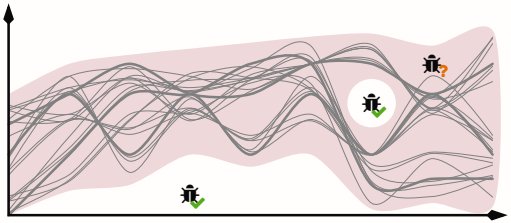


Static Program Analysis

inferring constraints without executing

Analyzing Programs

```
public static void main(String[] args) {
   int a = 1;                              a ∈ {1}
   double r = Math.random() * 10;          r ∈ [0..10)
   if (r > 5) {
     a = 2;                                a ∈ {2}
   }
   System.out.println(a);                  a ∈ {1,2}
}
```

Valid? Ok? Safe?

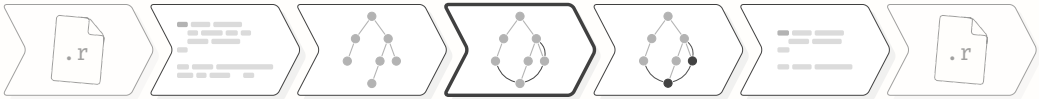
Program Slicing

Reducing a program to a relevant subset

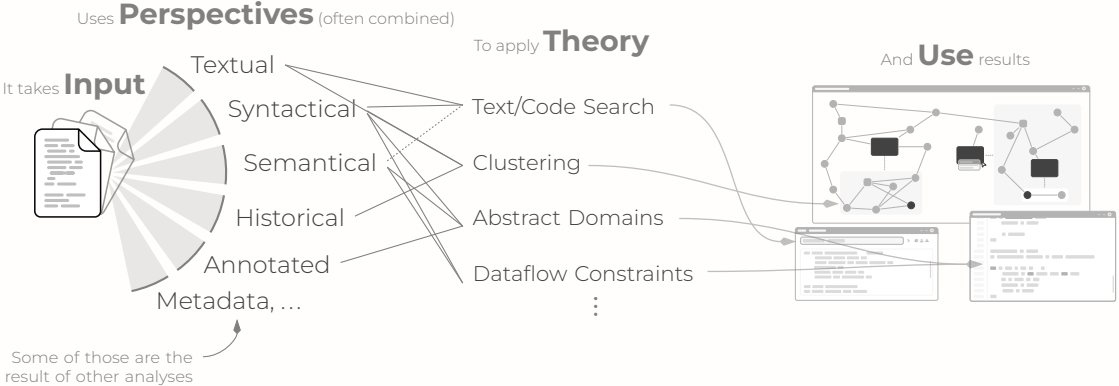
```
1  sum  ← 0
2  prod ← 1
3  n    ← 10
4
5  for(i in 1:(n-1)) {
6     sum  ← sum + i
7     prod ← prod * i
8  }
9
10 cat("Sum:", sum, "\n")
11 cat("Product:", prod, "\n")
```

slice(10, **sum**)

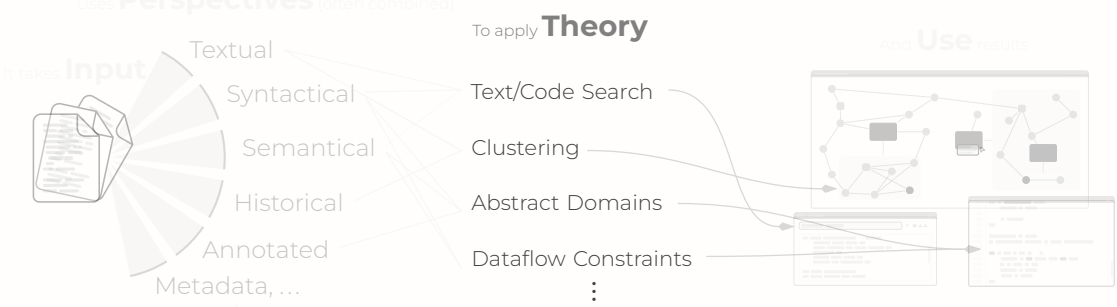
```
sum  ← 0
prod ← 1
n    ← 10

for(i in 1:(n-1)) {
   sum  ← sum + i
   prod ← prod * i
}

cat("Sum:", sum, "\n")
cat("Product:", prod, "\n")
```



What does a Program Analyzer do?



What is the goal of the bachelor seminar?



- We want to explore the current state of research in static program analysis

Static Program Analysis

Bachelor Seminar

- Explore the world of static program analysis
  - Abstract Interpretation,
  - Dataflow Analysis,
  - Control Flow Analysis, and more

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