1- Decision Tree structure:

- **root node is : HST**
  - **HST-HIGH node is : HY**
    - HST-High -- HY-Low node is : AC
    - HST-High -- HY-Med node is : HF
    - HST-High -- HY-High node is : AY
  - **HST-LOW node is : AST**
    - HST-low -- AST-low node is : AY
    - HST-low -- AST-Med node is : AF

2- Training Code Run output:

root node is : HST

with Gain = 0.22056889873306873

maximum Gain index = 2

HST descritization point -mean- = 4.686274509803922

HST High Branch size = (115, 13)

Home = 103

Away = 12

HST Low Branch size = (140, 13)

Home = 53

Away = 87

HST-HIGH node is : HY

with Gain = 0.0671764738178584

maximum Gain index = 7

HST-LOW node is : AST

with Gain = 0.08602658637774419

maximum Gain index = 2

HY descritization points (Q1, Q2)= [2.0, 4.0]

HST High Branch & HY low size = (97, 11)

Home = 91

Away = 6

HST High Branch & HY medium size = (15, 11)

Home = 11

Away = 4

HST High Branch & HY high size = (3, 11)

Home = 1

Away = 2

AST descritization points (Q1, Q2)= [4.666666666666667, 9.333333333333334]

HST LOW Branch & AST low size = (75, 11)

Home = 39

Away = 36

HST LOW Branch & AST medium size = (60, 11)

Home = 14

Away = 46

HST LOW Branch & AST high size = (5, 11)

Home = 0

Away = 5

HST-High -- HY-Low node is : AC

with Gain = 0.013895013279051405

maximum Gain index = 5

HST-High -- HY-Med node is : HF

with Gain = 0.30763617969254453

maximum Gain index = 2

HST-High -- HY-High node is : AY

with Gain = 0.9182958340544896

maximum Gain index = 6

HST-low -- AST-low node is : AY

with Gain = 0.04073912565755089

maximum Gain index = 6

HST-low -- AST-Med node is : AF

with Gain = 0.10259199481602699

maximum Gain index = 3

AC descritization points (Q1, Q2)= [4.333333333333333, 8.666666666666666]

HST High Branch & HY low & AC low size = (58, 8)

Home = 53

Away = 5

HST High Branch & HY low & AC med size = (35, 8)

Home = 34

Away = 1

HST High Branch & HY low & AC high size = (4, 8)

Home = 4

Away = 0

HF descritization points (Q1, Q2)= [8.333333333333332, 13.666666666666666]

HST High Branch & HY med & HF low size = (7,)

Home = 1

Away = 0

HST High Branch & HY med & HF med size = (10, 8)

Home = 9

Away = 1

HST High Branch & HY med & HF high size = (4, 8)

Home = 1

Away = 3

AY descritization points (Q1, Q2)= [2.0, 4.0]

HST High Branch & HY high & AY low size = (7, 2)

Home = 1

Away = 0

HST High Branch & HY high & AY med size = (2, 8)

Home = 0

Away = 2

HST High Branch & HY high & AY high size = 0

AY descritization points (Q1, Q2)= [2.0, 4.0]

HST low Branch & AST low & AY low size = (59, 9)

Home = 32

Away = 27

HST low Branch & AST low & AY med size = (14, 9)

Home = 5

Away = 9

HST low Branch & AST low & AY high size = (2, 9)

Home = 2

Away = 0

AF descritization points (Q1, Q2)= [9.0, 15.0]

HST low Branch & AST med & AF low size = (19, 9)

Home = 1

Away = 18

HST low Branch & AST med & AF med size = (38, 9)

Home = 13

Away = 25

HST low Branch & AST med & AF high size = (3, 9)

Home = 0

Away = 3

3- Test Code Run Output "Confusion Matrix":

Accuracy = 88.46153846153847 %

Confusion Matris:

[[16 2]

[1 7]]