Structural Based Testing Strategies

Structured Testing

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Objective

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Apply structured testing technique

McCable Cyclomatic Complexity

- **v(G) of a grap with e edges, n nodes and p connected components is e-n+p**

- **In a typical program:**
  - v(G) = #test predicates +1

Example

```
S1;
if x < 10
    then S2
    else if y > 0
            then S3
            else S4;
If z = 5
    then S6
    else S7;
```

Application for Testing

- Impossible to test all paths through code
- Structured testing provides a strategy for testing a subset of paths
- Select a set of basis paths (number is v(G)
- Linear combination of basis paths will generate any path
- Guarantees branch coverage

Identification of Basis Paths

- Select an arbitrary path through the graph as initial basis path
- Flip first decision while keeping other decisions constant
- Reset first decision and flip second decision
- Continue until all decisions have been flipped

Example

```
S1;
if x < 10
    then S2
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    then S6
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```

Summary