

ASSIGNMENT 01
MACHINE LEARNING

FA21-BSE-044

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Beak Type = Conical beak

Wing = Small Wings

Instance Space

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | - |
| Small Wings | Hooked beak | - |
| Small Wings | Generalist beak | - |
| Medium Wings | Conical beak | - |
| Medium Wings | Hooked beak | - |
| Medium Wings | Generalist beak | - |
| Large Wings | Conical beak | - |
| Large Wings | Hooked beak | - |
| Large Wings | Generalist beak | - |

Size of instance space = $|\mathbf{X}| = 3 \times 3 = 9$

Concept Space = $|\mathbf{C}| = 2^{|\mathbf{X}|} = 2^9 = 512$

Concept Space

| C | Wings | Beak Type | Bird |
|----------|--------------|------------------|-------------|
| C1 | Small Wings | Conical beak | 1 |
| C2 | Small Wings | Hooked beak | 0 |
| C3 | Small Wings | Generalist beak | 0 |
| C4 | Medium Wings | Conical beak | 0 |
| C5 | Medium Wings | Hooked beak | 0 |
| C6 | Medium Wings | Generalist beak | 0 |
| C7 | Large Wings | Conical beak | 0 |
| C8 | Large Wings | Hooked beak | 0 |
| C9 | Large Wings | Generalist beak | 0 |

| | | |
|---------------|---------------|---------------|
| C1 = 1 | C2 = 0 | C3 = 0 |
| C4 = 0 | C5 = 0 | C6 = 0 |
| C7 = 0 | C8 = 0 | C9 = 0 |

C1 = < Wing= Small Wings **AND** Beak Type= Conical beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 0 |
| Small Wings | Hooked beak | 0 |
| Small Wings | Generalist beak | 0 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 0 |

| | | |
|--------------|-----------------|---|
| Medium Wings | Generalist beak | 1 |
| Large Wings | Conical beak | 0 |
| Large Wings | Hooked beak | 0 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 0 | 1 |
| 0 | 0 | 0 |

C2 = < Wing= Medium Wings **AND** Beak Type= Generalist beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 0 |
| Small Wings | Hooked beak | 0 |
| Small Wings | Generalist beak | 1 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 0 |
| Medium Wings | Generalist beak | 0 |
| Large Wings | Conical beak | 1 |
| Large Wings | Hooked beak | 0 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 0 | 0 |
| 1 | 0 | 0 |

C3 = < Wing= Small Wings **AND** Beak Type= Generalist beak **OR**

Wing= Large Wings **AND** Beak Type= Conical beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 0 |
| Small Wings | Hooked beak | 1 |
| Small Wings | Generalist beak | 0 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 1 |
| Medium Wings | Generalist beak | 0 |
| Large Wings | Conical beak | 0 |
| Large Wings | Hooked beak | 0 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 0 |

C4 = < Wing= Small Wings **AND** Beak Type= Hooked beak **OR**

Wing= Medium Wings **AND** Beak Type= Hooked beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 0 |
| Small Wings | Hooked beak | 1 |
| Small Wings | Generalist beak | 0 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 1 |
| Medium Wings | Generalist beak | 0 |
| Large Wings | Conical beak | 0 |
| Large Wings | Hooked beak | 1 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 0 | 1 | 0 |

C5 = < Wing= Small Wings **AND** Beak Type= Hooked beak **OR**

Wing= Medium Wings **AND** Beak Type= Hooked beak **OR** Wing=

Large Wings **AND** Beak Type= Hooked beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 1 |
| Small Wings | Hooked beak | 0 |
| Small Wings | Generalist beak | 0 |
| Medium Wings | Conical beak | 1 |
| Medium Wings | Hooked beak | 0 |
| Medium Wings | Generalist beak | 0 |
| Large Wings | Conical beak | 1 |
| Large Wings | Hooked beak | 0 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 1 | 0 | 0 |
| 1 | 0 | 0 |
| 1 | 0 | 0 |

C6 = < Wing= Small Wings **AND** Beak Type= Conical beak **OR** Wing=

Medium Wings **AND** Beak Type= Conical beak **OR** Wing= Large

Wings **AND** Beak Type= Conical beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 1 |

| | | |
|--------------|-----------------|---|
| Small Wings | Hooked beak | 0 |
| Small Wings | Generalist beak | 0 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 0 |
| Medium Wings | Generalist beak | 1 |
| Large Wings | Conical beak | 1 |
| Large Wings | Hooked beak | 1 |
| Large Wings | Generalist beak | 0 |

| | | |
|---|---|---|
| 1 | 0 | 0 |
| 0 | 0 | 1 |
| 1 | 1 | 0 |

C7 = < Wing= Small Wings **AND** Beak Type= Conical beak **OR** Wing= Medium Wings **AND** Beak Type= Generalist beak **OR** Wing= Large Wings **AND** Beak Type= Conical beak **OR** Wing= Large Wings **AND** Beak Type= Hooked beak >

| Wings | Beak Type | Bird |
|--------------|------------------|-------------|
| Small Wings | Conical beak | 0 |
| Small Wings | Hooked beak | 1 |
| Small Wings | Generalist beak | 1 |
| Medium Wings | Conical beak | 0 |
| Medium Wings | Hooked beak | 1 |
| Medium Wings | Generalist beak | 0 |
| Large Wings | Conical beak | 0 |
| Large Wings | Hooked beak | 0 |
| Large Wings | Generalist beak | 1 |

| | | |
|---|---|---|
| 0 | 1 | 1 |
| 0 | 1 | 0 |
| 0 | 0 | 1 |

C8 = < Wing= Small Wings **AND** Beak Type= Hooked beak **OR**

Wing= Small Wings **AND** Beak Type= Generalist beak **OR** Wing=

Medium Wings **AND** Beak Type= Hooked beak **OR** Wing= Large

Wings **AND** Beak Type= Generalist beak >

| | | |
|---|---|---|
| 1 | 0 | 0 |
| 0 | 0 | 0 |
| 0 | 0 | 0 |

C1

| | | |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 0 | 1 |
| 0 | 0 | 0 |

C2

| | | |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 0 | 0 |
| 1 | 0 | 0 |

C3

| | | |
|---|---|---|
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 0 |

C4

| | | |
|---|---|---|
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 0 | 1 | 0 |

C5

| | | |
|---|---|---|
| 1 | 0 | 0 |
| 1 | 0 | 0 |
| 1 | 0 | 0 |

C6

| | | |
|---|---|---|
| 1 | 0 | 0 |
| 0 | 0 | 1 |
| 1 | 1 | 0 |

C7

| | | |
|---|---|---|
| 0 | 1 | 1 |
| 0 | 1 | 0 |
| 0 | 0 | 1 |

C8

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| | | |
|---|---|---|
| 1 | 1 | 1 |
| 1 | 1 | 0 |
| 1 | 1 | 1 |

C511

| | | |
|---|---|---|
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |

C512