SWE 637 Software Testing
Chapter 7

Graph Coverage from Source Code
In-class exercise

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(Dr. B for short)

https://go.gmu.edu/SWE637

Adapted from slides by Jeff Offutt and Bob Kurtz

Graph Coverage from Source Exercise

```
public static <T extends Comparable<? super T>>
T min (List<? extends T> list) {
  Iterator<? extends T> itr = list.iterator();
  if (!itr.hasNext()) {
    throw new IllegalArgumentException("min: empty list");
  }

  T result = itr.next();
  if (result == null)
    throw new NullPointerException();

  while (itr.hasNext()) {
    T comp = itr.next();
    if (comp.compareTo(result) < 0) { // throws NPE, CCE
      result = comp;
    }
  }
  return result;
}
```

Graph Coverage from Source Exercise

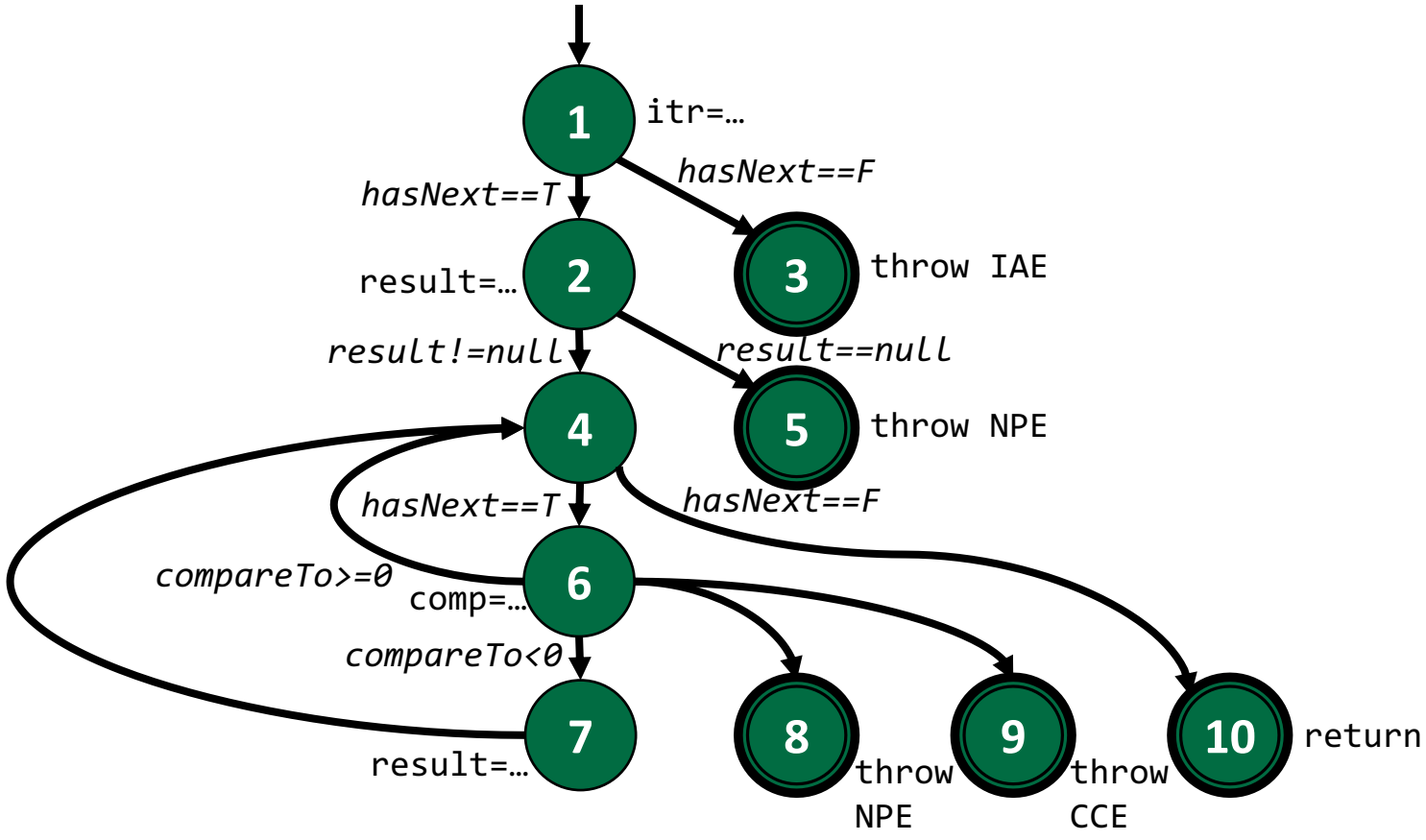
1. Draw the graph
2. Develop node coverage test requirements
3. Develop edge coverage test requirements
4. Develop edge-pair coverage test requirements
5. Develop prime path coverage test requirements

Graph Coverage from Source Exercise

Draw the graph.

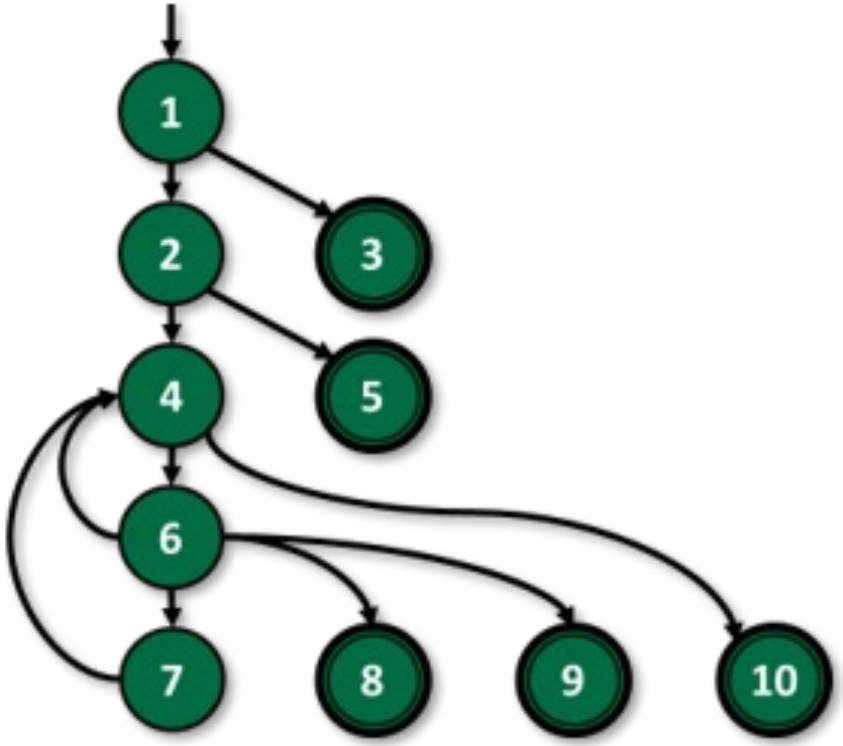
Graph Coverage from Source Exercise

Draw the graph.



Graph Coverage from Source Exercise

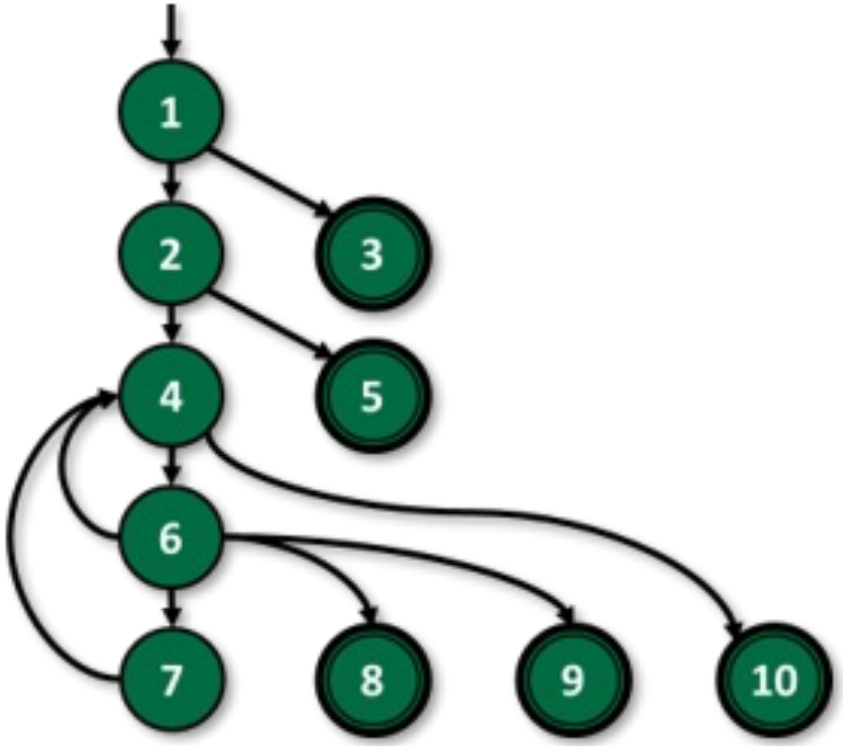
Develop node coverage test requirements:



Graph Coverage from Source Exercise

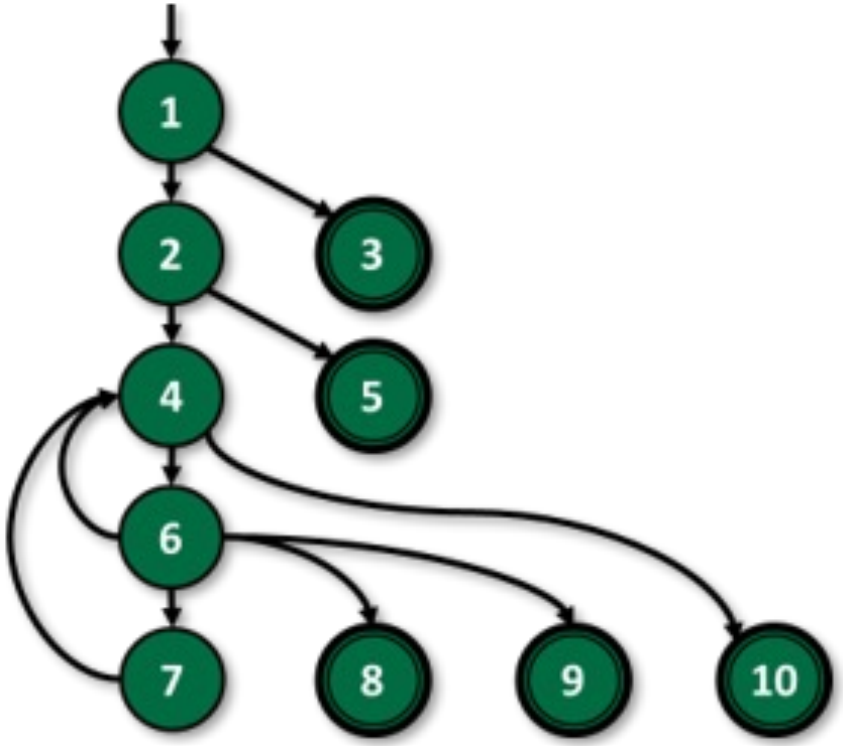
Develop node coverage test requirements:

{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 }



Graph Coverage from Source Exercise

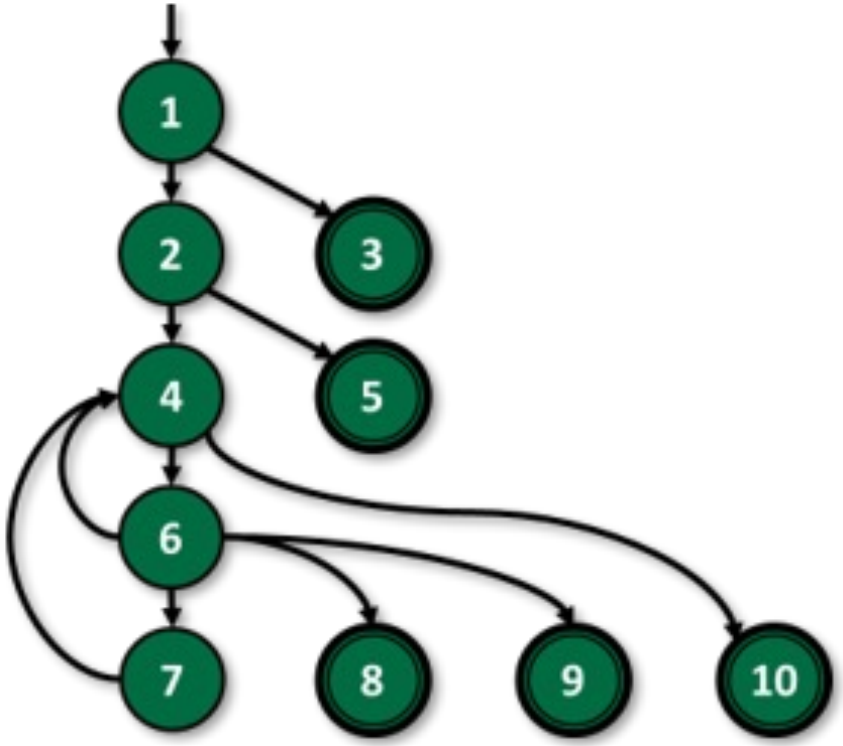
Develop edge coverage test requirements:



Graph Coverage from Source Exercise

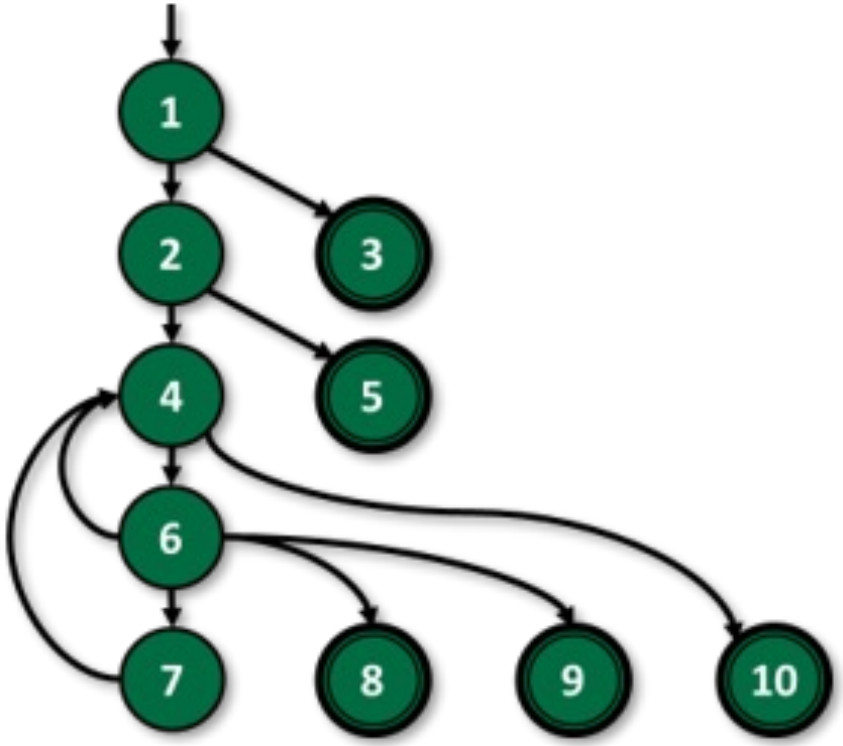
Develop edge coverage test requirements:

{ (1,2), (1,3), (2,4),
(2,5), (4,6), (4,10),
(6,4), (6,7), (6,8),
(6,9), (7,4) }



Graph Coverage from Source Exercise

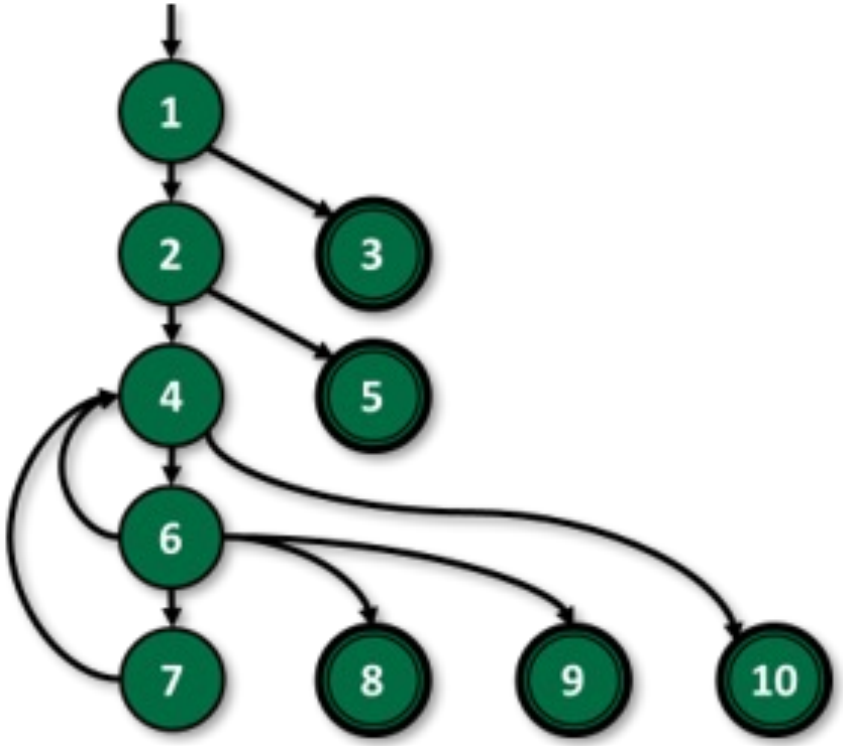
Develop edge-pair coverage test requirements:



Graph Coverage from Source Exercise

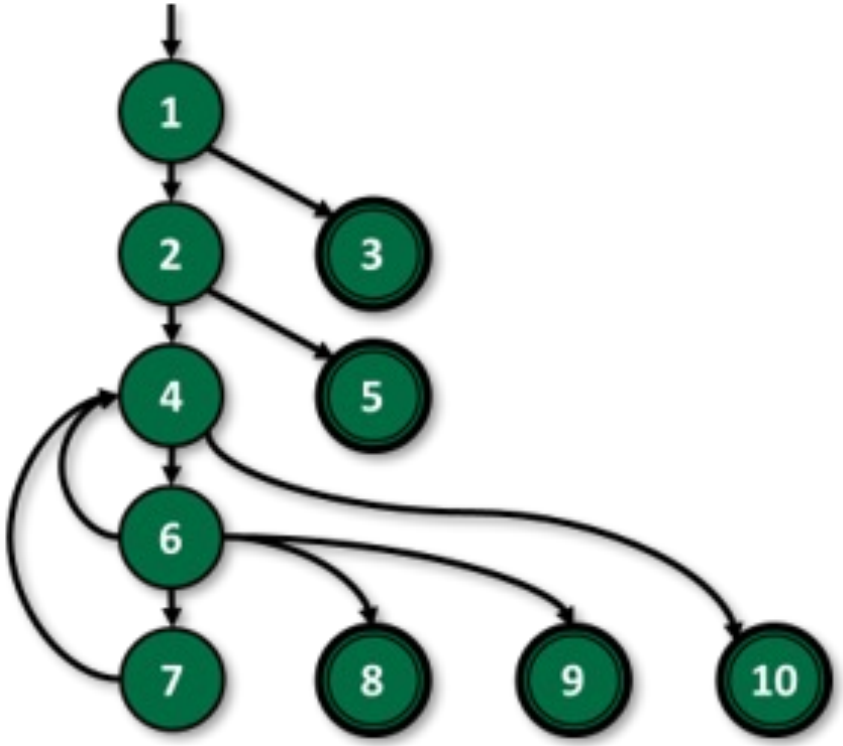
Develop edge-pair coverage test requirements:

{ (1,2,4), (1,2,5),
(1,3), (2,4,6),
(2,4,10), (4,6,4),
(4,6,7), (4,6,8),
(4,6,9), (6,4,6),
(6,4,10), (6,7,4),
(7,4,6), (7,4,10) }



Graph Coverage from Source Exercise

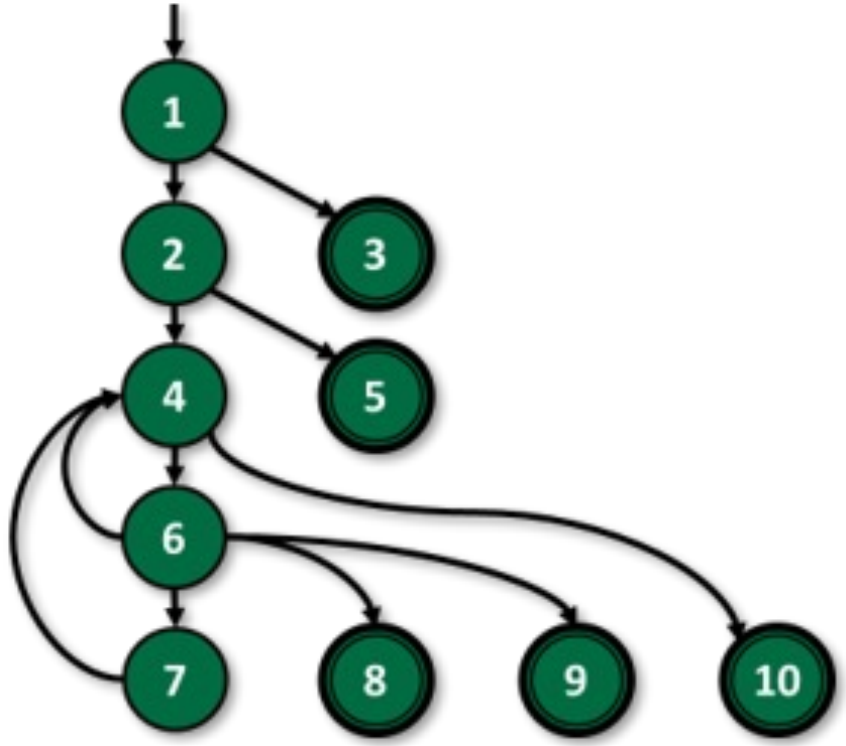
Develop prime path coverage test requirements:



Graph Coverage from Source Exercise

Develop prime path coverage test requirements:

{ (1,2,4,6,7),
(1,2,5), (1,3),
(1,2,4,10),
(1,2,4,6,8),
(1,2,4,6,9),
(4,6,4), (4,6,7,4),
(6,4,6), (6,4,10),
(6,7,4,6), (6,7,4,10),
(7,4,6,7),
(7,4,6,8),
(7,4,6,9) }



END OF EXERCISE 2