

## Output of the Entire Code

**Project Done by:**

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**FAR,FRR,Classification of Each User as Sheeps and goats:-**

```
s002 0.79 Sheep
FRR for s002 = 0.20999999999999996
FAR for s002 = 0.35
s003 0.6025 Goat
FRR for s003 = 0.39749999999999996
FAR for s003 = 0.253
s004 0.7725 Sheep
FRR for s004 = 0.22750000000000004
FAR for s004 = 0.484
s005 0.855 Sheep
FRR for s005 = 0.14500000000000002
FAR for s005 = 0.444
s007 0.85 Sheep
FRR for s007 = 0.15000000000000002
FAR for s007 = 0.439
s008 0.7825 Sheep
FRR for s008 = 0.21750000000000003
FAR for s008 = 0.422
s010 0.8575 Sheep
FRR for s010 = 0.14249999999999996
FAR for s010 = 0.31
s011 0.71 Sheep
FRR for s011 = 0.29000000000000004
FAR for s011 = 0.124
s012 0.755 Sheep
FRR for s012 = 0.245
FAR for s012 = 0.259
s013 0.7075 Sheep
FRR for s013 = 0.2925
FAR for s013 = 0.416
s015 0.5875 Goat
FRR for s015 = 0.4125
FAR for s015 = 0.206
s016 0.7475 Sheep
FRR for s016 = 0.25249999999999995
FAR for s016 = 0.296
s017 0.86 Sheep
FRR for s017 = 0.14
FAR for s017 = 0.444
s018 0.485 Goat
```

FRR for s018 = 0.515  
FAR for s018 = 0.307  
s019 0.89 Sheep  
FRR for s019 = 0.10999999999999999  
FAR for s019 = 0.148  
s020 0.465 Goat  
FRR for s020 = 0.5349999999999999  
FAR for s020 = 0.404  
s021 0.8125 Sheep  
FRR for s021 = 0.1875  
FAR for s021 = 0.373  
s022 0.5975 Goat  
FRR for s022 = 0.4024999999999997  
FAR for s022 = 0.14  
s024 0.8075 Sheep  
FRR for s024 = 0.1925  
FAR for s024 = 0.174  
s025 0.8 Sheep  
FRR for s025 = 0.19999999999999996  
FAR for s025 = 0.089  
s026 0.7425 Sheep  
FRR for s026 = 0.2574999999999995  
FAR for s026 = 0.394  
s027 0.835 Sheep  
FRR for s027 = 0.16500000000000004  
FAR for s027 = 0.139  
s028 0.8175 Sheep  
FRR for s028 = 0.1825  
FAR for s028 = 0.349  
s029 0.83 Sheep  
FRR for s029 = 0.17000000000000004  
FAR for s029 = 0.466  
s030 0.7375 Sheep  
FRR for s030 = 0.2624999999999996  
FAR for s030 = 0.444  
s031 0.64 Goat  
FRR for s031 = 0.36  
FAR for s031 = 0.509  
s032 0.5825 Goat  
FRR for s032 = 0.4175  
FAR for s032 = 0.404  
s033 0.57 Goat  
FRR for s033 = 0.43000000000000005  
FAR for s033 = 0.285  
s034 0.51 Goat  
FRR for s034 = 0.49  
FAR for s034 = 0.198  
s035 0.6575 Goat  
FRR for s035 = 0.3425  
FAR for s035 = 0.394  
s036 0.74 Sheep  
FRR for s036 = 0.26  
FAR for s036 = 0.076  
s037 0.74 Sheep

FRR for s037 = 0.26  
FAR for s037 = 0.418  
s038 0.74 Sheep  
FRR for s038 = 0.26  
FAR for s038 = 0.311  
s039 0.79 Sheep  
FRR for s039 = 0.20999999999999996  
FAR for s039 = 0.364  
s040 0.54 Goat  
FRR for s040 = 0.45999999999999996  
FAR for s040 = 0.429  
s041 0.6925 Goat  
FRR for s041 = 0.3075  
FAR for s041 = 0.37  
s042 0.8775 Sheep  
FRR for s042 = 0.12250000000000005  
FAR for s042 = 0.309  
s043 0.8125 Sheep  
FRR for s043 = 0.1875  
FAR for s043 = 0.195  
s044 0.6875 Goat  
FRR for s044 = 0.3125  
FAR for s044 = 0.18  
s046 0.6625 Goat  
FRR for s046 = 0.3375  
FAR for s046 = 0.234  
s047 0.555 Goat  
FRR for s047 = 0.44499999999999995  
FAR for s047 = 0.163  
s048 0.795 Sheep  
FRR for s048 = 0.20499999999999996  
FAR for s048 = 0.388  
s049 0.5525 Goat  
FRR for s049 = 0.4475  
FAR for s049 = 0.194  
s050 0.6525 Goat  
FRR for s050 = 0.34750000000000003  
FAR for s050 = 0.493  
s051 0.745 Sheep  
FRR for s051 = 0.255  
FAR for s051 = 0.426  
s052 0.815 Sheep  
FRR for s052 = 0.18500000000000005  
FAR for s052 = 0.007  
s053 0.7725 Sheep  
FRR for s053 = 0.22750000000000004  
FAR for s053 = 0.212  
s054 0.8075 Sheep  
FRR for s054 = 0.1925  
FAR for s054 = 0.365  
s055 0.835 Sheep  
FRR for s055 = 0.16500000000000004  
FAR for s055 = 0.091  
s056 0.7175 Sheep

FRR for s056 = 0.2825  
FAR for s056 = 0.423  
s057 0.6475 Goat  
FRR for s057 = 0.35250000000000004  
FAR for s057 = 0.457  
Sheep count: 33  
Goat count: 18  
Overall FRR: 0.27774509803921565  
Overall FAR: 0.30919607843137253

**Count of imitations made by and made against each user:-**

s002 can imitate 0 other subjects  
s002 can be imitated by 3 other subjects  
s003 can imitate 0 other subjects  
s003 can be imitated by 0 other subjects  
s004 can imitate 0 other subjects  
s004 can be imitated by 9 other subjects  
s005 can imitate 30 other subjects  
s005 can be imitated by 6 other subjects  
s007 can imitate 9 other subjects  
s007 can be imitated by 5 other subjects  
s008 can imitate 2 other subjects  
s008 can be imitated by 9 other subjects  
s010 can imitate 10 other subjects  
s010 can be imitated by 3 other subjects  
s011 can imitate 0 other subjects  
s011 can be imitated by 0 other subjects  
s012 can imitate 3 other subjects  
s012 can be imitated by 2 other subjects  
s013 can imitate 0 other subjects  
s013 can be imitated by 7 other subjects  
s015 can imitate 0 other subjects  
s015 can be imitated by 3 other subjects  
s016 can imitate 0 other subjects  
s016 can be imitated by 3 other subjects  
s017 can imitate 24 other subjects  
s017 can be imitated by 7 other subjects  
s018 can imitate 0 other subjects  
s018 can be imitated by 3 other subjects  
s019 can imitate 7 other subjects  
s019 can be imitated by 2 other subjects  
s020 can imitate 0 other subjects  
s020 can be imitated by 7 other subjects  
s021 can imitate 13 other subjects  
s021 can be imitated by 5 other subjects  
s022 can imitate 0 other subjects  
s022 can be imitated by 0 other subjects  
s024 can imitate 2 other subjects  
s024 can be imitated by 1 other subjects  
s025 can imitate 0 other subjects  
s025 can be imitated by 0 other subjects

s026 can imitate 5 other subjects  
s026 can be imitated by 7 other subjects  
s027 can imitate 8 other subjects  
s027 can be imitated by 0 other subjects  
s028 can imitate 10 other subjects  
s028 can be imitated by 4 other subjects  
s029 can imitate 17 other subjects  
s029 can be imitated by 10 other subjects  
s030 can imitate 6 other subjects  
s030 can be imitated by 7 other subjects  
s031 can imitate 0 other subjects  
s031 can be imitated by 8 other subjects  
s032 can imitate 0 other subjects  
s032 can be imitated by 5 other subjects  
s033 can imitate 0 other subjects  
s033 can be imitated by 1 other subjects  
s034 can imitate 0 other subjects  
s034 can be imitated by 2 other subjects  
s035 can imitate 0 other subjects  
s035 can be imitated by 8 other subjects  
s036 can imitate 0 other subjects  
s036 can be imitated by 0 other subjects  
s037 can imitate 3 other subjects  
s037 can be imitated by 6 other subjects  
s038 can imitate 3 other subjects  
s038 can be imitated by 3 other subjects  
s039 can imitate 21 other subjects  
s039 can be imitated by 3 other subjects  
s040 can imitate 0 other subjects  
s040 can be imitated by 6 other subjects  
s041 can imitate 0 other subjects  
s041 can be imitated by 4 other subjects  
s042 can imitate 17 other subjects  
s042 can be imitated by 4 other subjects  
s043 can imitate 2 other subjects  
s043 can be imitated by 2 other subjects  
s044 can imitate 1 other subjects  
s044 can be imitated by 3 other subjects  
s046 can imitate 0 other subjects  
s046 can be imitated by 1 other subjects  
s047 can imitate 0 other subjects  
s047 can be imitated by 2 other subjects  
s048 can imitate 11 other subjects  
s048 can be imitated by 5 other subjects  
s049 can imitate 0 other subjects  
s049 can be imitated by 2 other subjects  
s050 can imitate 0 other subjects  
s050 can be imitated by 11 other subjects  
s051 can imitate 1 other subjects  
s051 can be imitated by 5 other subjects  
s052 can imitate 0 other subjects  
s052 can be imitated by 0 other subjects  
s053 can imitate 2 other subjects  
s053 can be imitated by 1 other subjects

s054 can imitate 8 other subjects  
s054 can be imitated by 4 other subjects  
s055 can imitate 0 other subjects  
s055 can be imitated by 0 other subjects  
s056 can imitate 0 other subjects  
s056 can be imitated by 4 other subjects  
s057 can imitate 0 other subjects  
s057 can be imitated by 5 other subjects

**USERS WHO ARE LAMBS,WOLVES OR BOTH (Subjects who can imitate 5 other subjects(Wolf) or get imitated by 5 other subjects(lamb)) :**

s004 is Lamb  
s005 is Wolf  
s005 is Lamb  
s007 is Wolf  
s008 is Lamb  
s010 is Wolf  
s013 is Lamb  
s017 is Wolf  
s017 is Lamb  
s019 is Wolf  
s020 is Lamb  
s021 is Wolf  
s026 is Lamb  
s027 is Wolf  
s028 is Wolf  
s029 is Wolf  
s029 is Lamb  
s030 is Wolf  
s030 is Lamb  
s031 is Lamb  
s035 is Lamb  
s037 is Lamb  
s039 is Wolf  
s040 is Lamb  
s042 is Wolf  
s048 is Wolf  
s050 is Lamb  
s054 is Wolf

Generation: 1  
Success %: 0.0  
Max fitness: 0.8360892632183815  
Min fitness: 0.6748491905510933  
Avg fitness: 0.7453158257127819

Generation: 2

Success %: 0.0  
Max fitness: 0.8360892632183815  
Min fitness: 0.7300300846035985  
Avg fitness: 0.7702790148298096

Generation: 3  
Success %: 0.0  
Max fitness: 0.8360892632183815  
Min fitness: 0.7628951546796555  
Avg fitness: 0.7893245197439973

Generation: 4  
Success %: 0.0  
Max fitness: 0.8488770310406293  
Min fitness: 0.7764564662499972  
Avg fitness: 0.8046242813593135

Generation: 5  
Success %: 0.0019230769230769232  
Max fitness: 0.8502027605527935  
Min fitness: 0.7912080208925488  
Avg fitness: 0.8179082735329283

Generation: 6  
Success %: 0.011538461538461539  
Max fitness: 0.8587870573189521  
Min fitness: 0.814735998432729  
Avg fitness: 0.8286957971778173

Generation: 7  
Success %: 0.051923076923076926  
Max fitness: 0.8587870573189521  
Min fitness: 0.8245057797552525  
Avg fitness: 0.83713123293655

Generation: 8  
Success %: 0.19230769230769232  
Max fitness: 0.865280096779319  
Min fitness: 0.8279667013219837  
Avg fitness: 0.844541250949467

Generation: 9  
Success %: 0.5442307692307692  
Max fitness: 0.866451225093559  
Min fitness: 0.8417073779532771  
Avg fitness: 0.8511759435491996

Generation: 10  
Success %: 0.9865384615384616  
Max fitness: 0.874845203599848  
Min fitness: 0.8466452398565686  
Avg fitness: 0.8568452754351167