Assignment

SyoSil, 2025

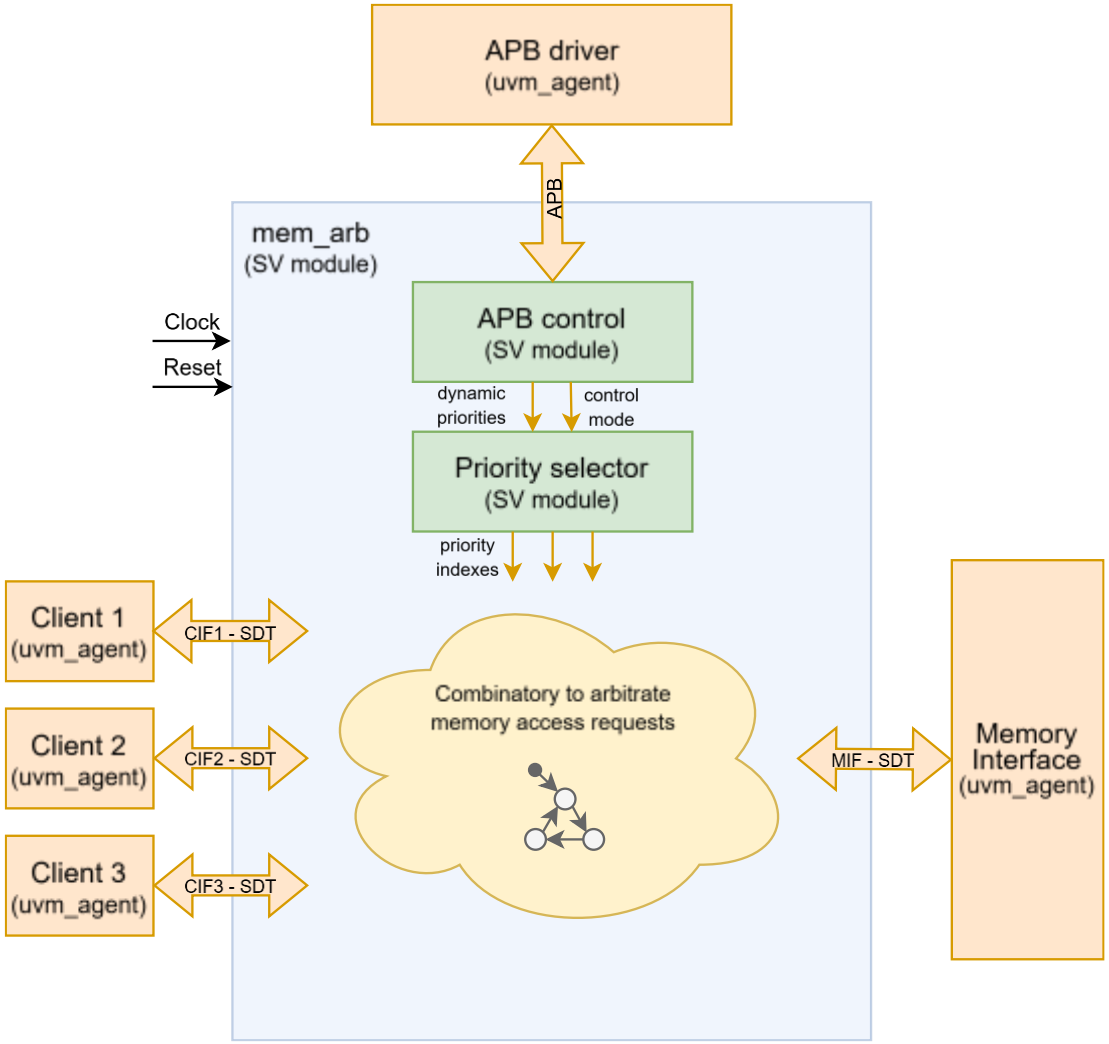
Contents

- Objective
- Memory Arbiter design specification
- SyoSil Data Transfer protocol
- Assignment:
  - Available items
  - Missing items

Objective

- The goal is to develop a PyUVM testbench to verify the MARB design.
  - Understand the design
  - Develop a verification plan
  - Integrate and connect the required UVCs
  - Implement tests and sequences
  - Implement the checking mechanism
    - Reference model
    - Scoreboard
    - Protocol checkers
  - Implement the coverage

Device Under Test: Memory Arbiter (MARB)



Device Under Test: Implementation

- 3 client interfaces (CIF)
- 1 memory interface (MIF)
- 1 APB interface (APB)
- Serves the client with the highest priority
- Default priority:
  - CIF1 > CIF2 > CIF3
- All interfaces follow SDT protocol

Device Under Test: Core

- *APB* module
  - APB protocol
  - Used to configure the device
- *Priority selection* module
  - *Static* or *Dynamic,* configured with *mode* signal
  - *Single sort* module:
    - Sorts the client requests depending on priority
    - Takes a *new* value and compares with the *current* and the *previous*
    - If the new value has higher priority change the order of the client requests
- *MIF* processes first the request of the *CIF* with the highest priority
  - Sends acknowledge signal to close the handshake

SyoSil Data Transfer protocol

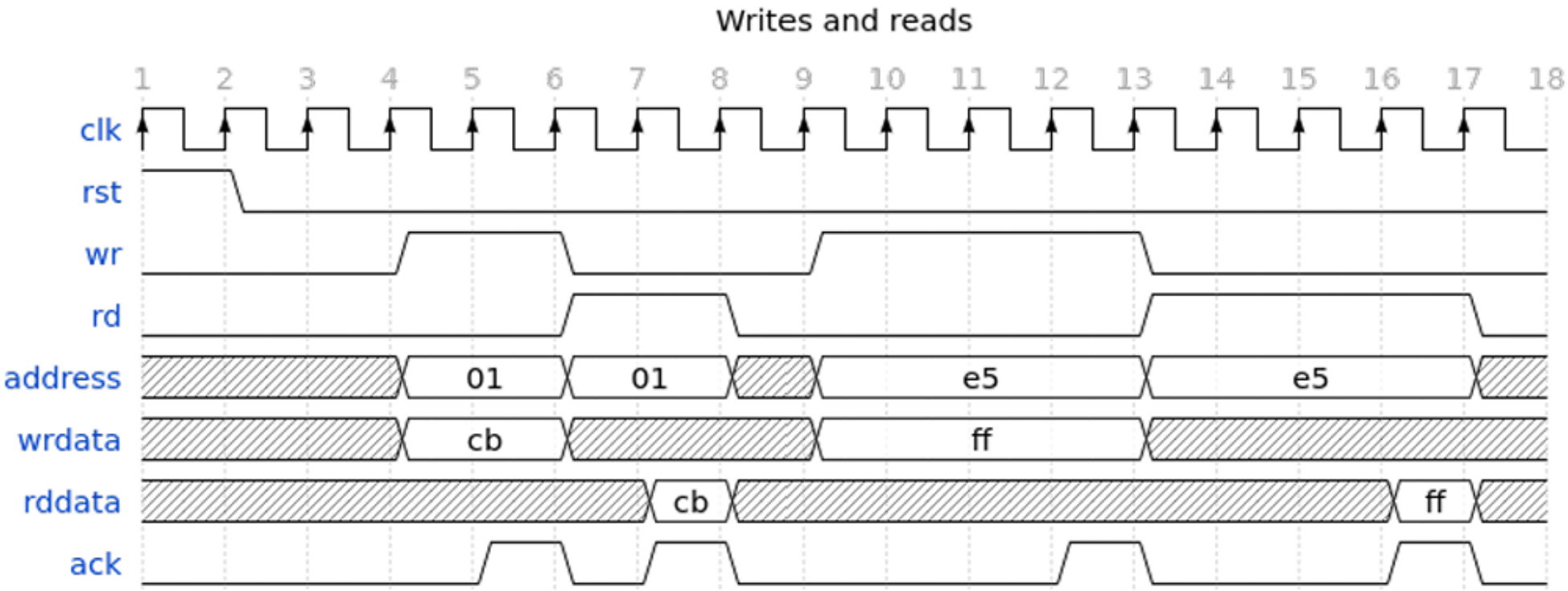
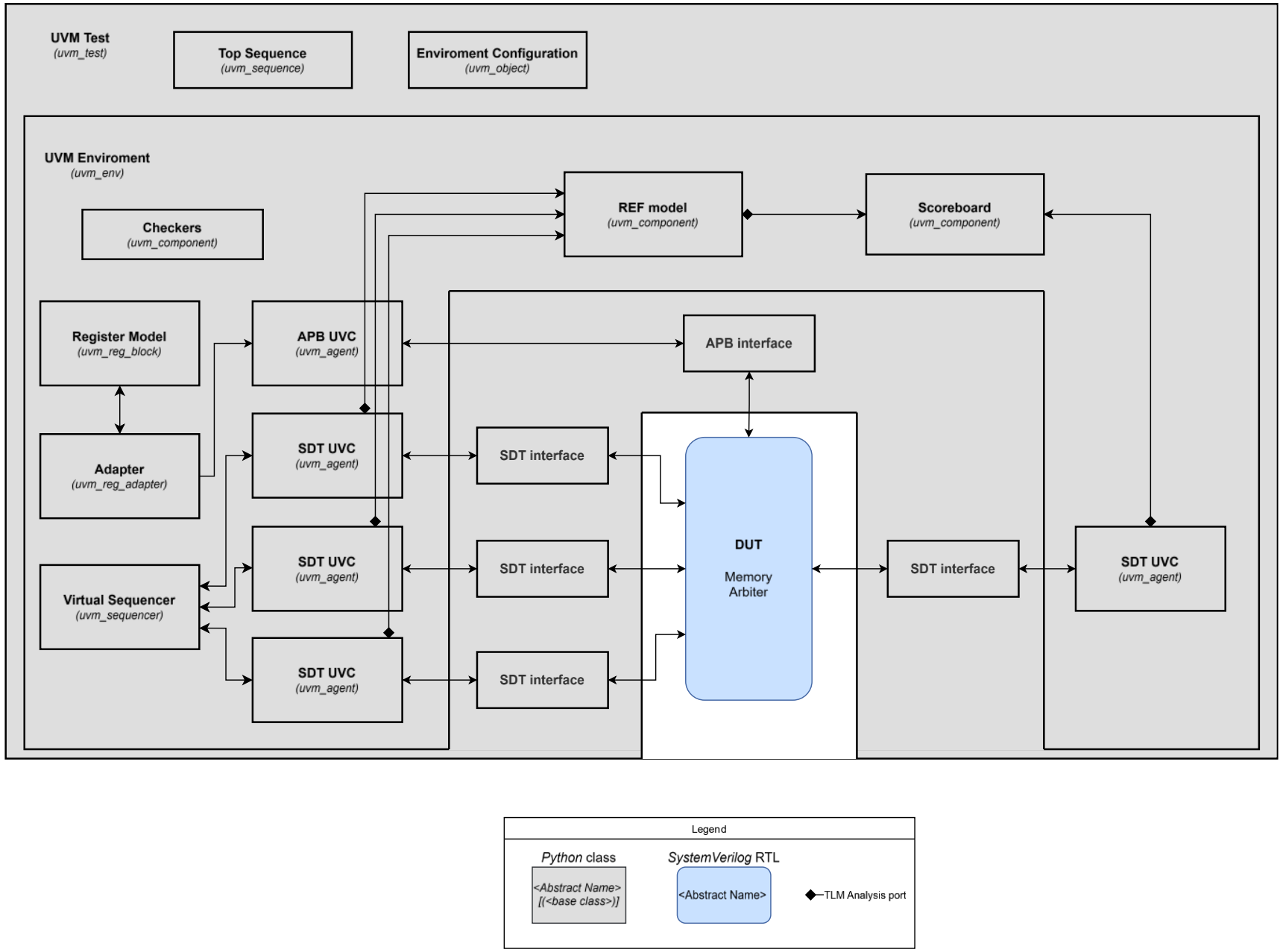


Fig. 3.1: Write and read operations using the *SDT* protocol.

MARB Test Bench



Assignment: Available items

- *RTL design*
- *uVCs:*
  - *SDT*
  - *APB*
  - *Clock (initially can be generated in base test, without uVC integration)*
  - *Reset (initially can be generated in base test , without uVC integration)*
- *MARB Test Bench:*
  - *Register model* implementation
    - Including the *static* configuration sequence
  - Base test
  - Base virtual sequence and virtual sequencer

Assignment: Missing Items

- *Verification Plan*
- *uVCs integration*
- *uVCs connections*
- Configuration implementation
- Sequences, virtual sequences and tests library
  1. Direct with static priority
  2. Random with dynamic priority
- Reference model
- Scoreboard
- *SDT protocol checkers*
- Coverage class and coverage reporting