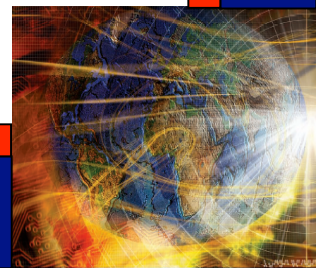
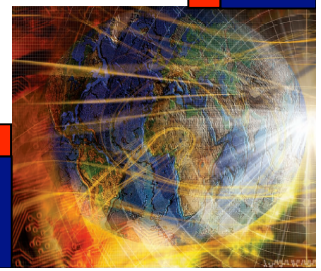
Chapter 11

Retrospective on Structural Testing



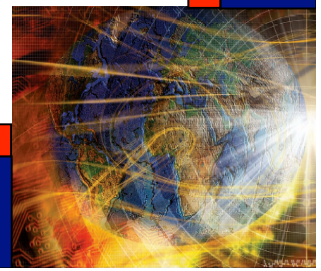
Structural Testing Comparison

- How much testing is enough?
- Effort and size trendlines
- Metrics for test method comparison

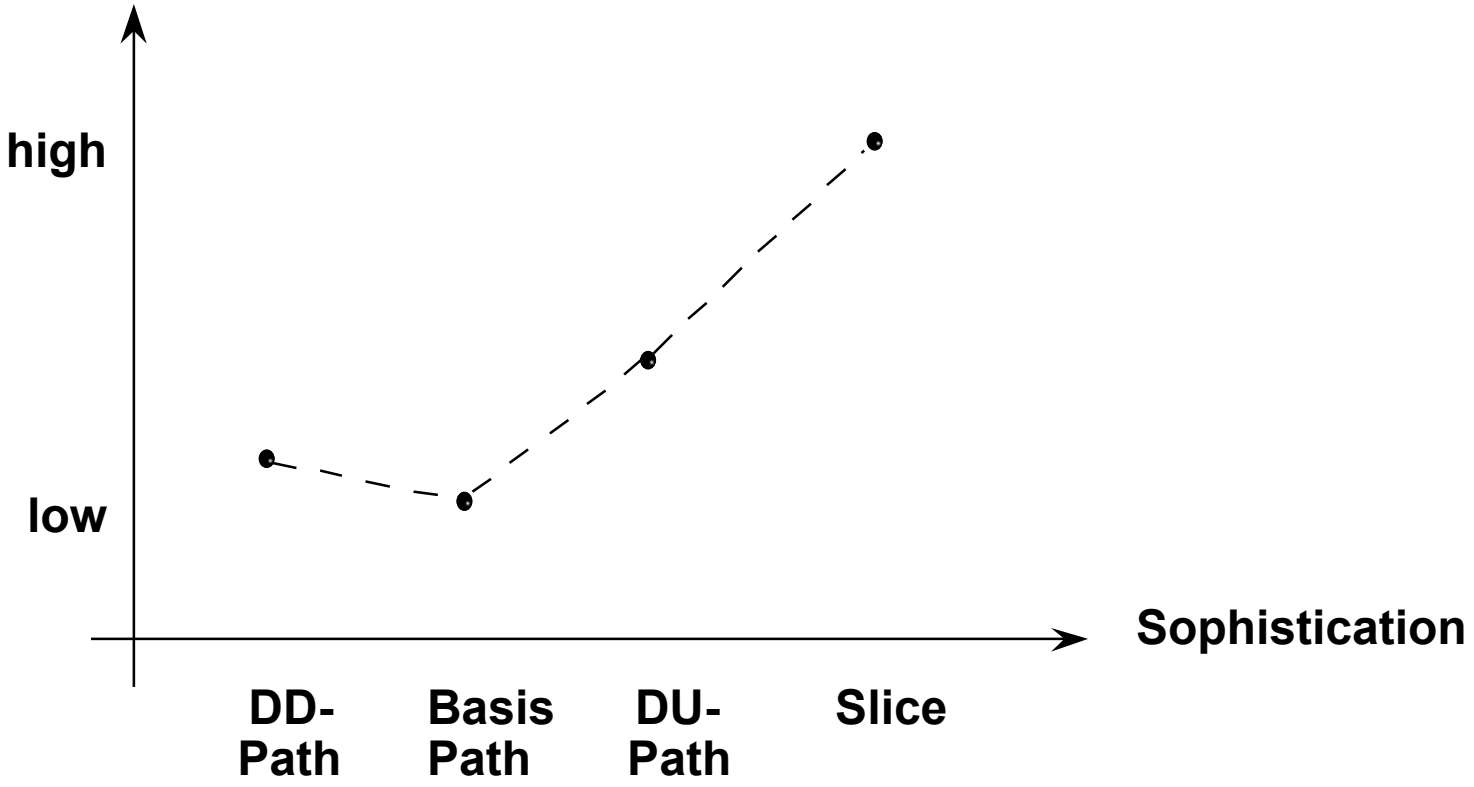


Exercise/Discussion: When should testing stop?

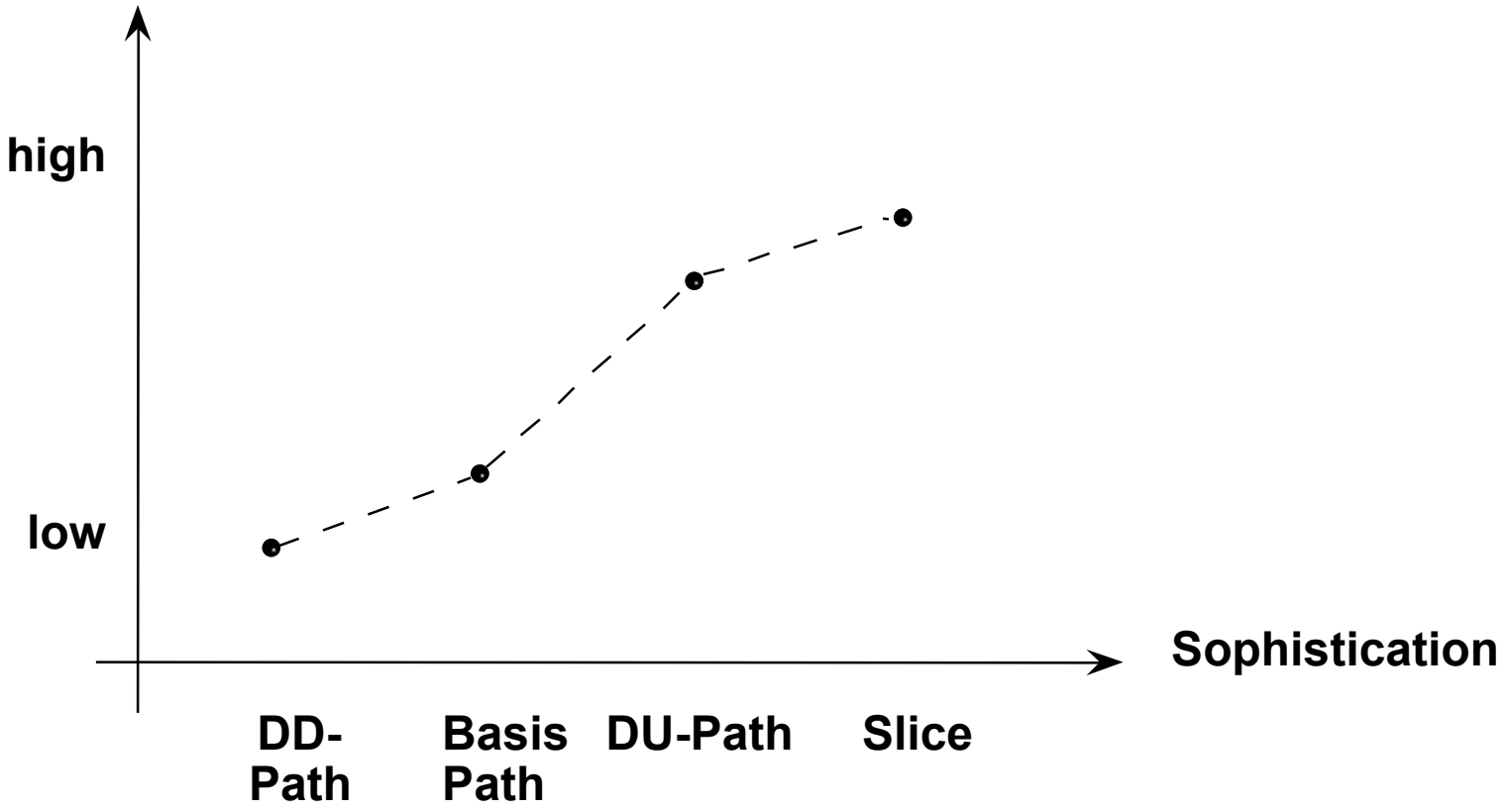
- when you run out of time?
- when continued testing causes no new failures?
- when continued testing reveals no new faults?
- when you can't think of any new test cases?
- when you reach a point of diminishing returns?
- when mandated coverage has been attained?
- when all faults have been removed?



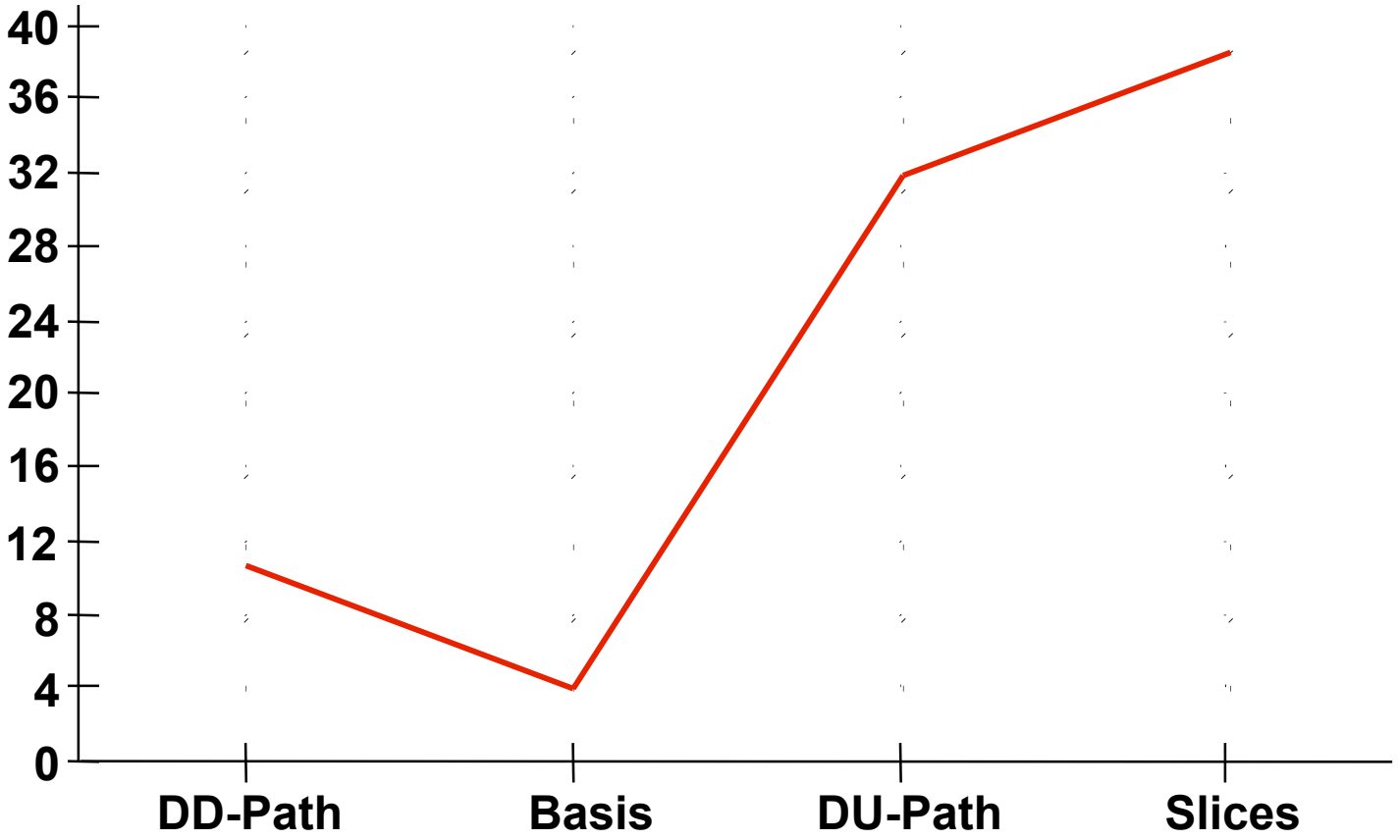
Number of Test Coverage Items



Effort to Identify Test Coverage Items



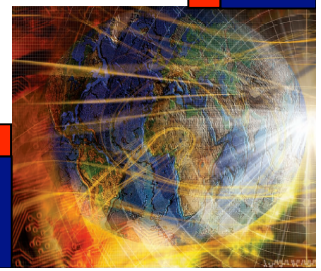
Number of Coverage Items in the Commission Problem



Metrics for Test Method Comparison

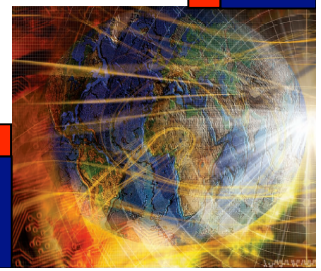
- Assume that a functional testing technique M generates m test cases, and that these test cases are tracked with respect to a structural metric S that identifies s elements in the unit under test. When the m test cases are executed, they traverse n of the s structural elements.

- This framework supports the definition of metrics for testing effectiveness.



Metrics for Testing Effectiveness

- The *coverage* of a methodology M with respect to a metric S is ratio of n to s. We denote it as C(M,S).
- The *redundancy* of a methodology M with respect to a metric S is ratio of m to s. We denote it as R(M,S).
- The *net redundancy* of a methodology M with respect to a metric S is ratio of m to n. We denote it as NR(M,S).



Sample Comparisons

Method	m	n	s	C(M,S)	R(M,S)	NR(M,S)
Triangle Program						
BVA	15	7	11	0.64	1.36	2.14
Worst Case BVA	125	11	11	1.00	11.36	11.36
Commission Program						
Output BVA	25	11	11	1.00	2.27	2.27
Decision Table	3	11	11	1.00	0.27	0.27
DD-Path	25	11	11	1.00	2.27	2.27
DU-Path	25	33	33	1.00	0.76	0.76
Slices	25	40	40	1.00	0.63	0.63