Solutions to Sheet 1

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Exercise 1

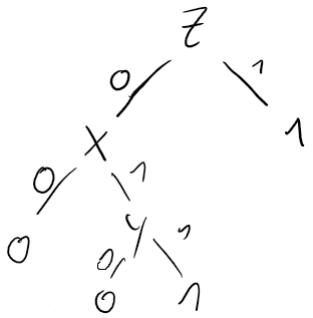
To calculate the class for every point we first need to find the k closest points (depending on the norm). To archive this, a script like the following can be used:

```
function [ nbs ] = knn( spc,pnt,k, norm_p )
%KNN Summary of this function goes here
%   Detailed explanation goes here
  nbs = [];
  nonb = 0;
  while nonb < k
    if nonb == 0
      candidates = spc;
    else
      candidates = transpose(setdiff(transpose(spc),transpose(nbs),'rows
    ↪ '));
    end
    closestp = [0,0,0];
    closestn = inf;
    for i = 1:length(candidates)
      d =transpose(pnt-candidates(:,i));
      n=norm(d,norm_p);
      if n < closestn
        closestn = n;
        closestp = candidates(:,i);
      end
    end
    nonb = nonb+1;
    nbs(:,nonb) = closestp;
  end
end
```

Using the results the following table can be created. Note that the ties can be arbirarily chosen.

Norm	Euclidian		Manhattan	
k	2	3	2	3
4,3,3	1	1	1	1
4,-1,1	tie	-1	tie	1
-2,4,5	-1	-1	tie	1
-2,-6,1	tie	1	tie	1
6,0,2	tie	1	-1	-1

Exercise2



The first split is done using z, because this is the only variable for wich the result stays the same for a value of the variable. The other two splits could be swapped because the influence on the result is the same for both variables.