Topic: Automated Testing Environment for Verification.

Aimed for: Verification *Author: Abdalrahman Alshannaq*

Objective

To create an automated testing environment for verifying processor benchmarks through integrated hardware (Quartus/ModelSim) and software (Cycle Accurate Simulator/Assembler).

Overview of Workflow

1. **Benchmark Preparation**
    - Accepts user-defined benchmarks or generates random ones.
    - Benchmarks are processed sequentially or in parallel according to implementation and complexity.
2. **Execution Paths**
    - **Hardware Simulation**: Automates compilation (Quartus) and simulation (ModelSim), extracting performance and result data.
    - **Cycle Accurate Simulation**: Logs execution cycles and program flow for comparison.
3. **Result Comparison**
    - Analyzes results from both paths, flags inconsistencies, and generates detailed reports with pass/fail indicators.

Proposed Output

- Logs for performance and execution data.
- Comparison reports highlighting discrepancies.

Benefits

- Reduces manual effort and enhances accuracy.
- Adapts to multiple benchmarks.
- Enables systematic error detection and debugging.

Automated Testing Environment Workflow

The figure below shows suggested flow for the automated verification environment.