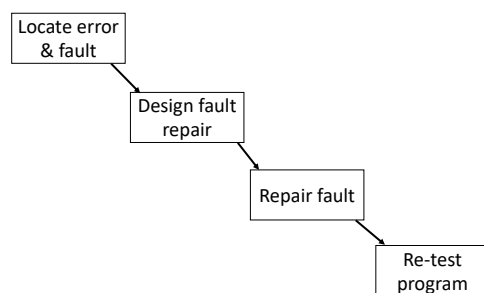# Testing and Debugging

Testing and Debugging

- Defect testing and debugging are distinct processes
- Defect testing is concerned with confirming the presence of errors
- Debugging is concerned with locating and repairing these errors
- Debugging involves formulating a hypothesis about program behavior then testing these hypotheses to find the system error

Debugging Activities

```
Locate error
& fault
      Design fault
      repair
            Repair fault
                  Re-test
                  program
```

Debugging: Issues

▪ observed bug and its cause may be geographically separated

▪ observed bug may disappear when another problem is fixed

▪ cause of bug may be due to human error that is hard to trace

▪ cause of bug may be due to assumptions that everyone believes

▪ observed bug may be intermittent because of a system or compiler error

Debugging: Approaches

- Brute Force – hack away at the code until it is found
- Backtracking – fine for small programs
- Cause elimination – hypothesise about what is causing the bug and input test data to check this