

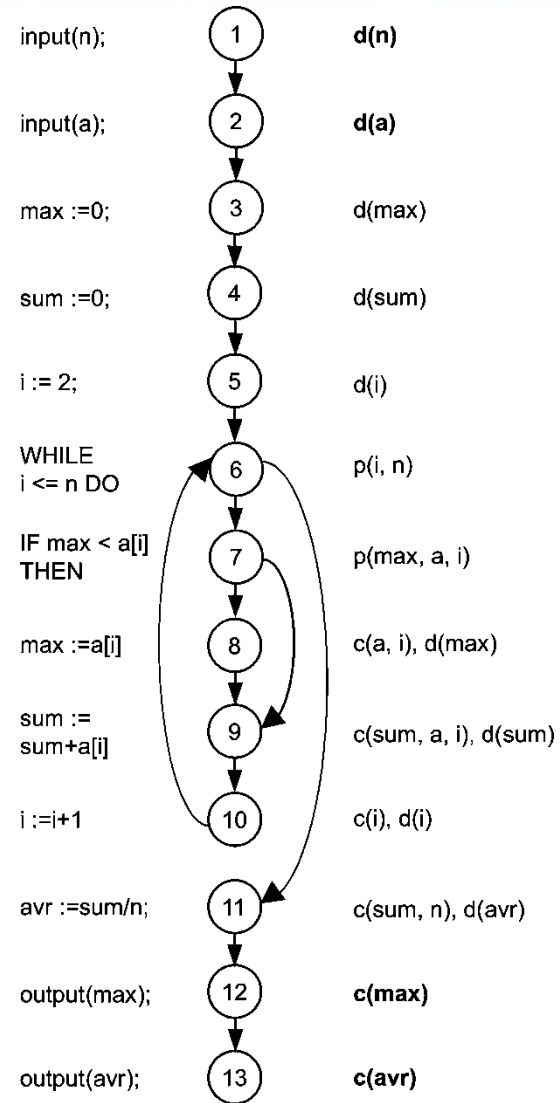
# sed

software engineering dependability

Software Quality Assurance  
Slicing

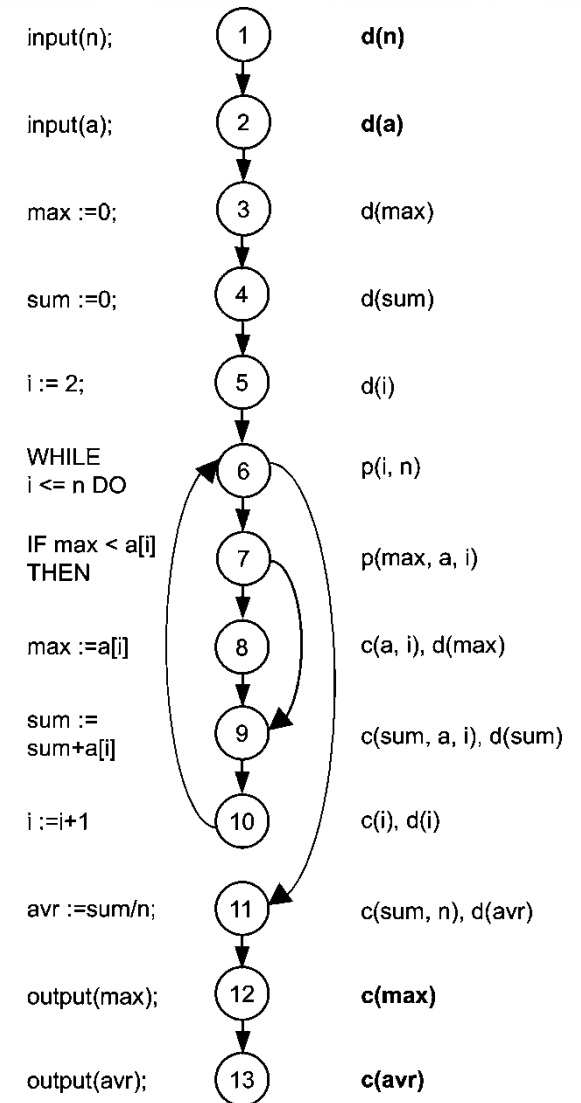
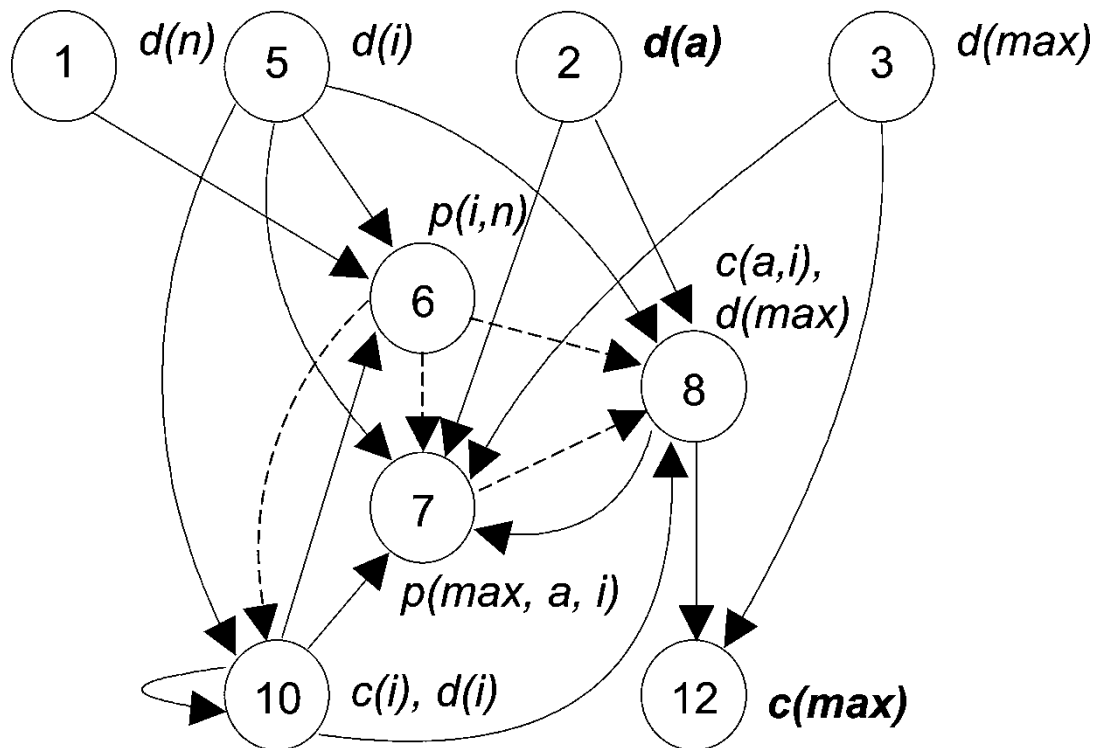
- Characteristics and Goals
- Static vs. Dynamic Slicing
- Static Slicing
- Dynamic Slicing

- Slicing is related to the extensively automatic provision of information about interactions in a program under observation. The operation mode is comparable to manual fault finding (debugging) after the occurrence of a failure. Debugging is also a typical application area for automatic slicing.
- A program slice in this context describes which instruction affects an observed value in which way. A slice will always be given in relation to an observed value at a certain position of the program. In a strict sense, this is the definition of so-called backward slicing. There is also forward slicing. Such a slicing shows which instruction is affected by an observed value in which way.

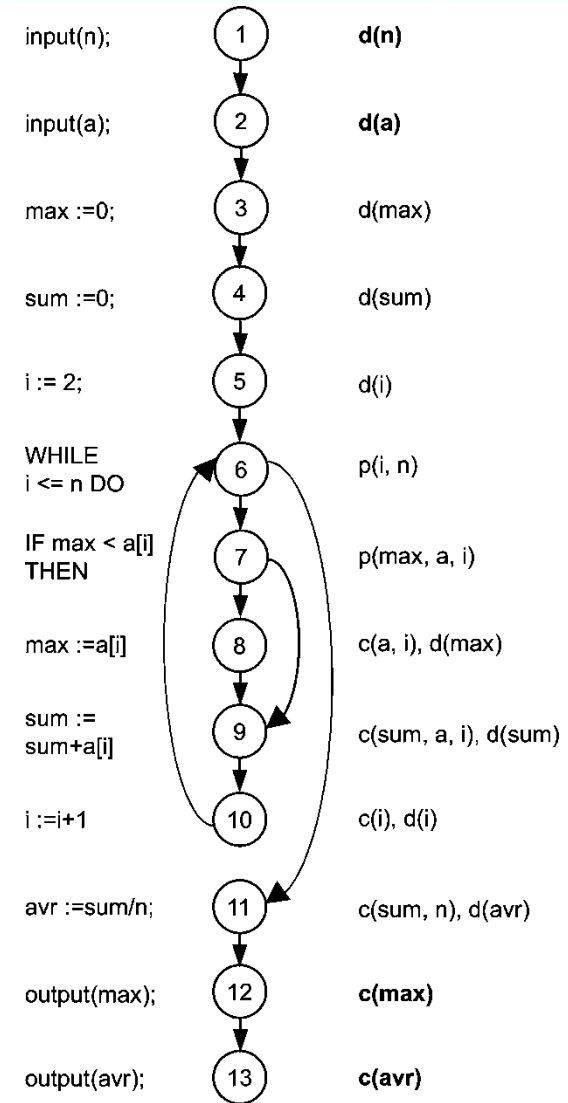
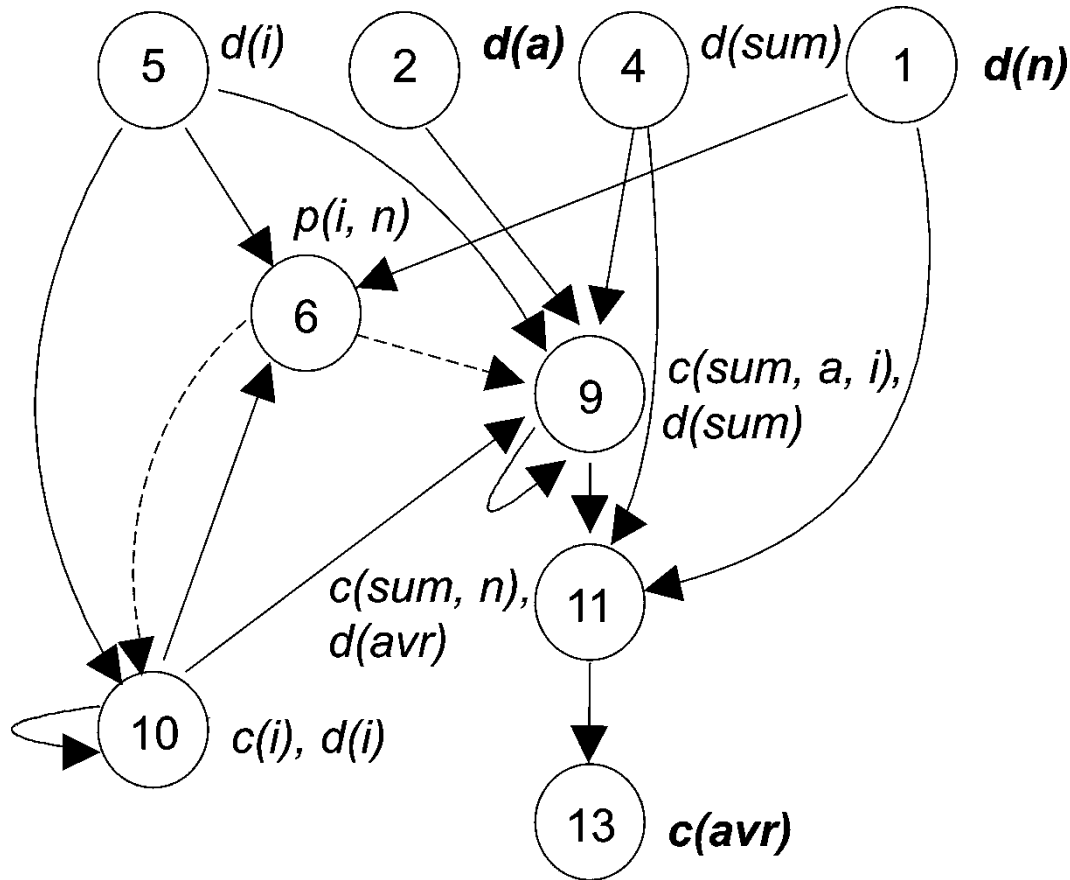


- There exist static und dynamic slicing.
- **Static slicing** can be executed in the sense of static analysis. It is not necessary to execute the program or to make assumptions about the values of variables. This is critical if dependencies only result from the concrete value of a datum. Such situations exist, e.g., in conjunction with the application of pointers or fields.
- A remedy is offered by so-called **dynamic slicing**.

- Slice to *max*



- Slice to *avr*



input(n);

input(a);

max := 0;

sum := 0;

i := 2;

WHILE  
i <= n DO

IF max < a[i]  
THEN

max := a[i]

sum :=  
sum + a[i]

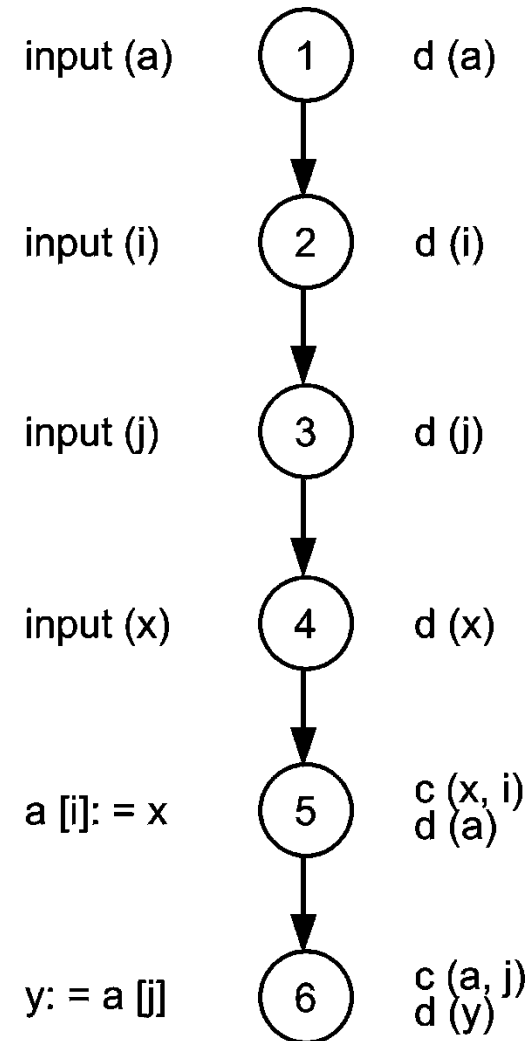
i := i + 1

avr := sum / n;

output(max);

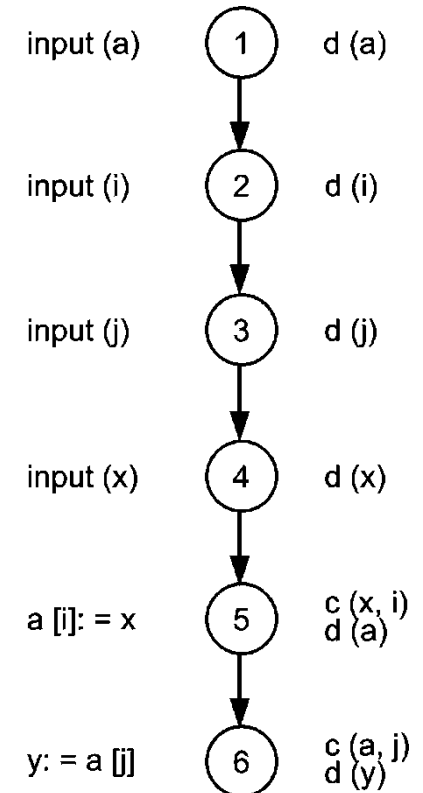
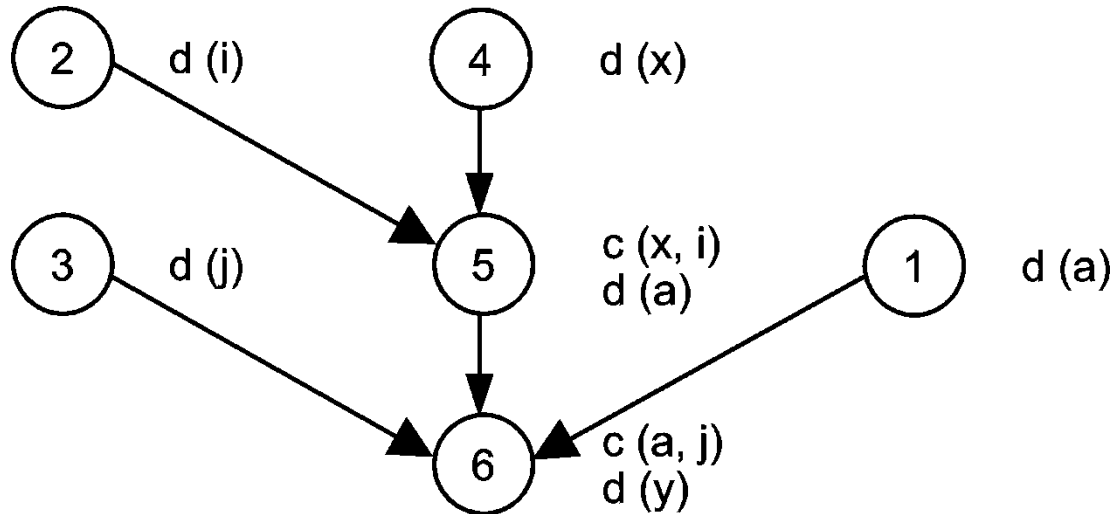
output(avr);

- A common drawback of all static procedures is that the information that is first generated at the execution time cannot be considered completely.

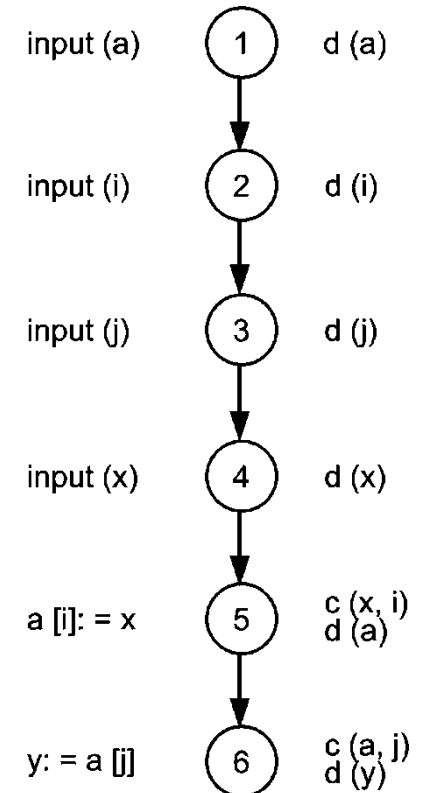
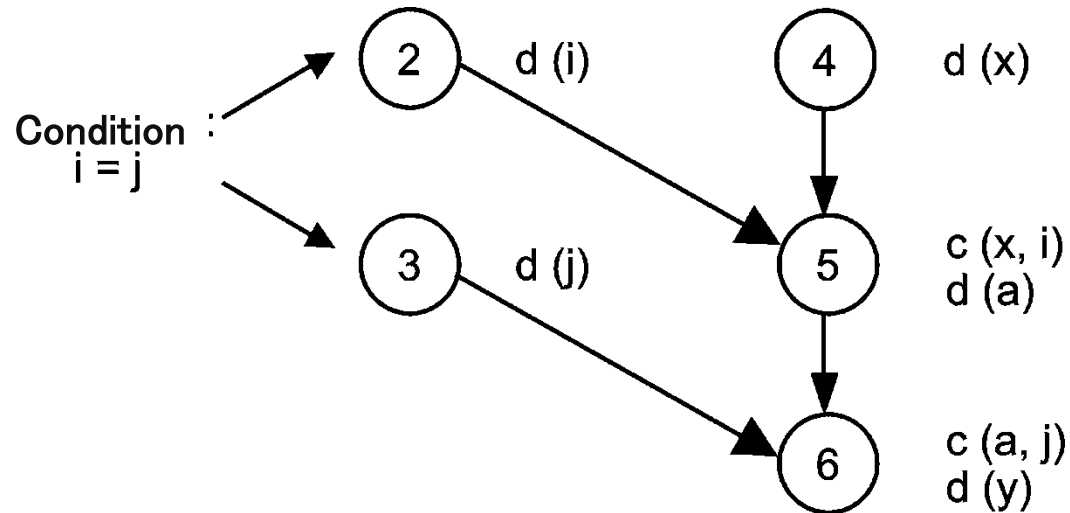




- Static slice for  $y$  in node 6 (is too complicated for every concrete situation)



- Dynamic slice for  $y$  in node 6 with  $i = j$



- Dynamic slice for  $y$  in node 6 with  $i$  not equaling  $j$

