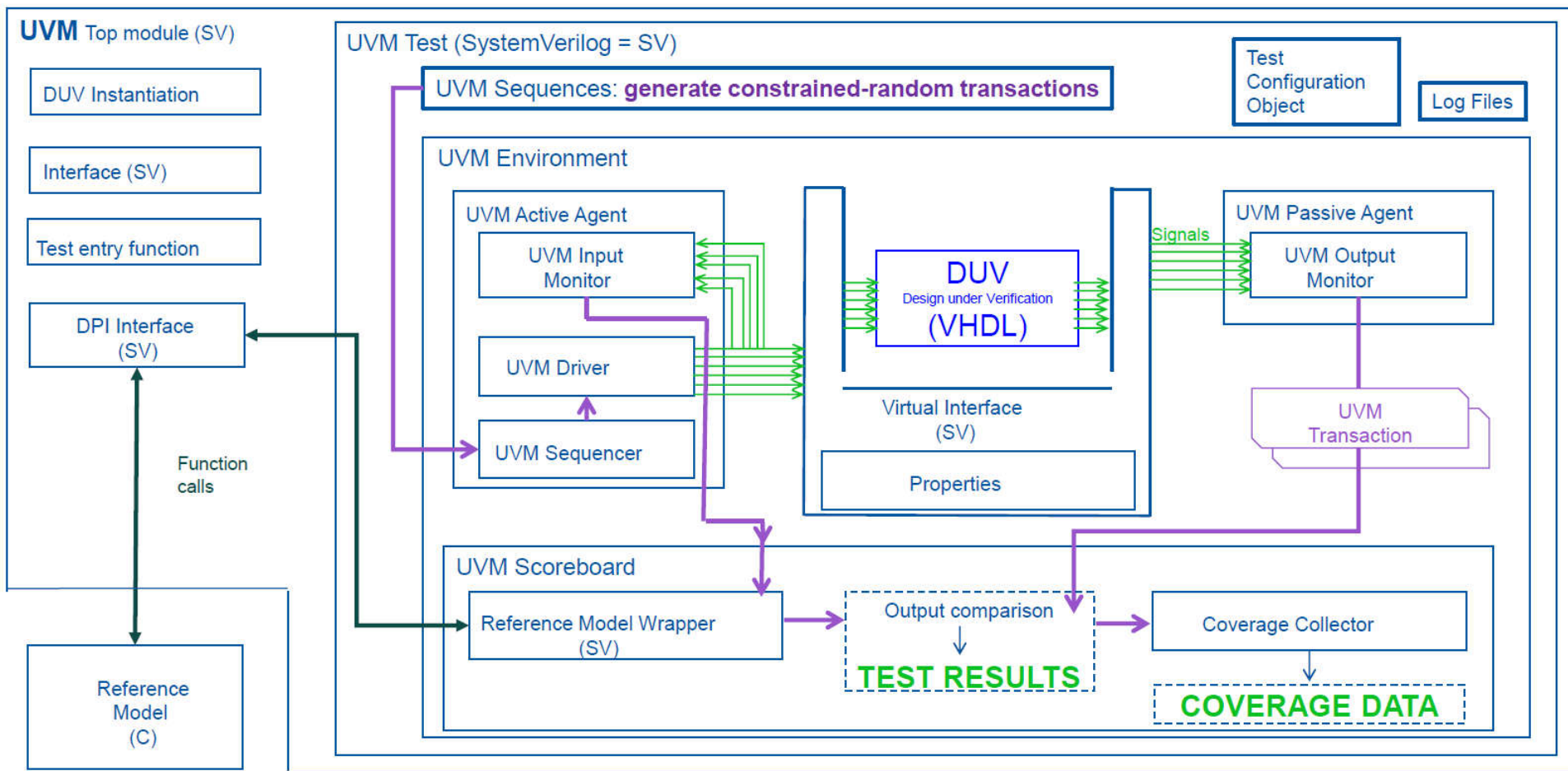


UVM (**U**niversal **V**erification **M**ethodology)

For SW Engineers

Tuan Nguyen-viet



Key Components of a UVM Testbench

Testbench Top

Test

Environment Top

Tx Environment

Rx Environment

Tx Agent

Rx Agent

Sequence item / Sequence

Sequence item / Sequence

Sequencer

Sequencer

Driver

Monitor

Driver

Monitor

Scoreboard

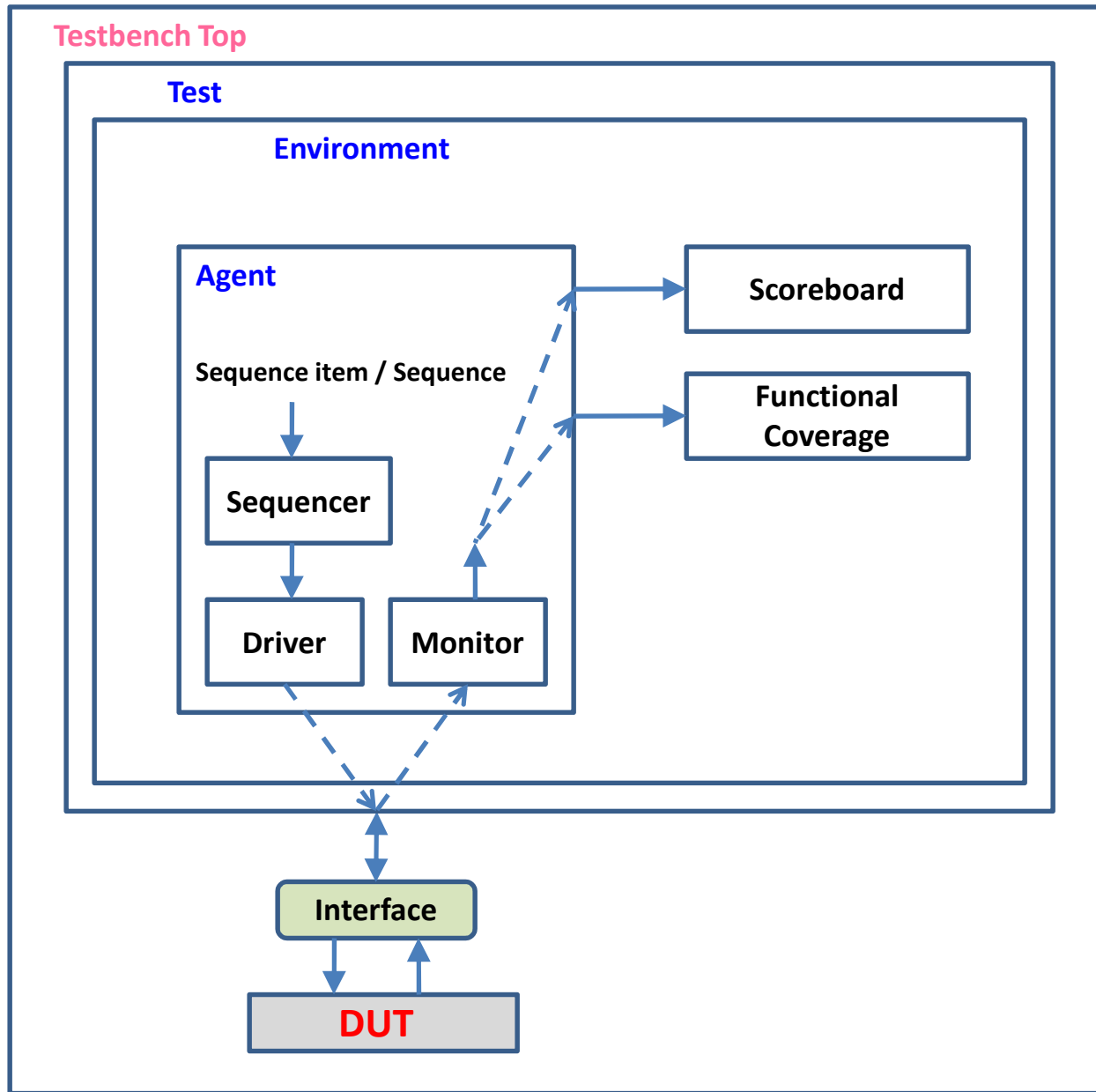
Functional
Coverage

Interface

Interface

DUT

UVM - Simple Architecture w/ Single Agent

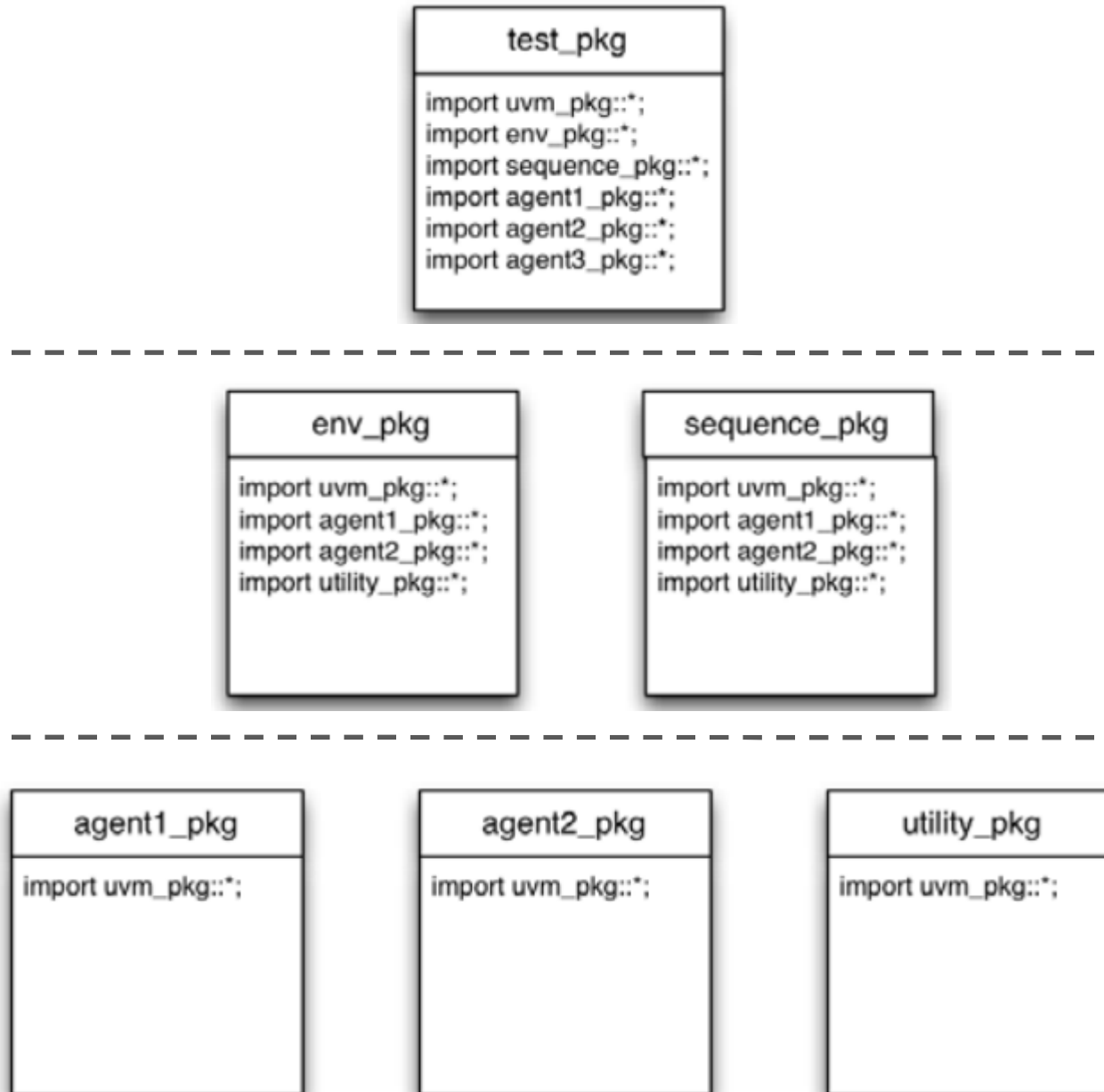


Package Definition/Organization

Introduction

- UVM organizes all of its **base classes** into a SystemVerilog Package.
- **Code** that is written *extending from* the UVM **base classes** should also be placed into packages in a **specific hierarchy**.
- The organization of **this hierarchy** makes it easier to
 1. compile smaller pieces of a testbench at once and in order
 2. and prevents circular references.

Package Hierarchy



Agent Package

Testbench Top

Test

Environment

Agent

Sequence item / Sequence

Sequencer

Driver

Monitor

Scoreboard

Functional
Coverage

Interface

DUT

```
package sfifo_agent_pkg;

`include "uvm_macros.svh"

import uvm_pkg::*;

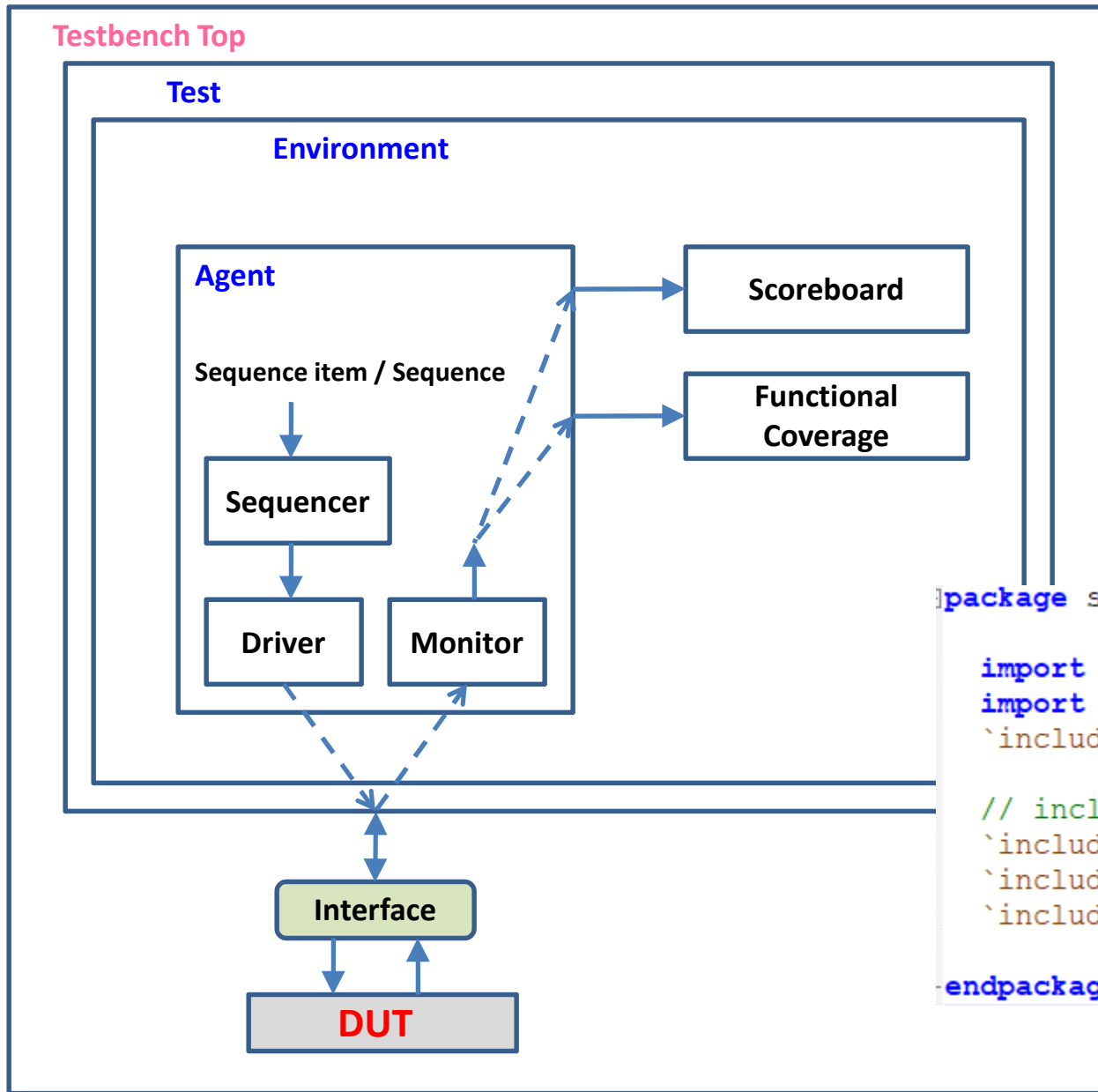
//Include the sequence_items (transactions)
`include "sfifo_seq_item.sv"

`include "sfifo_sequence.sv"
`include "sfifo_sequencer.sv"
`include "sfifo_driver.sv"
`include "sfifo_monitor.sv"

`include "sfifo_agent.sv"

endpackage
```

Environment Package



```
package sfifo_env_pkg;  
  
import uvm_pkg::*;  
import sfifo_agent_pkg::*;  
`include "uvm_macros.svh"  
  
// include top env files  
`include "sfifo_scoreboard.sv"  
`include "sfifo_coverage.sv"  
`include "sfifo_env.sv"  
  
endpackage
```

Sequence Package

Testbench Top

Test

Environment

Agent

Sequence item / Sequence

Sequencer

Driver

Monitor

Scoreboard

Functional
Coverage

Interface

DUT

```
package sfifo_seq_pkg;  
  import uvm_pkg::*;  
  import sfifo_agent_pkg::*;  
  `include "uvm_macros.svh"  
  
  //`include "sfifo_seq_item.sv"  
  `include "sfifo_sequence.sv"  
endpackage
```

Test Package

Testbench Top

Test

Environment

Agent

Sequence item / Sequence

Sequencer

Driver

Monitor

Scoreboard

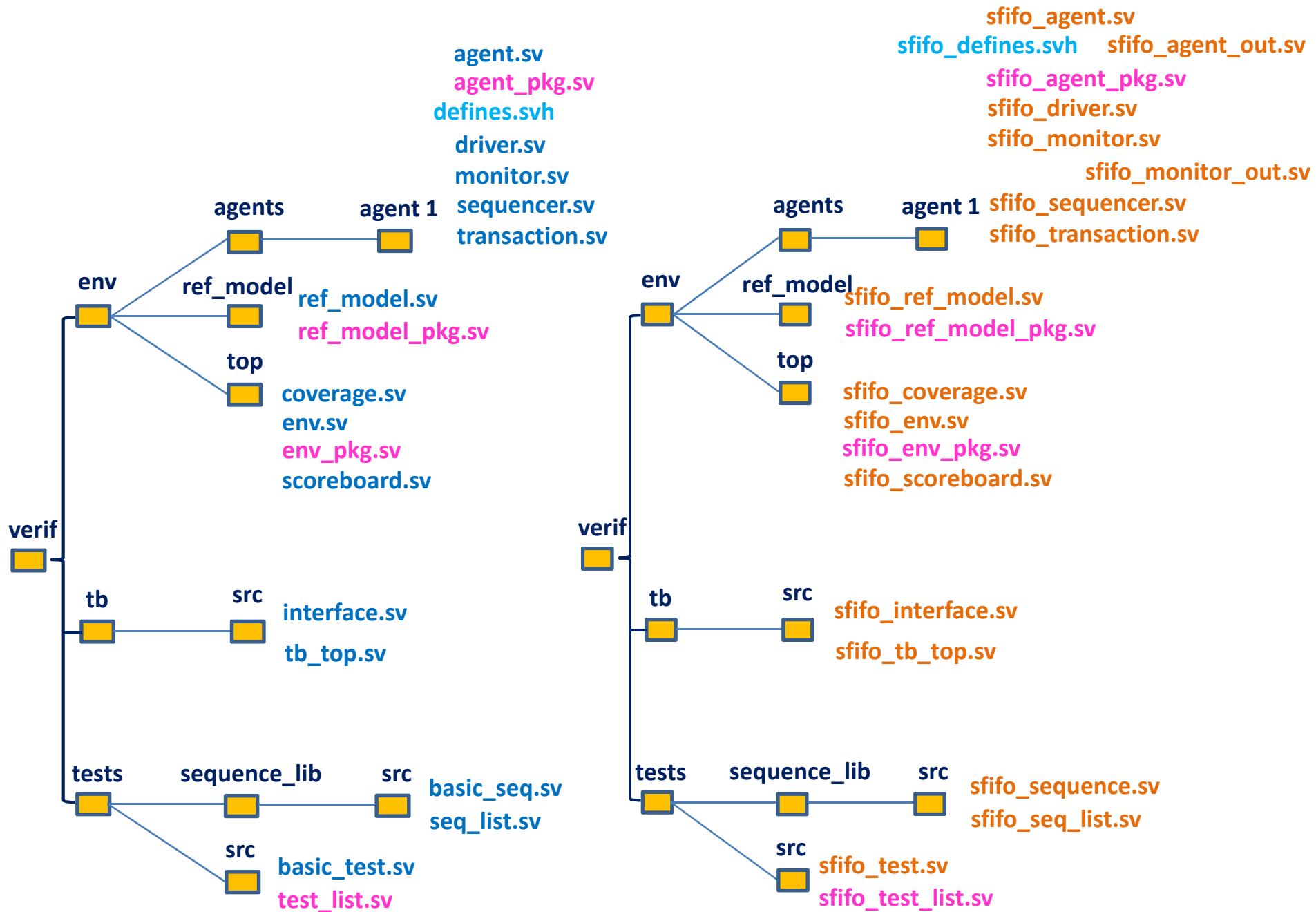
Functional
Coverage

Interface

DUT

```
package sfifo_test_pkg;  
  `include "uvm_macros.svh"  
  import uvm_pkg::*;  
  
  //import sfifo_pkg::*;  
  import sfifo_seq_pkg::*;  
  import sfifo_agent_pkg::*;  
  import sfifo_env_pkg::*;  
  
  `include "sfifo_base_test.sv"  
  `include "sfifo_wr_rd_test.sv"  
endpackage
```

An Example of Packages in a Simple Project



Thank You