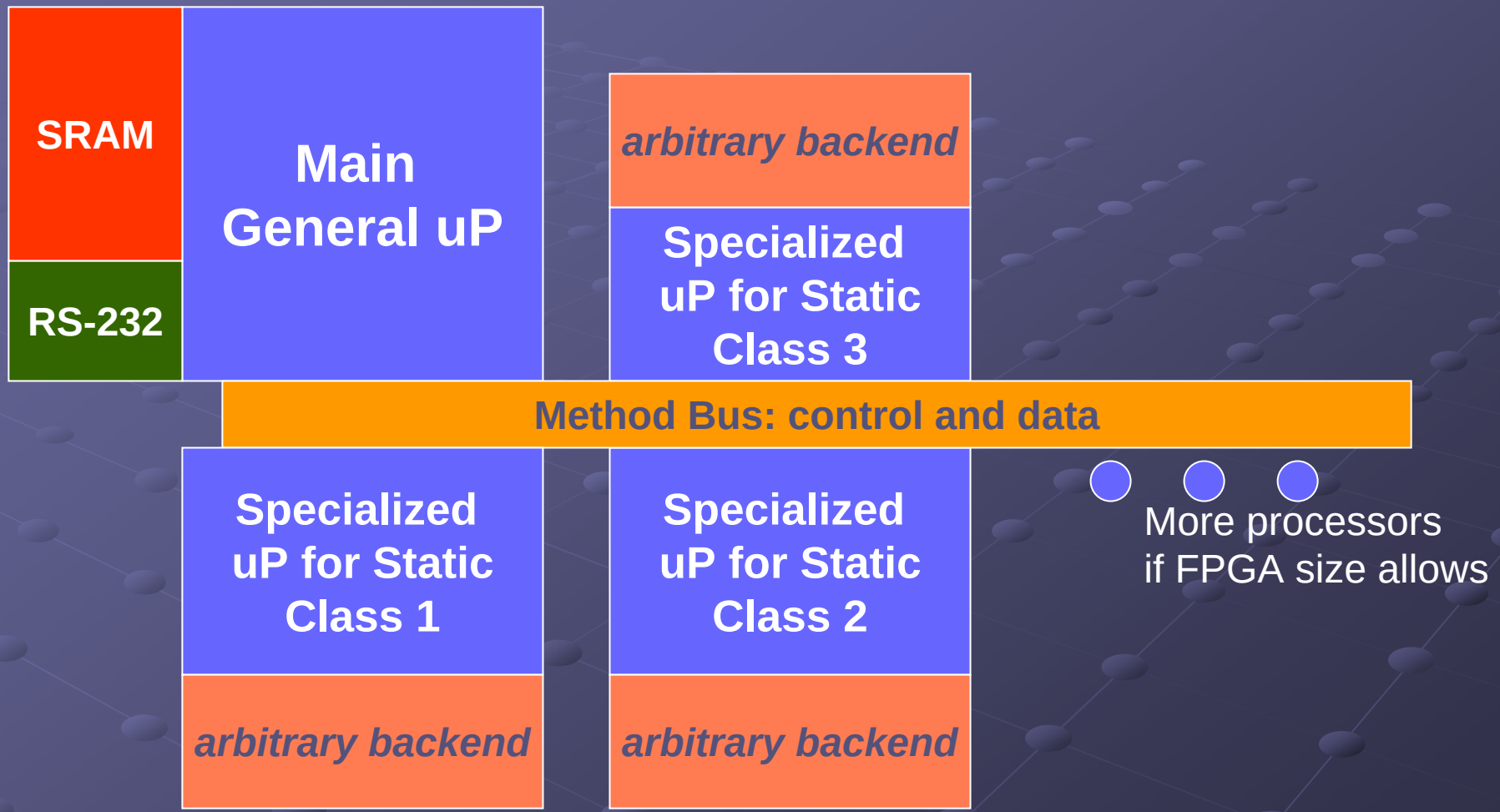
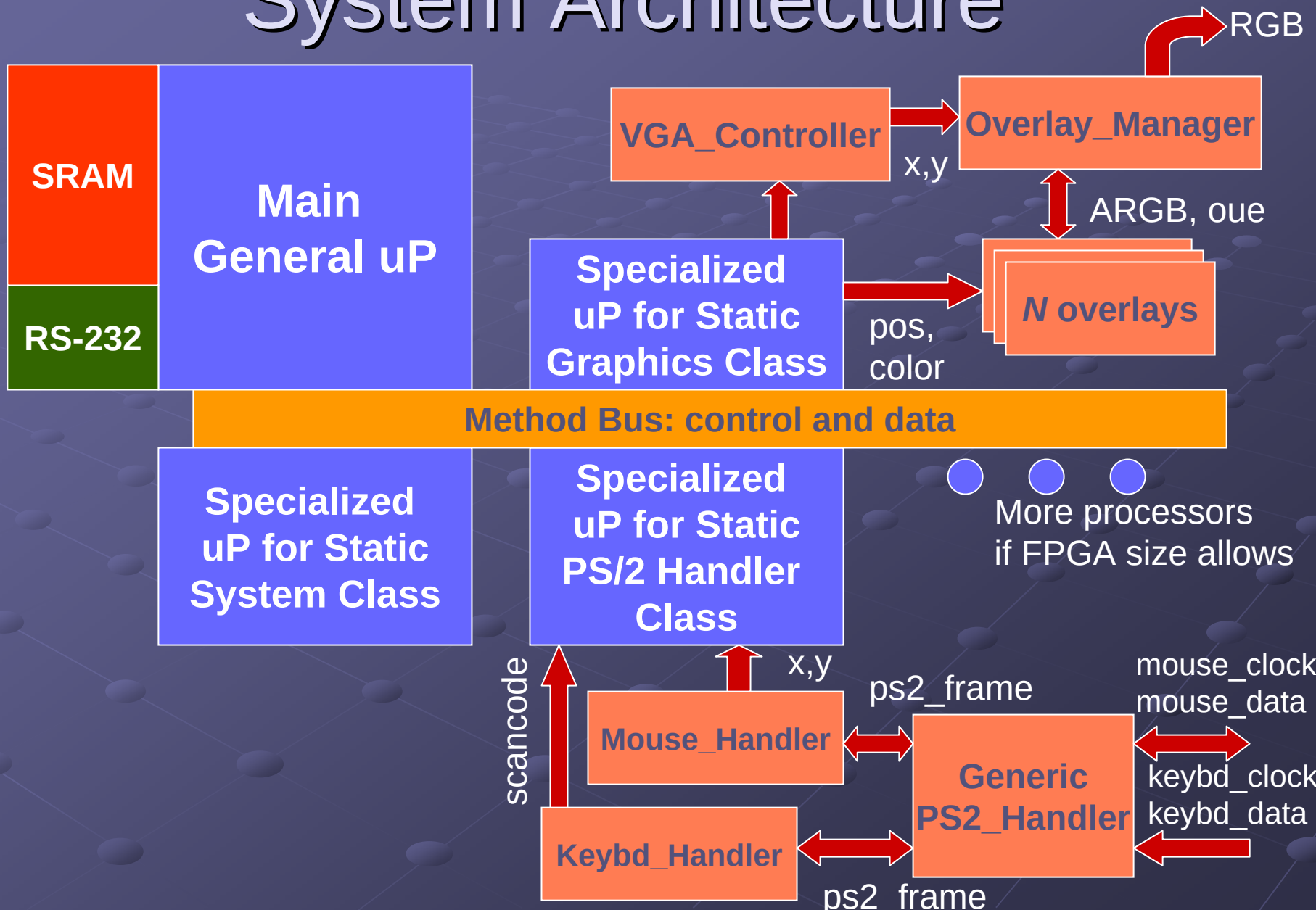
The J Computer

- Executes Java ME-like bytecode in hardware
- Constraints: (relatively) slow clock rate, not much memory
  - Use Connected, Limited Device Configuration v1.0
- Downloads user-specified class files from PC over RS-232 connection
- Interfaces with hardware devices to allow user interaction

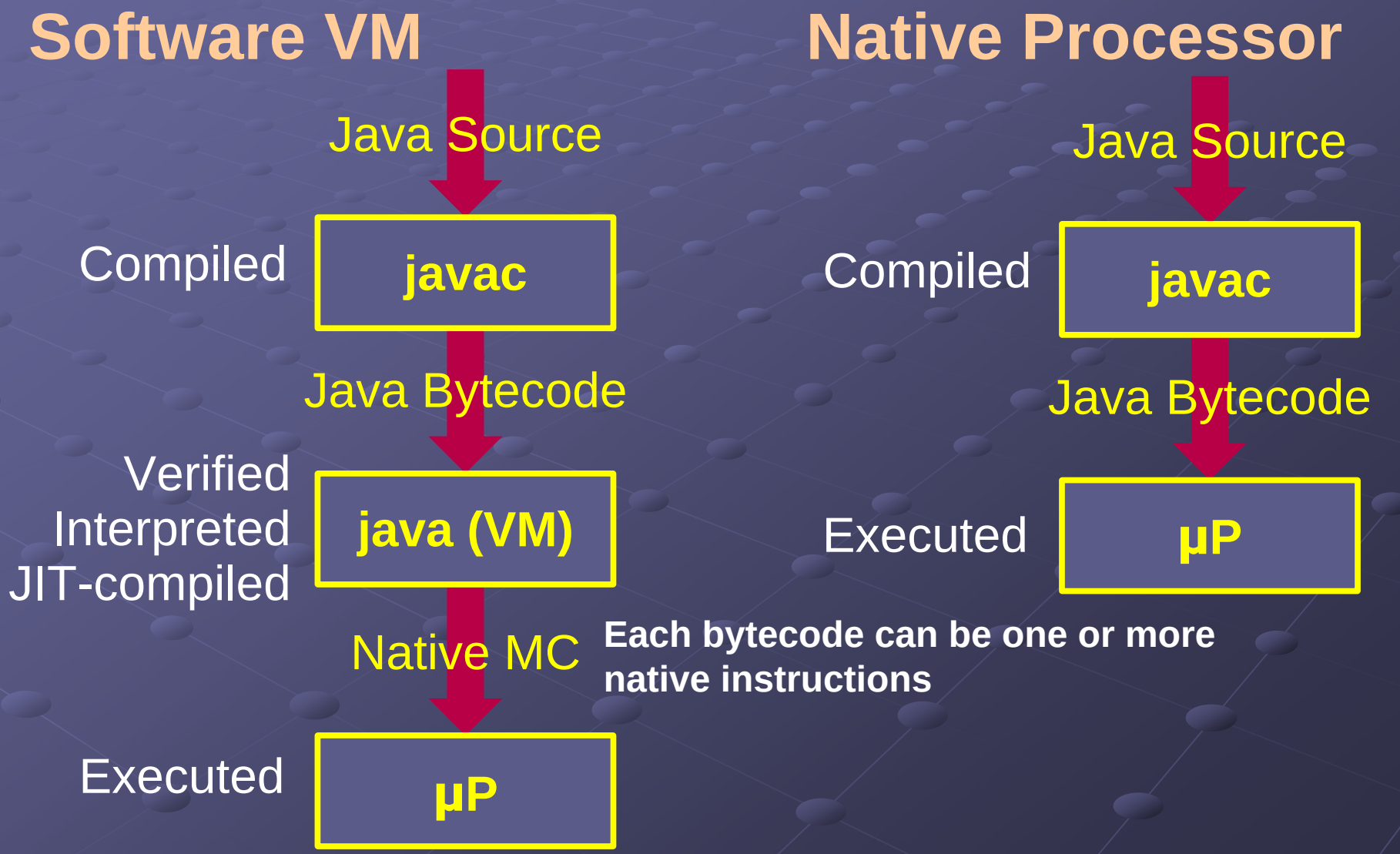
System Architecture



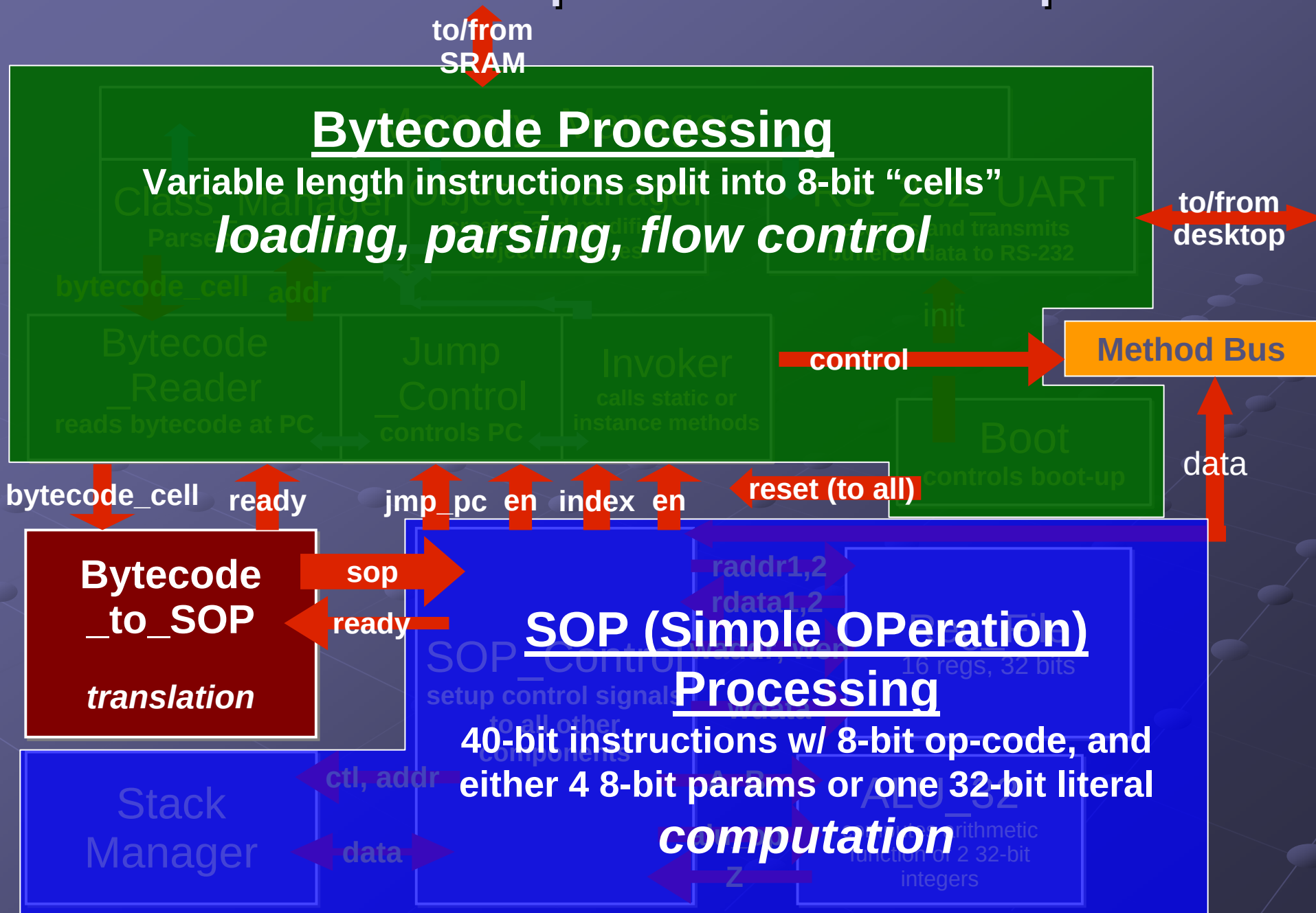
System Architecture



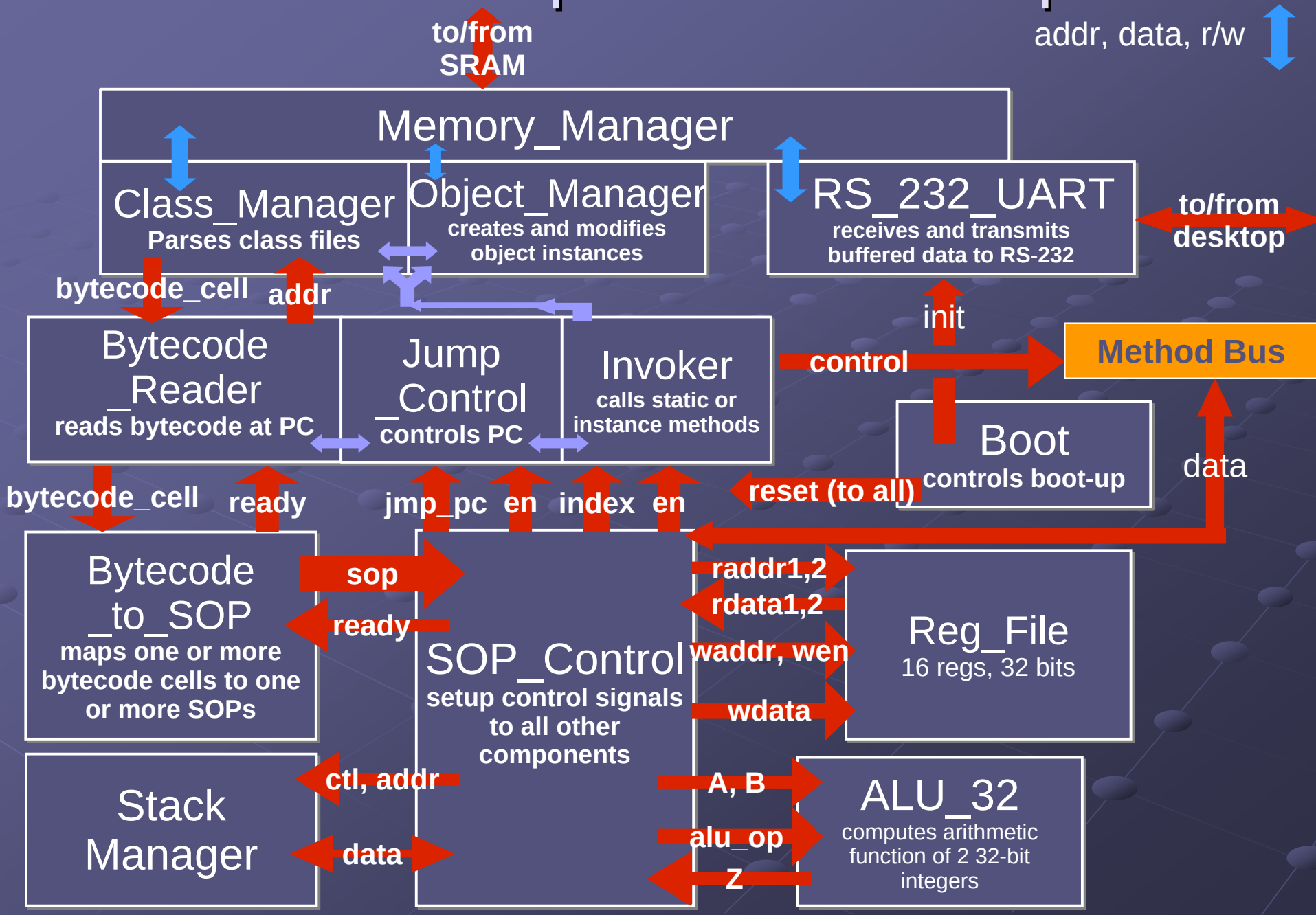
Executing HLLs in Software vs. in Hardware



General Microprocessor: Simplified

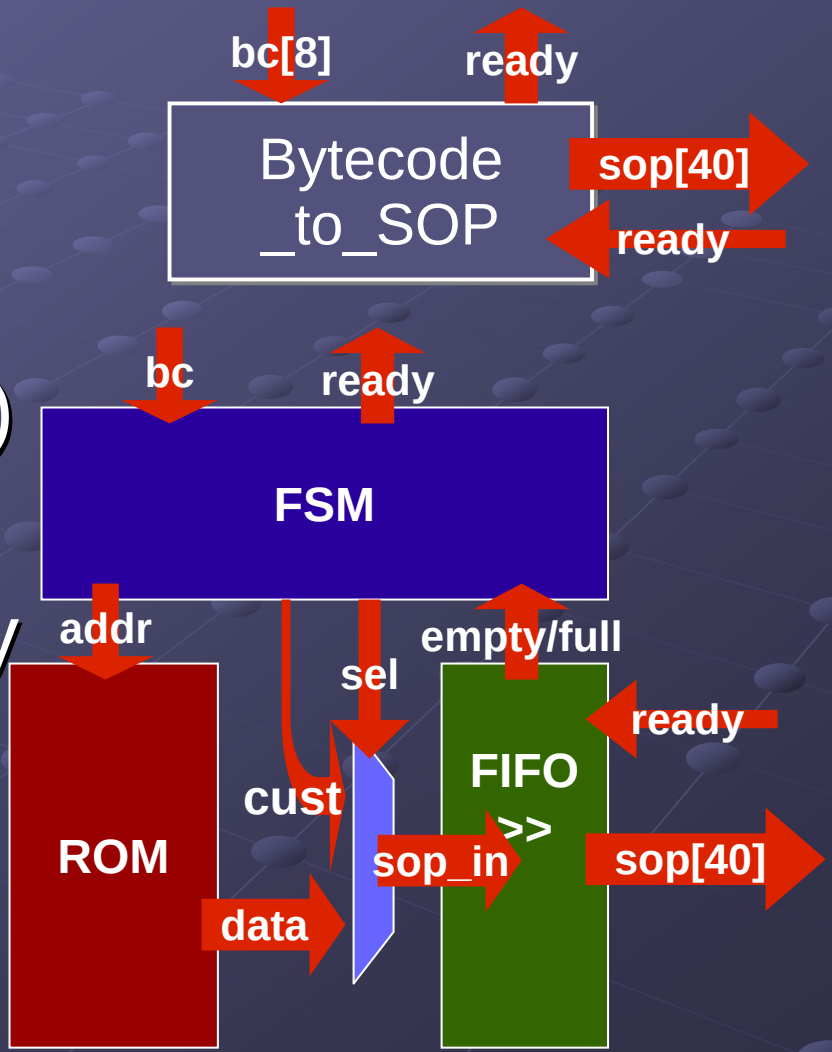


General Microprocessor: Simplified



Bytecode-to-SOP translation

- Most bytecodes can be directly translated into one or more constant SOPs (looked up in ROM)
- Others may generate custom SOPs dynamically



Goals & Challenges

- Final demo: Write MIT Pong in Java
- The most complex bytecodes: **instanceof**, **invoke_virtual**
  - Need to traverse type trees
  - Raise traps via SOP and write in Java, or
  - Implement via in-BRAM data structures
- Gate count
  - Can we fit 4 processors on a single FPGA?

Questions?