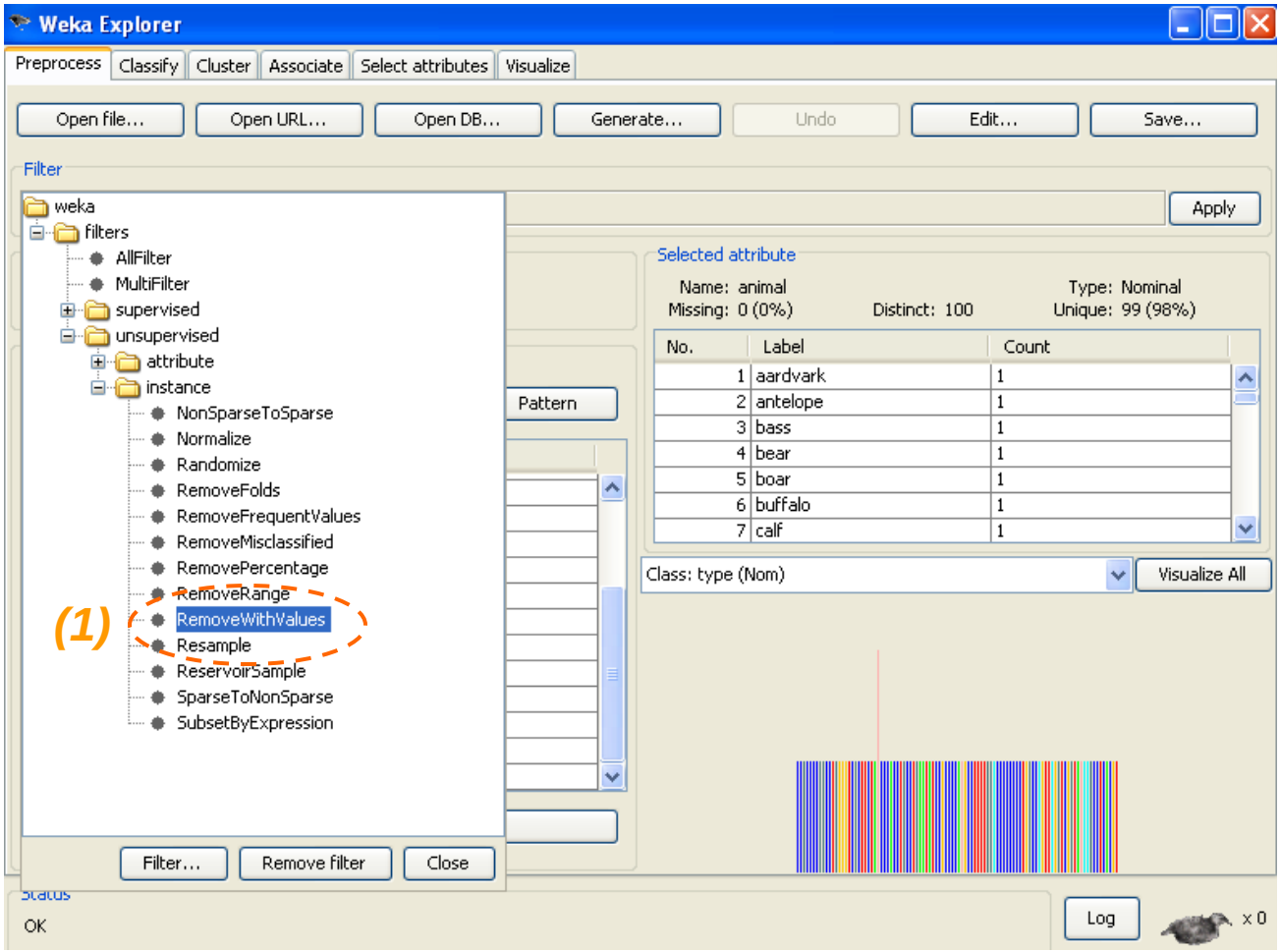
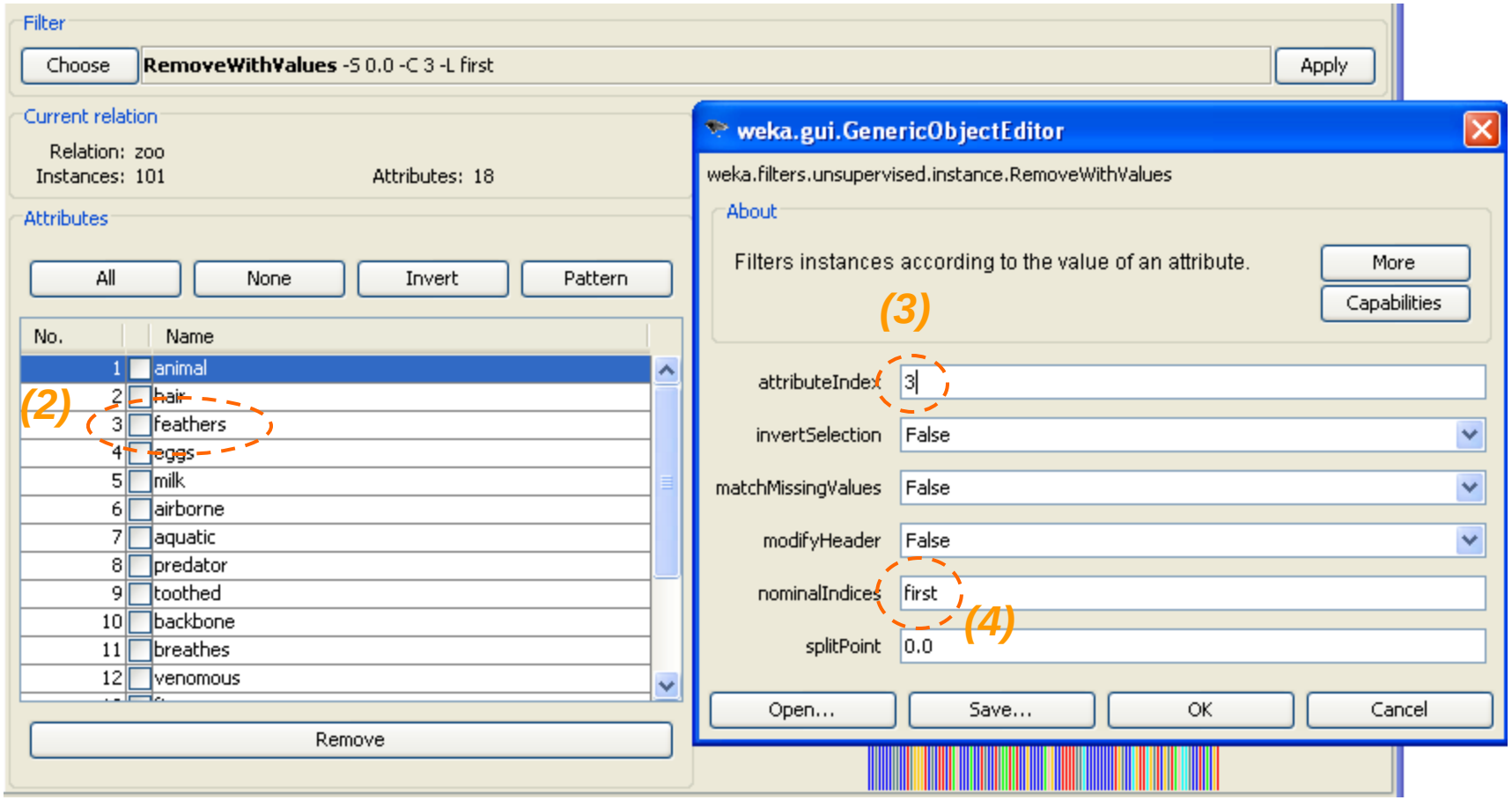
Q1:
For each of the attributes feathers, predators, tail, and domestic, report on the types and numbers of animals having the attribute true.



step1: choose the RemoveWithValues filter

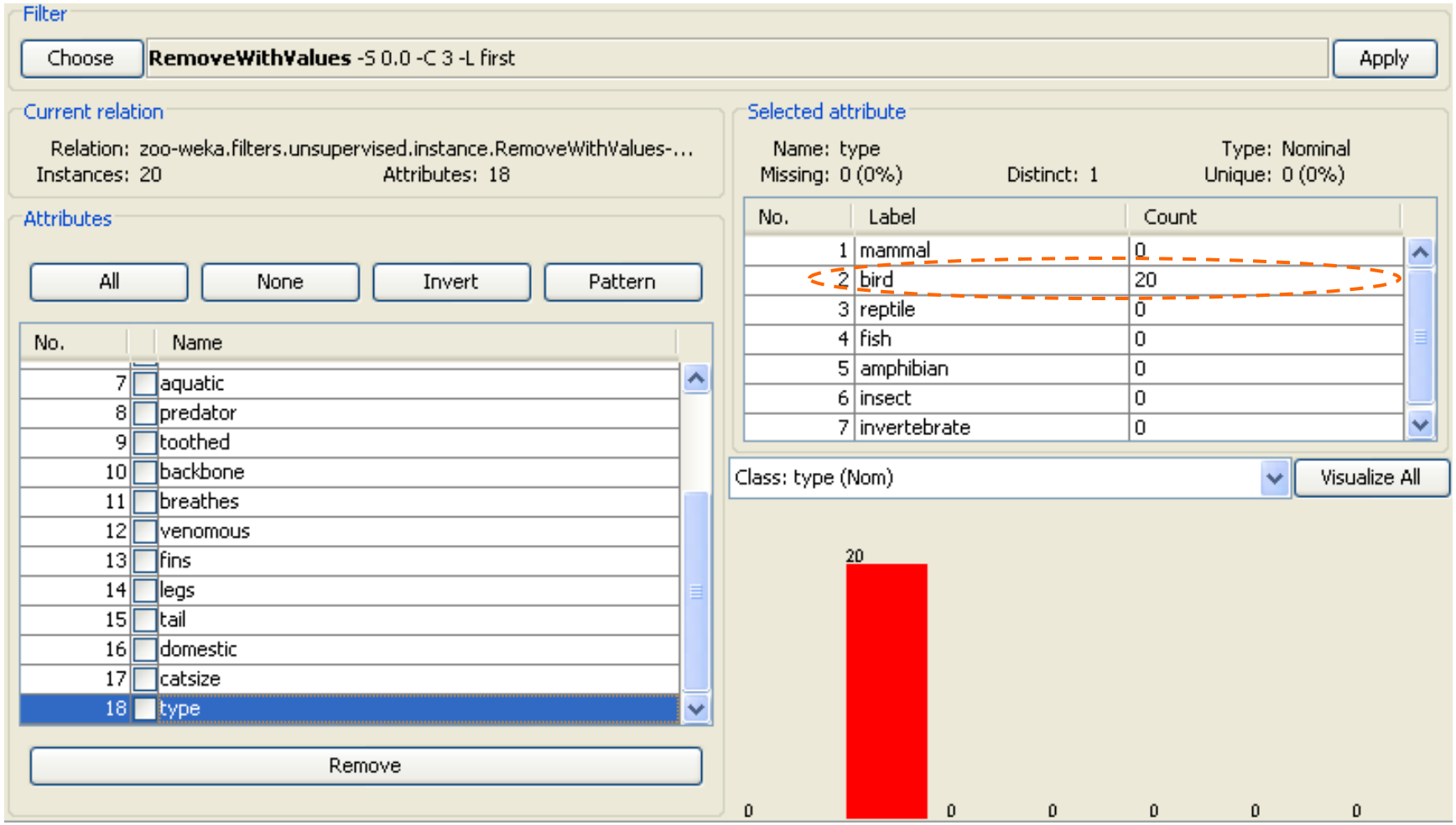


step2: check out which attribute you want to filter

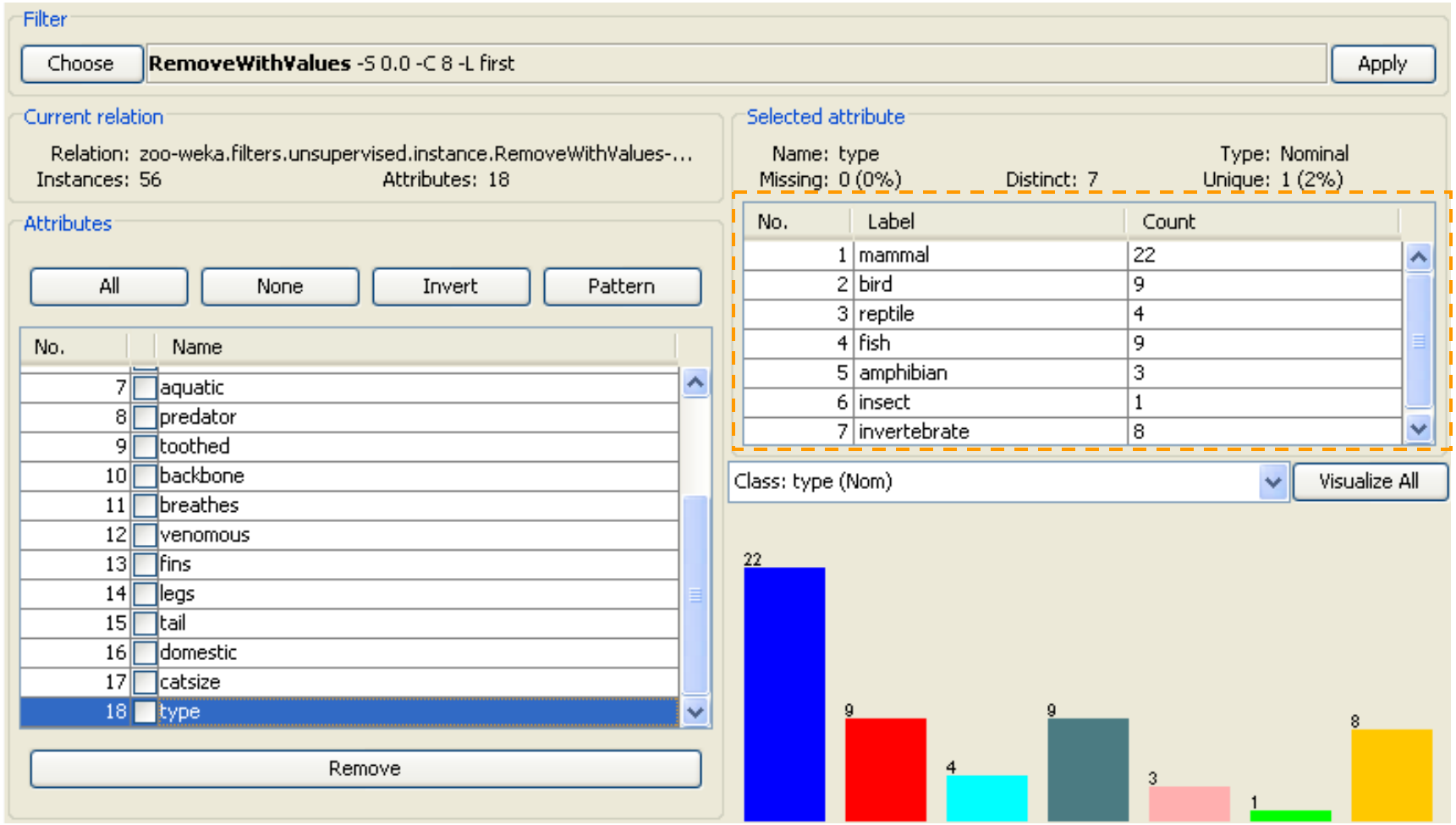
step3: the index of feather is 3 so attributeIndex is set to 3

step4: the feather attribute has two values:1 (False) and 2 (True); to keep the instances with true value, we set nominalindices to first (False)

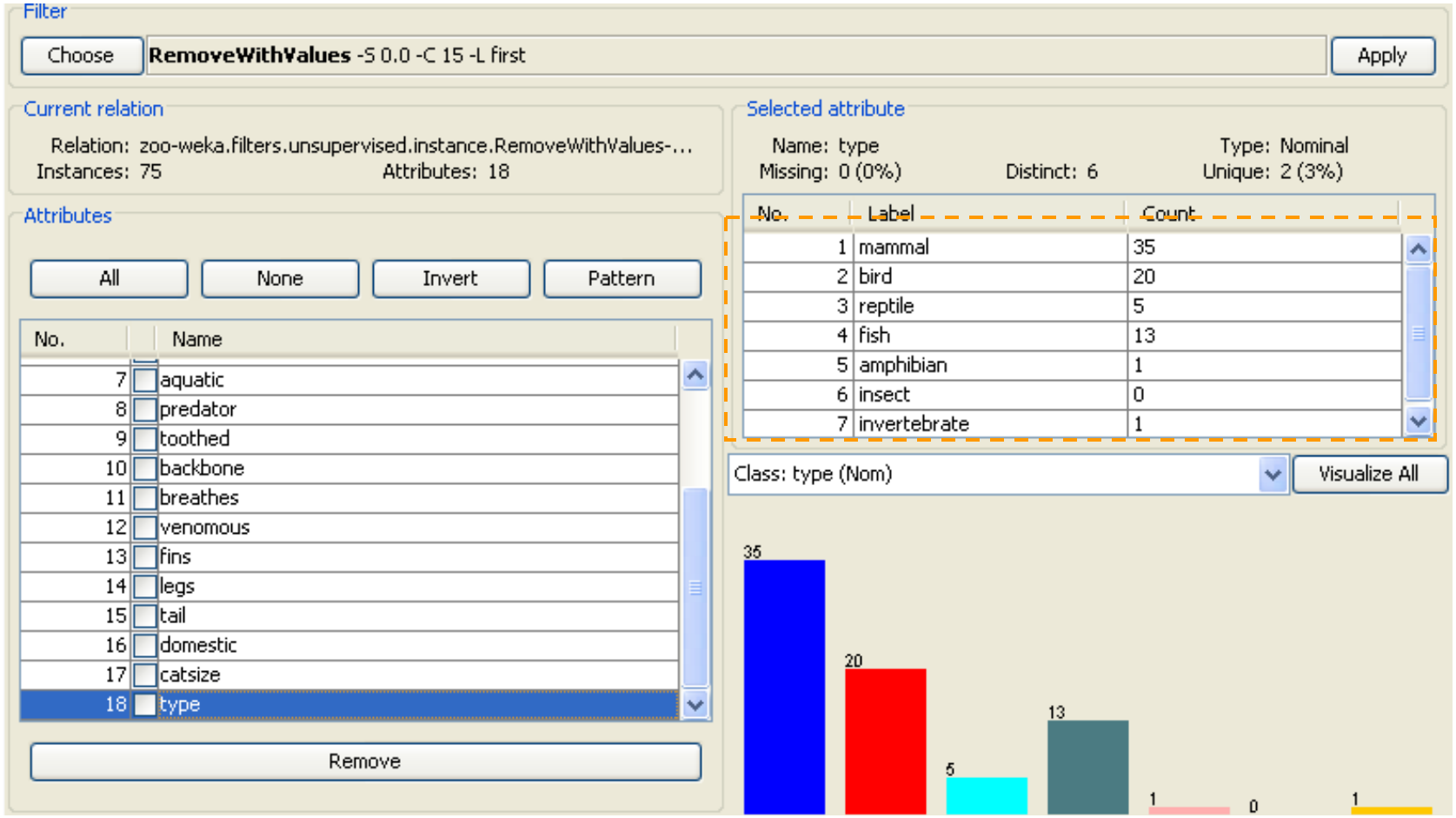
(1) Feather:


Filter
Choose
RemoveWithValues -S 0.0 -C 3 -L first
Apply
Current relation
Relation: zoo-weka.filters.unsupervised.instance.RemoveWithValues-...
Instances: 20
Attributes: 18
Attributes
All
None
Invert
Pattern
No.
Name
7 aquatic
8 predator
9 toothed
10 backbone
11 breathes
12 venomous
13 fins
14 legs
15 tail
16 domestic
17 catsize
18 type
Remove
Selected attribute
Name: type
Type: Nominal
Missing: 0 (0%)
Distinct: 1
Unique: 0 (0%)
No. Label Count
1 mammal 0
2 bird 20
3 reptile 0
4 fish 0
5 amphibian 0
6 insect 0
7 invertebrate 0
Class: type (Nom)
Visualize All
20
0
0
0
0
0
0

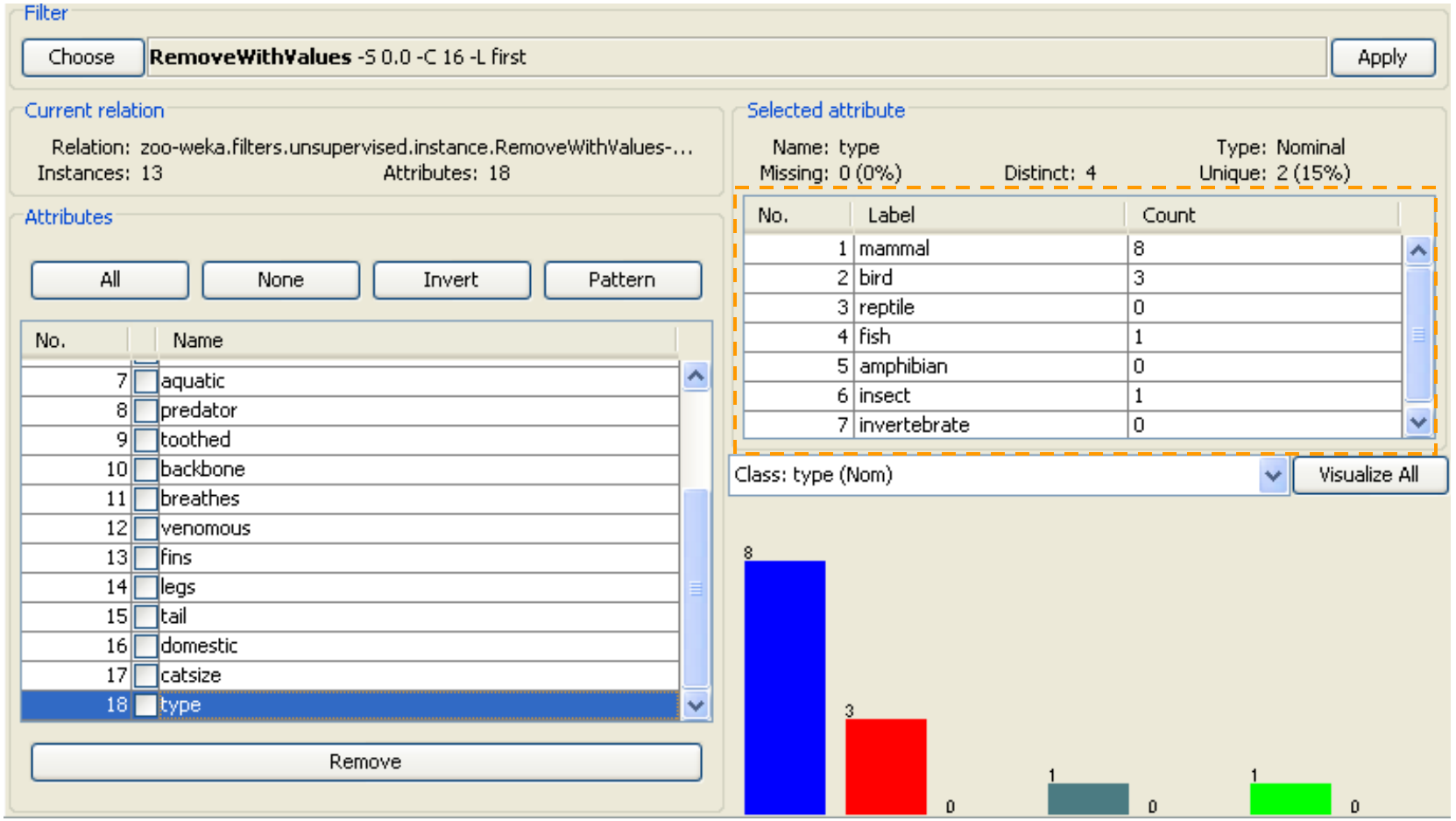
(2) Predators:


Filter
Choose
RemoveWithValues -S 0.0 -C 8 -L first
Apply
Current relation
Relation: zoo-weka.filters.unsupervised.instance.RemoveWithValues-...
Instances: 56
Attributes: 18
Attributes
All
None
Invert
Pattern
No.
Name
7 aquatic
8 predator
9 toothed
10 backbone
11 breathes
12 venomous
13 fins
14 legs
15 tail
16 domestic
17 catsize
18 type
Remove
Selected attribute
Name: type
Type: Nominal
Missing: 0 (0%)
Distinct: 7
Unique: 1 (2%)
No. Label Count
1 mammal 22
2 bird 9
3 reptile 4
4 fish 9
5 amphibian 3
6 insect 1
7 invertebrate 8
Class: type (Nom)
Visualize All
22
9
4
9
3
1
8

(3) Tail:

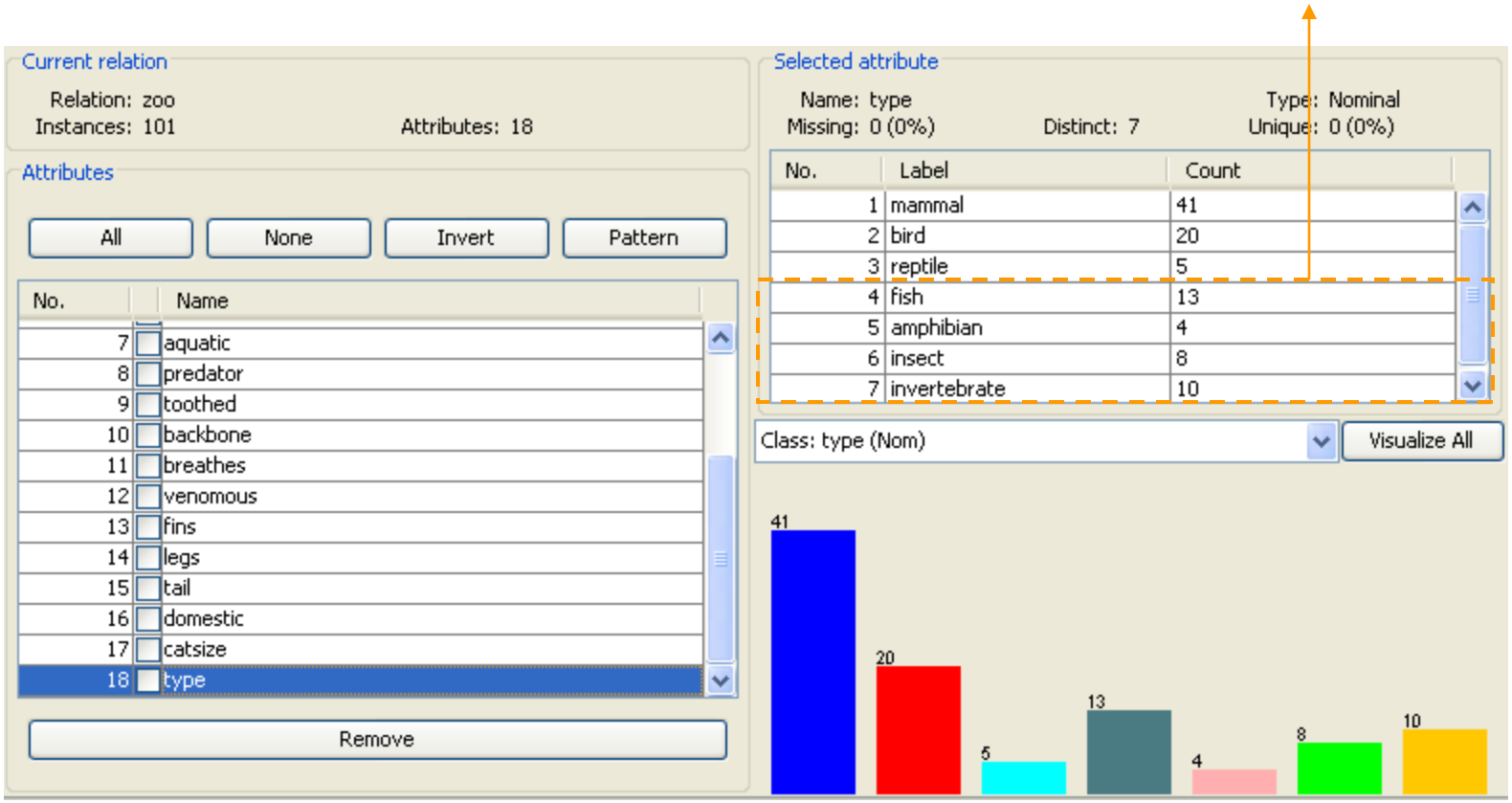

Filter
Choose
RemoveWithValues -S 0.0 -C 15 -L first
Apply
Current relation
Relation: zoo-weka.filters.unsupervised.instance.RemoveWithValues-...
Instances: 75
Attributes: 18
Attributes
All
None
Invert
Pattern
No.
Name
7 aquatic
8 predator
9 toothed
10 backbone
11 breathes
12 venomous
13 fins
14 legs
15 tail
16 domestic
17 catsize
18 type
Remove
Selected attribute
Name: type
Type: Nominal
Missing: 0 (0%)
Distinct: 6
Unique: 2 (3%)
No. Label Count
1 mammal 35
2 bird 20
3 reptile 5
4 fish 13
5 amphibian 1
6 insect 0
7 invertebrate 1
Class: type (Nom)
Visualize All
35
20
5
13
1
0
1

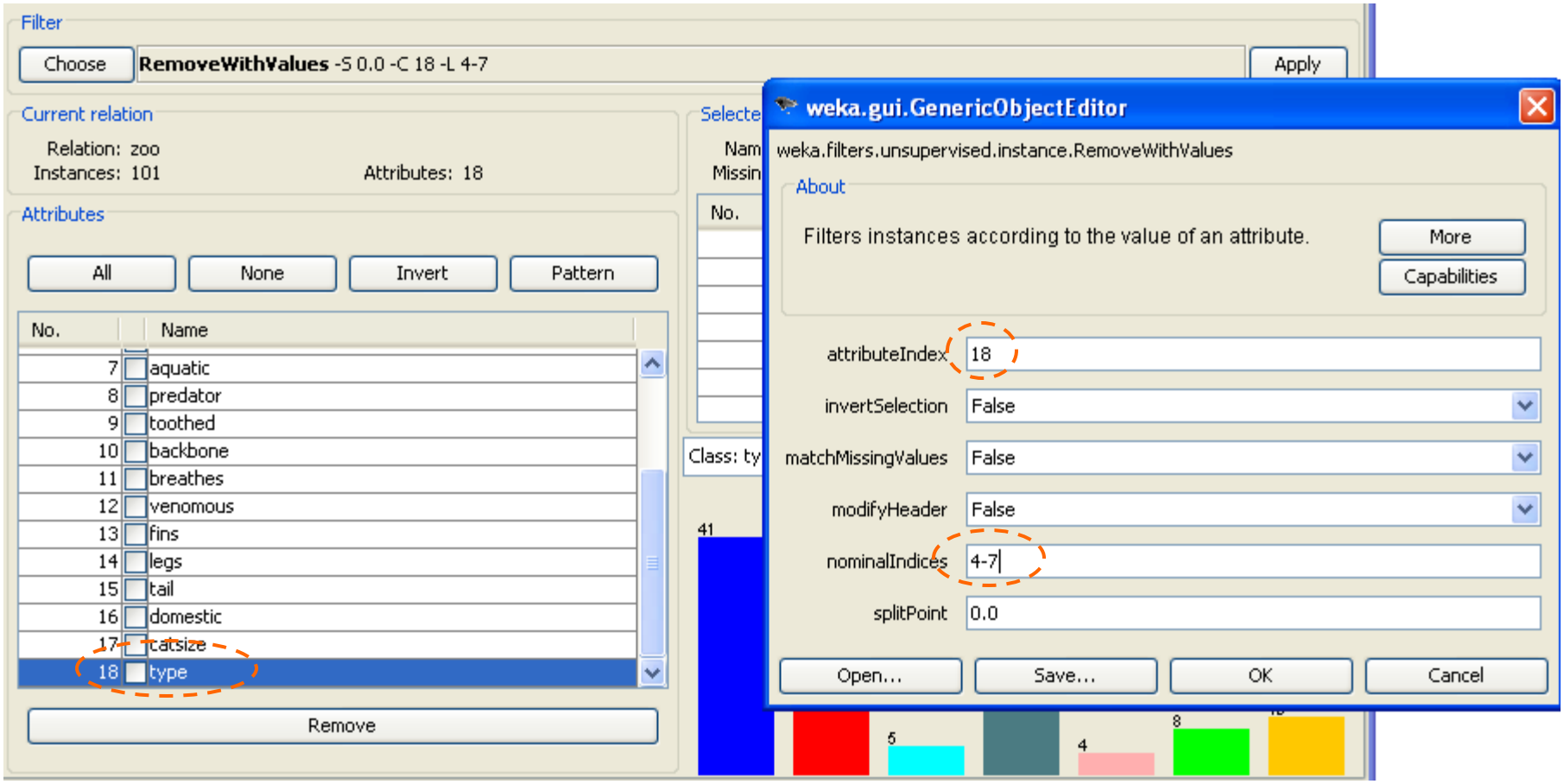
(4) Domestic:


Filter
Choose
RemoveWithValues -S 0.0 -C 16 -L first
Apply
Current relation
Relation: zoo-weka.filters.unsupervised.instance.RemoveWithValues-...
Instances: 13
Attributes: 18
Attributes
All
None
Invert
Pattern
No.
Name
7 aquatic
8 predator
9 toothed
10 backbone
11 breathes
12 venomous
13 fins
14 legs
15 tail
16 domestic
17 catsize
18 type
Remove
Selected attribute
Name: type
Type: Nominal
Missing: 0 (0%)
Distinct: 4
Unique: 2 (15%)
No. Label Count
1 mammal 8
2 bird 3
3 reptile 0
4 fish 1
5 amphibian 0
6 insect 1
7 invertebrate 0
Class: type (Nom)
Visualize All
8
3
0
1
0
1
0

Q2:
Remove instances whose “type” attribute is larger than or equal to 4.
Use the classifier J48graft to derive the corresponding decision tree.
Draw the corresponding tree.

type attribute larger than or equal to 4



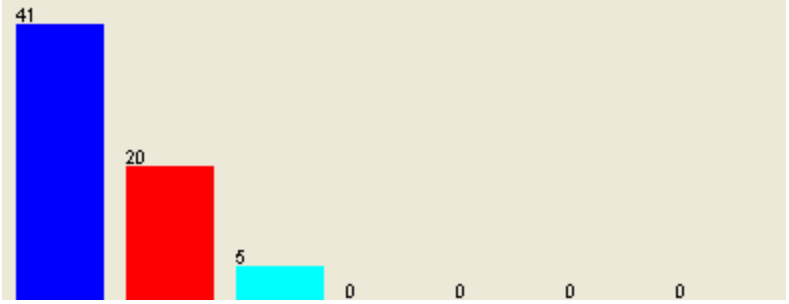

Filter
Choose
RemoveWithValues -S 0.0 -C 18 -L 4-7
Apply
Current relation
Relation: zoo
Instances: 101
Attributes: 18
Attributes
All
None
Invert
Pattern
No.
Name
7 aquatic
8 predator
9 toothed
10 backbone
11 breathes
12 venomous
13 fins
14 legs
15 tail
16 domestic
17 catsize
18 type
Remove
weka.gui.GenericObjectEditor
weka.filters.unsupervised.instance.RemoveWithValues
About
Filters instances according to the value of an attribute.
More
Capabilities
attributeIndex
18
invertSelection
False
matchMissingValues
False
modifyHeader
False
nominalIndices
4-7
splitPoint
0.0
Open...
Save...
OK
Cancel

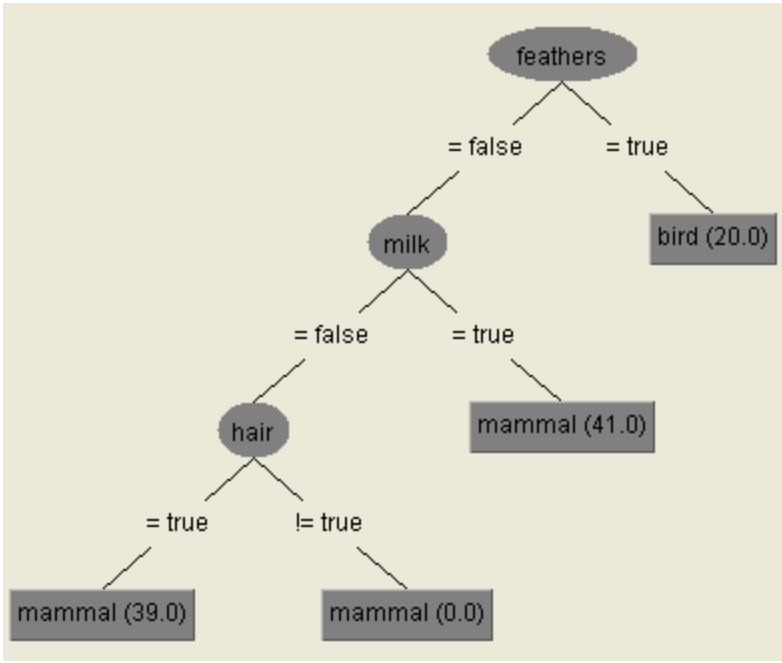
Selected attribute

Name: type Type: Nominal
Missing: 0 (0%) Distinct: 3 Unique: 0 (0%)

No.	Label	Count
1	mammal	41
2	bird	20
3	reptile	5
4	fish	0
5	amphibian	0
6	insect	0
7	invertebrate	0

Class: type (Nom) Visualize All

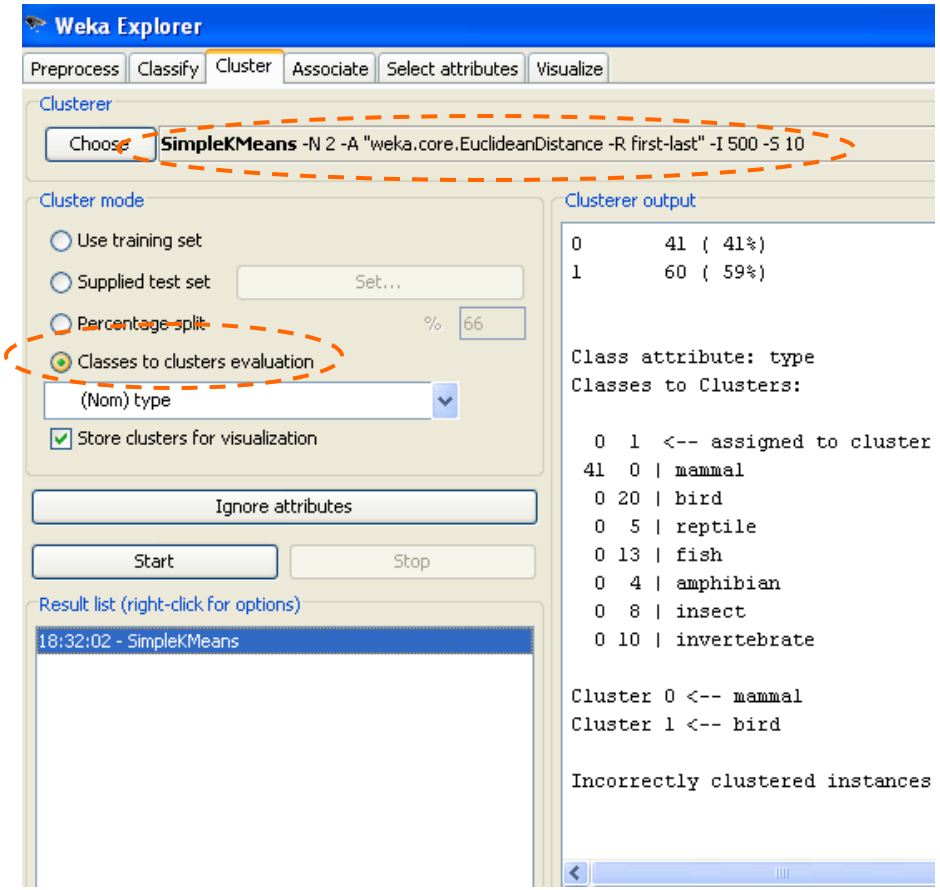




Q3:
Use the rules classifier PART to derive the rules on the zoo dataset. List the rules obtained.

```
PART decision list
------------------

feathers = false AND
milk = true: mammal (41.0)

feathers = true: bird (20.0)

backbone = false AND
airborne = false AND
predator = true: invertebrate (8.0)

backbone = false AND
legs > 2: insect (8.0)

fins = true: fish (13.0)

backbone = true AND
tail = true: reptile (6.0/1.0)

aquatic = true: amphibian (3.0)

: invertebrate (2.0)

Number of Rules  :      8
```

Q4:
Remove the “type” attribute from the dataset and run the default clustering algorithm SimpleKMeans. How many clusters do you obtain? Can you relate these clusters to the initial class values



	Cluster 0	Cluster 1
mammal	41	0
bird	0	20
reptile	0	5
fish	0	13
amphibian	0	4
insect	0	8
invertebrate	0	10