

## CS 367 Tutorial

25 August 2008

Week 6 (tutorial #4)

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Material is taken from lecture notes (<http://www.cs.auckland.ac.nz/compsci367s2c/lectures/index.html>).

### [exercise]

Attributes and values for some animals are

Tail (yes, no)

Size (small, medium, large)

Skin (smooth, furry, slimy)

Legs (none, two, four)

- how many distinct animals are there?
- how many syntactically distinct hypotheses are there?
- how many semantically distinct hypotheses are there?

a)  $2*3*3*3=54$

b)  $4*5*5*5=500$

c)  $1+3*4*4*4=193$

### [exercise]

Arrange the following hypotheses in order from most general to least general

$h_a = \langle \text{sunny, warm, ?, strong, cool, same} \rangle$

$h_b = \langle \text{sunny, ?, ?, strong, ?, ?} \rangle$

$h_c = \langle \text{sunny, warm, ?, strong, ?, same} \rangle$

$h_d = \langle \text{sunny, ?, ?, ?, ?, ?} \rangle$

$h_e = \langle \text{sunny, warm, high, strong, cool, same} \rangle$

$h_f = \langle \text{sunny, warm, ?, strong, ?, ?} \rangle$

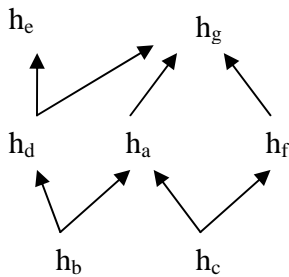
$h_g = \langle \text{?, ?, ?, ?, ?, ?} \rangle$

g,d,b,f,c,a,e

**[exercise]**

Draw a graph of generality (partial order) for the following hypotheses. *Hint*: start with the most general and the most specific then fill in the gaps.

- $h_a = \langle \text{sunny, warm, ?, ?, ?, ?} \rangle$
- $h_b = \langle \text{?, warm, ?, ?, ?, ?} \rangle$
- $h_c = \langle \text{sunny, ?, ?, ?, ?, ?} \rangle$
- $h_d = \langle \text{?, warm, ?, strong, ?, ?} \rangle$
- $h_e = \langle \text{rainy, warm, ?, strong, ?, ?} \rangle$
- $h_f = \langle \text{sunny, ?, ?, strong, ?, ?} \rangle$
- $h_g = \langle \text{sunny, warm, ?, strong, ?, ?} \rangle$



**[exercise]**

Attributes and values for some animals are

- Tail (yes, no)
- Size (small, large)
- Skin (furry, slimy)
- Legs (two, four)

Perform the “Find-S” algorithm to determine the maximally specific hypothesis for the following training data

1.  $\langle \text{yes, small, slimy, four} \rangle, +$
2.  $\langle \text{no, small, slimy, four} \rangle, -$
3.  $\langle \text{yes, large, slimy, four} \rangle, +$
4.  $\langle \text{yes, small, furry, four} \rangle, +$

- $h_0 = \langle 0,0,0,0 \rangle$
- $h_1 = \langle \text{yes, small, slimy, four} \rangle$
- $h_2 = \langle \text{yes, small, slimy, four} \rangle$
- $h_3 = \langle \text{yes, ?, slimy, four} \rangle$
- $h_4 = \langle \text{yes, ?, ?, four} \rangle$