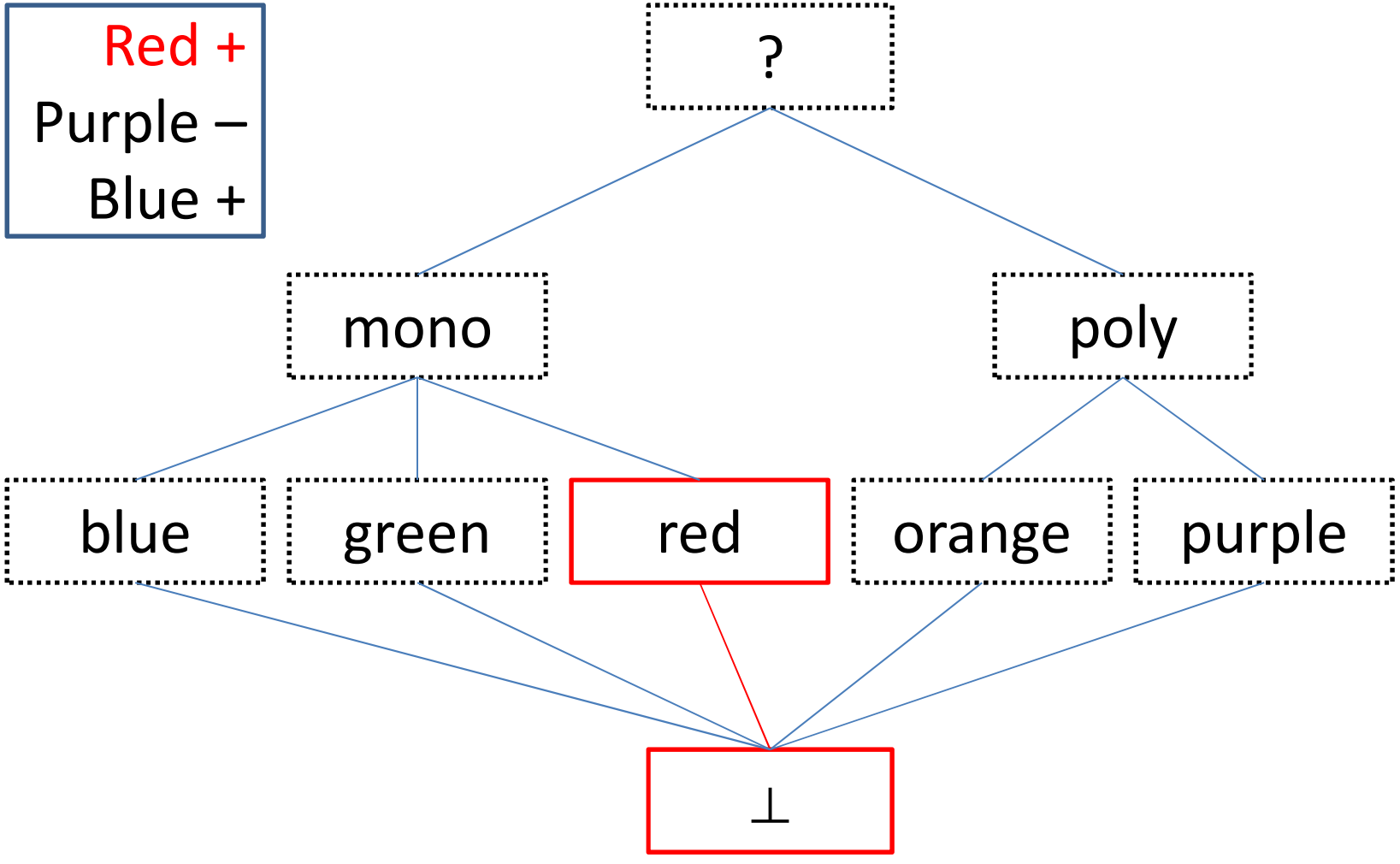
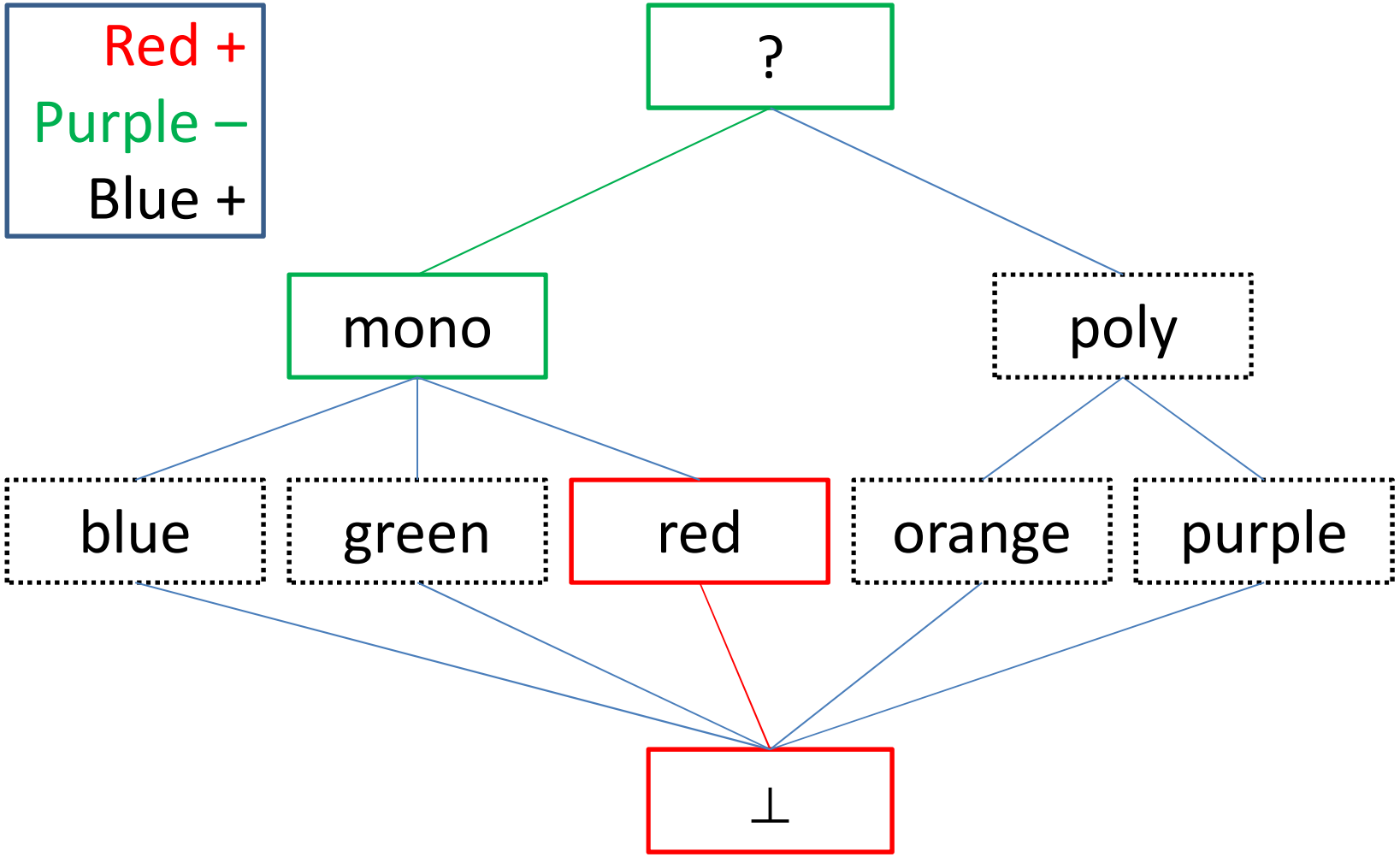
# Exercises: Artificial Intelligence

Version Spaces: Colors

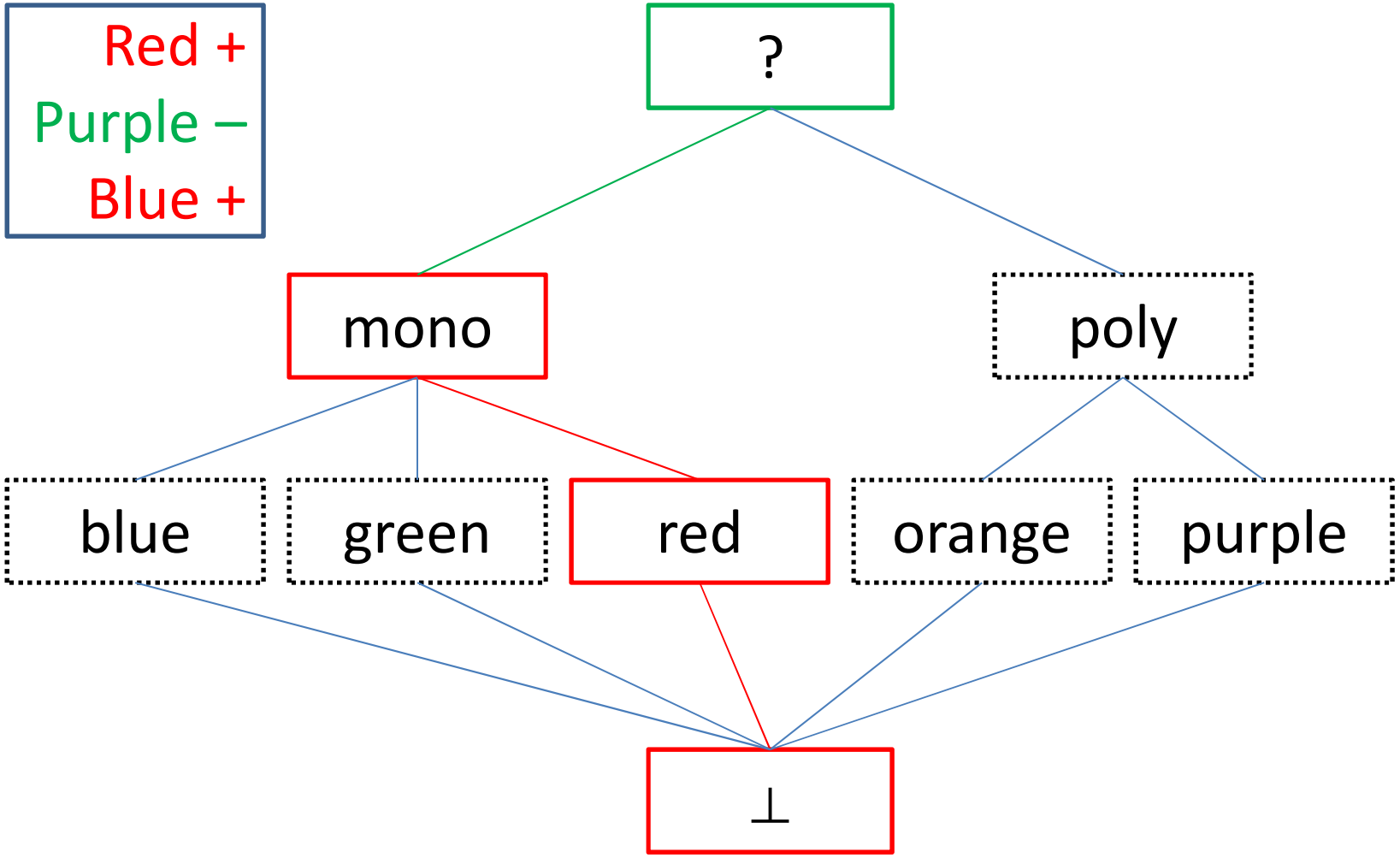
# Version-Spaces Algorithm



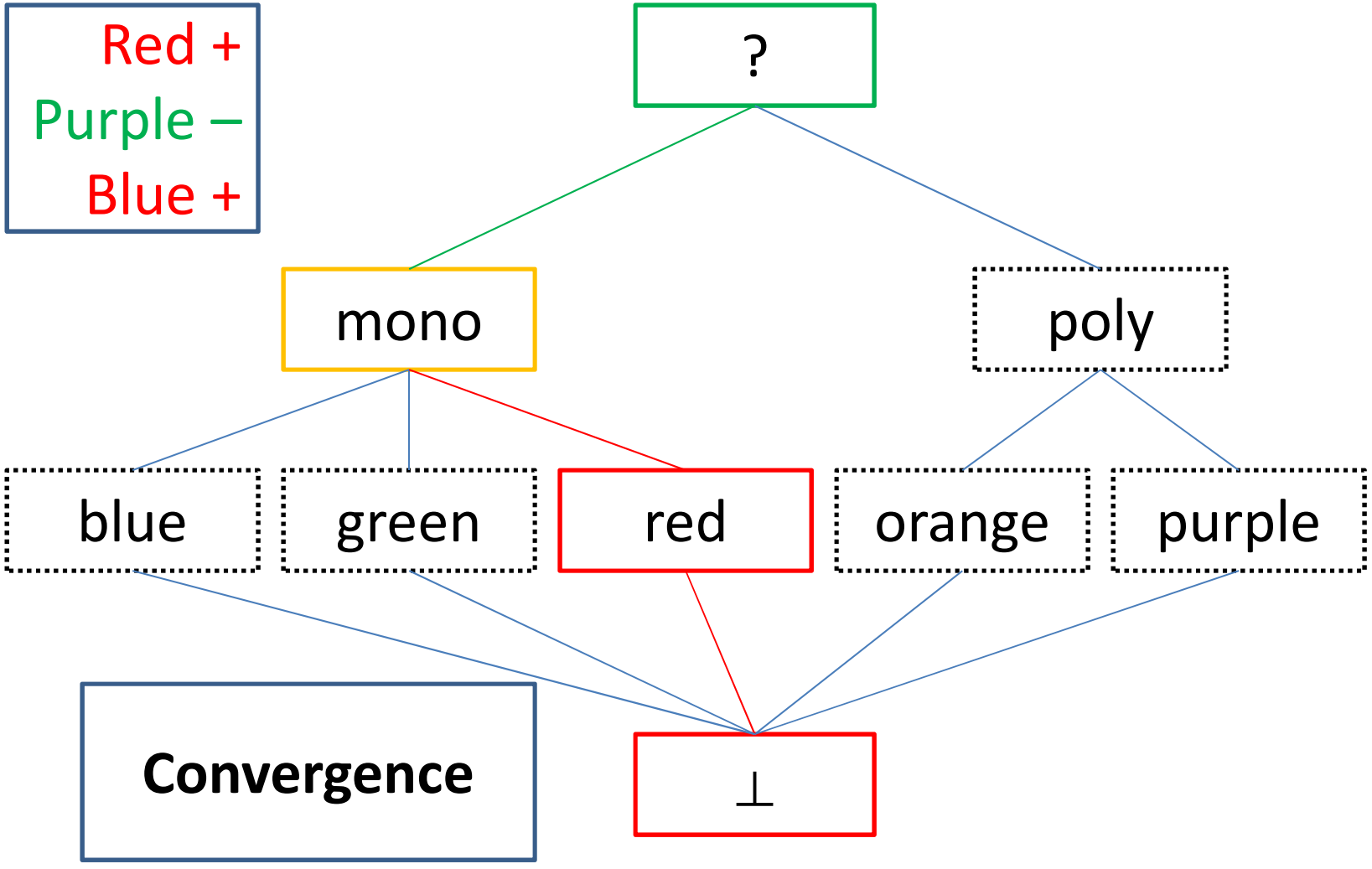
# Version-Spaces Algorithm



# Version-Spaces Algorithm



# Version-Spaces Algorithm



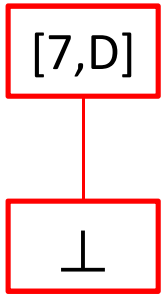
# Exercises: Artificial Intelligence

Version Spaces: Playing Cards

# Version-Spaces Algorithm

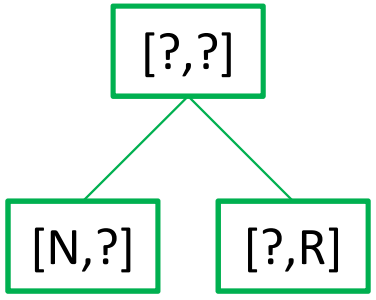
**[7,D] +**
**[A,C] –**
**[Q,H] –**
**[9,H] +**
**[8,C] –**

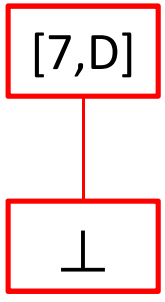
[?,?]



# Version-Spaces Algorithm

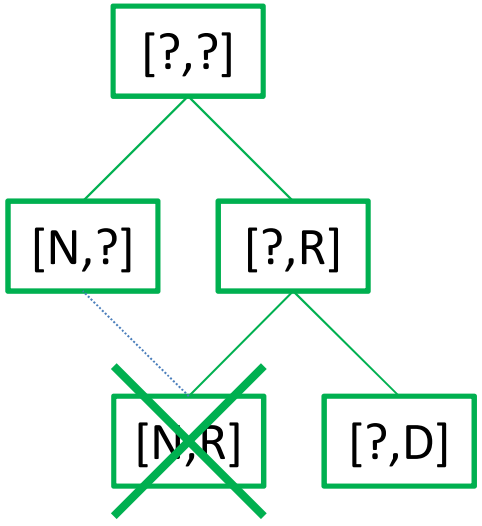
**[7,D] +**
**[A,C] –**
**[Q,H] –**
**[9,H] +**
**[8,C] –**



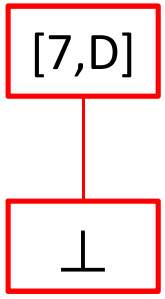



# Version-Spaces Algorithm

[7,D] +
[A,C] –
[Q,H] –
[9,H] +
[8,C] –

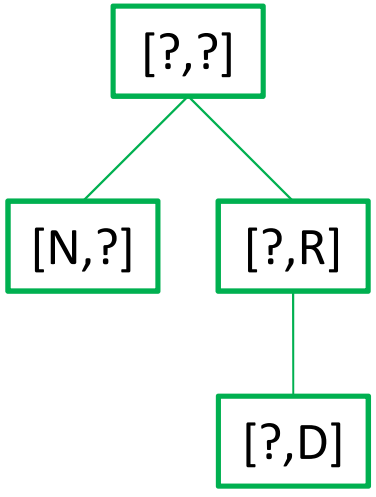


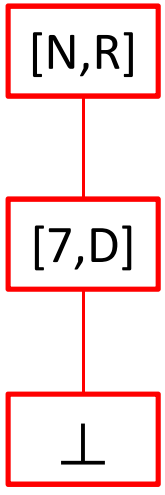

**Redundant Hypotheses**



# Version-Spaces Algorithm

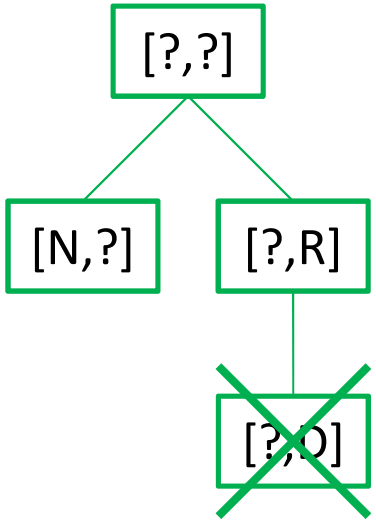
[7,D] +
[A,C] –
[Q,H] –
[9,H] +
[8,C] –

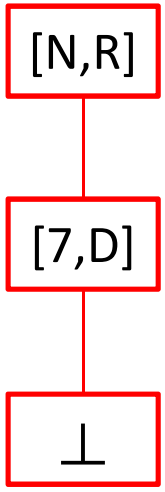


# Version-Spaces Algorithm

**[7,D] +**
**[A,C] –**
**[Q,H] –**
**[9,H] +**
**[8,C] –**

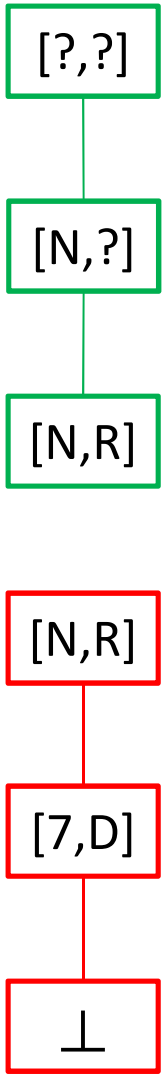



**does not cover last positive example**

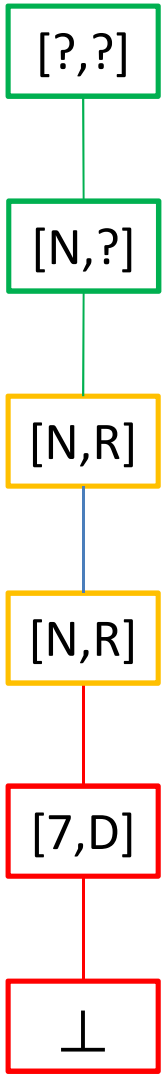
# Version-Spaces Algorithm

**[7,D] +**
**[A,C] –**
**[Q,H] –**
**[9,H] +**
**[8,C] –**



# Version-Spaces Algorithm

**[7,D] +**
**[A,C] –**
**[Q,H] –**
**[9,H] +**
**[8,C] –**

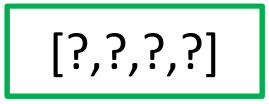


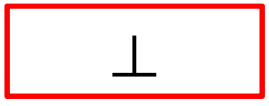

**Convergence**

# Exercises: Artificial Intelligence

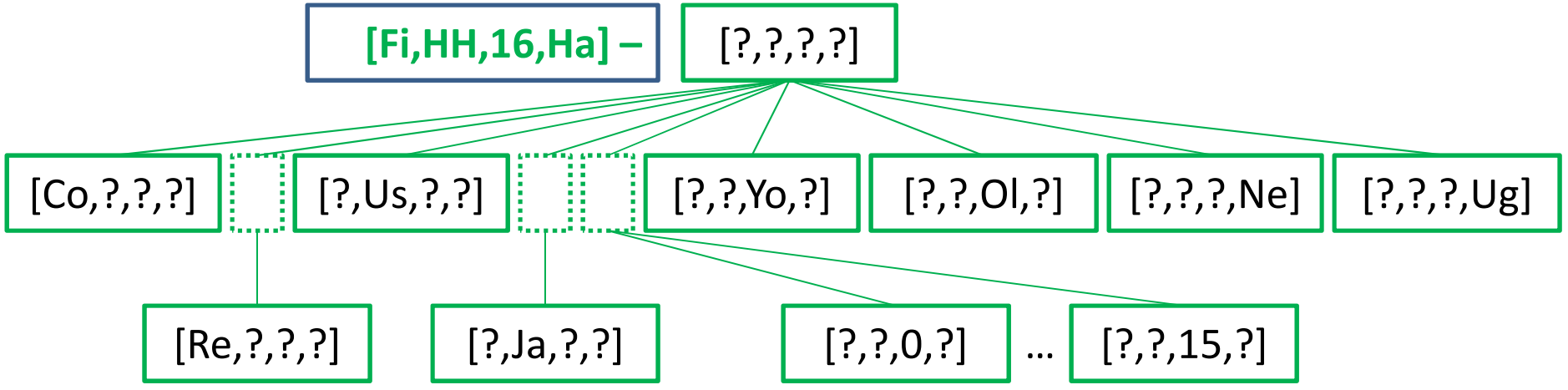
Version Spaces: Ex-exam

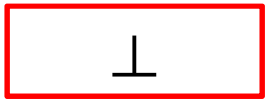
# Version-Spaces Algorithm



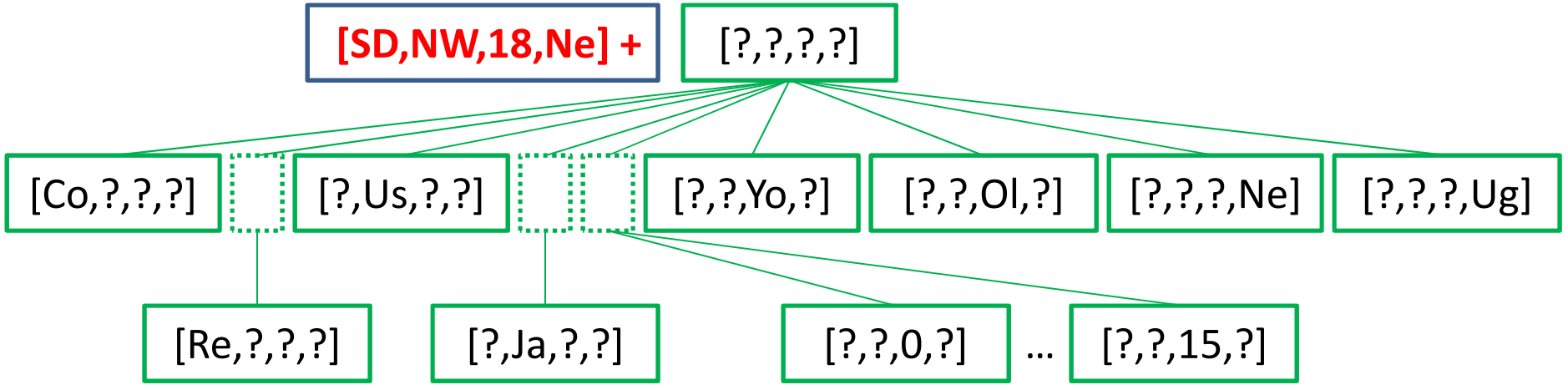



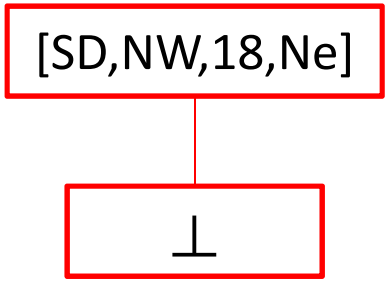
# Version-Spaces Algorithm



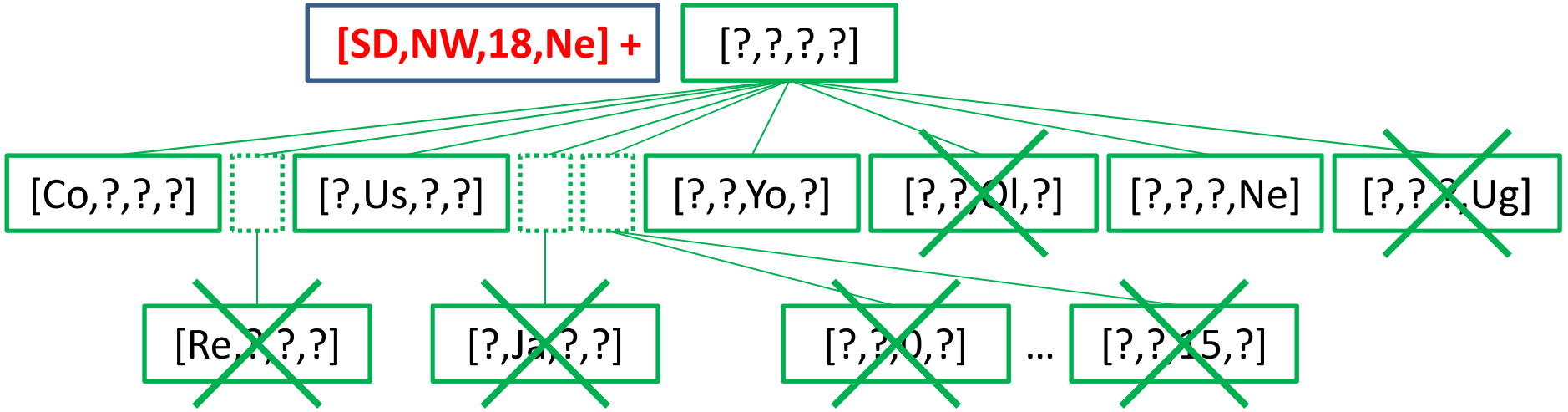



# Version-Spaces Algorithm

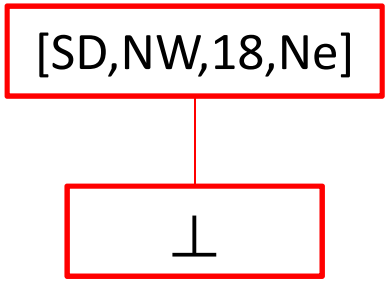


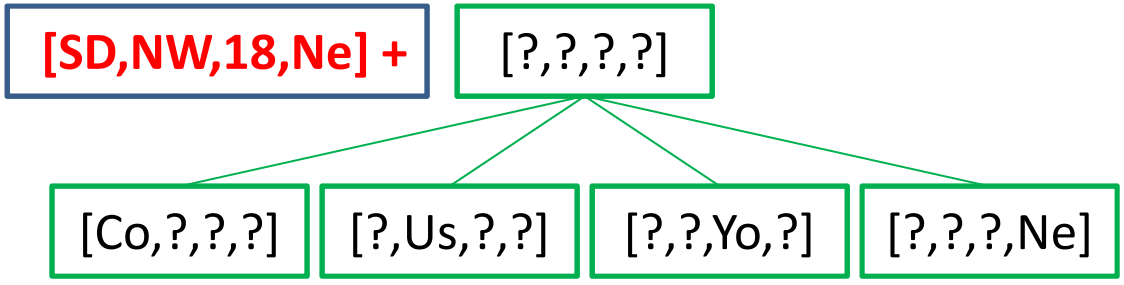
# Version-Spaces Algorithm

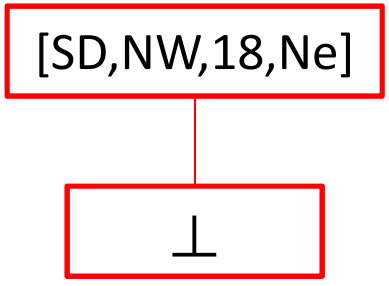



**19 out of 23 do not cover last positive example**

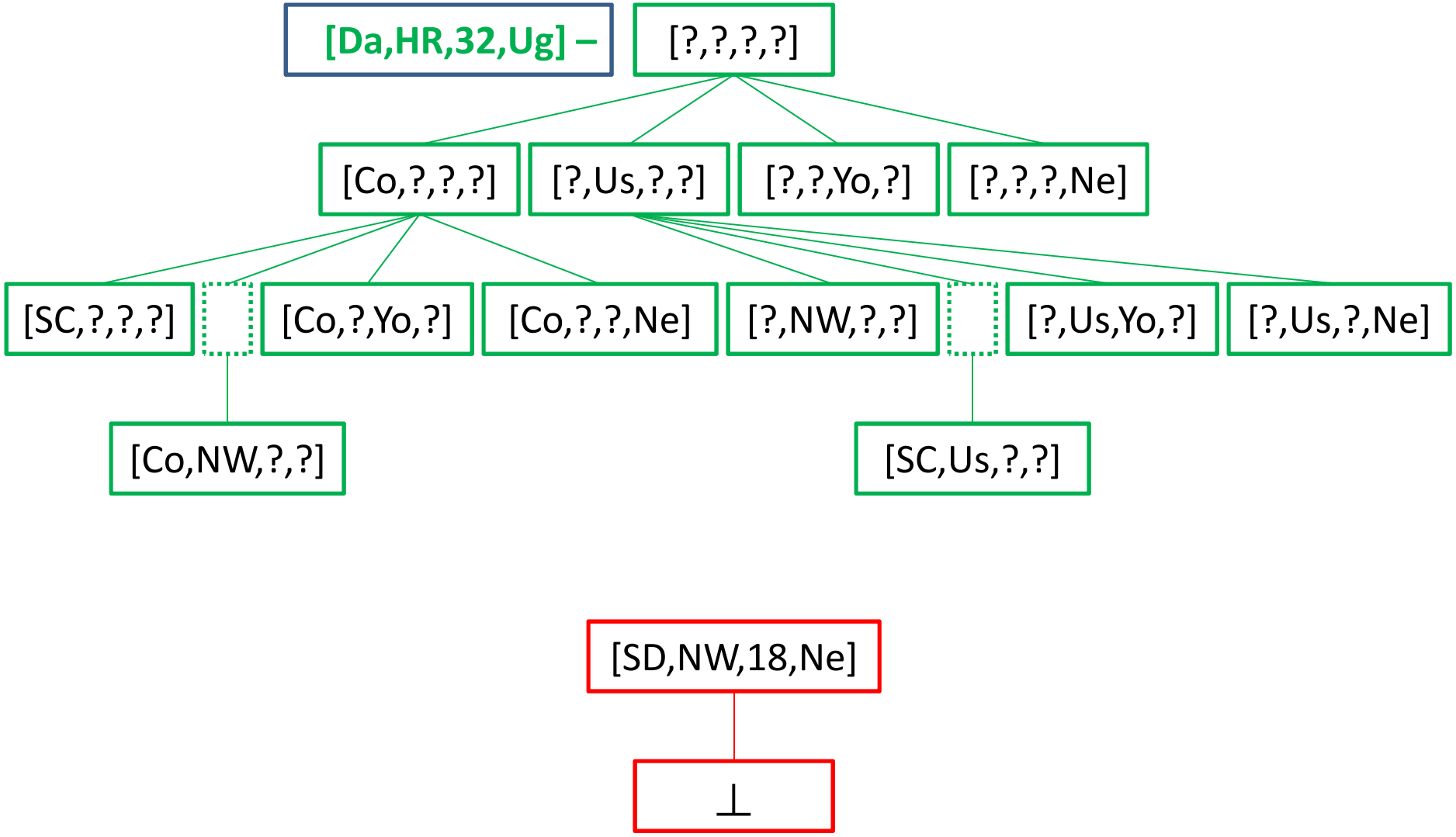


# Version-Spaces Algorithm

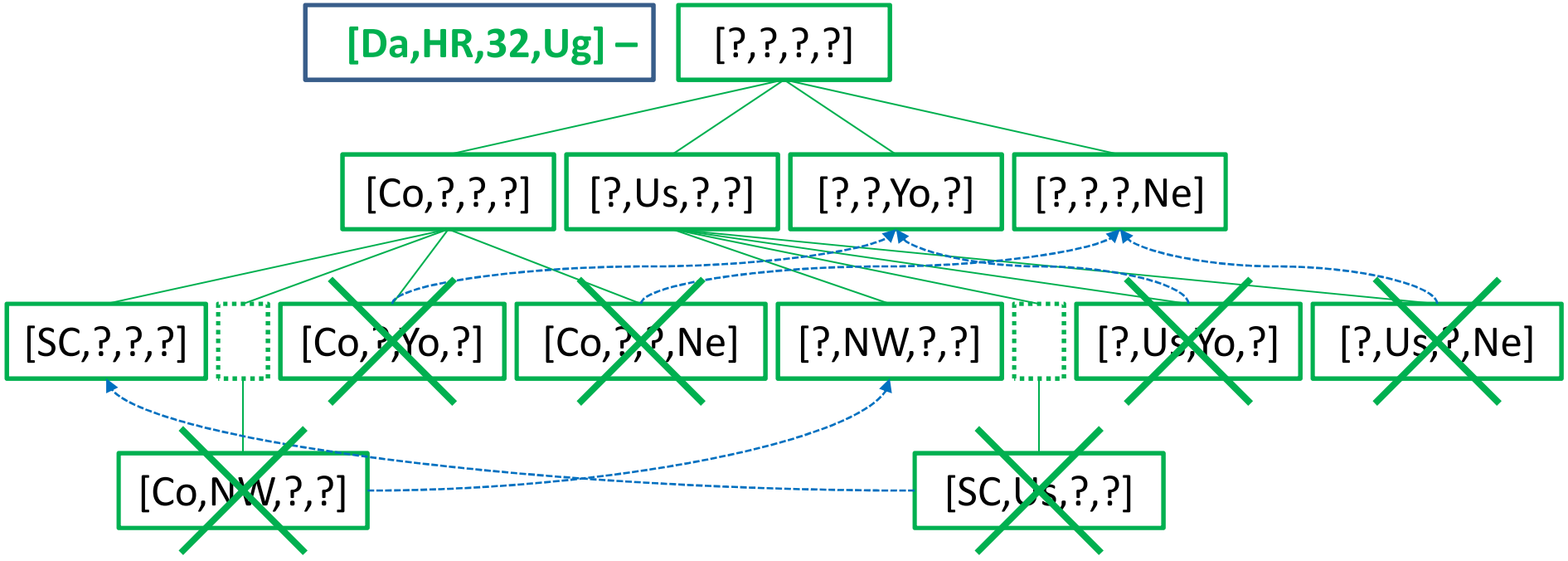


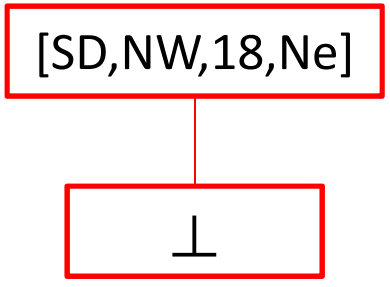
# Version-Spaces Algorithm



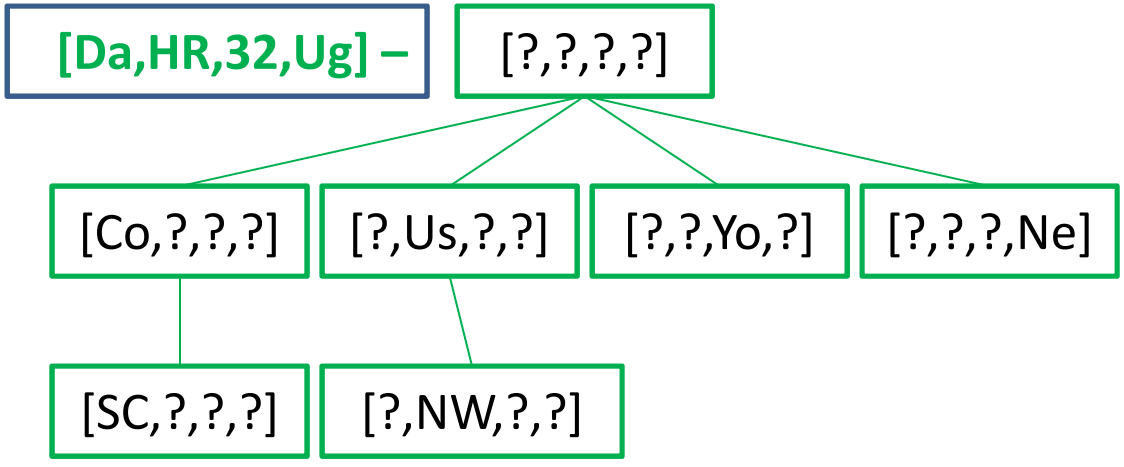
# Version-Spaces Algorithm

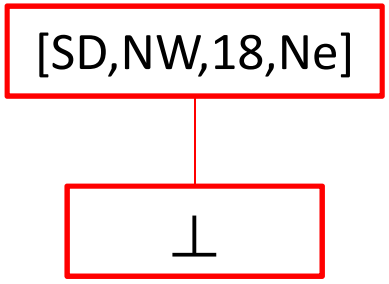



**Redundant hypotheses**

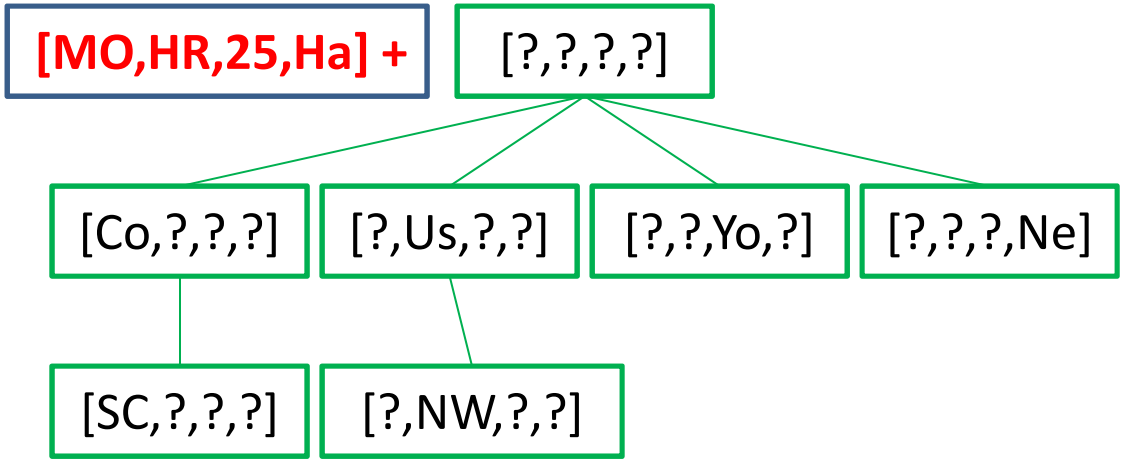


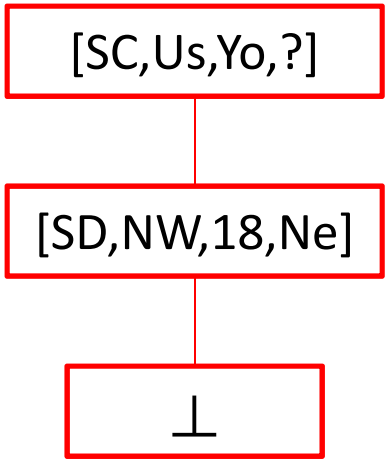
# Version-Spaces Algorithm



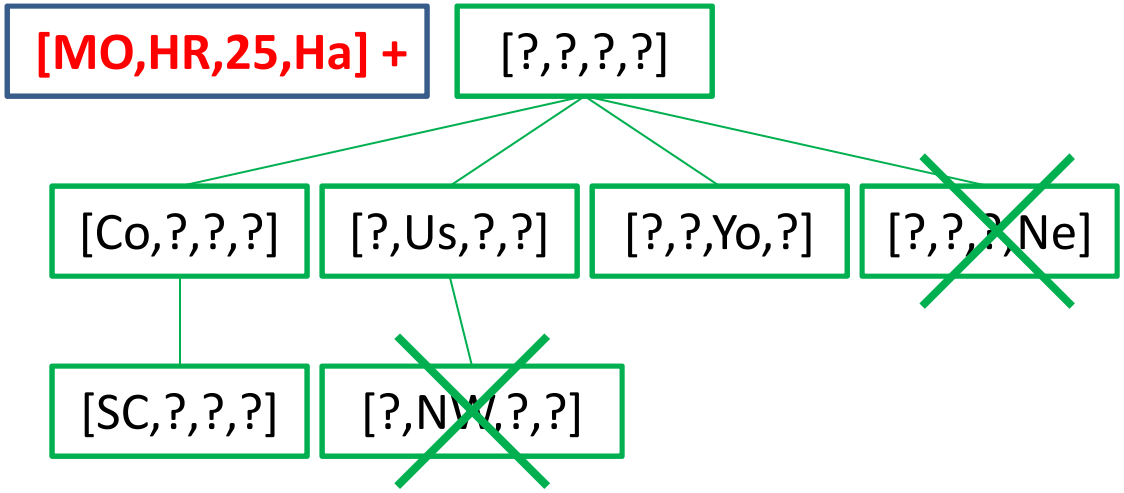



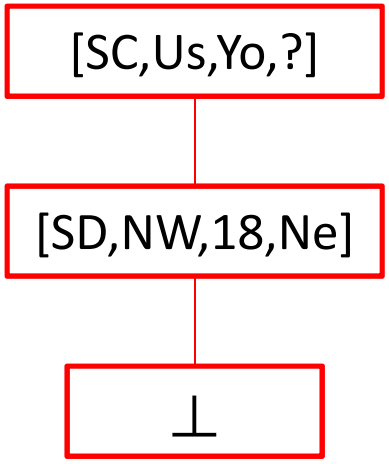
# Version-Spaces Algorithm



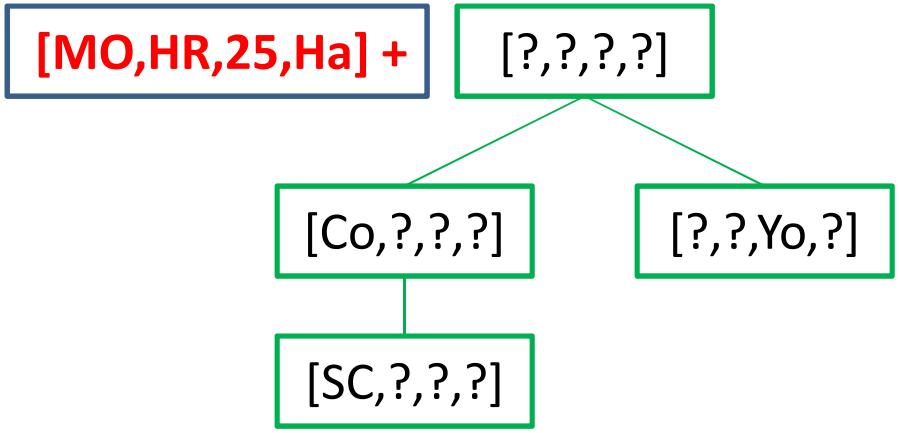
# Version-Spaces Algorithm

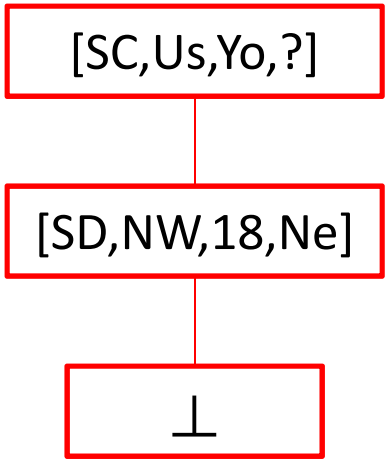


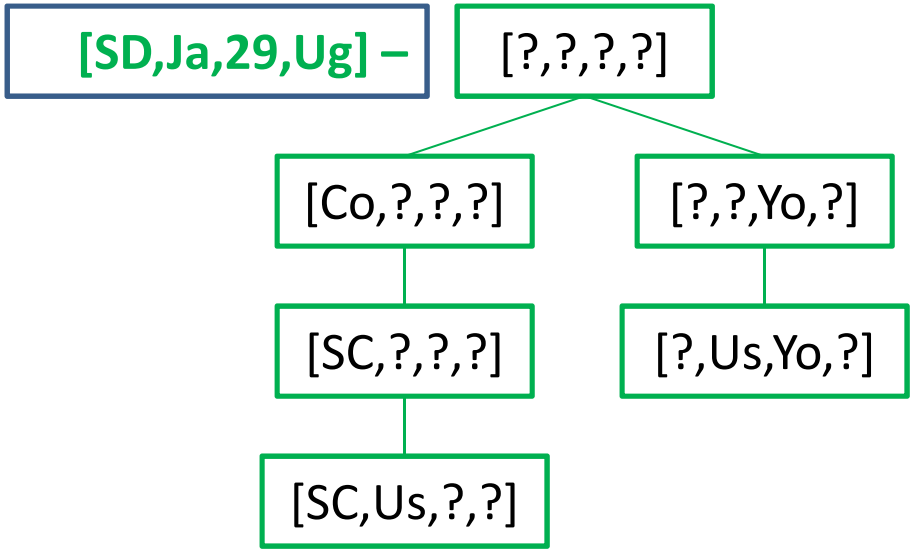

**2 out of 4 do not cover last positive example**

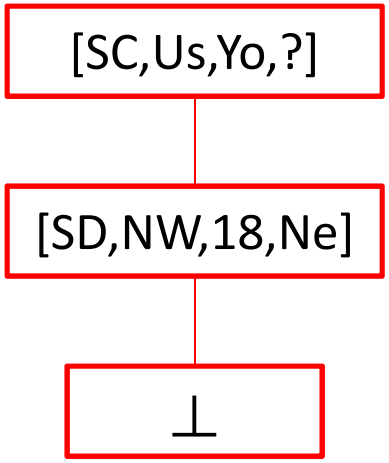
# Version-Spaces Algorithm



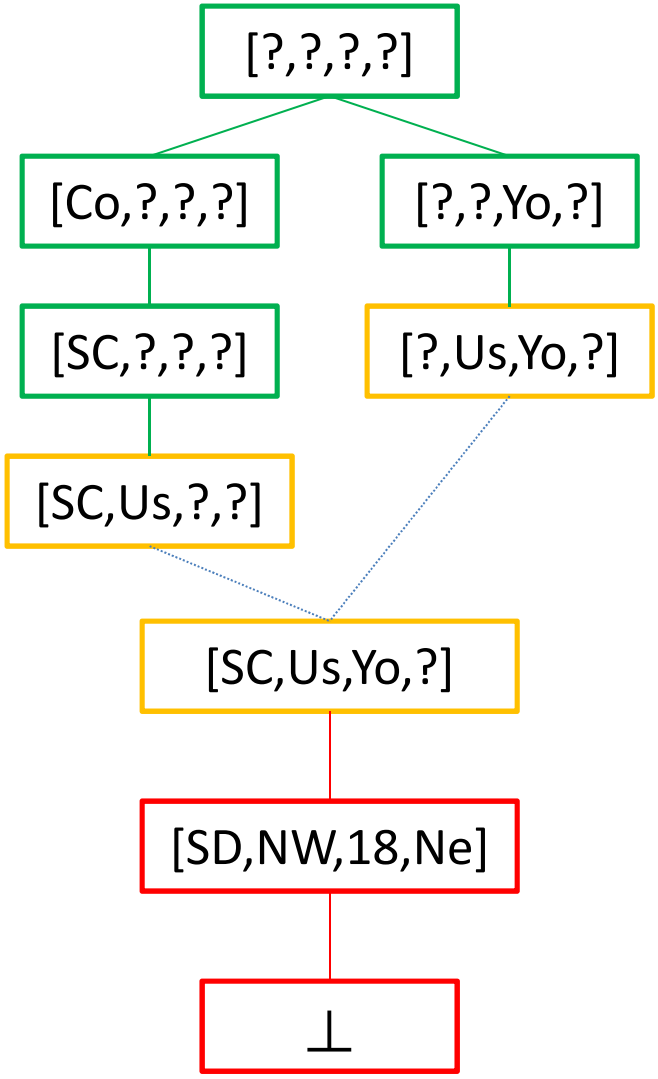



# Version-Spaces Algorithm



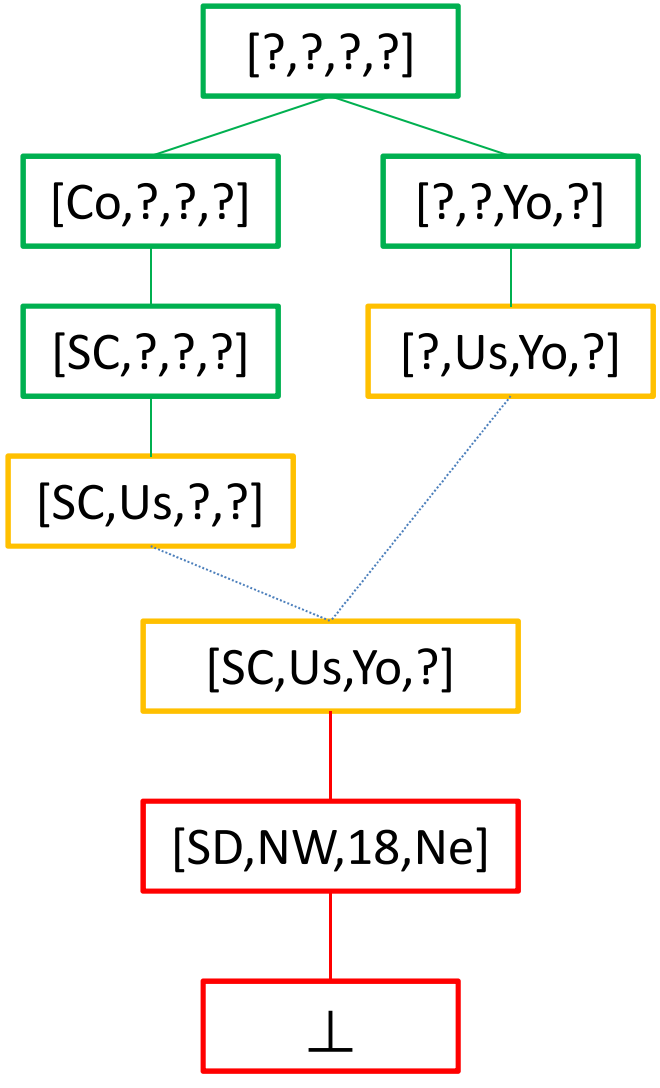



# Version-Spaces Algorithm



# Using the result

- [MO,HR,32,Ha]: **Maybe**
  - More Specific than [SC,Us,?,?]
  - Not more Specific than [SC,Us,Yo,?]
- [SD,HH,18,Ne]: **NO**
  - Not More Specific than [SC,Us,?,?]
  - Not More Specific than [?,Us,Yo,?]
- [Da,NW,22,Ug]: **Maybe**
  - More Specific than [?,Us,Yo,?]
  - Not more Specific than [SC,Us,Yo,?]



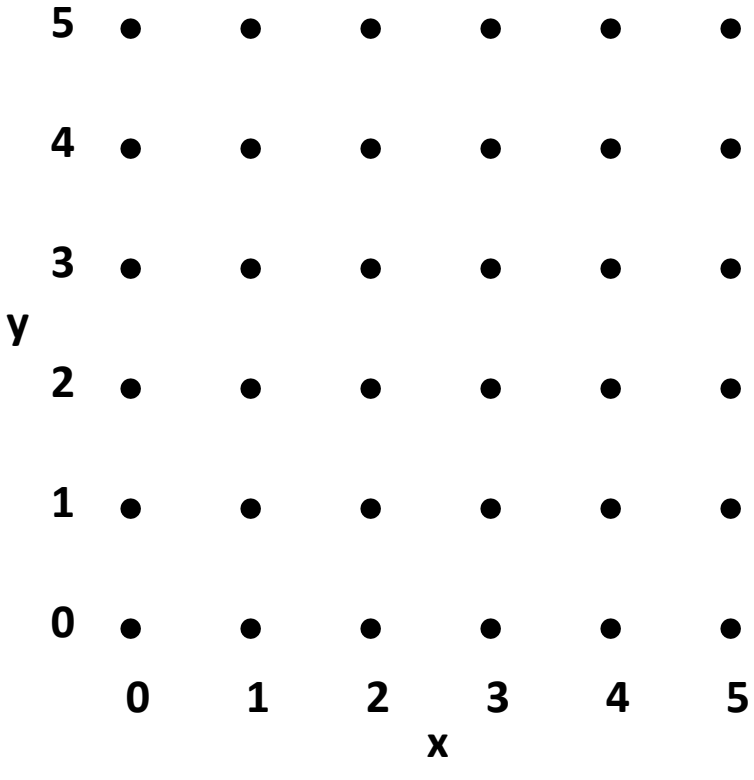
# Exercises: Artificial Intelligence

Version Spaces: Computer Screen

# Version-Spaces Algorithm

**G = {[((0,0),5),white]}**

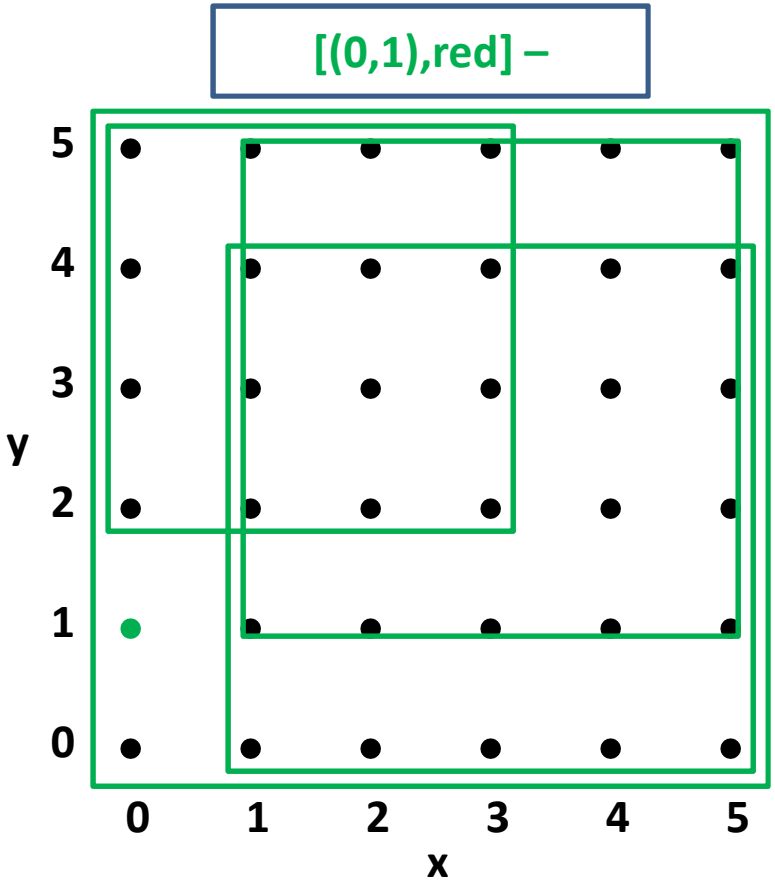
**S = {⊥}**



# Version-Spaces Algorithm

**G = {[((0,0),5),white]}**

**S = {⊥}**

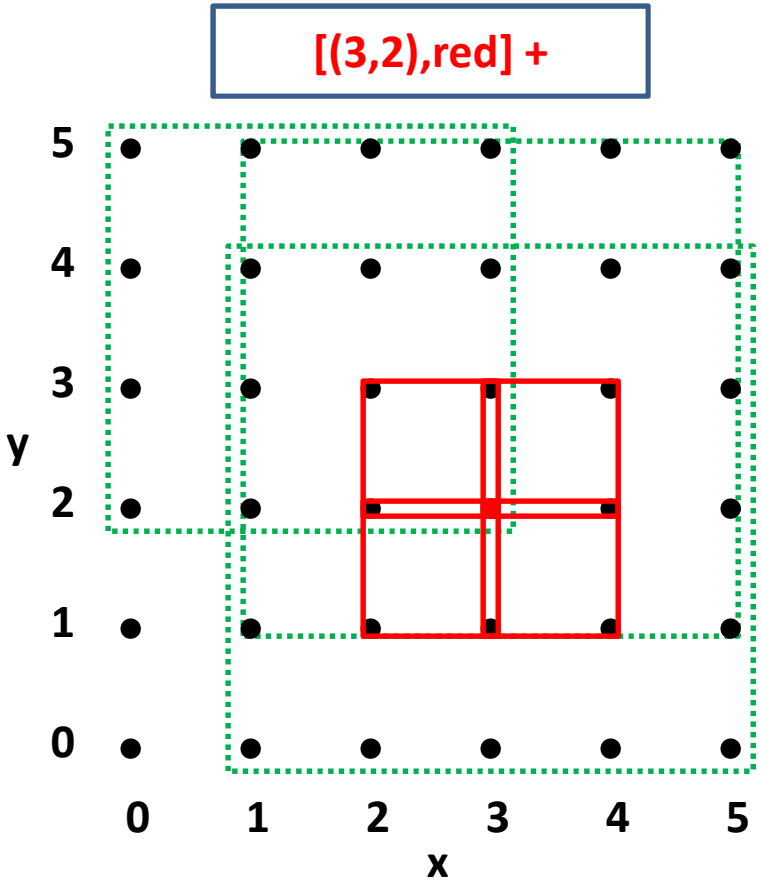



G = {
[((0,2),3),white],
[((1,0),4),white],
[((1,1),4),white],
[((0,0),5),cyan]
}
Redundant:
[((0,0),5),green]
[((0,0),5),blue]
S = {⊥}

# Version-Spaces Algorithm

**G = {[((0,2),3),white],[((1,0),4),white],[((1,1),4),white],[((0,0),5),cyan]}**

**S = {⊥}**




G = {

[((0,2),3),white],

[((1,0),4),white],

[((1,1),4),white]

}

Removed:

[((0,0),5),cyan]

S = {

[((2,1),1),red],

[((2,2),1),red],

[((3,1),1),red],

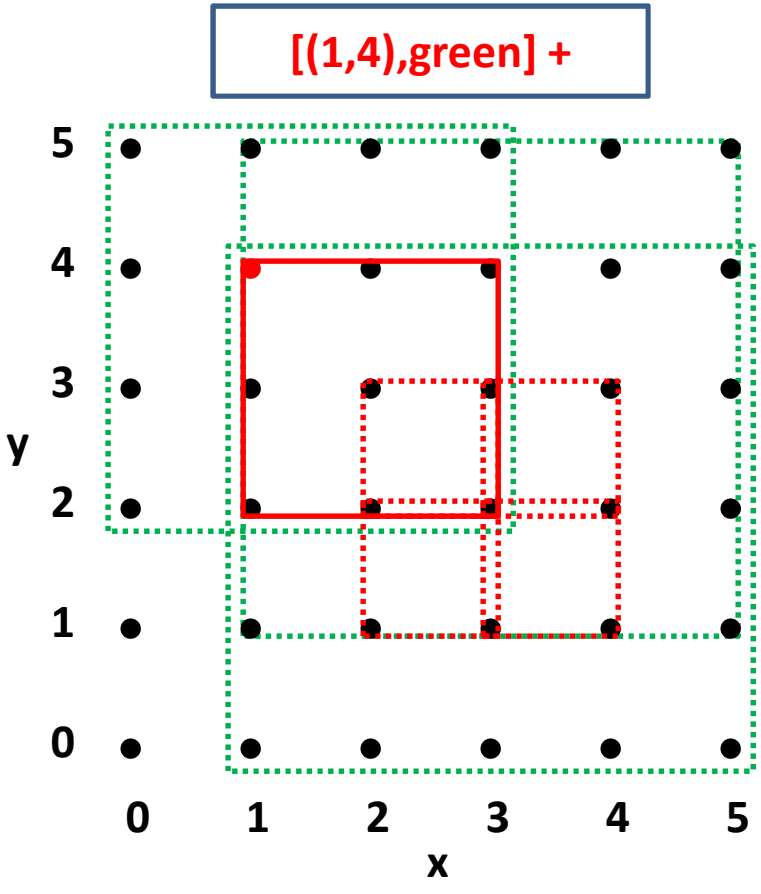
[((3,2),1),red]

}

# Version-Spaces Algorithm

**G = {[((0,2),3),white],[((1,0),4),white],[((1,1),4),white]}**

**S = {[((2,1),1),red],[((2,2),1),red],[((3,1),1),red],[((3,2),1),red]}**




G = {

[((0,2),3),white],
[((1,0),4),white],
[((1,1),4),white]

}

S = {

[((1,2),2),yellow]

}

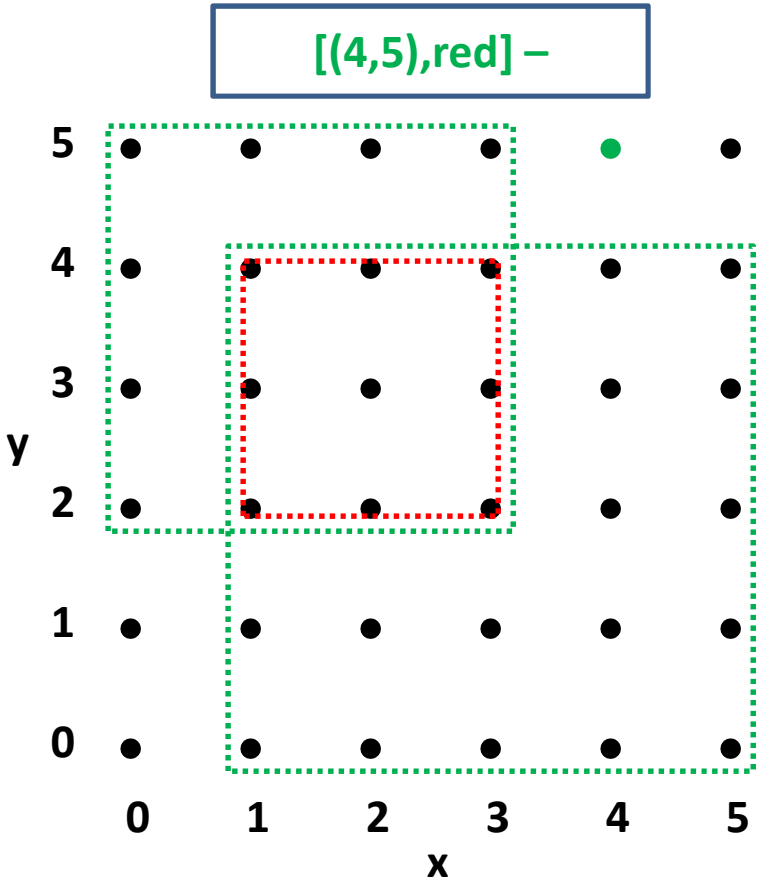
Redundant:

[((0,2),3),yellow]
[((1,2),3),yellow]
[((1,1),3),yellow]
[((1,1),4),yellow]
[((1,0),4),yellow]

# Version-Spaces Algorithm

**G = {[((0,2),3),white],[((1,0),4),white],[((1,1),4),white]}**

**S = {[((1,2),2),yellow]}**

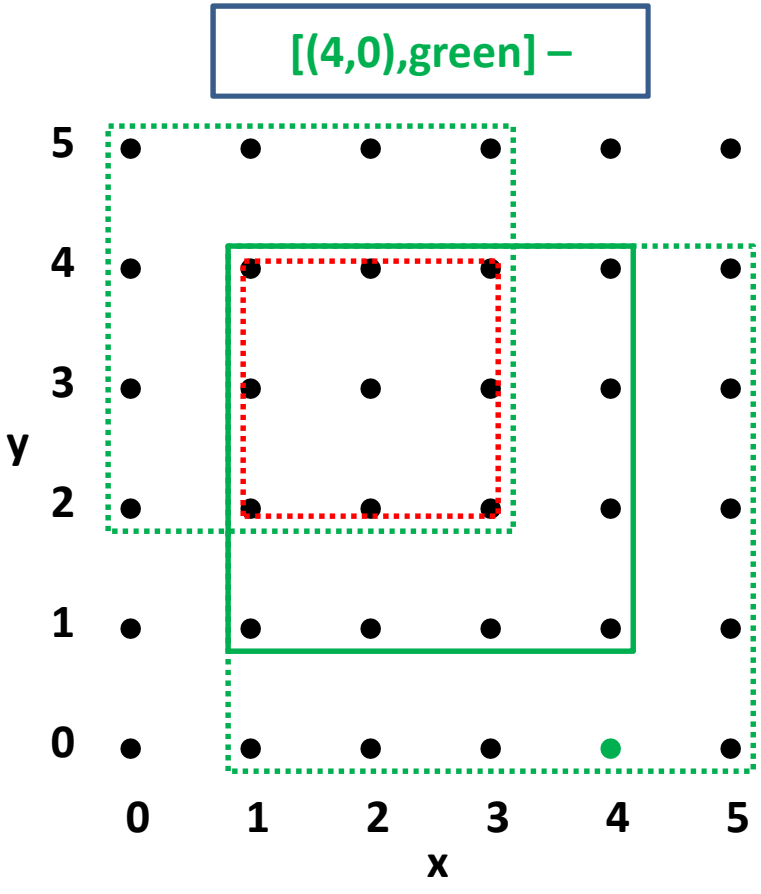



G = {
[((0,2),3),white],
[((1,0),4),white]
}
Redundant:
[((1,1),3),white]
Others don't generalize S
S = {
[((1,2),2),yellow]
}

# Version-Spaces Algorithm

**G = {[((0,2),3),white],[((1,0),4),white]}**

**S = {[((1,2),2),yellow]}**

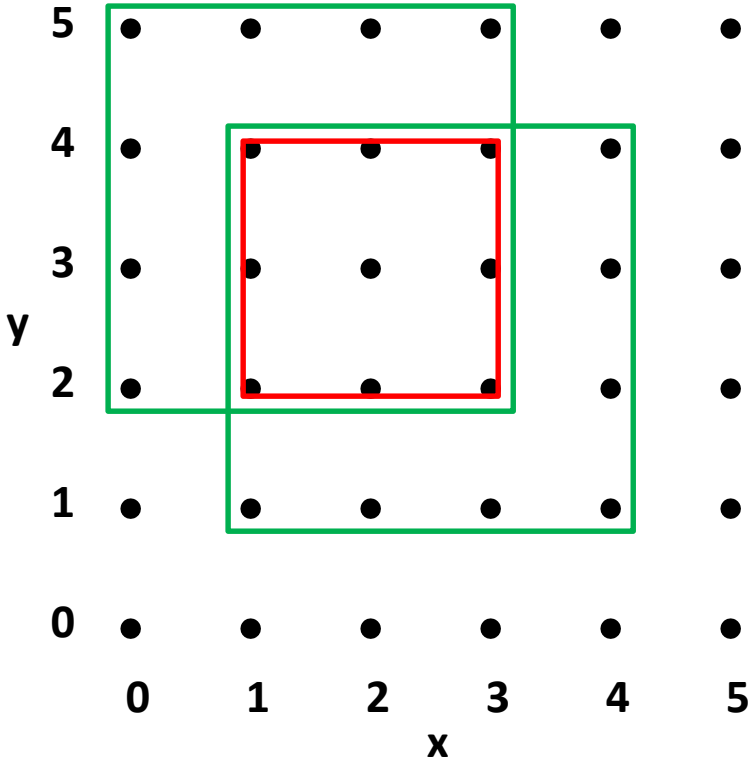



G = {
[((0,2),3),white],
[((1,1),3),white]
}
Others don't generalize S
S = {
[((1,2),2),yellow]
}

# Version-Spaces Algorithm

**G = {[((0,2),3),white],[((1,1),3),white]}**

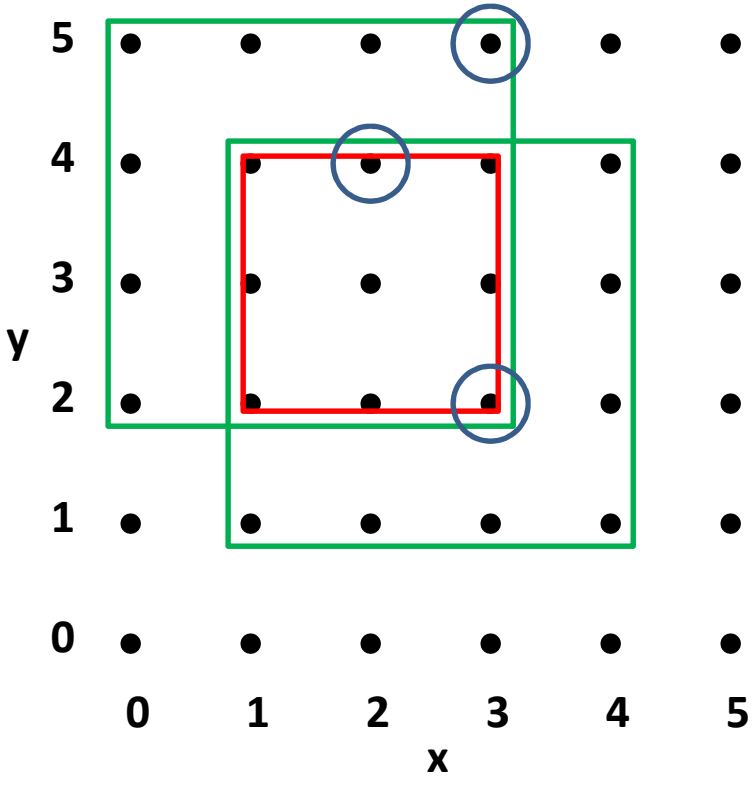
**S = {[((1,2),2),yellow]}**



# Using the Result

**G = {[((0,2),3),white],[((1,1),3),white]}**

**S = {[((1,2),2),yellow]}**




**[(3,2),green]**
**Yes**

**[(2,4),red]**
**Yes**

**[(3,5),blue]**
**Maybe**