Calculations with environments
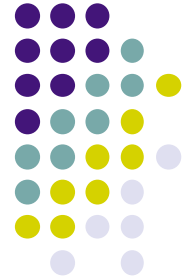
- The abstract machine does two kinds of calculations with environments

- Adjunction: $E_2 = E_1 + \{X \rightarrow y\}$
  - Add a pair (identifier→variable) to an environment
  - Overrides the same identifier in E_1 (if it exists)
  - Needed for **local** <x> **in** <s> **end** (and others)

- Restriction: $E_C = E_{|\{X,Y,Z\}}$
  - Limit identifiers in an environment to a given set
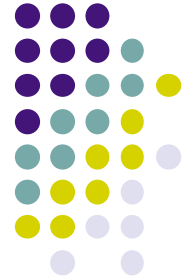 - Needed to calculate the contextual environment

Adjunction

- For a **local** instruction

```
local X in (E₁)
    X=1
    local X in (E₂)
        X=2
        {Browse X}
    end
end
```

- E_1 = {Browse → b, X → x}
- E_2 = E_1 + {X → y} = {Browse → b, X → y}

Restriction

- For a procedure declaration

  local A B C AddB **in**
      A=1 B=2 C=3 (E)
      fun {AddB X} (E_C: contextual environment)
          X+B
      end
  end

- E = {A $\rightarrow$ a, B $\rightarrow$ b, C $\rightarrow$ c, AddB $\rightarrow$ a' }
- E_C = $E_{|\{B\}}$ = {B $\rightarrow$ b}