

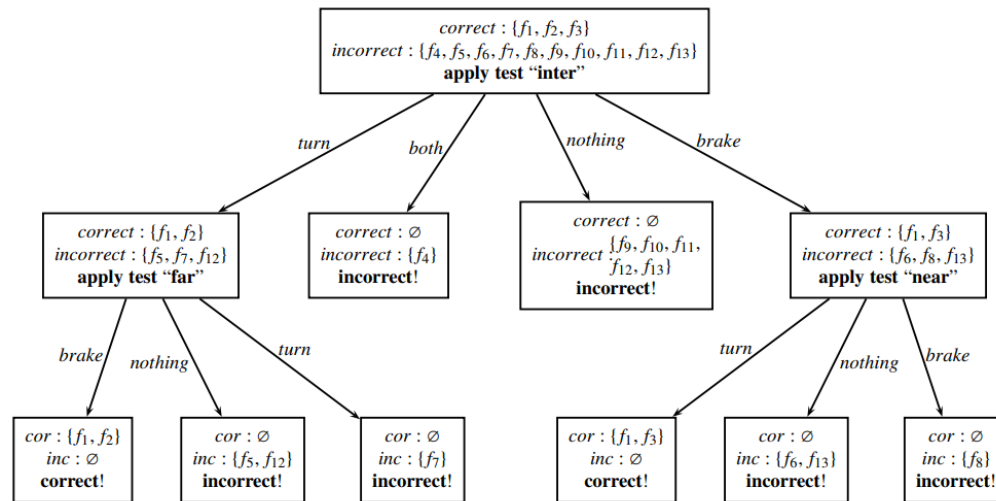
Complexity of adaptive testing in scenarios defined extensionally

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Problems & Ideas

- Problem: What is the minimum testing strategy such that collected observations will necessarily let us decide whether the IUT is correct or not?
- Ideas:
 - Adaptive testing can be seen as a *game* between tester and the IUT where the tester aims at exposing faults and the IUT at hiding them.
 - We study the most essential case, where the set of possible behaviors of the IUT for all possible interactions is extensionally defined



Example of the usefulness of adaptive testing. In this case, only two tests are required in the worst case under adaptive testing, while three tests (far, near, inter) would be needed in case preset testing were being used.

Main Contributions

- Contributions:
 - Formally defining adaptive testing scenarios defined extensionally, considering different possibilities:
 - Deterministic (D-AT*) and Non-Deterministic (N-AT*) cases
 - Decision Problems (*DP) and Optimization Problems (*OP)
 - A single correct specification (subscript 1) or multiple possible correct specifications (without subscripts)
 - Proving the complexity of the previous testing problems:
 - D-ATDP and D-ATDP₁ are NP-Complete
 - D-ATOP is Log-APX-hard
 - D-ATOP₁ is Log-APX-complete
 - N-ATDP and N-ATDP₁ are PSPACE-complete