I have done this assignment completely on my own. I have not copied it, nor have I given my solution to anyone else. I understand that if I am involved in plagiarism or cheating I will have to sign an official form that I have cheated and that this form will be stored in my official university record. I also understand that I will receive a grade of 0 for the involved assignment for my first offense and that I will receive a grade of "F" for the course for any additional offense.
Selin DINC

Results for Information Gain heuristic for dataset 1

Tree:

Decision Tree :

XI= 0 :
| XH= 0 :0
| XH= 1 :
| | XB= 0 :0
| | XB= 1 :
| | | XN= 0 :0
| | | XN= 1 :
| | | | XK= 0 :0
| | | | XK= 1 :
| | | | | XC= 0 :1
| | | | | XC= 1 :0
XI= 1 :
| XH= 0 :
| | XP= 0 :0
| | XP= 1 :
| | | XT= 0 :0
| | | XT= 1 :
| | | | XG= 0 :
| | | | | XK= 0 :1
| | | | | XK= 1 :0
| | | | XG= 1 :0
| XH= 1 :
| | XC= 0 :
| | | XN= 0 :
| | | | XD= 0 :
| | | | | XP= 0 :
| | | | | | XO= 0 :
| | | | | | | XK= 0 :0
| | | | | | | XK= 1 :1

```
| | | | | | XO= 1 :1
| | | | | | XP= 1 :0
| | | | XD= 1 :
| | | | | XU= 0 :
| | | | | | XG= 0 :0
| | | | | | XG= 1 :1
| | | | | | XU= 1 :0
| | | XN= 1 :
| | | | XB= 0 :
| | | | | XL= 0 :0
| | | | | XL= 1 :
| | | | | | XR= 0 :
| | | | | | | XJ= 0 :1
| | | | | | | XJ= 1 :
| | | | | | | | XF= 0 :0
| | | | | | | | XF= 1 :1
| | | | | | XR= 1 :
| | | | | | | XM= 0 :0
| | | | | | | XM= 1 :
| | | | | | | | XE= 0 :1
| | | | | | | | XE= 1 :0
| | | | XB= 1 :
| | | | | XQ= 0 :1
| | | | | XQ= 1 :
| | | | | | XF= 0 :0
| | | | | | XF= 1 :
| | | | | | | XD= 0 :
| | | | | | | | XM= 0 :0
| | | | | | | | XM= 1 :1
| | | | | | | XD= 1 :1
| | XC= 1 :
| | | XB= 0 :
| | | | XG= 0 :
| | | | | XU= 0 :
| | | | | | XK= 0 :1
| | | | | | XK= 1 :0
| | | | | XU= 1 :0
| | | | XG= 1 :0
| | | XB= 1 :0
```

Accuracy:

Accuracy of test_set: 100.0 %
Accuracy of validation_set: 96.5 %
Accuracy of test_set: 95.66666666666667 %

Results for Information Gain heuristic for dataset 2

Decision Tree :

```
XI= 0 :
| XU= 0 :
| | XQ= 0 :
| | | XF= 0 :
| | | | XO= 0 :
| | | | | XB= 0 :
| | | | | | XJ= 0 :0
| | | | | | XJ= 1 :
| | | | | | | XG= 0 :0
| | | | | | | XG= 1 :1
| | | | | XB= 1 :0
| | | | XO= 1 :
| | | | | XB= 0 :
| | | | | | XD= 0 :
| | | | | | | XM= 0 :1
| | | | | | | XM= 1 :0
| | | | | | XD= 1 :0
| | | | | XB= 1 :
| | | | | | XH= 0 :
| | | | | | | XL= 0 :1
| | | | | | | XL= 1 :
| | | | | | | | XS= 0 :
| | | | | | | | | XJ= 0 :
| | | | | | | | | | XC= 0 :0
| | | | | | | | | | XC= 1 :1
| | | | | | | | | XJ= 1 :1
| | | | | | | | XS= 1 :0
| | | | | | XH= 1 :1
| | | XF= 1 :0
| | XQ= 1 :
| | | XB= 0 :
| | | | XT= 0 :
| | | | | XL= 0 :
| | | | | | XR= 0 :
| | | | | | | XN= 0 :
```

```
| | | | | | | | XG= 0 :1
| | | | | | | | XG= 1 :
| | | | | | | | | XP= 0 :1
| | | | | | | | | XP= 1 :
| | | | | | | | | | XC= 0 :
| | | | | | | | | | | XE= 0 :0
| | | | | | | | | | | XE= 1 :1
| | | | | | | | | | | XC= 1 :0
| | | | | | | XN= 1 :0
| | | | | | XR= 1 :1
| | | | | XL= 1 :
| | | | | | XF= 0 :0
| | | | | | XF= 1 :
| | | | | | | XC= 0 :
| | | | | | | | XH= 0 :1
| | | | | | | | XH= 1 :
| | | | | | | | | XE= 0 :1
| | | | | | | | | XE= 1 :0
| | | | | | | XC= 1 :
| | | | | | | | XJ= 0 :0
| | | | | | | | XJ= 1 :
| | | | | | | | | XK= 0 :1
| | | | | | | | | XK= 1 :
| | | | | | | | | | XM= 0 :1
| | | | | | | | | | XM= 1 :0
| | | | XT= 1 :
| | | | | XO= 0 :1
| | | | | XO= 1 :
| | | | | | XM= 0 :
| | | | | | | XH= 0 :
| | | | | | | | XL= 0 :0
| | | | | | | | XL= 1 :
| | | | | | | | | XC= 0 :
| | | | | | | | | | XD= 0 :0
| | | | | | | | | | XD= 1 :1
| | | | | | | | | XC= 1 :1
| | | | | | | XH= 1 :1
| | | | | | XM= 1 :0
| | | XB= 1 :
| | | | XO= 0 :0
| | | | XO= 1 :
| | | | | XM= 0 :
| | | | | | XF= 0 :
| | | | | | | XP= 0 :
| | | | | | | | XL= 0 :
| | | | | | | | | XC= 0 :1
| | | | | | | | | XC= 1 :
```

```
| | | | | | | | | | XK= 0 :
| | | | | | | | | | | XE= 0 :
| | | | | | | | | | | | XD= 0 :
| | | | | | | | | | | | | XG= 0 :
| | | | | | | | | | | | | |

| | | | | | | | | | | | | | XH= 1 :
| | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | XJ= 1 :
| | | | | | | | | | | | | | | | XN= 0 :
| | | | | | | | | | | | | | | | | XR= 0 :
| | | | | | | | | | | | | | | | | | XS= 0 :
| | | | | | | | | | | | | | | | | | | XT= 0 :1

| | | | | | | | | | | | XE= 1 :0
| | | | | | | | | | | XK= 1 :1
| | | | | | | | | XL= 1 :0
| | | | | | | | XP= 1 :1
| | | | | | XF= 1 :0
| | | | | XM= 1 :0
| XU= 1 :
| | XG= 0 :
| | | XS= 0 :
| | | | XB= 0 :
| | | | | XF= 0 :0
| | | | | XF= 1 :
| | | | | | XQ= 0 :0
| | | | | | XQ= 1 :
| | | | | | | XC= 0 :1
| | | | | | | XC= 1 :
| | | | | | | | XH= 0 :
| | | | | | | | | XD= 0 :0
| | | | | | | | | XD= 1 :1
| | | | | | | | XH= 1 :
| | | | | | | | | XJ= 0 :
| | | | | | | | | | XN= 0 :1
| | | | | | | | | | XN= 1 :0
| | | | | | | | | XJ= 1 :1
| | | | XB= 1 :
| | | | | XO= 0 :0
| | | | | XO= 1 :
| | | | | | XJ= 0 :
| | | | | | | XC= 0 :0
| | | | | | | XC= 1 :
| | | | | | | | XD= 0 :0
| | | | | | | | XD= 1 :1
```

```
| | | | | | XJ= 1 :1
| | | XS= 1 :
| | | | XO= 0 :0
| | | | XO= 1 :
| | | | | XL= 0 :
| | | | | | XN= 0 :
| | | | | | | XJ= 0 :1
| | | | | | | XJ= 1 :0
| | | | | | | XN= 1 :1
| | | | | XL= 1 :0
| | XG= 1 :0
XI= 1 :
| XK= 0 :
| | XC= 0 :
| | | XS= 0 :
| | | | XG= 0 :
| | | | | XM= 0 :1
| | | | | XM= 1 :
| | | | | | XT= 0 :1
| | | | | | XT= 1 :
| | | | | | | XL= 0 :
| | | | | | | | XP= 0 :1
| | | | | | | | XP= 1 :
| | | | | | | | | XB= 0 :1
| | | | | | | | | XB= 1 :0
| | | | | | | XL= 1 :
| | | | | | | | XP= 0 :0
| | | | | | | | XP= 1 :
| | | | | | | | | XQ= 0 :1
| | | | | | | | | XQ= 1 :
| | | | | | | | | | XB= 0 :1
| | | | | | | | | | XB= 1 :0
| | | | XG= 1 :
| | | | | XO= 0 :1
| | | | | XO= 1 :
| | | | | | XH= 0 :0
| | | | | | XH= 1 :
| | | | | | | XL= 0 :1
| | | | | | | XL= 1 :0
| | | XS= 1 :
| | | | XR= 0 :
| | | | | XN= 0 :1
| | | | | XN= 1 :
| | | | | | XH= 0 :
| | | | | | | XJ= 0 :
| | | | | | | | XM= 0 :
| | | | | | | | | XD= 0 :0
```

```
| | | | | | | | | XD= 1 :1
| | | | | | | | | XM= 1 :1
| | | | | | | | XJ= 1 :1
| | | | | | | XH= 1 :
| | | | | | | | XT= 0 :0
| | | | | | | | XT= 1 :
| | | | | | | | | XF= 0 :0
| | | | | | | | | XF= 1 :1
| | | | XR= 1 :
| | | | | XG= 0 :
| | | | | | XM= 0 :
| | | | | | | XH= 0 :0
| | | | | | | XH= 1 :
| | | | | | | | XB= 0 :1
| | | | | | | | XB= 1 :
| | | | | | | | | XF= 0 :1
| | | | | | | | | XF= 1 :0
| | | | | | XM= 1 :
| | | | | | | XD= 0 :0
| | | | | | | XD= 1 :1
| | | | | XG= 1 :0
| | XC= 1 :
| | | XD= 0 :
| | | | XS= 0 :
| | | | | XF= 0 :
| | | | | | XB= 0 :0
| | | | | | XB= 1 :
| | | | | | | XE= 0 :0
| | | | | | | XE= 1 :1
| | | | | XF= 1 :
| | | | | | XP= 0 :1
| | | | | | XP= 1 :
| | | | | | | XH= 0 :1
| | | | | | | XH= 1 :
| | | | | | | | XL= 0 :
| | | | | | | | | XJ= 0 :1
| | | | | | | | | XJ= 1 :
| | | | | | | | | | XN= 0 :0
| | | | | | | | | | XN= 1 :1
| | | | | | | | XL= 1 :0
| | | | XS= 1 :
| | | | | XJ= 0 :
| | | | | | XM= 0 :0
| | | | | | XM= 1 :
| | | | | | | XQ= 0 :
| | | | | | | | XB= 0 :1
| | | | | | | | XB= 1 :
```

```
| | | | | | | | | XF= 0 :
| | | | | | | | | | | XH= 0 :0
| | | | | | | | | | | XH= 1 :1
| | | | | | | | | | XF= 1 :1
| | | | | | | XQ= 1 :0
| | | | | XJ= 1 :
| | | | | | XO= 0 :
| | | | | | | XF= 0 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :1
| | | | | | | XF= 1 :1
| | | | | | XO= 1 :
| | | | | | XR= 0 :
| | | | | | | XB= 0 :
| | | | | | | | | XH= 0 :0
| | | | | | | | | XH= 1 :1
| | | | | | | | XB= 1 :1
| | | | | | | XR= 1 :1
| | | XD= 1 :
| | | | XF= 0 :0
| | | | XF= 1 :
| | | | | XS= 0 :
| | | | | | XO= 0 :0
| | | | | | XO= 1 :1
| | | | | XS= 1 :0
| XK= 1 :
| | XD= 0 :
| | | XT= 0 :
| | | | XF= 0 :
| | | | | XB= 0 :
| | | | | | XR= 0 :0
| | | | | | XR= 1 :
| | | | | | | XO= 0 :1
| | | | | | | XO= 1 :
| | | | | | | | XL= 0 :1
| | | | | | | | | XL= 1 :0
| | | | | XB= 1 :
| | | | | | XO= 0 :0
| | | | | | XO= 1 :1
| | | | XF= 1 :
| | | | | XO= 0 :1
| | | | | XO= 1 :
| | | | | | XH= 0 :
| | | | | | | XL= 0 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :
| | | | | | | | | XG= 0 :1
```

| | | | | | | | | XG= 1 :0
| | | | | | | | XL= 1 :1
| | | | | | | XH= 1 :
| | | | | | | XM= 0 :
| | | | | | | | XQ= 0 :0
| | | | | | | | XQ= 1 :1
| | | | | | | XM= 1 :1
| | | XT= 1 :
| | | | XB= 0 :
| | | | | XC= 0 :
| | | | | | XM= 0 :1
| | | | | | XM= 1 :
| | | | | | | XJ= 0 :0
| | | | | | | XJ= 1 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :1
| | | | | XC= 1 :
| | | | | | XH= 0 :1
| | | | | | XH= 1 :
| | | | | | | XL= 0 :1
| | | | | | | XL= 1 :
| | | | | | | | XN= 0 :1
| | | | | | | | XN= 1 :0
| | | | XB= 1 :0
| | XD= 1 :0

Accuracy of test_set: 99.83333333333333 %
Accuracy of validation_set: 77.0 %
Accuracy of test_set: 72.5 %

Results for Variance Impurity heuristic for dataset 1

Decision Tree :

XI= 0 :
| XH= 0 :0
| XH= 1 :
| | XB= 0 :0
| | XB= 1 :
| | | XN= 0 :0
| | | XN= 1 :
| | | | XK= 0 :0
| | | | XK= 1 :
| | | | | XC= 0 :1
| | | | | XC= 1 :0
XI= 1 :
| XH= 0 :

```
| | XP= 0 :0
| | XP= 1 :
| | | XT= 0 :0
| | | XT= 1 :
| | | | XG= 0 :
| | | | | XK= 0 :1
| | | | | XK= 1 :0
| | | | XG= 1 :0
| XH= 1 :
| | XC= 0 :
| | | XN= 0 :
| | | | XD= 0 :
| | | | | XP= 0 :
| | | | | | XF= 0 :
| | | | | | | XG= 0 :0
| | | | | | | XG= 1 :1
| | | | | | XF= 1 :
| | | | | | | XO= 0 :
| | | | | | | | XK= 0 :0
| | | | | | | | XK= 1 :1
| | | | | | | XO= 1 :1
| | | | | XP= 1 :0
| | | | XD= 1 :
| | | | | XU= 0 :
| | | | | | XG= 0 :0
| | | | | | XG= 1 :1
| | | | | XU= 1 :0
| | | XN= 1 :
| | | | XB= 0 :
| | | | | XL= 0 :0
| | | | | XL= 1 :
| | | | | | XR= 0 :
| | | | | | | XJ= 0 :1
| | | | | | | XJ= 1 :
| | | | | | | | XF= 0 :0
| | | | | | | | XF= 1 :1
| | | | | | XR= 1 :
| | | | | | | XM= 0 :0
| | | | | | | XM= 1 :
| | | | | | | | XE= 0 :1
| | | | | | | | XE= 1 :0
| | | | XB= 1 :
| | | | | XQ= 0 :1
| | | | | XQ= 1 :
| | | | | | XF= 0 :0
| | | | | | XF= 1 :
| | | | | | | XD= 0 :
```

| | | | | | | | XM= 0 :0
| | | | | | | | XM= 1 :1
| | | | | | | | XD= 1 :1
| | XC= 1 :
| | | XB= 0 :
| | | | XG= 0 :
| | | | | XU= 0 :
| | | | | | XK= 0 :1
| | | | | | XK= 1 :0
| | | | | XU= 1 :0
| | | | XG= 1 :0
| | | XB= 1 :0

Accuracy of test_set: 100.0 %
Accuracy of validation_set: 96.66666666666667 %
Accuracy of test_set: 95.33333333333334 %

Results for Variance Impurity heuristic for dataset 2

Decision Tree :

XI= 0 :
| XU= 0 :
| | XQ= 0 :
| | | XF= 0 :
| | | | XO= 0 :
| | | | | XB= 0 :
| | | | | | XJ= 0 :0
| | | | | | XJ= 1 :
| | | | | | | XG= 0 :0
| | | | | | | XG= 1 :1
| | | | | XB= 1 :0
| | | | XO= 1 :
| | | | | XB= 0 :
| | | | | | XD= 0 :
| | | | | | | XM= 0 :1
| | | | | | | XM= 1 :0
| | | | | | XD= 1 :0
| | | | | XB= 1 :
| | | | | | XH= 0 :
| | | | | | | XS= 0 :
| | | | | | | | XJ= 0 :
| | | | | | | | | XN= 0 :1
| | | | | | | | | XN= 1 :0
| | | | | | | | XJ= 1 :1
| | | | | | | XS= 1 :

```
| | | | | | | | XL= 0 :1
| | | | | | | | XL= 1 :0
| | | | | | | XH= 1 :1
| | | XF= 1 :0
| | XQ= 1 :
| | | XB= 0 :
| | | | XF= 0 :
| | | | | XG= 0 :0
| | | | | XG= 1 :
| | | | | | XL= 0 :
| | | | | | | XS= 0 :0
| | | | | | | XS= 1 :1
| | | | | | XL= 1 :0
| | | | XF= 1 :
| | | | | XT= 0 :
| | | | | | XL= 0 :
| | | | | | | XS= 0 :1
| | | | | | | XS= 1 :
| | | | | | | | XC= 0 :0
| | | | | | | | XC= 1 :1
| | | | | | XL= 1 :
| | | | | | | XC= 0 :
| | | | | | | | XH= 0 :1
| | | | | | | | XH= 1 :
| | | | | | | | | XE= 0 :1
| | | | | | | | | XE= 1 :0
| | | | | | | XC= 1 :
| | | | | | | | XJ= 0 :0
| | | | | | | | XJ= 1 :
| | | | | | | | | XK= 0 :1
| | | | | | | | | XK= 1 :
| | | | | | | | | | XM= 0 :1
| | | | | | | | | | XM= 1 :0
| | | | | XT= 1 :
| | | | | | XH= 0 :
| | | | | | | XO= 0 :1
| | | | | | | XO= 1 :
| | | | | | | | XL= 0 :0
| | | | | | | | XL= 1 :
| | | | | | | | | XC= 0 :
| | | | | | | | | | XD= 0 :0
| | | | | | | | | | XD= 1 :1
| | | | | | | | | XC= 1 :1
| | | | | | XH= 1 :1
| | | XB= 1 :
| | | | XO= 0 :0
| | | | XO= 1 :
```

```
| | | | | XM= 0 :
| | | | | | XF= 0 :
| | | | | | | XP= 0 :
| | | | | | | | XL= 0 :
| | | | | | | | | XC= 0 :1
| | | | | | | | | XC= 1 :
| | | | | | | | | | XK= 0 :
| | | | | | | | | | | XE= 0 :
| | | | | | | | | | | | XD= 0 :
| | | | | | | | | | | | | XG= 0 :
| | | | | | | | | | | | | |

| | | | | | | | | | | | | | | XH= 1 :
| | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | XJ= 1 :
| | | | | | | | | | | | | | | | | XN= 0 :
| | | | | | | | | | | | | | | | | | XR= 0 :
| | | | | | | | | | | | | | | | | | | XS= 0 :
| | | | | | | | | | | | | | | | | | | | XT= 0 :1
| | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | XE= 1 :0
| | | | | | | | | | | XK= 1 :1
| | | | | | | | | XL= 1 :0
| | | | | | | | XP= 1 :1
| | | | | | XF= 1 :0
| | | | | XM= 1 :0
| XU= 1 :
| | XG= 0 :
| | | XS= 0 :
| | | | XF= 0 :
| | | | | XO= 0 :0
| | | | | XO= 1 :
| | | | | | XM= 0 :1
| | | | | | XM= 1 :
| | | | | | | XB= 0 :0
| | | | | | | XB= 1 :
| | | | | | | | XJ= 0 :
| | | | | | | | | XC= 0 :0
| | | | | | | | | XC= 1 :
| | | | | | | | | | XD= 0 :0
| | | | | | | | | | XD= 1 :1
| | | | | | | | | XJ= 1 :1
| | | | XF= 1 :
| | | | | XB= 0 :
| | | | | | XQ= 0 :0
```

```
| | | | | | XQ= 1 :
| | | | | | | XC= 0 :1
| | | | | | | XC= 1 :
| | | | | | | | XH= 0 :
| | | | | | | | | XD= 0 :0
| | | | | | | | | XD= 1 :1
| | | | | | | | XH= 1 :
| | | | | | | | | XJ= 0 :
| | | | | | | | | | XN= 0 :1
| | | | | | | | | | XN= 1 :0
| | | | | | | | | | XJ= 1 :1
| | | | | XB= 1 :0
| | | XS= 1 :
| | | | XO= 0 :0
| | | | XO= 1 :
| | | | | XL= 0 :
| | | | | | XN= 0 :
| | | | | | | XJ= 0 :1
| | | | | | | XJ= 1 :0
| | | | | | XN= 1 :1
| | | | | XL= 1 :0
| | XG= 1 :0
XI= 1 :
| XK= 0 :
| | XC= 0 :
| | | XS= 0 :
| | | | XG= 0 :
| | | | | XM= 0 :1
| | | | | XM= 1 :
| | | | | | XT= 0 :1
| | | | | | XT= 1 :
| | | | | | | XL= 0 :
| | | | | | | | XP= 0 :1
| | | | | | | | XP= 1 :
| | | | | | | | | XB= 0 :1
| | | | | | | | | XB= 1 :0
| | | | | | | XL= 1 :
| | | | | | | | XP= 0 :0
| | | | | | | | XP= 1 :
| | | | | | | | | XQ= 0 :1
| | | | | | | | | XQ= 1 :
| | | | | | | | | | XB= 0 :1
| | | | | | | | | | XB= 1 :0
| | | | XG= 1 :
| | | | | XO= 0 :1
| | | | | XO= 1 :
| | | | | | XH= 0 :0
```

```
| | | | | | | XH= 1 :
| | | | | | | | XL= 0 :1
| | | | | | | | XL= 1 :0
| | | XS= 1 :
| | | | XR= 0 :
| | | | | XN= 0 :1
| | | | | XN= 1 :
| | | | | | XH= 0 :
| | | | | | | XJ= 0 :
| | | | | | | | XM= 0 :
| | | | | | | | | XD= 0 :0
| | | | | | | | | XD= 1 :1
| | | | | | | | XM= 1 :1
| | | | | | | XJ= 1 :1
| | | | | | XH= 1 :
| | | | | | | XT= 0 :0
| | | | | | | XT= 1 :
| | | | | | | | XF= 0 :0
| | | | | | | | XF= 1 :1
| | | | XR= 1 :
| | | | | XG= 0 :
| | | | | | XM= 0 :
| | | | | | | XH= 0 :0
| | | | | | | XH= 1 :
| | | | | | | | XB= 0 :1
| | | | | | | | XB= 1 :
| | | | | | | | | XF= 0 :1
| | | | | | | | | XF= 1 :0
| | | | | | XM= 1 :
| | | | | | | XD= 0 :0
| | | | | | | XD= 1 :1
| | | | | XG= 1 :0
| | XC= 1 :
| | | XD= 0 :
| | | | XS= 0 :
| | | | | XF= 0 :
| | | | | | XB= 0 :0
| | | | | | XB= 1 :
| | | | | | | XE= 0 :0
| | | | | | | XE= 1 :1
| | | | | XF= 1 :
| | | | | | XP= 0 :1
| | | | | | XP= 1 :
| | | | | | | XH= 0 :1
| | | | | | | XH= 1 :
| | | | | | | | XL= 0 :
| | | | | | | | | XJ= 0 :1
```

```
| | | | | | | | | XJ= 1 :
| | | | | | | | | | | XN= 0 :0
| | | | | | | | | | | XN= 1 :1
| | | | | | | | | XL= 1 :0
| | | | XS= 1 :
| | | | | XJ= 0 :
| | | | | | XM= 0 :0
| | | | | | XM= 1 :
| | | | | | | XQ= 0 :
| | | | | | | | XB= 0 :1
| | | | | | | | XB= 1 :
| | | | | | | | | XF= 0 :
| | | | | | | | | | | XH= 0 :0
| | | | | | | | | | | XH= 1 :1
| | | | | | | | | XF= 1 :1
| | | | | | | XQ= 1 :0
| | | | | XJ= 1 :
| | | | | | XO= 0 :
| | | | | | | XF= 0 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :1
| | | | | | | XF= 1 :1
| | | | | | XO= 1 :
| | | | | | | XR= 0 :
| | | | | | | | XB= 0 :
| | | | | | | | | XH= 0 :0
| | | | | | | | | XH= 1 :1
| | | | | | | | XB= 1 :1
| | | | | | | XR= 1 :1
| | | XD= 1 :
| | | | XF= 0 :0
| | | | XF= 1 :
| | | | | XS= 0 :
| | | | | | XO= 0 :0
| | | | | | XO= 1 :1
| | | | | XS= 1 :0
| XK= 1 :
| | XD= 0 :
| | | XT= 0 :
| | | | XF= 0 :
| | | | | XB= 0 :
| | | | | | XR= 0 :0
| | | | | | XR= 1 :
| | | | | | | XO= 0 :1
| | | | | | | XO= 1 :
| | | | | | | | XL= 0 :1
| | | | | | | | XL= 1 :0
```

```
| | | | | XB= 1 :
| | | | | | XO= 0 :0
| | | | | | XO= 1 :1
| | | | XF= 1 :
| | | | | XO= 0 :1
| | | | | XO= 1 :
| | | | | | XH= 0 :
| | | | | | | XL= 0 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :
| | | | | | | | | XG= 0 :1
| | | | | | | | | XG= 1 :0
| | | | | | | XL= 1 :1
| | | | | | XH= 1 :
| | | | | | | XM= 0 :
| | | | | | | | XQ= 0 :0
| | | | | | | | XQ= 1 :1
| | | | | | | XM= 1 :1
| | | XT= 1 :
| | | | XB= 0 :
| | | | | XC= 0 :
| | | | | | XM= 0 :1
| | | | | | XM= 1 :
| | | | | | | XJ= 0 :0
| | | | | | | XJ= 1 :
| | | | | | | | XE= 0 :0
| | | | | | | | XE= 1 :1
| | | | | XC= 1 :
| | | | | | XE= 0 :
| | | | | | | XF= 0 :0
| | | | | | | XF= 1 :1
| | | | | | XE= 1 :
| | | | | | | XM= 0 :
| | | | | | | | XQ= 0 :1
| | | | | | | | XQ= 1 :0
| | | | | | | XM= 1 :1
| | | | XB= 1 :0
| | XD= 1 :0
```

Accuracy of test_set: 99.83333333333333 %
Accuracy of validation_set: 77.0 %
Accuracy of test_set: 72.66666666666667 %