```
1 ab - 2
```

```
Implement ID3 algorithm
```

y = no/(yes +no)

```
import runpy as up
import matplotlib pyplot as plt
impost pandas as pd and 160 at a little
import mathy
 import copy
dataset = pd. read - cer ('terris, cw')
x = dataset. iloc [:, : ]. ralues
×
attribute = [ outlook', 'Temp', 'Hanidity', 'Wind']
                           the difference the war man
class Node (object):
    def _nit_(self):
       self. ralue = None
       self. decision - Nine
       self. drild = None
dely find Entropy (dato, rows):
    yes=0 le all ill ill all
    no = 0
    idx = lor (data (o)) - 12 12 life idish fellowing
    ostropy = 0
     for in sous:
        if data [i] [idx] == "Yes":
           yes = yes +1
       else:
           14 on = on
    x = yes/(yes tra)
```

```
x!=0 and y!=0;
        entropy = -1 *(x * nath, log 2(x) + y * noth, log 2(y))
   if >c== 1:
                                       but the state was some
       ars = 1
   if y==1;
                                (2 mm of s come intol ) weeth find
       ars = 0
                           wanter, it, up = first Mark sin Isla
   return extropy, are
def find Max Gair (data, sour, columns):
    maschain = 0
    retida = -1
    extropy, ars - find Extropy (data, earls)
    if ( etropy == 0:
        return monchain, retide, are
                               harder High ( ) Hoperal
    for j is columns:
        mydiat = 9300 for innerely in to solly I serve - was
       idx = j
        for in source.
            key = data (i) [ids]
                                  Will demand Will
            if key not is mydist:
               mydut[key] = 1 klad hagga while
           else:
               nydist [key] = mydist [key] +1
        gair = extroply
       for key is mydist:
                              = tomas Magnapia, printing = tol
           yes = 0
            No = 0 local policy of the Ad
            for k is low!
         data [x][j]== key:
   if data(x)[-1] == "Yes":
       Vendor start at on yes = yes + 1)
                        no = no+1 = 1 amon time
           x = yes/(yes+no) if yes+no >0 else 0
y=no/(ss+no) if yes+no>0 else 0
               30 and y>0:

gain -= (mydid (hey] /le (rous))* (>1 * moth log 2(x)+

y * moth, log 2(y))
           if xx0 and yx0:
          love to any income the
```

```
if gain > marchain:
          marchan, ectide = gain, 1
  ectuer moxbain, ectids, and
def buildTree (data, sour, columns);
     max brain, idr, are = find Marchain (data, rows, columns)
     root = Node ()
      if marchain ==0:
          root robbe = 'Yes' if an == 1 else 'Nell)
          return voot
     root ralue = attribute (ids) , old goard that
     nydit = { data [:] [idx]: [] for i in rows }
     for in rous:
                          we white fild arms
          mydist [data [:] [idx]], append (i)
     new-columns = (col for col in columns if col! = idx)
     for key as in mydit:
          child = build Tree (dota, mydrit (bus), new - columns)
         whild decision = key
                                   + key not in mychit:
         root. shilds. apperd (child)
   seturn sot
                       shirt ( buy ) = reduct ( heapt to !.
det visualize_tere (root):
       dot = graphing. Digraph (format = 'prog') tally
       def add-rodes. edges (rede, parent-nome = "Root");
               node_name = f "{ node decision} In { node noble}
            if node:
               dot. rode (node-name label = node nature if node decision "
                   None else f'Enrole dicision 3) n Prode value !)
              if parent_name ! = "Rost"
                    tot. edge (paret_rave, node_name)
              for child is node childs:
                  add_nodes_ Rages (child, none - name)
     add-modes-edges (root)
     dot-render ('decision tree', format = prg', view = True)
```

def calculate (1: 1) i col Puzzoscan lours = list (sange (ler(x))) columns = first (range (les (attribute))) root = buildTeer (x, saws, columns) by an taking lagar vicualize tree (root) Da w, they selfolder though calculate () (yr) for start fet (V) BANK AT - M (1) manique = K-m Output. Milel Johnal High Weab Strong Humidity outleck hunidity Survey Normal High YRS Yes Strong Surry Yes (v) Johnly the Breeze man) atti U, Along alt sot . I Thegain Along of) (Alogoli) where by the pulled to Talling ... souls of Today of (ext for themse -) of State of the death of the stand of Altrig (Y(0)) = (3d (d.v.r) ed interport tola